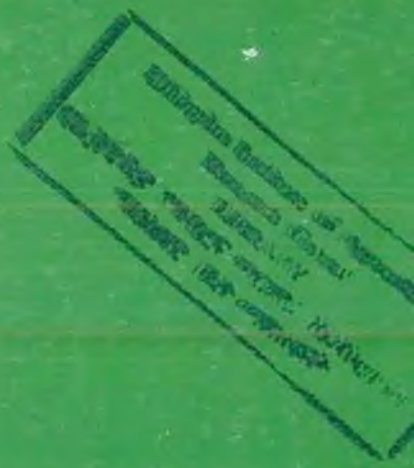

Debre Markos University

Excellence in Quality Education, Research and Community Services

Proceedings of the Second National Research Symposium

"Research for Growth and Transformation"

Debre Markos

June 10, 2011

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PROCEEDINGS OF THE SECOND NATIONAL RESEARCH SYMPOSIUM ON SUSTAINABLE DEVELOPMENT: RESEARCH FOR GROWTH AND TRANSFORMATION

Editors:

Molla Addisu (Ph.D), Director for Research & Community Services

Email: mollaaddis@yahoo.com

Belay Berza (MSc), Research & Publication Officer

Email: bbbelat7@gmail.com

Workneh Fisseha (MSc), Community Services Officer

Email: worknehf@yahoo.com

Debre Markos University

P.O. BOX 269; Debre Markos, Ethiopia

Tel. +251 (0)58 771 6768

Fax: +251 (0)58 771 1764

Website: www.dmu.edu.et

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PREFACE

Debre Markos University aspires to be the center of excellence for education, research and all rounded community services with a focus on impact for the benefit of the community and society. Creating conducive atmosphere for all societal segments in pursuit of research, invention and innovation promotion in science is one among the very important endeavours in achieving its vision and missions.

This proceeding is a compilation of papers presented at the 2nd national research symposium of Debre Markos University (DMU) which was organized by Debre Markos University under the theme "***RESEACH FOR GROWTH AND TRANSFORMATION***".

At this conference, the key issues addressed with the binding frame of the theme, Growth and Transformation includes research outputs emphasized on agriculture & environment, education, health, gender & governance. Of course, research is the key means to address immense society problems through conducting theme oriented activities that could emerge out with valuable results and recommendations. Nonetheless, research outputs must be presented, discussed and communicated with stakeholders in order to frame out strategies for their appropriate application and use. The University believes that scientific presentation, discussion and publication of research outputs in collaboration with stakeholders could have great contributions on creating knowledge to combat the chronic poverty of our nation.

Therefore, this research conference is a second for our University in the pursuit of research and technology promotion.

WELCOMING ADDRESS

Your Excellency Ato Yilkal Kefale, Vice President for Academic and Research of Debre Markos University

Distinguished Guests

Conference Participants

Ladies and Gentlemen

On behalf of the Research and Community Service Directorate, it is my great honor and pleasure to welcome each and every one of you to the 2nd National Research Symposium organized by Debre Markos University.

The University has enjoyed the great success in the last year's research symposium and most of the outstanding papers read at that symposium are in press to be published out in a special "**Research Proceeding**" of DMU. Due to the delayed process in press, we couldn't able to deliver the proceeding at this great occasion; I apologize for this.

It is well known that **research** is the vital means to address the multifaceted problems and challenges of development in any nation. Nonetheless, research findings must be discussed and communicated with researchers and stakeholders in order to frame out sound strategies for their application and use. For this reason, such arenas are essential to be organized by any concerned institutions. In order to align research with the 5 year growth & transformation plan of the country, DMU has called its 2nd National Research Conference under the special theme "***Research for Growth and Transformation***" The theme comprises all aspects of research endeavors that point towards a sustainable economic and social growth with a transformative potential.

The RCS, thus, has invited all interested scholars from different angles to submit research abstracts that focus on issues related to poverty alleviation, food security, natural resources conservation, education quality, agricultural productivity, societal health, environmental pollution, global climate change, and policy formulation.

The objective of this symposium is mainly to create the playground for science in order to build the culture of research and innovation among academicians, researchers, policy makers, students, and other diverse societal segments all round in the country and also to publish and disseminate outstanding research findings and technologies for end-users. This symposium is also a great opportunity partly to justify the money and efforts that went into the research and partly to identify novel directions for future research undertakings. All participants are, therefore, asked to participate on the discussions.

Then, I would like to appreciate all presenters for your excellent contributions for this great event.

Finally, I would like take this opportunity to thank the University's top management for financing this symposium from the available meager resources. This is an indication of your commitment for the endeavors of science. I thank you again!

May, I then respectfully invite his Excellency Ato Yilkal Kefale, Vice President for Academic and Research of Debre Markos University, to officially open the 2nd National Research Symposium.

Thank You,

Dr. Molla Addisu
Director for Resaesrch and Community Service

OPENING SPEECH

Distinguished guests

Dear researchers

Dear participants

Ladies and gentlemen,

On behalf of Debre Markos University and myself, I would like to welcome you all to this important national research symposium organized for the second time.

Our government has made a tremendous effort to assure access to education in all levels. As this part of expansion program, the number of higher education institutes has registered a success story with balanced regional distribution. The expansion will assure the strength of capacity building programs that enhances and supports the country's overall development programs. In this regard, Debre Markos University is one of the new public universities established recently as part of this expansion program to contribute the country's development program.

Research is a scholarly tool and value made to the benefit of human society. Cognizant to the importance and necessity of research, it is a mandatory and embedded activity in the achievement of higher education institutes' missions. It is from this essence that our university is conducting various research projects since its establishment. Implementing research projects such as our university is doing, require experiences and skills for quality and problem solving research outputs. One of the forums to test the quality of research is research symposium. It gives the chance to indicate the gap and examine the quality of the research out-put. I am pleased to assure you that all papers presented in this conference will be published in the form of proceedings and distributed to the stakeholders for application.

An attempt is made to prepare a symposium that could serve as forum to exchange experiences and information on how to enhance research activities. The mix of participant scholars and research themes justify the importance of the symposium. I would like to thank both presenters and participants for your significant contribution in the realization of the symposium. I am pleased to express that the university management is also committed to provide the necessary support to make the symposium fruitful. The symposium is officially opened.

I thank you!

Ato Yilkal Kefale
Vice President for Academic and Research

PART I- AGRICULTURE AND ENVIRONMENT

Studying the Role of Integrated Applications of Animal Manure and Synthetic Fertilizers on Wheat Productivity and Soil Properties

Molla Addisu (Ph.D)

Department of Plant Science, Debre Markos University, P.O. Box, 269; Debre Markos Ethiopia;

Email: mollaaddis@yahoo.com

Abstract

The high demand for crop land in the semi-arid highlands of northeastern Ethiopia, arising from high population pressure, has led to a decrease in fallow periods and an increase in continuous cultivation of cereals without replenishment of nutrients to the soil. Consequently, poor soil fertility is the main constraint of crop production for the resource poor farmers in this area. A field experiment was conducted to assess the role of integrated use of animal manure (AM) and mineral fertilizers on soil fertility parameters and grain yield and yield components of wheat. The experiment was laid out in a randomized complete block design in three replications where the treatments were composed of the factorial combination of the different rates of AM (0, 5 and 10 ton ha^{-1}) and 50% of the locally recommended mineral fertilizer rates (0 and 23 Kg ha^{-1} nitrogen; 0 and 10 Kg ha^{-1} phosphorus). The results showed that the sole application of AM significantly improved soil physical properties at different soil depths. The use of AM in integration with mineral fertilizers has also improved most of the soil physical properties. The soil chemical properties were affected by both application of AM alone and integrated with mineral fertilizers. Increased soil fertility parameters were observed with increased levels of AM application. However, the application of mineral fertilizer has shown inconsistent effects on soil fertility parameters. The yield and yield components of wheat had increased significantly with the integrated application of AM with mineral fertilizers. The sole application of AM had also increased these crop parameters. The application of AM at a rate of 5 and 10 ton ha^{-1} gave a yield advantage of 15.4 and 28.6% over the non-manured plots, respectively. The highest grain yield of wheat (2796.4 kg ha^{-1}) was obtained by the combined application of 10 ton ha^{-1} AM and 50% the locally recommended mineral fertilizer rates (23/10 Kg ha^{-1} N/P). In conclusion, the application of 5 to 10 ton ha^{-1} AM with 50% the locally recommended mineral fertilizer rates could have positive effects both on soil fertility parameters and wheat yield and yield components.

Keywords: Animal manure; Mineral fertilizer; Soil fertility; Yield; Yield components

1. Introduction

Agriculture is the greatest living, private sector industry of Ethiopia providing livelihood to over 85% of the population. Crop productivity is a function of the genetic potential of crops and their environment. Thus, productivity of crops depends not only on crop improvement but also on crop management technologies that enhance resource or input use efficiency. Therefore, increased productivity of crops could be achieved through improving both the genetic potential and the total environment in which the crop is grown. But in dryland areas, the environment is often more yield limiting than the genetic potential of crops (Wondimu and Getachew, 1998). Soil fertility in dryland areas is declining alarmingly due to the pressing need to increase crop production to meet the food demands for the ever increasing population. Thus, most of the dryland agroecologies are intensively cultivated, deforested, and overgrazed. This situation is true in the drought prone areas, particularly in the northern highlands (Kidane and Abuhay, 1997). Soil erosion and several years of cultivation has not only made soils thinner but has also impoverished them in nutrients, thereby making them even less productive.

The major soil related problems in these areas are susceptibility to water erosion due to the undulating topography, low soil fertility (mainly N and P); low organic matter content; poor water holding capacity; shallowness; stoniness; and surface soil hardening (Wondimu and Getachew, 1998). Soil physical properties are those soil properties responsible for transport of air, water and solutes through the soil. They are widely variable in tropical soils. In the tropics severe desiccation and high temperature at the soil surface may be followed by abrupt changes due to high intensity rainstorms. Many soil physical properties deteriorate with cultivation, rendering the soil less permeable and more susceptible to runoff and erosion losses. The ability of the soil to retain water and supply it to plants is one of the main limiting factors in tropical agriculture (Verplancke, 2003).

The continuous cultivation of soils in Africa has depleted the organic matter content of many soils. Many soils have organic carbon content ranging between 0.4 and 0.6% or even less. Intensive cropping systems based on cereal growing, mineral fertilizers, intensive soil tillage and removal of crop residues have often resulted in decreased levels of soil organic matter, thereby

adversely affecting soil physical properties (Haynes and Naidu, 1998). In a non-sustainable cropping system soil resources are declining through changes in surface properties, subsoil compaction, loss of organic matter and reduced biological activity. These soil physical and chemical fertility properties may affect each other and they also can directly and indirectly reduce crop performance. Low soil physical and chemical fertility can be improved through the use of chemical fertilizers, biological nitrogen fixation, and the use of organic manure.

The high demand for croplands in the semi-arid highlands of northeastern Ethiopia, arising from high population pressure, has led to a decrease in fallow periods and an increase in continuous cultivation of cereals without replenishment of nutrients to the soil. In this area, livestock is an essential component of farming but only a small part of the farmyard manure produced is utilized in crop production. This is due to the competitive use of manure as firewood and the problem of transporting the manure to the farm lands. Although, farmers in the area use farmyard manures around their homestead farms to the maintenance of soil fertility and increasing crop productivity, the quantities produced and added are inadequate in most cases. Moreover, distant farms that are used for the production of wheat and barley crops are fertilized rarely either with manure or mineral fertilizers. As a result, there is a decline in soil organic matter content and essential plant nutrients that led to low crop productivity. The only means of reversing this insidious process is through applying nutrients, either through organic or inorganic fertilizers.

The application of organic substances, including farmyard manure, apart from supplying nutrients, also provides growth regulating substances and improves the physical, chemical and microbial properties of the soil (Bayu, 2004). Although, the results of several studies on integrated nutrient management are variable, presumably due to climatic, soil type and quality effects on the performance of the organic component of the system, beneficial effects of AM on crop production and soil properties are well known. According to estimates of Stoorvogel and Smaling (1990), application of 2000 Kg fresh weight of animal manure (AM) will supply 8.4 and 9.6 Kg N/ha in humid and semi-arid regions, respectively. Application of AM besides nutrient supply can help in increasing the organic matter content that is also important for maintaining good physical conditions of the soil. The residual effects of manure application are important for the maintenance of soil fertility. Manure and compost provide a stable supply of ammonium

through slow nutrient release. Musa (1975) obtained results showing that, during the decomposition of cattle manure, the main form of nitrogen release was as NH_4^+. This could partly explain the positive immediate effect of manure on yield and also its residual effect. Unlike mineral fertilizers, nutrients contained in organic manures are released more slowly and are stored for a longer time in the soil ensuring longer residual effects (Bayu, 2004).

Although, mineral fertilizers can be used to replenish soil nutrients removed in crop harvests, farmers in the area have limited financial resources and cannot afford to purchase sufficient quantities for sustainable production. On the other hand, organic manures alone cannot supply sufficient amounts for optimum crop growth because of its limited availability and low nutrient concentration. As a result, there is a decline in soil organic matter content and essential plant nutrients that led to low crop productivity. Such a challenge can be met only by harnessing the best in frontier technologies and blending them with our rich heritage of ecological prudence. Eco-technologies for an Ever-green revolution should be the bottom line of our strategy to shape our agricultural future. The integrated use of inorganic and organic nutrient sources is the most feasible strategy for improving soil fertility and thus to increase crop productivity on sustainable basis.

Thus the integrated use of inorganic and organic nutrient sources is widely advocated as a strategy for soil fertility improvement and thus to increase crop productivity on sustainable basis. However, in the highlands of northeastern Ethiopia, there is very limited research output information on the effect of integrated nutrient management. Hence, this study was initiated to evaluate the effects of sole and integrated use of animal manure and mineral fertilizers on the physical and chemical properties of the soil and the agronomic performance and yield of wheat.

1.1.Research Objectives

- To investigate the combined and sole effects of animal manure and synthetic fertilizers on soil physical and chemical properties; and yield and yield components of Wheat in semi-arid areas

- To determine appropriate rates of animal manure and synthetic fertilizers for increased productivity of wheat

2. Materials and Methods

2.1. Description of the Study Site

The experiment was conducted at Kon research site of Sirinka Agricultural Research Centers in Wollo, northern Ethiopia. The experimental site has been used as an adaptive variety and fertilizer trial site for the Amhara Regional Bureau of Agriculture and the Amhara Regional Agricultural Research Institute (ARARI). The research site is located at latitude 11° 32' N and longitude 38° 43' E with an altitude of 2800 m above sea level. The mean annual maximum and minimum air temperature of the area is 21°C and 9°C. The mean annual rainfall amount of the area is 1100 mm which is characterized by erratic and uneven distribution. The major crops growing in the area are wheat, teff, barley, faba bean, flax and field pea. The major soil characteristics of the site between soil depths of 0 – 30 cm on the average are clay 56%, silt 35% and sand 9%, with a pH of 5.9 (1:2.5 in water), 0.2163% of total nitrogen, 16.92 (ppm) available P, CEC of 34.7 meq $100g^{-1}$, 0.965 meq $100g^{-1}$ of K and EC of 0.035 dS/m.

2.2. Experimental Design and Treatments

The experiment was laid out in a randomized complete block design in three replications where the treatments were composed of the factorial combination of the different rates of animal manure (M) (0, 5 and 10 ton ha^{-1}), N (0 and 23 Kg ha^{-1}) and P (0 and 10 Kg ha^{-1}). The N and P rates used for this experiment are half of the locally recommended fertilizer rates for wheat production. Urea and TSP were used as sources of nitrogen and phosphorous respectively. Animal manure was collected from farmer's kraals before the cropping season and it was analyzed in the laboratory for its nitrogen, phosphorous, potassium and organic carbon content. TSP was applied at planting and Urea was applied in split, half at planting and half at tillering stage and all of the manure was broadcasted one month before planting and incorporated in to the soil by ploughing. The wheat variety, Galama, was broadcasted with its recommended seed rate

of 150 kg/ha on the whole plot. The plot size was 4 m x 4 m and the spacing between replications and between plots were 1 m and 0.5 m respectively. All other cultural practices were conducted as per recommended. The chemical composition of animal manure applied to the soil during the experiment was pH (6.9), EC (1.13 dSm^{-1}), OM (55.5 %), P (26.12 ppm), N (0.562 %) and K (18.56 meq $100g^{-1}$).

2.3. Data Collection Procedures

Representative soil samples were taken from each plot at three spots for three different depths (0-15, 15-30 and 30-45 cm) before manure application (one month before planting) and at mid season (tillering stage of the crop). The soil samples at each spot were mixed for their respective depths and used for determining major soil physical and chemical properties. For soil bulk density determination core soil samples, using soil core samplers, were taken at different soil depths from each plot. Data on the grain yield and other agronomic characters of wheat were taken for each plot.

2.3.1. Soil Physical Properties

A. Soil Moisture Content

The moisture content of the soil sample was determined by the gravimetric method. The mixed soil samples were put in soil core samplers for each plot and depth and; oven dried in an oven at 105 ^{O}C for 24 hours. The samples were weighted before and after drying; and the moisture content on mass and volume basis were calculated.

B. Bulk Density

The core soil samples in soil core samplers for each plot and depth were oven dried in an oven at 105 ^{O}C for 24 hours. The samples were weighted, before and after oven drying, with the core sampling ring. Then the soil in the ring was removed and the ring was measured for its weight, height and diameter and the volume of the soil was calculated based on the volume of the ring.

C. Total Pore Volume

The total pore volume (TPV) was calculated using particle density and bulk density as follows:

$$TPV\ (\%) = 100 * (1 - \rho_b / \rho_p)$$

D. Saturated Hydraulic Conductivity

The hydraulic conductivity was measured for the three soil depths (0-15, 15-30 and 30-45 cm) based on saturated (for 24 hours) soil samples, that were mixed and packed appropriately in soil core samplers, using the constant water head method, i.e. the volumetric flask method. The Ks was calculated by applying the Darcy's law for saturated water flow,

$$Ks = - (V/A*t)* l / \Delta H$$

where, Ks = saturated hydraulic conductivity (m/s)

V = volume of water passed through the soil sample during time, t (m^3)

t = time (s)

A = cross sectional area of soil sample (m^2)

l = length of soil column (m)

ΔH = hydraulic head difference (m)

E. Vertical Infiltration

Vertical infiltration was measured using a double ring infiltrometer. A large (53 cm diameter) and a small (28 cm diameter) steel cylinders were hammered concentrically in to the ground up to 15 cm depth and the soil in the rings was leveled. Each ring was filled with water to an equal height above the ground surface. A simple ruler was used for recording the water fall in the inner ring. The height of the water level in the inner ring was allowed to fall about 5 to 10 cm between refills up to its original level. The fall of the water level in the inner ring was recorded in one minute intervals and when the rate of inflow has slowed down the record was taken at greater time intervals. This procedure was continued until a more or less constant rate of inflow was reached. The calculation for cumulative infiltration and infiltration rate was done using the Kostiakov equation.

2.3.2. Soil Chemical Properties

A. Organic Matter Content

Walkley & Black (1934) method was used for determination of organic carbon. The soil organic matter percentage values were obtained by multiplying the values of organic carbon by 1.724.

B. Soil pH

The soil pH measurement was done on a 1:2.5 soil: water suspension and measured by pH meter (Schofield and Taylor, 1955; Bower and Wilcox, 1965).

C. Soil Electrical Conductivity

The soil electrical conductivity (EC) measurement was done on a 1:2.5 soil: water suspension and measured by an EC meter (Schofield and Taylor, 1955; Bower and Wilcox, 1965).

D. Phosphorous & Nitrogen

Phosphorous was determined using Bray II method (1945) and total nitrogen was determined by Kjeldahl nitrogen assay method.

2.3.3. Crop Yield and Yield Components

Days to maturity were recorded when 50% of the plants reached their physiological maturity. Plant height and spike length were measured based on randomly selected ten representative plants per plot and ten spikes per plot, respectively. Thousands grain weight was measured on randomly selected grains for each plot. Grain yield and straw yield were determined from net plot areas after removing 1m from each boarder. Total biomass yield was recorded before threshing and grain yield was adjusted to 12.5% moisture content.

2.4. Statistical Analysis

Analysis of variance for the measured crop and soil parameters were performed using GENSTAT statistical computer program (Genstat Version 10). Significant differences between

and/or among treatment means were delineated using the Least Significance Difference (LSD) at 5% level.

3. Results and Discussion

3.1.Soil Physical Properties

A. Soil Moisture Content

The volumetric soil moisture content at the upper soil depth (0-30 cm) was found significant ($p<0.05$) due to the application of animal manure. However, it was not statistically significant at the lower depth of 30-45 cm. At the upper soil depth, plots which received 10 ton ha^{-1} AM had 15.3 and 3.5% higher soil moisture content than the non-manured (control) plot (Figure 1). At all soil depths the soil moisture content was higher for plots which received 10 ton ha^{-1} AM than those received 5 ton ha^{-1}.

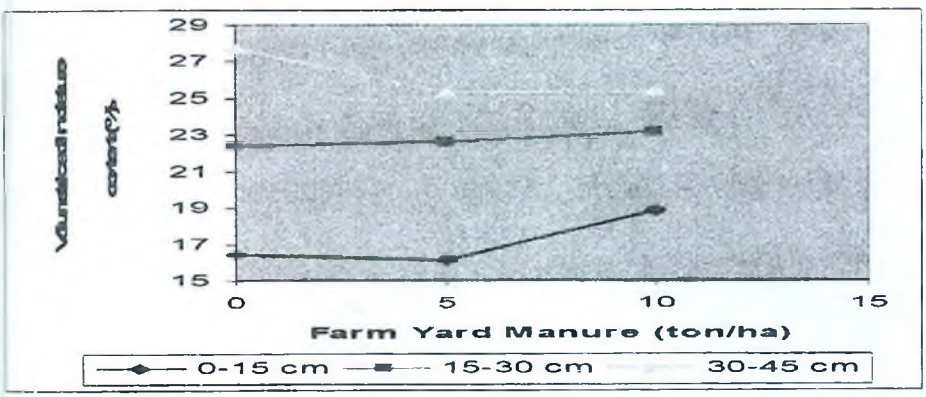

Figure 1. Effect of AM on soil volumetric moisture content

At the upper soil depth, it has been clearly seen that there is a linear increase in soil moisture content as the amount of applied AM is increased (Figure 1). These results are in agreement with works of different researchers. Bayu et al (2004) reported that plots which received 10 and 15 ton ha^{-1} AM had 1.3 and 3.5% greater water holding capacity than the control (non-manured plots). A report by Powel (1986) similarly indicated a 2% greater maximum water holding

capacity in manured plots over the control. Carter et al (1992) also reported increases of 4.19 and 27% in water holding capacity in manured plots over the control.

The application of AM in combination with mineral fertilizers had no significant effect on the volumetric soil moisture content. The application of mineral fertilizers alone or in combination with AM had shown inconsistence increase and decrease in soil moisture content. Reports of Sarkar et al (2003) also show that application of organic matter in combination with inorganic fertilizer resulted in a smaller increase in the moisture retention capacity of the soil.

B. Soil Bulk Density

Organic fertility inputs like AM and green manure are known to improve soil physical properties by lowering bulk density (Petersen et al, 1999). The application of AM alone or in combination with mineral fertilizers had no significant ($P>0.05$) effect on the bulk density at different soil depths. In general, soil bulk density had decreased with increasing soil depths irrespective of AM and mineral fertilizers application (Figure 2). Soil bulk density at 0-15 cm soil depth was reduced by 1.7 and 5.3% due to the application of AM at 5 and 10 ton ha^{-1}, respectively. There was also a 4.02 and 5.24% reduction of bulk density at soil depth of 15-30 cm due to AM application at a rate of 5 and 10 ton ha^{-1}, respectively.

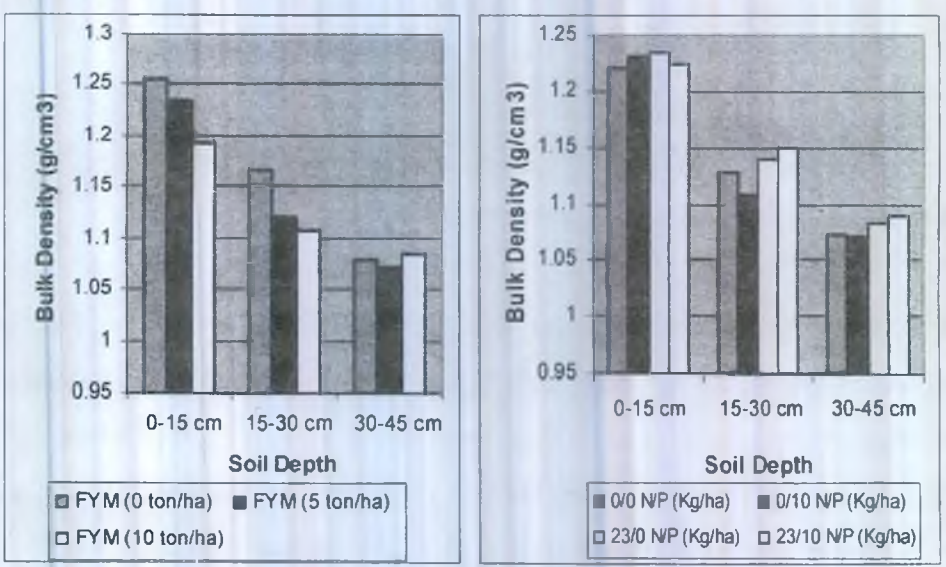

Figure 2. Effect of AM and mineral fertilizers on soil bulk density

The above results are in agreement with some researchers who found that long term manure application reduced bulk density in the top layers of eroded soils. Inexplicably, bulk density seems to increase with manure application at the 30 to 37.6 cm soil depth (Francisco et al. 2003). The application of mineral fertilizers had not shown consistent results on soil bulk density although the bulk density had a decreased trend with increasing soil depth (Figure 2). But it is hardly possible to explain the impact of mineral fertilizers on soil bulk density.

C. Total Pore Volume

The total porosity is of importance from the stand point of aeration and moisture storage (Arnon, 2002). The proportion of solid to pore space varies greatly among the different types of soils. In general, with an increase in the content of soil colloids there is an increase on the percentage of the pore space. The application of AM alone or in combination with mineral fertilizers had no significant ($P>0.05$) effect on the total pore volume at all soil depths. However, the total pore volume was found to be higher at 30-45 cm depth.

Table 1. Effect of AM and mineral fertilizers on soil total pore volume (TPV%)

Soil Depth (cm)	AM (ton/ha)			N/P (Kg/ha)			
	0	5	10	0/0	0/10	23/0	23/10
0-15	53.50	54.25	55.92	54.81	54.47	54.21	54.74
15-30	56.85	58.57	59.06	58.36	58.98	57.86	57.47
30-45	60.01	60.35	59.79	60.24	60.40	59.87	59.68

Numerically, TPV had increased with the increased application of animal manure (Table 1). At the upper soil depth the application of 10 ton ha^{-1} had increased total pore volume by 4.52%. However, at lower soil depth the application of AM did not increase the total porosity of the soil. The TPV values from this experiment are consistent with other reports. Total soil porosity in mineral soils can range from 25 to 60% and most usually it is within the range of 40 to 50% (Gardner, 1966). The application of mineral fertilizers alone or in combination with AM gave inconsistent results of TPV at all depths.

D. Saturated Hydraulic Conductivity (Ks)

Table 2. The effect of AM and mineral fertilizers on soil saturated hydraulic conductivity (cm hr^{-1})

AM (ton/ha)	Soil Depth (cm)				N/P (Kg/ha)	Soil Depth (cm)			
	0-15	15-30	30-45	Average		0-15	15-30	30-45	Average
0	1.32	1.27	1.34	1.31	0/0	1.46	1.38	1.49	1.44
5	1.62	1.48	1.34	1.48	0/10	1.70	1.59	1.46	1.58
10	1.83	1.46	1.56	1.62	23/0	1.62	1.31	1.42	1.45
					23/10	1.58	1.32	1.27	1.40

Hydraulic conductivity measures the ability of the soil to conduct water. The hydraulic conductivity depends on the nature of the soil and the fluid properties. The soil characteristics which affect the hydraulic conductivity are related to pores geometry such as, the total porosity, the pore size distribution and the turtuosity of the soil pores (Verplancke, 2003). Based on O'Neal (1949) classification, the permeability class of the soil at the study site is a moderately slow permeable as the Ks has values ranging between 0.5 and 2.0 cm hr^{-1}. Saturated hydraulic conductivity for the upper soil depth was highly significant ($p<0.01$) due to AM application but Ks was not significantly affected by sole mineral fertilizer application and by the interaction. The sole mineral fertilizer application gave inconsistent results of Ks regardless of soil depth (Table 2).

Compared to the control (0 ton ha^{-1} AM) the application of 10 ton ha^{-1} AM had increased Ks values by 38.3, 15.3 and 16.4% % at 0-15, 15-30 and 30-45 cm soil depths, respectively. In general, Ks had decreased with increasing depth irrespective of treatments. It had also increased with an increased application of AM for all depths. This result is in agreement with other researchers who reported that sub plots receiving manure application had greater Ks values at measured depths when compared with sub plots not receiving manure (Francisco et al, 2003). The increase in Ks in those areas receiving manure seems to be related to increased carbon content in the soil with greater organism activity. Uttam et al (2003) also reported that an increase in hydraulic conductivity by Sesbania green manuring was due to the reduction in the bulk density and increase in organic carbon content of the soil.

E. Vertical Infiltration

Infiltration is the process of vertical movement of water in to a soil from rainfall or irrigation. The Green-Ampt approach assumes that the rate of infiltration is high initially and then decreases approaching saturated hydraulic conductivity asymptotically. From this study it might not possible to say that accurate measurements are taken to adequately characterize the infiltration process. The study showed that the infiltration rate had decreased as the infiltration time increases irrespective of treatments (Figure 3). The sole application of AM had increased infiltration rate. Thus, higher infiltration rates of 0.94 and 0.74 cm hr^{-1} were recorded on plots received 10 and 5 ton ha^{-1} manure, respectively. Higher cumulative infiltrations in one hour time were also recorded on the same plots. Similar results also reported by Sarkar et al (2003), that incorporation of wheat straw increased infiltration rate most, followed by AM. Increases in infiltration capacity were also observed with combined applications of organic and inorganic fertilizers.

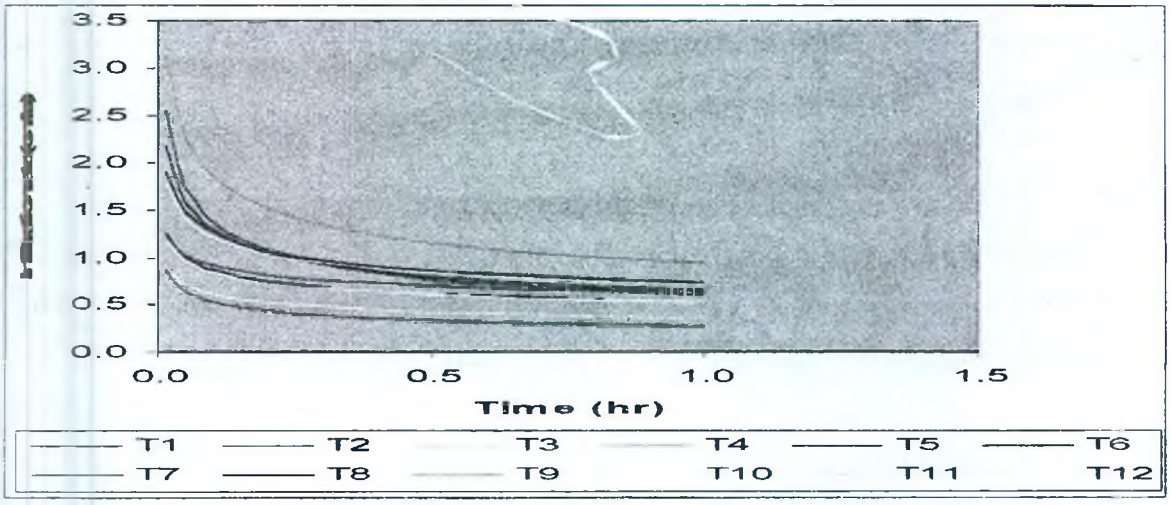

Figure 3. The effect of integrated use of AM and mineral fertilizers on soil infiltration rate

3.2.Soil Chemical Properties

A. Soil Organic Matter

The application of AM had increased significantly ($P<0.05$) the organic matter content of the soil at all soil depths. The organic matter content of the soil was found to be higher at the upper soil layers of 0-30 cm (Table 3). The addition of mineral fertilizers did not affect organic matter content significantly and results were inconsistent with rate of application. The inorganic

fertilizer treatments and the interaction effects had no significant effect on the organic carbon and organic matter contents of the soil.

Table 3. Effect of AM and mineral fertilizers on the soil organic matter content (%)

AM (ton/ha)	Soil Depth (cm)			N/P (Kg/ha)	Soil Depth (cm)		
	0-15	15-30	30-45		0-15	15-30	30-45
0	3.26	2.83	2.60	0/0	3.19	3.14	2.78
5	3.45	3.10	2.75	0/10	3.32	2.90	2.72
10	3.47	3.21	2.81	23/0	3.38	2.98	2.67
				23/10	3.27	2.90	2.70

The observed increase in soil organic matter because of AM application is in agreement with the reports of Bayu et al (2004) who found that AM application increased soil organic carbon content by 67% and organic matter content by up to 50% over the AM control. Shirani et al (2003) also reported a three fold increase in soil organic matter with the application of AM at 3 and 6 ton ha^{-1}. Although it was not statistically significant ($P>0.05$) the integrated use of AM and mineral fertilizers had increased the soil organic matter content.

B. Soil Total Nitrogen

The total nitrogen was not significant ($P>0.05$) with the application of AM, mineral fertilizers and their interaction. But, at 15-30 cm soil depth, the addition of AM at rates of 10 and 5 ton ha^{-1} had increased total nitrogen by 17.81 and 10.05%, respectively (Table 4).

Table 4. Effect of AM and mineral fertilizers on soil total nitrogen (%)

AM (ton/ha)	Soil Depth (cm)			N/P (Kg/ha)	Soil Depth (cm)		
	0-15	15-30	30-45		0-15	15-30	30-45
0	0.27	0.22	0.24	0/0	0.22	0.23	0.25
5	0.27	0.24	0.24	0/10	0.27	0.26	0.23
10	0.24	0.26	0.24	23/0	0.26	0.23	0.23
				23/10	0.29	0.24	0.25

At the upper soil layer, 0-15 cm, the addition of AM did not brought an increase on the total soil nitrogen. This might be due to the volatile nature of N to the atmosphere at the upper soil surfaces. This result is in agreement with reports of many researchers. Powel (1986) reported that a three fold increase in nitrogen was found in manured plots (126 kg ha^{-1}) as compared to non-

manured plots (42 kg ha^{-1}). Applying 10 and 15 ton ha^{-1} AM increased the soil total nitrogen content by 17 to 24% in the 0-20 cm soil depth relative to the plot lacking AM application (Bayu et al., 2005). The application of mineral fertilizers had shown inconsistent results on total soil nitrogen.

C. Soil Phosphorous

The addition of AM, mineral fertilizers and AM by mineral fertilizers interaction had no significance ($P>0.05$) effect on the available soil phosphorous content. This might be due to the slow release of nutrients from the AM.

Table 5. The effect of AM and mineral fertilizers on soil available phosphorous (ppm)

AM (ton/ha)	Soil Depth (cm)			N/P (Kg/ha)	Soil Depth (cm)		
	0-15	15-30	30-45		0-15	15-30	30-45
0	16.32	12.42	14.31	0/0	19.89	12.33	14.89
5	24.10	15.47	16.11	0/10	18.80	12.95	13.30
10	20.91	14.77	13.93	23/0	18.10	14.92	13.30
				23/10	24.97	16.67	17.64

The available soil phosphorous had been found higher at the upper soil layer irrespective of AM and mineral fertilizer applications. It is clearly shown that increments in the amount of available phosphorous content due to AM and mineral fertilizer applications were inconsistent. This result might be changed as the experiment proceeds for longer periods.

D. Soil pH and Electrical Conductivity

The effect of AM, mineral fertilizers and their interactions was not significant ($P>0.05$) on the soil pH and electrical conductivity. However, the addition of AM at a rate of 10 ton ha^{-1} increased soil pH by 0.45 and 0.16% at 15-30 and 30-45 cm soil depths, respectively. At 0-15 cm soil depth, soil pH did not increased with the application of AM. Bayu et al (1994) also found that AM and mineral fertilizer application did not significantly affect soil reaction (pH). Schjonning et al (1994) reported that soil pH was not significantly affected after 90 years of animal manure application. However, Powel (1986) found a soil pH increase in manured plots (pH 5.8) as compared with non-manured plots (pH 5.1). An increase of 0.019 and 0.015 dS m^{-1} was observed with 5 and 10 ton ha^{-1} AM application, respectively. The application of mineral

fertilizers alone and the integrated application of mineral fertilizers with AM had shown inconsistent results for both soil pH and EC at different soil depths.

3.3.Wheat Yield and Yield Components

A. Yield Components

The application of animal manure had significant ($P<0.05$) effect on plant height, days to heading, spike length and thousand grain weight (Table 6). However, days to maturity and productive spikes did not affected by the application of animal manure. Yield components were not significantly ($P>0.05$) affected by the interaction of treatments. The sole application of nitrogen and phosphorous mineral fertilizers had not significant ($P>0.05$) effect on most yield components. The sole application of nitrogen, however, had significant ($P<0.05$) on productive spikes and thousand grain weight. Although statistically not significant the combined application of AM with mineral fertilizers had improved most yield components of wheat. The non-significant effect in most yield parameters of wheat due to mineral fertilizer application might be attributed to the inadequate application rates of both nitrogen and phosphorus fertilizers, i.e. half of the recommended fertilizer rates of the crop for the study area.

Table 6. Effects of manure, nitrogen and phosphorus on plant height, days to heading, days to maturity and spike length

Treatments	Plant height (cm)	Days to Heading	Days to Maturity	Spike length (cm)
AM levels (t/ha)				
0	79.4	85.9	156	7.1
5	83:2	85.2	155	7.4
10	85.8	85.7	155.5	7.8
$LSD_{<0.05}$	4.17	0.58	Ns	0.56
N levels (kg/ha)				
0	82.3	85.7	155.6	7.4
23	83.3	85.6	155.6	7.5
$LSD_{<0.05}$	Ns	Ns	Ns	ns
P levels (kg/ha)				
0	82.3	85.7	155.8	7.4
10	83.3	85.5	155.4	7.4
$LSD_{<0.05}$	Ns	Ns	Ns	ns
CV%	5.7	1.6	1.48	8.6

B. Total Biomass and Grain Yield of Wheat

Total biomass yield of wheat was significantly ($P<0.05$) affected only by the sole application of animal manure whereas grain yield of wheat was significantly ($P<0.05$) affected by the sole application of animal manure and phosphorous (Table 7). The sole application of nitrogen did not affect both total biomass and grain yield significantly ($P<0.05$). Both total biomass and grain yield was not affected significantly by the treatment interactions. Relative to the non-manured plots the addition of 5 and 10 ton ha^{-1} AM increased the total biomass yield of wheat by 16.0 and 28.4%, respectively. The application of AM at a rate of 5 and 10 ton ha^{-1} gave a yield advantage of 15.4 and 28.6% over the non-manured plots, respectively. This result is in agreement with reports of several researchers. Francisco et al (2003) reported that manure application had a positive impact on average yield, possibly from an increase in soil carbon content and associated changes in water retention and other physical properties. The application of 10 and 15 ton ha^{-1} AM gave grain yield benefits of 24 and 36% over the control, respectively (Bayu et al, 2005). Kaihura et al (1994) also reported that maize grain yield increases of 1732 kg ha^{-1} across eight locations with manure application.

Table 7. Effects of manure, nitrogen and phosphorus on productive spike, grain yield, total biomass yield and 1000 seed weight

Treatments	Productive spike/m^2	Grain yield (Kg/ha)	Total biomass Yield (kg/ha)	1000 Seed weight (g)
AM levels (t/ha)				
0	171.7	2173.8	5292.1	42.89
5	176.9	2508.4	6139.0	43.04
10	182.4	2791.8	6797.4	44.18
$LSD_{<0.05}$	Ns	364.4	841.4	0.69
N levels (kg/ha)				
0	170.7	2489.7	5991.9	43.7
23	183.4	2493.1	6160.4	43.0
$LSD_{<0.05}$	11.79	Ns	Ns	0.54
P levels (kg/ha)				
0	175	2415.1	5946.7	43.3
10	179	2567.6	6205.7	43.4
$LSD_{<0.05}$	Ns	136.9	Ns	ns
CV%	20.19	16.65	15.77	3.75

The addition of mineral fertilizers did not increased biomass and grain yield of wheat significantly. However, numerically the sole application of 23 kg N ha^{-1} and 10 kg P ha^{-1} had

increased grain yield by 4.3 and 6.3%, respectively, as compared to plots not received mineral fertilizers. This low increment on grain yield by the mineral fertilizers might be associated with the half application of the recommended rates. Although not statistically significant the combined application of AM with mineral fertilizers gave higher yields over the control. The application of 10 ton ha^{-1}AM in combination with 23/10 kg ha^{-1} N/P gave a yield advantage of 23.0% over the control. Bayu et al (2004) also reported that the application of 10 to 15 ton ha^{-1}AM in combination with 50% of the recommended inorganic fertilizer rate resulted in statistically better yields than applying 100% of the recommended inorganic fertilizer alone. In this study, it has been realized that the application of AM had positive effects on most agronomic parameters and grain yield of wheat.

4. Conclusions and Recommendations

Generally, it is known that the positive impact of AM application on soil physical and chemical properties and crop yield and agronomic parameters can be realized after long years of AM application. However, the results of this study from three year animal manure application highlighted the potential of animal manure in improving the soil fertility parameters and crop yield and yield components. The application of AM alone or combined with mineral fertilizers significantly improved soil physical and chemical parameters at different soil layers. The application of AM alone or integrated with mineral fertilizers also significantly improved yield and yield components of wheat.

To come to a specific recommendation, this experiment should be continued for some more years to assess the long term impacts of integrated application of AM and mineral fertilizers on the soil fertility parameters and crop yields. However, for resource poor farmers in the northeastern Ethiopia, the integrated use of AM with mineral fertilizers is inevitable to improve the crop yield and to maintain soil fertility. Hence, under smallholder crop production conditions in the northeastern highlands of Ethiopia, the integrated use of animal manure at a rate of 5 to 10 ton ha^{-1} (depending on their manure source) with 50% of the locally recommended mineral fertilizers is recommended as an economically feasible alternative for wheat production and maintaining soil fertility.

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The Effect of Feeding Different Levels of Dried Tomato Pomace on the Performance of Rhode Island Red (RIR) Grower Chicks in Wolaita Zone, Southern Ethiopia

Melkamu Bezabih, Yayneshet Tesfay (PhD)

Department of Animal Science, Debre Markos University, E- mail: melkamu_bezabih@yahoo.com, Tel+251922262741, Ethiopia

Department of Animal, Wildlife and Range Science, Mekelle University, E- mail: yayneshet_tesfay@yahoo.com, Tel+251914700384, Ethiopia

Abstract

This experiment was carried out to evaluate the effect of feeding different levels of Dried Tomato Pomace (DTP) with commercial ration on the performance of Rhode Island Red (RIR) grower chicks in terms of feed intake, body weight gain, feed conversion ratio (FCR), mortality rate, carcass yield and dressing percentage. A total of one hundred RIR grower chicks at eight weeks of age were grouped into 20 pens of 5 chicks each, and randomly assigned to five treatments (control fed a commercial ration; 5% DTP; 10% DTP; 15% DTP; 20% DTP) according to a completely randomized design. Birds fed on 5, 10, 15, and 20% DTP had the higher dry matter intake (72.93, 72.75, 72.98 and 73.15 g/bird/day) than the control group (72.10g/bird/day). The daily body weight gain of birds ranged from 13.3-15.3 g/day, the highest being on birds fed on 5% DTP; The feed conversion ratio (FCR) of birds were 5.3, 4.8, 5.0, 5.3, and 5.5 for the control and for birds that consumed 5, 10, 15, and 20% DTP, respectively, with significant difference observed between 5 and 20% DTP. No any mortality was observed due to in good management. The mean edible carcass weight of birds placed on the control, 5, 10, 15, and 20% DTP was 892.5, 1007.5, 937.3, 926.8, and 888.5 g, respectively. Dressing percentage of birds fed on the control, 5, 10, 15, and 20% DTP were 62.9%, 67.1%, 64.6%, 63.7% and 63.3%, respectively. The mean value of 5% DTP was better than among those groups. The economic efficiency of the experimental diets was 1.35, 1.79, 1.80, 1.78, and 1.82 for a group fed on the control, 5, 10, 15, and 20% DTP, respectively. There was a higher significant ($p<0.05$) difference on a group fed on DTP and the control diet. 20% DTP brought the highest economic efficiency

among the groups. Based on the obtained results it could be concluded that Dried tomato pomace could be incorporated in grower chick rations at the level of 20% without any adverse effect on growth performance in order to increase the economic efficiency.

Keywords: DTP, FCR, DM intake, Weight gain, Economic Efficiency.

1. Introduction

The world today is suffering from a serious shortage of livestock feed ingredients because of the rapid increase in human population and feed competition of people and livestock (Adeniji and Oyeleke, 2008). Among the factors contributing to the constraints of poultry production is the availability and cost of feed ingredients stand at the forefront. This costs accounts for 60-80% of the total cost of production for intensively reared poultry in the tropics (Fajimi et al., 1993 and Tewe, 1997).

Ethiopia is not self sufficient in cereal grains and could not provide the bulk of concentrate feeds for poultry. There are shortages of protein supplements and micro-nutrients (vitamins and minerals) which are needed for the preparation of balanced rations. Scarcity of poultry feed is the major problem and the expected output from birds is very low. If food self-sufficiency is to be achieved and malnutrition combated in developing countries particularly in Ethiopia, there is a need to give due attention to poultry production. To run efficient poultry production in the country regular availability of good quality ingredients and a fully balanced complete feed are very essential, because birds require large quantities of energy and sufficient quantities of protein for growth and development. To fulfill these daily nutrient requirements, using alternative feed ingredients in poultry ration is a key determinant of successful poultry production.

One such non-conventional feedstuff, which could be of value for poultry feeding, is tomato pomace. Tomato pomace is an inexpensive and primary by-product of tomato manufacturing. It consists mainly of the skins, seeds and hard tissues of the whole tomatoes. When tomatoes are processed into products, 10% to 30% of their weight becomes waste or "pomace" (King and Zeidler, 2004). According to King and Zeidler (2004), tomato pomace contains 5.1% moisture,

11.9% fat, 26.8% protein and 26.3% crude fiber. Moreover, it contains 13% more lysine than soybean protein (AL-Betawi, 2005), a good source of vitamin B, fair source of vitamin A and no known antinutritive factors (Geisman, 1981), and 2130 Kcal/kg metabolizable energy (NRC, 1988). It is also fiber rich feed resource and thought to act as a cholesterol reducing feedstuff in poultry products (AL-Betawi, 2005). It is a good feed substitute for the usual ration of growing cattle, growing and fattening pigs, broilers and layers. NRC (1983) reported that it has been successfully fed to cattle, swine and poultry at a 10–15 % dietary level, thereby reducing cost of production and increasing profit.

However, in the country there are two tomato processing factories (Melgi-Wondo and Upper Awash Agro industry) that produce substantial amounts of tomato pomace. Annually around 23,490,200 kg of tomato can be processed into tomato paste and tomato juice (UAAI, 2009). According to King and Zeidler (2004), 10-30% of tomato pomace is produced at time of processing. This huge by product has not yet been extensively utilized as a feed source for poultry, the majority of it is just dumped and allowed to decay in the surrounding areas near the factories (MOA, 2006). So finding solutions to utilize these abundant and inexpensive wastes is very crucial. One of the best alternative means is to utilize this feed stuff as a feed ingredient in poultry ration. Because in recent years, people are becoming more and more health conscious and prefer meat and egg with low cholesterol content (Rahmatzadeh et al., 2009). Efforts are being made to reduce the cholesterol content of egg and meat by feeding poultry with low cost fiber rich diets. There is no any documented evidence about the potential of this feed stuff in the country. Therefore, the possibility of utilizing this waste in feeding Rhode Island Red (RIR) grower chicks is the most promising one to alleviate chronic feed shortages for poultry and reduce cost of feed. The objective of this study intended to evaluate the potential use of Dried Tomato Pomace which could be used in poultry feeding on the performance of Rhode Island Red (RIR) grower chicks under intensive management conditions.

2. Materials and methods

The study area

The study was carried out in Wolaita Zone at Soddo town, which is found in the southern region and located 390 km southwest of Addis Ababa and 165 km from the town of the region-Awassa. Its total areas is 4383 km square (438370 ha). The mean annual temperature of the area is 190C. The average rainfall is 1014 mm. It has moderately drained soils (nitosols). The livestock population of the area is estimated to be 1.8 million, of which 53% are cattle, 9% sheep and goat, 3% equines and 35% poultry.

Management of experimental birds

A total of 100 (60 male and 40 female) male and female Rhode Island Red (RIR) grower chicks at eight weeks of age were purchased from Awassa Poultry Multiplication Center. All the birds were randomly divided into 20 pens with 5(3 male and 2 female) birds /pen. The 20 pens were randomly assigned to five treatment groups. Replicates were housed in the partitioned house with all the necessary facilities for seventy days experimental period. Standard vaccination schedule was done and strict sanitary measures were followed during the experimental period. All birds were vaccinated la-sota vaccine against New Castle Disease for three times at 60, 90,120 days of age. Amprolium was used as a prophylactic treatment for three times (At a time 30g /100 litters of water for 5 days).

Experimental diet

Wet Tomato Pomace was obtained from Upper Awash tomato processing plant. It was dried by spreading and exposing to sunlight at an open place using plastic sheet as drying material. The particle size of pomace was reduced by beating using stick and hand crushing. Over sized DTP was ground using a hand mortar and passed through 3 mm sieve size. The formulated commercial grower chick ration was bought from Kaliti Animal Feed Processing Factory (KAFPF) & used as a control diet. The chicks were fed in the form of mash for grower diets from the age of eight weeks to eighteen weeks. Feed and water were provided on ad libitum basis. Feed intake and refusals were weighed and recorded every day to estimate the feed consumption for each replicate and treatment. After a week of adaptation period live body

weight in grams was measured for all birds at the beginning of the experiment and continued every week until the end of the experiment.

Table 1 : Ingredients of experimental diets fed to the RIR grower chicks

Feed ingredients	T1 (%)	T2 (%)	T3 (%)	T4 (%)	T5 (%)
DTP	0	5	10	15	20
Corn	30	28.5	27	25.5	24
Wheat bran	10	9.5	9	8.5	8
Wheat middling	27.15	25.79	24.44	23.08	21.72
Nouge cake	15	14.25	13.5	12.75	12
Soya bean	5	4.75	4.5	4.25	4
Rape seed	10	9.5	9	8.5	8
Lime stone	2	1.9	1.8	1.7	1.6
Salt	0.5	0.48	0.45	0.43	0.4
Vitamin premix	0.25	0.24	0.23	0.21	0.2
Lysine	0.05	0.05	0.05	0.04	0.04
Methionone	0.05	0.05	0.05	0.04	0.04
Total	**100**	**100**	**100**	**100**	**100**

Source: Control diet from KAFPF, 2009

Laboratory Analysis

Representative samples of experimental diets were taken to Debre Zeit National Veterinary Institute for chemical analysis from each of the feed ingredients used in the experiment and analyzed before mixing with the actual dietary treatments. Feed samples were analyzed for dry matter (DM), crude protein (CP), ether extract (EE), crude fiber (CF) and ash (A.O.A.C., 2000). The metabolizable energy (ME) levels of feed ingredients was calculated using the formula ME (Kcal/kg DM) = 3951 + 54.4 EE - 88.7 CF - 40.8 Ash (Wiseman, 1987).

Measurements and observations

Feed intake of each replicate was recorded daily throughout the experimental period. Individual weight of each replicates was taken once per week. The body weight measurements were used to determine pen averages and to calculate the feed conversion ratio. At the end of the experiment 20 birds (10 male and 10 female) of the experimental birds were used to determine dressing percentage and parts yield. The grower chicks were starved for eight hours, slaughtering weight measured and killed. They were immersed in a bucket of hot water, and

defeatherd by hand plucking. The carcass was then eviscerated and allowed to drain for 15 minutes prior to weighing. The back, two thigh, two drum sticks, two wings and breast were used to evaluate the carcass yield on a commercial basis.

Dressing percentage was calculated from carcass weight as a percentage of slaughter weight. Gizzard, skin and liver are edible in most places in Ethiopia and were, therefore, included in the edible component. These were added to the carcass weight and another version of dressing percentage was also calculated. The average feed intake was recorded (g/day), Feed conversion ratio was calculated as gram feed intake /per gram body weight gain. Body weight gain was calculated by subtraction of the live body weight at the beginning of the week from that of the second measuring date (BWG, g/d). Daily mortality was recorded for each replicate and treatment, and then weekly mortality rate was calculated by subtracting the number of dead chicks from the number of live chicks at each interval. Feed cost per live weight gain was computed by the cost of feed consumed to attain a kilogram (kg) live weight gain.

Experimental design and statistical analysis

The experiment was arranged in completely randomized design (CRD).The data were subjected to one way ANOVA using SPSS (Version .13) and SAS (Version 6.12 and GLM procedures) softwares. When treatment effects were found to be significant ($P<0.05$), mean separation was undertaken using Turkey HSD test. All values were calculated on a pen average basis.

3. RESULTS AND DISCUSSION

Chemical composition of Dried Tomato Pomace (DTP)

The chemical analysis results for DTP are presented in Table 2. The average dry matter of DTP was 93.2%, and the organic matter was 94.0%. The crude protein (CP) content of DTP was 21.6% while the average crude fiber (CF) contained in DTP was 38.8%. The fat content of DTP was about 9.5%, and that of calcium 0.54%.

The level of dry matter found in this study agrees with other reports (NRC, 1988; Ayhan and Aktan, 2004). The amount of CP found in the present study agrees with that of Haasan (2004)

and El Hassan (1999). However, this value is greater than the values reported by Rogelio et al. (2004) and Mikail (1997) and lower than the values reported by King and Zeidler (2004) and Saad (1998). This variation might have occurred due to agricultural and processing practices, the degree of drying, tomato cultivars, growing conditions (geographic, seasonal variations, climatic conditions and soil characteristics), moisture removal and separation of cellulose (Maheri-Sis et al., 2008). Generally, the crude protein content of tomato pomace indicates that the potential of the feed as a protein supplement for both ruminants and non-ruminants. The mount of CF is comparable to values reported by other researchers (Harb, 1986 and Rogelio et al., 2004).

The metabolizable energy (ME) concentration of DTP was estimated to be 773.3 kcal /kgDM which is comparable to other reported values (AbdelElmalek, 1991), but higher than the value reported by Mikail (1997) and lower than values reported by El-Hassen (1999) and NRC (1988). Such differences are partly explained by differences in varieties of tomato used, their processing, and the prevailing environmental condition (Waheed and Eltaieb, 2005).

Table 2: Chemical analysis of experimental diets in Dry Matter basis

Nutrient content	Unit	DTP	Experimental Diets				
			T1	T2	T3	T4	T5
DM	%	93.2	90.56	91.42	91.37	91.28	91.36
OM	%	94.00	89.27	90.28	90.75	91.24	92.64
CP	%	21.6	18.66	19.84	21.36	18.82	18.77
ME	kcal/kg DM	773.3	3157.08	3087.07	3084.95	2789.60	2163.48
CF	%	38.8	8.67	9.26	10.21	13.46	17.00
EE	%	9.5	7.59	6.5	7.26	7.16	7.61
MM	%	6.2	10.73	9.71	8.71	8.75	8.06
NFE	%	24.1	54.35	54.68	53.92	51.80	48.56
Ca	%	0.54	0.64	0.56	0.47	0.64	0.39

DM -Dry Matter ;OM-Organic Matter ;CP-Crude Protein; ME-Metabolizable Energy; CF-Crude Fiber; EE-Ether Extract; MM-Mineral Matter NFE-Nitrogen free Extract; Ca-Calcium.

Dry Matter (DM) intake

The daily and the total mean DM intake of grower chicks fed with the treatment levels of DTP is presented in Table 3. The average daily dry matter intake among the treatments that comprised DTP ranged from 72.75 to 73.15 g/bird, and as a significantly ($P<0.05$) differed from the control

group (72.10 g/bird). The maximum cumulative DM consumption per bird was 5120.50g in the birds fed on T5. The intake was highly improved when birds fed different levels of DTP than those fed on the commercial ration alone. The result is in agreement with the findings of King and Zeidler (2004) who indicated that diet containing seed and Tomato pomace had higher feed consumption than the control group.

The daily DM intake of this result is in agreement with Halima et al (2006) who reported that the mean daily feed intake of RIR chicks was 83.3g per head for 22 weeks. The finding is also similar to Tegene and Asrat (2009) who reported that 68- 77g dry matter intake per day per head for RIR chicks regardless of the diet. However, it contradicts with the report of Ayhan and Aktan (2004) and Ghazi and Drakhshan (2002) who reported that there were no significant difference in cumulative feed consumption per bird between groups fed with diets containing different levels (5%, 10% and 15 %) of DTP with the control group. It also disagrees with the report of El Hassen (1999) who cited that the presence of 2. 5% dried tomato pomace in the diet decreased the total feed consumption in broiler chicks. In this finding, the feed intake of birds was varied from the other experiments. Because according to the report of Ernest (1996), feed intake largely depends on factors like feed quality, palatability, climates, housing systems, health, management and other factors. DTP did not affect the DM intake of grower chicks and it improved the mean daily and cumulative feed consumption of birds. This is an advantage for producers, as DTP is regarded as a waste material that can be bought cheaply, and reduce the production cost without affecting the feed consumption.

Intake improvement might be due to the higher crude fiber or lower ME content of DTP. Such fiber increases fecal bulk and speed up the passage of feed through the digestive tract and keeps the health of gastro intestinal tract (Anderson et al., 2010). Inclusions of high fiber ingredients are usually limited because of the poor metabolizable energy contents (Johnston et al.,2005).To fulfill their energy requirement birds need to consume more feed. If the energy level is low the consumption and FCR are high and vise versa (Ralph Say, 1987).

Table 3: Mean DM intake of RIR grower chicks

Parameters	Experimental Diets						
	T1	T2	T3	T4	T5	SEM	P-value
Mean daily DMIntake (g/bird)	72.10[b]	72.93[a]	72.75[a]	72.98[a]	73.15[a]	0.1784	0.000
Mean total DM Intake (g/bird)	5046.98[b]	5102.85[a]	5092.18[a]	5108.90[a]	5120.50[a]	11.826	0.000

Mean body weight gain

The effect of including varying levels of DTP in growers ration on body weight gain is presented in Table 4.The mean daily body weight gain of grower chicks during this study was 13.5, 15.3, 14.6, 13.8 and 13.3 gram fed on T1, T2, T3, T4 and T5, respectively. The diet containing 5% DTP led to significantly higher body weight gain than those placed on a 20% DTP and the control diet. Although statistically not significant from the other treatments, the least mean daily body weight gain was recorded from chicks fed on diets containing 20% DTP. The pattern observed in this study is similar to Ghazi and Drakhshan (2002) who indicated that there were no significant differences in weight gain among chicks fed 10 and 15% tomato pomace in comparison with the control group. Alkali, heat treated, and sun dried tomato pomace offered at 10% level to broilers also resulted in similar live body weight with that of the control group (AL-Betawi, 2005). The result of this study is in agreement with results reported by El Hassan (1999) that 2.5 and 5 % level of inclusion of DTP in the starter and finisher diets had significantly heavier live body weight and body weight gain than the control group. Boushy and Van derpoels (2000) reported that DTP inclusion in the diet improves the body weight gain of broiler checks. A group fed a diet containing10% DTP improved the mean body weight gain next to 5%DTP level, but did not brought the significant difference. The presence of slightly higher crude protein and less amount of crude fiber in the group fed on the 5% DTP might have contributed to the increase in body weight, as higher amount of protein is broken down in the intestines into its constituent amino acids which may then be absorbed into the blood and used for muscle growth, replacement of body cells, and for the synthesis of body tissue (Firman.2004).

The most commonly deficit amino acids in grower chicken ration are lycine, methionine, tryptophane glycine and arginine (Gillispie.1992). DTP contain these amino acids and could

satisfy their amino acid requirements. In addition, they require fats and carbohydrates, vitamins (A, D3, E, K, riboflavin, B12, niacin, panthothenic acid and choline), minerals (Calcium, Phosphorus, Manganese, Iodine, Sodium Chlorine and Zinc) and cannot exist on high fibre diets (Burton and Silverman, 2009). In case of the group fed with the diet containing 20% DTP the live body weight & body weight gain was significantly lower than the group fed with 5% DTP due to increased level of crude fiber. In the monogastric animal, fiber represents the insoluble matter of plant cell walls that is indigestible by animal enzymes, but can be partially degraded by gastrointestinal microflora (Damron and Sloan, 2009). The constituents of fiber affect the gastrointestinal tract differently, ultimately affecting the nutrition of the animal.The crude fiber level not less than 6% and not above 6.5% will be suitable for optimal growth (Chandrasekaran, 2005). The maximum amount of crude fiber, for grower chicks should be 7.0 % (Anjum et al., 2005).

According to Johnston et al. (2005), inclusions of high fiber ingredients are usually limited because of the poor metabolizable energy contents and it affects performance and nutrient utilization of chicken. High amount of crude fiber in poultry rations reduce feed efficiency, growth, egg production and time of food passage throughout the digestive system (Connell, 1982). The use of the lower energy diets will result in a somewhat longer growing period and reduced feed efficiency (Damron and Sloan, 2009). Feeding of high fiber diets, however, is used as a strategy to control growth in some types of poultry such as turkey breeder candidates or chicken pullets to prevent excessive growth (Johnston et al, 2005). A fiber rich feed resource can be act as cholesterol reducing feedstuff in poultry product (Brodowski and Geisman, 1980).

Table 4: Body weight gain (g/bird) of RIR grower chicks.

Parameters	Experimental Diets						
	T1	T2	T3	T4	T5	SEM	P-value
Initial bodyweight(g)	485.5	485.2	484	486.4	484.3	10.715	0.999
Mean final body weight(g)	1433.5^{b}	1559.1^{a}	1508.4^{ab}	1453.05^{ab}	1414.2^{b}	39.284	0.013
Mean daily weight gain(g/bird)	13.5^{b}	15.3^{a}	14.6^{ab}	13.8^{ab}	13.3^{b}	0.561	0.012
Mean total gain(g)	948.3^{b}	1073.9^{a}	1024.4^{ab}	966.7^{ab}	929.9^{b}	39.5	0.014
Feed conversion ratio(FCR)	5.3^{ab}	4.8^{b}	5.0^{ab}	5.3^{ab}	5.5^{a}	0.200	0.016

Means with a different superscript in a row are significantly different ($P< 0.05$)

Feed Conversion Ratio

Feed conversion ratio of the experimental chicks expressed as grams of feed consumption per unit body weight gain are shown in Table 4. There was no statistically marked variation in the feed conversion ratio among all treatments compared to the control group. The mean feed conversion ratio was 5.3, 4.8, 5.0, 5.3 and 5.5 for the group fed on T1, T2, T3, T4 and T5, respectively.

A group fed with a diet containing 5% dried tomato pomace had significantly higher feed conversion ratio compared with a group that fed a diet containing 20% DTP. Thus, more feed was needed to attain a unit gain compared with a bird fed a diet containing 5% DTP; this may be due to the higher crude fiber content in the experimental diet. The inclusion of 20% DTP was higher fiber content that led to reduced body weight gain. The result agrees with El-Hassen (1999) who reported tha. the feed conversion was significantly improved in a diet containing 2.5-5% DTP. The lowest feed conversion ratio measured in RIR fed the highest level of DTP (20%) is also in agreement with Rahmatnejad (2009) who indicated that a feed containing 24% DTP had the worst feed conversion ratio due to high fiber content.

Carcass characteristics

Data on carcass characteristics is presented in Table 5. The mean edible weight, and carcass yieldvalueswerehigher for a group fed on 5% DTP compared with other treatment groups. But statistically there were no significant difference between the groups. This result is in agreement with El Hassan (1999) who indicated that at the levels of 2.5 and 5.0% dietary TP exhibited higher values of carcass dressing weight of chick. The present result also agrees with Ghazi and Drakhshan (2002) who underlined that inclusion of Tomato pomace up to the level of 15% in the commercial ration did not show any significant difference compared with the control group.

The back, breast, drum stick, thigh, wing, liver, gizzard and skin are part of the edible carcass weight in Ethiopian condition (Asrat, 2007). As shown in Table 9, the mean edible carcass weight was 892.5, 1007.5, 937.3, 926.8 and 888.5 g for the groups fed on the control diet, 5% DTP, 10% DTP, and 15% DTP and 20% DTP, respectively. The dressing percentage was 62.9%, 67.1%, 64.6%, 63.7% and 63.3% of groups fed on the control diet, 5% DTP, 10% DTP, 15%

DTP and 20% DTP, respectively. Dressing percentage was no significantly affected by the level of inclusion of DTP. The result agrees with Ghazi and Drakhshan (2002) who showed that the dressing percentage was not significantly affected by the inclusion of DTP on the diet. The mean dressing percentage value found in this study (64.3%) confirms the results of Asrat (2007) and Negussie (1999), who reported 64.94% and 63%, respectively.

GhaziandDrakhshan (2002) and El Hassen (1999)reported that including tomato pomace at different levels gave no significant differences in carcass yieldThe commercial carcass parts collectively referred to as carcass weight included two wings, two thighs, two drumsticks, back, and breast. The mean carcass weight was 755,846. 3, 793.5, 775.8 and 753.3 gram for a group fed on the control diet, 5% DTP, and 10% DTP, and 15% DTP and 20% DTP, respectively. Carcass weight was not significantly ($P>0.05$) influenced by the inclusion of DTP on the diet. The mean dressing percentage was, 53.2%, 56.4%, 54.7%, 53.4% and 53.7% for the control, 5% DTP, 10% DTP, 15% DTP, and 20% DTP, respectively. There were no statistically significant ($p>0.05$) difference in dressing percentage.

The result was in close agreement to reports from Bangladesh by Munira et al. (2006) in their comparative study on carcass characteristics of different genetic groups of hens indicated similar dressing percentage (56%) of RIR hens regardless of diet. Teketel (1986) indicated range of dressing of 51.5 to 57.8%, depending on strains of the local chicken in Ethiopia.

The present result agrees with Ghazi and Drakhshan (2002) who reported that the overall performance of the broiler chicks was not statistically affected by the inclusion of DTP in different levels. Commercially important carcass yield throughout the world includes only back, breast, drum stick, thigh and wing (Asrat, 2007).

Table 5: Carcass yield and dressing % of RIR grower chicks fed with different levels DTP

Parameters	*Experimental diets*								
	Control	**5% DTP**	**10% DTP**	**15% DTP**	**20% DTP**	**Mean**	**C.V.**	**SEM**	**P-Value**
Slaughter weight(g)	1422	1503.8	1452.8	1453	1405.5	1447.4	8.40	85.99	0.819^{ns}
Plucked weight(g)	1242.8	1347.8	1294.5	1284.0	1252.5	1284.3	8.3	75.29	0.665 ^{ns}
Plucked weight (%)	87.4	89. 7	89.2	88.4	89.1	88.7	1..5	0.93	0.188 ^{ns}
Carcass yield(g)	755	846.3	793.5	775.8	753.3	784.8	7.8	43.36	0.239 ^{ns}
Dressing percentage	53.2	56.4	54.7	53.4	53.7	54.3	4.3	1.64	0.317 ^{ns}
Edible weight(g)	892.5	1007.5	937.3	926.8	888.5	930.5	8.0	52.96	0.216 ^{ns}
Dressing percentage	62.9	67.1	64.6	63.7	63.3	64.3	4.1	1.89	0.223 ^{ns}
Thigh (g)	155.5	177.3	164.5	157.8	151.3	161.3	9.3	10.60	0.174 ^{ns}
Drum stick(g)	133.3	164.5	145.8	150.8	144.5	147.8	12.3	12.82	0.234 ^{ns}
Breast(g)	198.8	214.3	208.5	216.8	200.8	207.8	7.4	10.95	0.410 ^{ns}
Back(g)	145.3	160.3	158.5	139.5	141.5	149.0	12.4	13.09	0.392 ^{ns}
Wing(g)	122.3	130.0	116.5	116.0	115.5	120.0	11.3	9.62	0.527 ^{ns}
Liver(g)	28.5	35.3	32.5	36.0	30.8	32.6	11.5	2.66	0.067 ^{ns}
Kidney(g)	2.0	2.5	2.8	3.0	2.5	2.6	21.7	0.40	0.194 ^{ns}
Heart(g)	6.5	6.0	6.5	7.3	5.8	6.4	16.9	0.76	0.377 ^{ns}
Gizzard(g)	36.5	45.5	39.5	44.0	41.8	41.5	13.7	4.01	0.226 ^{ns}

NS-Non significant difference

Economic analysis

The cost effectiveness of the unconventional feed is shown in Table 6. Feed cost (in Birr) /total gain was 20.16, 19.25, and 18.28, 17.41 and 16.49 Birr for the groups fed on the control diet, 5% DTP, 10% DTP, 15% DTP, and 20% DTP, respectively. The inclusion of DTP in growers ration and feed cost per kg feed were inversely proportional. This result agrees with report of Rahmatnejad (2009), the cost per kg feed was decreased with increasing DTP in diets in compared with control group. El-Hassan (1999) reported that inclusion of tomato pomace in broiler diets with 2.5 or 5.0% level showed significant low feed cost /kg gain values as compared to control diets. Rahmatnejad (2009) indicated that the cost/kg feed of treatment containing 16% DTP was lowest, due to the low price of DTP and it had the positive effect on economic value of production. Rogelio et al (2004) also cited that it reduces the feed cost per bird per kg gain in weight in broiler and reduces the feed cost per dozen eggs in layers. The Economic Efficiency of the experimental diets was 1.35, 1.79, 1.80, 1.78, and 1.82 for a group fed on the control diet, 5% DTP, 10% DTP, 15% DTP and 20% DTP, respectively. There was a significant ($P< 0.05$)

difference between a diet containing 5%, 10%,15% and 20% DTP compared with the control (commercial) diet. The highest economic efficiency was obtained at a diet containing 20% DTP.

Table 1: Partial budget analysis of RIR chick

Parameters	Experimental Diets						
	Control	5% DTP	10% DTP	15% DTP	20% DTP	SEM	P-value
Cost per chick(Birr/chick)	17	17	17	17	17	00	NS
Feed cost (Birr/kg)	3.62^{a}	3.45^{b}	3.28^{c}	3.16^{d}	2.95^{e}	00	0.000
Feed cost/ Kg gain	21.32^{a}	18.03^{b}	17.87^{b}	18.03^{b}	17.75^{b}	0.743	0.000
Cost of total feed consumed(Birr/bird	20.16^{a}	19.25^{b}	18.28^{c}	17.41^{d}	16.49^{e}	0.045	0.000
Miscellaneous cost(Birr/chick)	8.9	8.9	8.9	8.9	8.9	000	NS
Total cost (Birr/bird)	46.06^{a}	45.15^{b}	44.18^{c}	43.31^{d}	42.39^{e}	0.045	0.000
Sale (Birr/bird)	50.00	51.00	50.50	50.00	50.00	00	NS
Net Profit	3.94^{e}	5.85^{d}	6.32^{c}	6.69^{b}	7.61^{a}	0.045	0.000
Economic Efficiency	1.35^{b}	1.79^{a}	1.80^{a}	1.78^{a}	1.82^{a}	0.25	0.002

*Means with a different superscript in a row are significantly different ($P< 0.05$)

NS-Non Significant difference

One of the most frequently cited and the foremost challenge facing in poultry production is inadequate supply and poor quality of poultry feeds and lack of systematically documented information in the value of the available feed resource base. The significance of feed availability and quality and information on alternative feed sources in poultry production can not be overemphasized since, especially under commercial systems. Feed is the principal determinant of the economics of production (Negussie and Alemu, 2005). The cost of feed ingredients represents 60-80% of the total cost of production for intensively reared poultry in the tropics (Fajimi et al., 1993; Tewe 1997).

Exploitation of agricultural by-products may make a substantial contribution towards better and more economic feeding of poultry. In view of the shortage and the high costs of protein feed stuffs. Tomato pomace could provide part of the protein needed by poultry (Rahmatnejad, 2009). The present result clearly indicated that the inclusion of Dried Tomato Pomace at 20% inclusion level in grower commercial ration reduces much production cost, economically feasible and

brought high economic efficiency with out affecting feed intake, weight gain, feed conversion efficiency, carcass yield and dressing percentage of grower chicks.

4. Conclusions

Based on the result obtained in this study concluded that the lowest and highest DM intake were observed at the control group and 20% DTP inclusion level, respectively. Birds fed on at 5%DTP inclusion level had the highest body weight gain than the control group. When the level of DTP inclusion in a commercial ration was increased, the body weight gain of birds was reduced. However, by increasing DTP inclusion in the growers ration similar body weight gain was observed that of the control group. Higher fed conversion ratio (FCR) was obtained when DTP was included at 5 % level compared with 20% inclusion level. Significantly similar carcass yield and dressing percentage was observed at 20% of DTP inclusion on grower chicks. At 20% DTP inclusion in grower commercial ration significantly reduced the feed cost and increased the economic efficiency for producers compared to the commercial diet

Recommendations

Based on the results of the study the following recommendations are made:

- Using DTP as a feed ingredient during ration formulation for RIR grower chicks at 20 % inclusion level helps to reduce the production cost and maximizes profit without deleterious effect on the overall performance of grower chicks.
- Technology dissemination about the advantage of this feed stuff is very advisable especially for commercial poultry farm owners and intensive system broiler producers to reduce their production cost.
- Further research on treatment of the DTP when included at higher level is necessary to know the effect of this feed staff beyond 20% inclusion.

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Analysis of informal seed system for sorghum and maize crops: the case of Midegha Tolla district, East Hararghe zone, Ethiopia

(**Meseret Getahun,**Ranjan S. Karippai and Firew Mekbib)

Abstract

For most of the crops, farmers largely depend on the informal seed system, which is actively functioning compared to formal system all over Ethiopia. Access to the formal seed sources is limited for the farmers, and hence the role of informal system is significant. This research study was conducted in December, 2010 to analyze the strengths, weaknesses, opportunities and prevailing challenges' of informal seed system of sorghum and maize crops in Midegha Tolla district of East Hararghe Zone, Ethiopia. The study covered 200 maize and sorghum grower farmers, randomly selected from 4 kebele administrations of the district, and the data were collected with the help of structured interview schedule and processed using descriptive statistics with the help of SPSS software. In addition, qualitative data were also collected using focused group discussions and key informant interviews. The research revealed that the 90% of seed sources for the farmers in the study area were informal sources such as farmer-to-farmer seed exchange, own saved seed, gifts, local market purchases and supply from NGOs, while the rest is covered by formal source were occasional availability from District Office of Agriculture (WARDO). The respondents indicated that timely availability, accessibility in the locality, local adaptability, knowledge and experience sharing along with the seeds were important strengths of informal seed system. Moreover, it did not involve cash since farmer-to-farmer seed exchange was for payment in kind, mostly seeds of other crops. However, the major weaknesses, as reported by the respondents were the low quality of seed, lack of purity due to mixing with other crop seeds, and lack of specificity of variety. The major challenges faced by the farmers for improving the informal seed system in the study area were the lack of adequate knowledge and skills in seed multiplication and lack of appropriate storage mechanism protecting the seed quality. The study also identified the opportunities to strengthen the informal seed system and thereby improve the crop productivity in the area. Availability of traditional seed experts and hence the possibility of establishing community seed banks was one among them. The presence of facilitating GOs and NGOs in the area, existence of a farmers' cooperative which can involve in the seed system, proximity to Haramaya University and a research centre are other opportunities. The farmers in the locality are willing to organize themselves and initiate scientific seed multiplication, if necessary trainings are provided to them. Moreover, the culture of the area encourages exchanging seed among themselves, even as gifts. Based on the study findings, feasible recommendations are also forwarded.

Meseret Getahun, Post graduate student, Department of Rural Development and Agricultural Extension, Haramaya University, E-mail: mesipow@gmail.com Phone: 0911 996369

Dr Ranjan S. Karippai, Professor, Rural Development and Agricultural Extension, Haramaya University

Dr. Firew Mekbib, Assistant Professor, School of Plant Sciences, Haramaya University

1. Introduction

1.1 Background and Justification

Ethiopia is among the least developed countries in the world where agriculture is the major source of living for about 85 percent of its people. The agricultural sector of the country contributes to about 85% of employment, 45% of GDP and 90% of export (MoFED, 2010). Even though the sector is dominant in the country's economy and contributes to the country's development, it does not show progress as fast as expected. The progress in the sector is perceived as an essential point to change the wellbeing of farm households and effort has been made to improve the contribution of the sector to the national economy. However, it has even failed to satisfy the food demand of the country.

As agriculture dependent country, to ensure food security, standardized living condition of the farmer and to bring general economic development of the country, the production and productivity of the farmer have to be increased. Agricultural production and productivity increment in Ethiopia certainly lead to the issue of seed. In Ethiopia the use of improved seeds on the cultivated area is at very low levels and it is reported that use of improved seeds is less than 3% of the total cultivated area (CSA, 2007).

Like many sub-Saharan countries, in Ethiopia, among the two types of seed supply system: formal and informal, the informal seed system is the dominant system for seed supply. It is the system in which farmers select their crops and varieties, produce their own seeds, and locally exchange or purchase seeds. The proportion of seed supplied by the informal seed system is estimated to be about 80 -90 % (Zewdie et al., 2008).East Hararghe is one of the 12 zones of Ethiopian region of Oromia, where the vast majority of the populations' well being depends on agriculture, with some pastoralists and agro pastoralists in the lowlands. Increasing the population density coupled with the lack of alternative employment opportunities leads to progressive land pressure and subsequent shrinking of individual land holdings or migration and utilization of marginal lowland areas for agriculture (Guinand, 1999).

Also food insecurity is the main challenge of the zone, one of the major factors contributes for this is seed insecurity. Seed insecurity in East Hararghe zone is created and aggravated by economic and environmental factors. The major constraints are lack of infrastructure, lack of improved and adapted varieties and seeds, and lack of services by formal sector agricultural institutions such as research, input suppliers, and extension. The situation is further aggravated by successive years of severe drought or erratic rainfall, which require repeated re-planting. Farmers' seed-saving practices have become unreliable; while neither emergency seed supply interventions nor past seed multiplication projects have had a sustainable impact on seed insecurity. The capacity of the informal seed sector to maintain a secure supply of appropriate seeds for the dry land or traditional farming systems areas is inadequate (Ibrahim, 2008).

One of the woredas' in East hararghe zone is Midegha Tolla, where the food insecurity situation is very serious. In order to overcome the problem, different interventions take place including seed distributions. However, because of insufficient rain for cultivation, people began to consume their seed instead of planting (Guinand, 1999). In Midegha Tolla woreda, (where the study was conducted) informal seed supply system is the main source of seed for the farmers. So this study explores how the informal seed supply system functions and draw out its strengths, weaknesses, opportunities and challenges with its institutional frameworks.

1.2 Statement of the Problem

Currently the share of the formal seed system in the country is estimated to be 10-20%, the formal seed sector, which produces certified seed of improved varieties of cereals, legumes and oil seed crops, is dominated by Ethiopian Seed Enterprise (ESE). ESE produces an average of 12% of the total potential seed demand, with only small part reaching the small scale farmer and the rest going to large scale farms (Osborn and Cooper, 2004). As Zewdie et al., (2008) noted most of the facilities like cleaning and selling centres owned by ESE are not located strategically for serving the small farmers throughout the country. These all, in turn, make the small holder farmers to depend on the informal seed supply system.

The seed production-distribution chain in the informal seed system is short and simple, without any regulation and is found to be effective in quickly reaching out to the difficult and inaccessible. Although the formal seed sector started some five decades ago, it still remains limited to a few major crop varieties developed by agricultural research. Improving farmer based seed production schemes and fortifying informal seed supply for local crops and varieties is crucial for the development of the seed sector in the country. Supporting the informal seed sector will help to maintain genetic resources and to increase productivity so as to attain food security and improve farmers' livelihoods.

As different agencies' reports indicate, Midegha Tolla, where the study was conducted, is a district where the informal seed supply system dominates for many years. The system does not show a positive change on the production and productivity of the farmers (Guinand, 1999). So far, no systematic study has been conducted in this issue in the study area. Therefore, assessing the strengths, weakness, challenges and opportunities of informal seed supply system with the available institutional frameworks in the woreda is essential for the development of the sector and improving production and productivity, by filling the prevailing knowledge gap.

1.3 Objective of the study

The general objective of this study is to assess the functioning of informal seed supply system in the study area.

The specific objectives are:

- to assess the strengths and weaknesses of the informal seed supply system;
- to assess the challenges and opportunities of the informal seed supply system; and
- to analyze the available institutional frameworks of the informal seed supply system.

1.4 Research questions

- How the existing informal sorghum and maize seed supply system is functioning?
- What informal rules and norms exist in the informal seed supply system?; and
- Who are the actors involved in the informal sorghum and maize seed supply system and how their linkages look like?

1.5 Significance of the study

Like in many developing countries, poverty and food insecurity are persistent problems in Ethiopia, especially among the rural population predominantly dependent on low productive semi–subsistence farming. In achieving the country's development goal by eradicating poverty and achieving food security, there should be a clear mechanism on improving the productivity of the farmers. Different technologies should be applied on the farmers' land to increase productivity. One of these technologies is improved seed. So in order to deal with the application of this input, there should be a clear understanding on how the input supply reaches the farmer.

The dominant seed supply sector of the country is the informal seed system; the study was focused on assessing the informal seed supply system in the study area. The study generates valuable information on the strengths, weaknesses, opportunities and challenges of informal seed supply system with the informal institutional frameworks available, which assists the government policy makers and other stakeholders to make relevant decisions to intervene in seed sector. It also helps to frame valuable recommendations to overcome the prevailing constraints and improve the situation at different levels. Furthermore, the study will be used as a bench mark for further studies on the topic and area.

1.6 Scope and Limitations of the study

The study focus was on assessing the informal seed supply system in Midegha Tolla woreda. Therefore, out of four major crops in the woreda, this study focused on the two major food crops which are maize and sorghum. Moreover, the study were confined to four major maize and sorghum growing Kebele Administrations (KAs) in the woreda and 200 sample respondents, due to the limitations of time and other resources, and hence the generalizations of the finding are limited to the study area and locations of similar contexts.

2. Literature review

2.1 Seed system

Seed system is composed of organizations, individuals and institutions involved in different seed related functions. These seed related functions involve research and development, seed

multiplication, seed processing, seed storage, seed marketing, and seed distribution (Scowcraf and Polak, 2000). The system also includes farmers who produce, select, save and acquire seeds (Sthapit et al., 2008). These activities can be done by the formal and/ or the informal seed systems.According to Sperling and Copper (2003), a formal seed system and a local system are the two main divisions of seed sector. The local system is also sometimes called as "informal," "traditional," or "farmer" seed system.

2.2.1 Formal seed system

According to Minot et al., (2007) the formal seed sector is described as the seed value chain which includes plant breeding by scientists to produce varietal pure seed, multiplication by state enterprise or seed company conditioning with specialized machinery, seed testing, and distribution through stockists, extension agents, or cooperatives.The formal seed sector in Ethiopia includes research institutions, MoARD, development projects, and public and private seed enterprises (Abdisa, 2001 and Dawit, 2010). This seed system is easier to characterize than the informal one. It is a deliberately constructed system which involves certification of seed varieties (Sperling and Copper, 2003). It is said to be formal because it have its own regulatory parts to control and monitor each functions performed by the actors.

2.2.2 Informal seed system

As compared to the formal seed system, the informal seed system is more complex and the functions also differ from place to place. This sector is the most common form of seed exchange in African countries and it is mainly from farmer-to-farmer. As different authors describe, the system uses indigenous structures for information flow and exchange of seeds, and its informal nature makes it less rigid than the formal sector (Almekinders, 2000; Abdisa et al., 2001). The system comprises a multitude of individual private farmers who select and save their own seed or exchange seed with others through traditional means such as gift, barter, labour exchange, cash transactions or social obligations (Almekinders, 2000; Zewdie, 2004; Hassan et al.,2007).

The informal seed system under Ethiopian context is defined as seed production and distribution along with the different actors where there is no legal certification in the process. This includes retained seed by farmers, farmer-to-farm seed exchange, cooperative based seed multiplication and distribution, NGO based seed multiplication and distribution etc (Dawit, 2010).

2.3. Strengths, Weaknesses, Opportunities and Challenges of Informal Seed Supply System

Even though informal seed supply system in the country failed to provide improved seeds for the farmer and increase productivity, it have got its own advantages like being short and simple to access and its without any regulations. Also it fills the gap of the formal seed supply system by providing all the necessary crop varieties as the farmers demand (Zewdie et al., 2008).

According to Abdisa et al., (2001) the informal seed supply system has more advantages for the farmer than of the formal one. Because it uses indigenous structures of information flow and exchange of goods and its informal nature makes it less rigid than of the formal sector. Even though the issue of quality in the informal seed system is neglected, some authors explain the traditional way of producing, harvesting and post harvest handling of the informal seed sector also have strengths. (Abdisa et al., 2001 ; Almekinders and Louwaars, 2008)

The research findings of Yealembirhan (2007) indicated the weaknesses of informal seed supply system. Based on his findings the major weaknesses are that there is an offering of poor quality seed and seed mixtures and there is also a social problem which demand is associated with evil eye.Challenges of the informal seed supply system discussed by different authors. Zewdie et al., (2008) explains that varieties maintained by farmers lack varietal stability. Many wheat and maize varieties quickly became susceptible to major diseases. This has caused disappointment among farming communities who have adopted new varieties.

2.4 Institutional frameworks

Institutions are rules and norms which are created formally or informally. In the informal seed supply system farmers set their own rules and norms to exchange seed. Of these institutions,

social norms are the important one. In the informal sector, quality is regulated by social norm, reciprocity, or 'good neighbourliness.' (Minot et al., 2007).McGuire (2005) explained that, mutual aid institutions are common in Ethiopia and indicate their role in acquiring seed.

3. Methodology

3.1. Description of the study area

Midegha Tolla is one of the 180 districts in East Hararghe Zone of Oromia Region of Ethiopia. Midegha Tolla is bordered in the southwest by Gola Odana Meyumuluke, in the west by Grawa, in the north by the Fedis and Harari Region, in the east by Babile, and in the southeast by the Erer River which separates it from the Somali Region. The administrative center of this district is Midegha Tolla.

The estimated population size in the district is 83.002 where 42.716 and 40,286 are male and female respectively. Out of the total population 69,749 are living in the rural area (CSA, 2010).Midegha Tolla district covers a total area of 109.6 km2 includes 18 keble administrations and one town. The agro ecology of the district shows that it is 100% low land. The altitude of the district ranges from 960-1564 masl. The temperature of the district ranges between 21-330c.

The economic base of the population is mixed agriculture, which is crop and livestock production. The major crops grown in the district were maize, sorghum, groundnut, sweet potato and haricot bean.

3.2. Sampling and Data collection

A two stage sampling procedure was implemented for the collection of data. Four KAs were selected purposively and the purpose was to get maximum maize and sorghum crop grower KAs. Using probability proportional to size random sampling 200 sample respondents were selected from the total four KAs for the formal survey. (The total size of population in each KAs and proportionality of sample taken indicated in the next table). In addition to the formal survey, primary data were collected from key informants and focus group discussions.

Table 1. Probability proportional to size sampling of each KA

KA	Population	Sample Size
Roba	1263	70
Terkanfata	835	46
Urjii	850	48
Quffa	625	36
Total	3573	200

Separate checklists were used to obtain information from the Focused Group Discussions (FGD) and Key Informant Interviews. Other Participatory Rural Appraisal (PRA) tools like pair wise ranking, observations were also employed to collect the data. Rapid Appraisal of Agricultural Knowledge Systems (RAAKS) windows of actor linkage (window B4) were used to collect data for identifying the intensity of actors' linkage and their roles, which are involved in the informal seed supply system.

3.3. Data analysis

For analysis of quantitative data, the study employed descriptive statistical methods like mean, frequency, percentages and ranking. The Statistical Package for Social Science (SPSS) version 16.0 computer programme was used to analyze the primary data collected though structured interview schedule.Descriptive tools were supplementary for the qualitative analytical tools mainly for the data acquired through participatory methods. The data recorded in on the discussions and interviews of key informants were transcribed. Thereafter, the transcribed data generated from each source were analyzed, with interpretations by the researcher. Of the different qualitative analysis approaches, this study mainly used narrative analysis approach.

In order to analyze the strengths, weaknesses, challenges and opportunities of the informal seed supply system; SWOT analysis were made on spot by discussants and key informants. By considering that strengths and weaknesses are focused on intrinsic to the seed supply system while challenges and opportunities are extrinsic to the system. RAAKS window of actor linkage analysis was applied to analyze the institutional linkages existed in the informal seed supply system. The data generated through RAAKS tool were converted to Actor Linkage Matrix.

To confirm and to improve the clarity or validity of the research findings, triangulations were employed. There are different forms of triangulation. Of these forms, this study used method triangulation which compares the results of quantitative data with qualitative one plus the data collected using different methods like data from FGDs and key informants. Triangulation with theories was also made by comparing the findings of other studies with the results found on this study. Finally triangulation with multiple analysts was employed. This is by giving the results for different individuals who are knowledgeable on the issue of the study. These analysts include advisors, government officials responsible for agricultural and seed related activities and other professionals in the area.

4. Results and discussions

4.1 Demographic characteristics of respondents

The sample respondents of the study were composed of both male and female respondents. It is found that out of the total respondents 84% were male and the remaining 16% of the respondents were female. The survey result shows that 90.5 % of respondents were married while 6 %, 1 % and 2.5 % were unmarried, divorced and widowed, respectively.Regarding the educational status of sample respondents, the study includes 78 % respondents which cannot read and write; whereas 4 % of respondents took informal education which is mostly focus on religious education. The remaining respondents had formal education. The household size of respondent for the study ranges between 1 and 15 with the mean value of 5.96. A household often consists of the head, the spouse, their children and some other persons living in the household. The average active labour force in the household is 2.65 with a minimum of 1 and maximum of 9 individuals.

From the total households 54% (n=108) of the respondents livelihood depend on both crop and livestock production. The remaining 46% (n=92) are based on only crop production. The major crops grown in the study area were maize, sorghum, ground nut, sweet potato and haricot bean. Respondents also rear different kinds of animals for food and also to generate income.

4.2 Farm Characteristics of Respondents

Farmers in the study area were mainly engaged in production of maize, sorghum, sweet potato, haricot bean and ground nut crops. The land allotted for each crop differs from farmer to farmer. The result from sample respondents shows that a minimum land holding of a farmer is 0.2 hectare and the maximum owned land is six hectare. The average land holding in the study area is 1.6 hectare. All farmers in the selected KAs are involved in production of maize and sorghum crops. In 2009/2010 cropping season the mean of the cultivated land was 0.62 hectare and 0.85 hectare for maize and sorghum, respectively.

The study revealed that mean of the yield gained from one hectare of land was 10.7qt and 11.3 qt of maize and sorghum crops, respectively from a hectare of land.The intensive use of fertilizer, improved seed and other complementary inputs contributes to the production and productivity of a farmer. The application technological of inputs like fertilizer and improved seed in the study area was found extremely low. The fertilizer applied on a farm land ranges between zero and 50 kg for cultivated maize and sorghum hectare of land. With the mean value of 1.05 kg for one hectare cultivated maize land and 0.85 kg for one hectare cultivated sorghum, respectively. Whereas the recommended rate of fertilizer for is 100 kg of DAP and 100 kg of Urea for one hectare land. Farmers' in the study area apply their own local fertilizers like compost on their farm land.

The use of improved maize seed ranges between zero and 20 kg with the mean of 2.37 kg and for sorghum crop it is zero to a maximum of 5 kg with the mean of 0.33. As compared to the recommended amount (12.5 kg per hectare for maize and 5 Kg per hectare for sorghum), the existing application is very low. Rather farmers in the study area were using the local seeds. A mean of 7.53 kg of maize seed and 10.06 kg sorghum seed is applied on one hectare farm land of an individual farmer.

4.3 Sorghum and maize seed supply system

4.3.1. Type of seed and varieties used

About 71.5% respondents use local sorghum varieties and 43.5% respondents use the local maize seed varieties. Only 2.5% and 7% of the respondents were using improved sorghum and maize seeds respectively. The remaining 26% and 49.5% respondents were using both local and improved sorghum and maize seeds respectively. The rationale for not only concentrating on the improved maize seed is that there is a late delivery from the supplier which is the Woreda Agricultural and Rural Development Office (WARDO) and also the amount supplied by the WARDO was not in a position to provide the required demand of the farmer. Some discussants also illustrate the reason for not using improved sorghum seed as there is no much difference in the productivity. Moreover, the local seed has much capacity to adapt to the local conditions than the improved one.

Table 1. Types of seed used (N=200)

Types of varieties	Sorghum seed		Maize seed	
	N	%	n	%
Local	143	71.5	87	43.5
Improved	5	2.5	14	7.0
Local and Improved	52	26.0	99	49.5
Total	200	100	200	100

Source: own survey, 2010

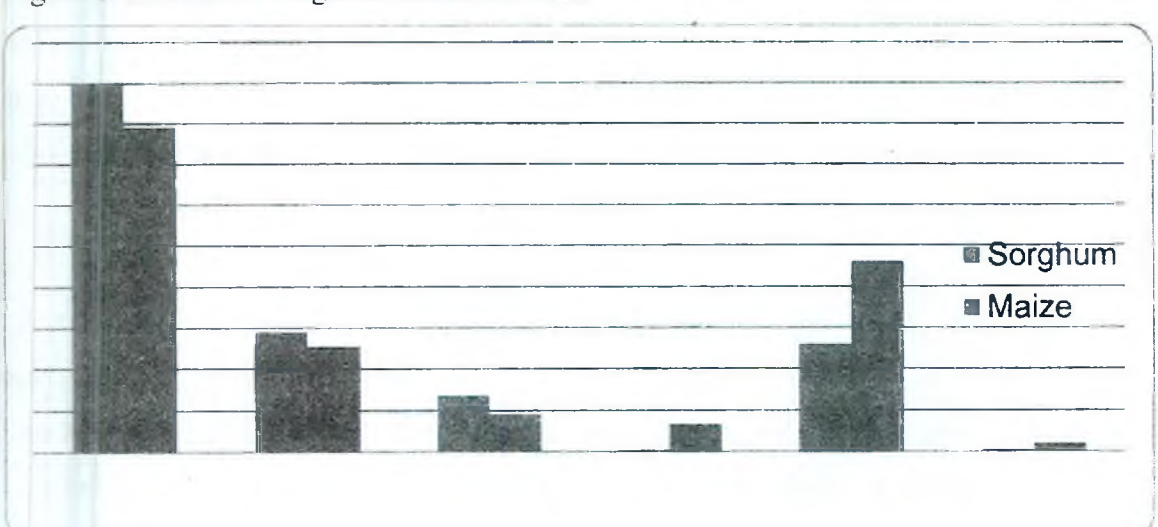
4.3.2. Seed source

Farmers in the study area obtain the local and improved seed varieties from both formal and informal sources. The main seed sources are own saved seed, neighbours/relatives, local market traders, cooperatives, GOs and NGOs.For 90% and 79% of respondents respectively, the source for sorghum and maize seeds is farmers own saved seed from their previous harvest. The use of own saved seed on sorghum is higher than of the maize. The finding of Longley et al., (2001) in southern Somalia, also explains that more farmers use their own saved sorghum seed as compared to maize.

Farmers use own saved seed under normal conditions. In the time of seed shortage or where there is a need to have 'new' varieties, farmers go to other farmers, local market and other organized institutions. The survey results of this study indicated that about 29% and 25.5% of the respondents receive sorghum and maize seed from neighbours respectively.

The WARDO is the only formal seed supply source in the study area. The provision of seed by the office varies from crop to crop. As the study result indicate only 26% and 46% of respondents receive sorghum and maize seed respectively from the office. This finding further confirmed and strengthened by the empirical works which stated that, the formal sector play very minor roles in supplying sorghum seed as compare to maize seed (McGuire, 2007). Local markets, NGOs and cooperatives were also involved in provision of both improved and landrace seed varieties for the farmers.

Figure 1. Sources of sorghum and maize seed



Source: Own survey, 2010

4.4 Strengths and weaknesses of seed sources

As described in the above section, farmers acquire seed from different sources; from both on-farm and off-farm sources. These sources have their own advantages and disadvantages which have an impact on the functioning of the seed supply system of the study area.

The survey result shows that 26.5% of the respondents put the major advantage of using own stock for both seeds (sorghum and maize) as easily accessible, timely available and reliable in supply. As compared to other sources, farmers can get the seed in the near distance, on the required time (at the time for planting) and the farmers are sure that they can get the seed on a continuity bases. The discussants of FGD illustrate that if a farmer use his/her own stock can be secure even in drought times, and this makes it a reliable source.

The study revealed that 27.5% of respondents prefer own stock seed because farmers can easily access it in their own home with no additional cost involved. In addition, the capability of own saved local seed to adapt with the local conditions raised as an advantage of this seed source. Even though the source is relevant and preferable because of its' easily availability and accessibility, it has got its own disadvantages. Most of the farmers (31.5% and 33 %) for sorghum and maize seed respectively agreed up on the low productivity of the seed from this source. About 15% respondents considered the seed obtained from own stock is poor in quality and the yield gained also very low for both sorghum and maize seed varieties. The yield gained from own stock/local variety/ is very low as compared to the improved one. This result is supported by the findings of Yealembirhan (2007) explaining that the yields gained from local seed is lower than that of the certified and recycled one.

Of the total respondents 10.5% and 12% respondents for sorghum and maize seeds respectively complained that there was no specific variety when it is from own stock. This is because there will be mixture of selected seed with grain and other varieties of seeds.There is a social obligation to share the seed available on stock for other farmers' who face seed shortage as a form of gift to support or by expecting one day to get the benefit back. There is also an exchange of one seed with another seed/grain between farmers-to-farmers. The provision of seed to other farmers by means of gift or exchange shows the role of social capital available in the study area. This can be used as an opportunity while supporting the informal seed supply system of the study area.

The easily accessibility and the timely availability of seed 24% and 21.5% of respondents for sorghum and for maize seeds respectively prefer other farmers (neighbours or relatives) as the

best seed source. Others like quality assurance and reliability of supply are also seen as an advantage of this seed source. The findings of Abdisa et al., (2001) strengthen this result.

Acquiring seed from neighbours/ relatives is preferable because the yield gained from the seed, the adaptability of the seed to the weather condition of the locality and the resistance of the seed to disease can be easily seen nearby the house and make the seed selection easy. This result agrees with the former findings of Zewdie (2004) who indicated that acquiring seed from neighbours will provide an opportunity for the farmer to assess the performance of the crop before adopting it while the variety grown on the neighbours' fields. Singh (1990) cited in Chakanda (2000) also illustrate that, in Ethiopia, most seed transactions take place between neighbours and relatives because farmers prefer to see the crop stand in a neighbours' farm before deciding on obtaining the seed.

Through the social obligations existed, neighbours are obliged to provide and/or exchange seed to/with each other. The seed obtained from this source have its own disadvantages like poor quality and adulteration, no specific variety, unfair exchange etc. Of the total respondents, 25% and 20.5% respondents for sorghum and maize seed sources respectively complain that the seed which is acquired from neighbours does not have its own specific variety. This leads the farmer to fail in getting the preferred type of variety because different varieties stored together and it creates ambiguity to differentiate.

About 16% and 17% of respondents for sorghum and maize seed respectively consider problem of unreasonable exchange. The combination of poor quality, low productivity and unfair exchange are also the major drawbacks given by 16% and 15.5% of respondents for sorghum and maize seeds respectively.

The study gathers the reasons behind acquiring seeds from local markets. Of the total respondents, 39% respondents put the main reason as easy to access the seed, followed by the availability of seed when there is a shortage of seed due to drought and other related causes. In line with this 22.5% of the respondents put the availability of seed even when shortage occurs in the community as the advantage of obtaining seed from local market.

The survey result also showed that 21% respondents prefer the source because it is easy to access at the needed time. This is supported by the results of FGDs. The discussants explain that local seed traders come from different KAs. So the farmers are able to access the needed amount of seed on time in crisis situations. The result is also confirmed by Zewdie (2004).

Most of the respondents (25%) indicated the high price of seed on local market make it to be less preferred seed source than others. The issue of poor quality and adulteration is also raised by 17.5% and 17% respondents for sorghum and maize seeds respectively.As FGD discussants narrated, "because we go to local market on the time of seed shortage, the price of the seed will rise up and also the seed will be adulterated. However, we were forced to buy with its poor quality and high price." The study undertaken in western Hararghe (Chiro and Miesso) by McGuire (2002) also reported that the seed obtained from merchants is usually not pure.

The unavailability of required specific variety is one problem facing for 5.5% and 6.5% of respondents for sorghum and maize seed respectively. The finding of McGuire (2007) confirms this result. Explaining that merchants purchase the seed to be sold from different sources in the same or different localities, this leads to a bulk of varieties at once. Others like low productivity of the seed and unfair exchanges are also the problems faced while acquiring seed from local market.Even though there are not much NGOs operating in the study area, as key informants describe, organizations like FAO and Red Cross supported the farmers by providing seed aid where there was seed insecurity. The result of FGDs shows that in some KAs, nongovernmental organization (Mercy corps) is operating and serving the farmers by providing seed both for production and multiplication.

The survey reveals that 24.5% and 26% of respondents for sorghum and maize seed respectively believe that the seed supplied by NGOs have better quality. Also 20% and 17.5% of respondents for sorghum and maize seed respectively put the advantage of this source is that it is cost free. Seed is just simply distributed as aid. Despite the fact that farmers prefer freely distributed seed, the findings from key informants' showed that this would create a dependency syndrome among farmers. This implication is backed by Abdisa et al., (2001) who indicated that the distribution of free seed by NGOs and relief agencies has actually had several negative effects by creating

dependency on free services, disrupting the informal farmer-to-farmer seed exchange system, and weakening sustainable development in the seed subsector.

Respondents' views on the weakness of NGOs in providing seed were assessed. Out of the total respondents 17% and 18%, for sorghum and maize seed respectively describe this source has limitation on the amount supplied in relation to other sources. The seed gained from NGOs are not covering the demand of the farmers who earn from this source and they did not fulfil their required amount of seed for planting.

About 16.5% and 17% of respondents for sorghum and maize seeds respectively showed that there is a problem on the adaptability of the seed to the locality. In line with this, the results from FGDs also reveal that the seed provided by NGO failed to adapt the local environment. The problems related to specificity of variety, low productivity, poor quality and adulteration, and untimely supply are also faced in seed source.

In addition to specific advantages revealed on each sources discussants also pointed out the major strengths of the informal seed supply system that are availability of different sources, fast communication, trust among farmers, willingness to involve in seed multiplication activity and traditional methods of storage. The discussants put the weaknesses as lack of improved varieties in the system, unfair exchange, high price of seed and lack of knowledge. The existence of NGO, GOs, cooperatives, Haramaya University and Fedis Research Centre are found to be the major opportunities to be used.

4.5 Seed dissemination in the informal seed system

For both sorghum and maize seeds, the primary off farm sources are neighbours and relatives. About 16% and 10% of the respondents for sorghum and maize seeds respectively, usually acquire through gifts and barter/exchange base from their neighbours/ relatives.For 10% and 14% for sorghum and maize seeds respectively the means of earning is based on cash and barter in most of the time. As discussants illustrate, cash is involved only when farmers obtain the seed from local market and WARDO. The barter system is applied when transacting with neighbours

by exchanging the seed with other seed or seed with grain.Only 2.5% and 9.5% of the respondents were borrowing the seed from different sources. Loan system for maize seed is higher because farmers in the study area obtain improved maize seed based on credit basis.

4.6 Challenges to acquire seed

The study explores the challenges facing in relation to seed acquisition and prioritizes the major challenges to the rarely available challenges. Of the total respondents, 14% indicated that drought is the major challenge in their locality that constraint them to have the required amount of seed on the required time. As elaborated by discussants frequent droughts caused in their locality and this lead to weaken the informal seed supply system. When the farmers fail to harvest well in one year they were even forced to eat the saved seed.

The second challenging situation for 12% respondents in sorghum seed is the limited availability of improved sorghum seed. Whereas for maize seed there is already a supplied by the formal seed supplier (WARDO) but 12% respondents explain the time of delivery is not appropriate. This finding supported by Byerlee et al., (2007) who indicated that untimely delivery of seed is one of the shortfalls of Ethiopian formal seed industry.

As discussed earlier, farmers in the study area are highly depend on their own saved seed and sometimes the seed will be spoiled because it will wait in stock for a year or more. For 9.5% and 8% of respondents for sorghum and maize seed respectively, damage of the seed for the next season of planting is a main problem. Other challenges like famine, disease, unavailability of quality seed and limited amount of supply are also raised by the respondents of the survey.

4.7 Informal seed system in achieving seed security

A farmer is said to be seed secure when he/she has an access to seed of adequate quantity, acceptable quality and in the time of planting. The study assesses the availability of seed in proximity point of view and timely availability.

From the total respondents, 87.5% and 86.5% for sorghum and maize seeds respectively reported that seed is available on the near distance. This result is supported by focus group discussants and key informants. Farmers mainly obtain seed from their own stock and/or neighbours. Hence, the farmers are not expected to travel long distance to acquire seed. This can be seen as the strength of the informal seed supply system of the study area. The survey result indicates that 71.5% for both sorghum and maize growers' seed is available on the required time. Farmers in the study area have a practice to donate and exchange seed among themselves at the time of need. Seed exchange in the informal seed supply system is important in addressing seed insecurity and explains that availability is not generally a primary problem for farmers (McGuire, 2007). The findings of Juarez et al., (2007) also indicated selecting and saving own seed provide seed security.

The second attribute of seed security is access to seed which is measured by the ability of an individual to acquire or purchase the required seed. The results of key informant interviews indicate that farmers can easily access to local varieties because there is no cash based transaction. The results of McGuire (2007), elaborate this finding as, households lacking financial or social assets are vulnerable to seed access. By arguing that, the poorest often lack cash and other means of exchange and rely on free gifts of seed, which tend to be small quantities. However, the farmers in the study area also practice provision of free gifts makes seed more accessible to the recipients.

Farm families are seed secure when they have access to seed of adequate quantity, acceptable quality and on time for planting. The above two attributes (availability and access) should be supported with the right quality of seed.

Farmers in the study area mostly perceive quality from traditional point of view. The purity or cleanliness of the seed, high productivity, early maturity and local conditions adaptability are the main issues conceived as basis of quality among them. By having these criteria, the discussants of FGD explained that the seed acquired through informal seed supply system fails to satisfy the quality demands of the farmer.

4.8 Seed production and management practices

4.8.1 Seed multiplication

The data obtained using formal survey shows that 11% of respondents are involved in sorghum seed multiplication activity. For maize seed multiplication 21% respondents participated. Seed multiplication of maize is much greater than the sorghum. This result is confirmed with the information provided by Dawit (2010). The recommended multiplication activity was applied by most of the farmers in the study area because there is a strong follow up by the WARDO.

Table 2. Involvement in seed multiplication and source of seed for multiplication

Involvement	Sorghum		Maize	
	N	%	n	%
Yes	22	11	42	21
No	178	89	158	79
Total	200	100	200	100

The multiplied seed was expected to generate income for the farmers who invest more costs to multiply. The farmers who multiply improved seed can also sell their seeds by themselves or through local merchants, but the other farmers are not willing to offer better prices than the local seeds, probably due to their inability to differentiate the grain with the seed. Hence this low price condition leads the farmers who multiply improved seeds not to sell in the open market, rather use for themselves or share with neighbours and relatives. Moreover, farmers are not motivated to engage in seed multiplication and generate income by seed sales due to this reason.

4.8.2 Seed selection

Farmers seed selection criteria are some of the unique features of informal seed supply system. Whether the farmer is saving his/her own harvest or acquire from off farm sources, the selection will be made using traditional methods. A study undertaken in eastern Kenya on dry land crops by Muhammad et al., (2003) put the selection criterion of seed as grain size, resistance to pests and diseases, correct distance between nodes, number of nodes etc.

The methods of selection differ from one crop to the other. In order to select best sorghum seed farmer see the head of the crop whether it is big or not and the length of straw, the longest the better because it will be used as fodder. For the selection of maize, the stock should be filled by much seeds to be preferred and the colour of the seed also be counted as a criteria. Most of the respondents (31% and 37.5%) for sorghum and maize respectively describe the time of selecting the seed is from plants on the field. The discussants elaborate this result that the selection was made on own farm or on neighbours. If the neighbour's farm has much yield than own, the farmer will go to his/her neighbour to get that seed.

The survey result also shows that 20% and 14.5% of respondents for sorghum and maize seed indicate that the selection is made while the grain is harvested. Others like removal of the seed while using the grain for food preparation. The findings of Lewis and Mulvany (1997); Almekinders and Louwaars (2008) strengthen the results of this study that farmers use different timings for selection of seed which can be before and/or after harvest.

The results of FGDs show that seed selection in the study area is performed by both male and female. The discussants explained that "we both participate in seed selection activity because the female is involved in selecting own saved seed from harvested grain and when the seed is purchased from market. The male will be involved in the selection of seed while there is an exchange between farmer to farmer and also if the seed selection is done on threshing time". The selection of seed when threshing is undertaken is made by the male and this is proved by personal observation. In the selection process especially when the selection is done when the crop is at the field, the village elders who are skilled and experienced in seed selection (traditional seed experts) are invited to select the best seeds. These traditional seed experts include both men and women.

4.8.3 Seed storage

There are about six ways of storing applied in the study area. Of these six ways of storage mechanisms 49.5% and 52% respondents are storing their maize and sorghum seed in the living room respectively. This method of storing takes the highest share. This result supported by the

findings of Firew (2008) that reported farmers have various storage methods to keep the quality of the seed for the next cropping season. Of these methods storing threshed seed in sacks in the house is the major one. Of the total respondents only 10.5% and 8.5% respondents were bagging the maize and sorghum seed respectively and store it in a separate room.

About 18.5% and 19% respondents for sorghum and maize respectively hang up the seed up on the roof. Only 1% and 0.5% respondents for sorghum and maize seed respectively store it by hanging the seed on open air /outside the house. There are also other mechanisms like storing it in underground hall and also in the grain store.

The FGDs and key informant interviews revealed the advantages and disadvantages of the different types of storing mechanisms; explaining that each storage practices have its own advantage and disadvantage. ''If we store the seed underground it will be protected from theft and fire damage but the hall sometimes will be filled by water and there will be a colour change, quality deterioration, and fungus development. If the seed is kept up under the roof it will be protected from insect but there will be an over dry due to the smoke inside the house. Keeping the seed in the living room is also to protect it from theft''. This finding is supported by Louwaars and Almekinders (2008) by explaining the reasons why the farmers use such storing mechanisms.

Most respondents, 40.5% and 41% for sorghum and maize seeds respectively describe that seeds in stores most of the time are eaten by pests like weevils and rats. This is because of the inappropriate place of store and because farmers fail to use the required chemicals. About 32% and 31.5% respondents face a problem of pests in store plus the spoilage or over drying of the seed before the time of sowing. McGuire (2007) also indicated that farmers use different locations for different reasons; however losses to pests, moisture and seed borne diseases do occur.

Lack of appropriate storage and lack of knowledge and skill about store keeping are also described as challenges faced in relation to storing seed. The lack of good storage facilities and knowledge leads to loss of seed viability (Kiwanuka and Kintu, 2004). The FGD discussants also

raised that, there is no supply of chemicals to use for storing seed and this creates the spoilage and the quality losses in the store.

4.9 Institutional framework and actor linkages

4.9.1 Institutional frameworks

Any system can be influenced by institutions in it. The informal seed supply system also has a strong linkage between the available different institutions in the community. The study assesses the existing informal institutional frameworks from gender, knowledge and information perspective.

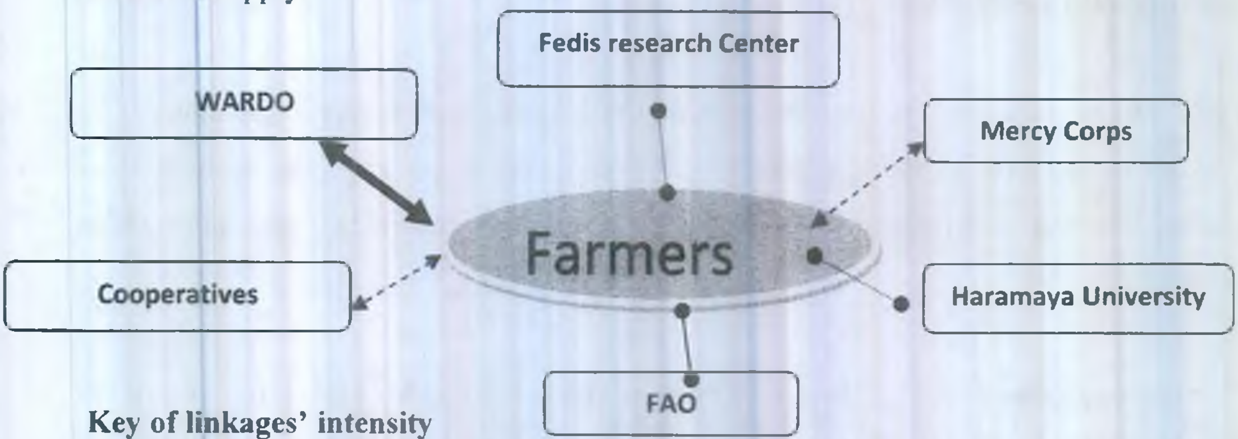
As a norm related to seed exchange there is a common saying in the study area, "you cannot say no for a bull and seed". So by having this norm if one farmer runs out of seed his/her neighbour should give him/her as a gift. This norm has derived from the ancestors and it is still applied in the study area. The one who fails to do this he/she will be socially neglected. The study in western Hararghe confirms the availability of this norm. As McGuire (2005) explain, farmers recognize that having appropriate seed and oxen for ploughing at a right time strongly affects yields, and see the supply of seed and oxen to those in need as an essential support to their livelihoods. Social norms stipulating that nobody should be denied seed, traditions of mutual aid, patron-client relationships, and the links between seed insecurity and poverty suggest that seed exchange forms part of a moral economy.

In the farmer to farmer seed exchange system there is an information sharing activity. Most of the respondents (85%) explain that they exchange their knowledge on different means. Discussants explain that when there is an exchange of seed or when there are informal discussions they share their knowledge experiences on the local or improved seeds.

4.9.2. Actor's linkage

Different actors involved in the seed supply system of the study area. Of these farmers, governmental organizations, nongovernmental organizations and community based organizations

are the main actors. The main actors involved in the informal seed supply system are farmers. Because in such systems, farmer saved seed and farmer to farmer seed exchange is the dominant source of supply.



Key of linkages' intensity

Strong linkage Medium linkage Weaklinkag

The discussion with key informants and discussants revealed the actors involved in the informal seed supply system with their intensity of linkage with main actors of the system (farmers). The intensity of linkage of actors other than WARDO is found to be medium and weak. Rubyogo et al., (2007) reported that one of the short coming of in the local seed system is inadequate linkage of to the sources of improved varieties.

Table 3. Actor linkage matrix

Actor	Farmer	Cooperative	Mercy Corps	FAO	WARDO	Fedis research center	HU
Farmer		input supply (seed, fertilizer, credit), marketing of seed and produce	Seed supply, technical support, monitoring, storage supply	Seed aid	Seed supply, technical support, facilitation of supports	provision of new technologies to be adapted	Nil
Cooperative			channel for seed provision and marketing,	Nil	technical support	Nil	Nil
Mercy corps				Nil	information about the demand, facilitation support	technology development / storage	Seed testing selection, provision and research works
FAO					measure the background of drought and seed aid	information	Nil
WARDO						technology distribution and information exchange	Nil
Fedis research center							collaborative researches and reviews
HU							

4.10 Conclusion and Recommendations

Even though farmers obtain seed from both formal and informal sources, the informal source is the dominant one. The study identified that the major sources of the informal seed supply system

and found out that most of the time farmers use their own saved seed/grain for the next year sawing. There are also off farm sources like neighbours/ relatives and local seed/grain markets.

The study assesses the major strengths and weakness of the informal seed supply system of the district. Easily availability and accessibility of seed, traditional knowledge for selection and storing are some of the strengths of the system. Of the weaknesses, the poor quality of the seed/grain, unavailability of storage and lack of technical knowledge are the major ones. The existence of NGO, the proximity of the district to the research centre and the university and the existence of farmer based community organizations are the main opportunities to be used to strengthen the informal seed supply system of the district.

The results of the study revealed the challenges related to seed related issues faced by farmers in the study area. The main challenge faced by the system is related to the supply of improved seed. Seed supplied by the formal source (WARDO) is not on the required amount and the time. Challenges related to storage are also weakening the functioning of the informal seed supply system. Natural hazards like drought and famine are also the challenges faced by the system.

The actors involved in the system were also identified; and of these, farmers, NGOs, GOs and cooperatives are the main. The support of these actors apart from the farmers in the system is in a very limited extent. The results of the study indicate that the linkage between different actors who are involved in seed supply system is very weak. In order to assist the informal seed system the integration of these actors is very essential. So relevant agencies and these actors should create a mechanism to strengthen their linkage to improve the informal seed system.

The study revealed that there are traditional seed experts (who are knowledgeable) in selection of good seeds. Also there is a threat of being exposed to seed insecurity due to drought and other environmental causes. So GOs and NGOs in the study area should organize the traditional experts, train them and form community seed banks. This will minimize and gradually eliminate the threats of being seed insecure. The organization of this community seed banks will help in assisting the farmers by conserving drought resistant varieties, providing appropriate storage service, multiplication of improved varieties and dissemination.

Farmers who are engaged in seed multiplication are not compensating the costs incurred during the production process. So GOs and NGOs who are involved in supporting the multiplication activity should give high attention to the marketing of the multiplied seed. To develop market, authority should be provided to the WARDO to be engaged in certification of multiplied seed therefore the farmers who are involved in seed multiplication can sell the multiplied seed in and out of the district easily.

The major problem seen in the study finding is untimely supply of improved seed. So, community based organizations like cooperatives need to be strengthened by providing technical, financial and material supports.The presence of farmers' research groups and traditional seed experts is an opportunity to be used. The group and skilled farmers should collaborate with researchers in technology development of new varieties of agencies like Haramaya University. Understanding the criteria that farmers use to evaluate new crop varieties allows the breeders to set effective priorities and target different breeding strategies suitable to the locality. And a strong coordination should be formed with the nearby (Fedis) Research Centre as well.

The district agricultural office should support the informal seed supply in the district by providing the required amount of improved seed needed on time and by building the capacity of farmers in seed related activity. In addition to supply of improved varieties the office should be engaged in supply of pesticides and other chemicals for storages.

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Phytoplankton Composition and Abundance of Shesher And Wolala Wetlands: Fogera Floodplain, Ethiopia

Tarekgne Wondmagegne*. Ayalew Wondie** and Minwyelet Mingist***

*Debre Markos University Department of Animal Science (email: wtarekgne@yahoo.com, or tarekegnw@gmail.com. Tell: +251913226471); **Bahir Dar University Biology Department

*** Bahir Dar University of fisheries, wetland and wildlife department.

Abstract

The study was conducted at eastern side of Lake Tana in Shesher and Wolala floodplain wetlands from July, 2009 to May, 2010 for four seasons (rainy, post-rainy, dry season and pre rainy season). The study aimed to investigate the spatial and temporal dynamics of phytoplankton photosynthetic production and biomass in relation to physicochemical conditions of the water column. Physicochemical parameters such as temperature, dissolved oxygen, total dissolved solids, pH, conductivity, water transparency (Secchi depth), nitrate, phosphate and silicate were measured in both wetlands at two sampling sites(littoral and open water). Temperature, dissolved oxygen, conductivity and Secchi depth showed highly significant temporal variation ($P<0.01$) and also nitrates, phosphate and silicate exhibited significant temporal variation ($P< 0.05$) however, there was no significant spatial variation ($P>0.05$). About 37 phytoplankton species were identified and grouped into 7 taxa. The green algae was the dominant group and contributed over 50 and 52 % of the total assemblage of phytoplankton in Shesher and Wolala floodplain Wetlands, respectively; and the dominant species were Pediastrum spp (43%) and Closterium spp. (46%) in Shesher and Wolala floodplain Wetlands, respectively. Diatoms and blue green algae were the second and the third dominant groups of phytoplankton, respectively. Cyclotella spp and Melosira spp were the representative species of diatoms in Shesher and Wolala, respectively. The Microcystis spp were the dominant in blue green algae Specie. The average gross primary productivity of Shesher and Wolala was 10.5 and 7.7 mgl-1 d-1, respectively, and phytoplankton productivity in terms of chl a was 67.51 and 90.64 µgl-1 for Shesher and Wolala, respectively. The peak concentration of chlorophyll a was observed in pre-rainy season which coincided with the phytoplankton abundance especially that of Microcystis spp. Overall, Shesher and Wolala are so productive although they were threatened by high silt load from mismanaged catchment and anthropogenic impact (farming activity and small scale irrigation) in the area. As the rice farming dominates the area, it might be considered as an opportunity for integrated fish farming which will also contribute to protect the ecosystem from being degraded. Therefore, the "wise use" concept should be important to maximize efficient utilization of the resource by developing environmentally sound strategic plans.

Key words: Anthropogenic impact, Integrated fish farming, Spatial and Temporal dynamics, Wise use

1. Introduction

Temporal variability in the structure and function of phytoplankton community have fundamental importance to the metabolism of an aquatic system (Calijuri et al., 2002). Aquatic environments are subject to high temporal variability, with frequent reorganization of the relative abundance and species composition of phytoplankton as a result of the interactions between physical, chemical and biological variables (Reynolds, 1990). In floodplain wetlands, there are additional factors owing to the hydrodynamic differences arising from the location, morphometry and the main function of a given system. The hydrological cycle, which determines precipitation, governs the flooding extent and theoretical water retention times in the system, generating 'pulses' of material and nutrients in suspension, material cycling and biomass losses (Calijuri, 2002). The study of changes in phytoplankton biomass, species composition and primary production in water bodies is, therefore, fundamental to the understanding of both water quality and fisheries (Taylor et al., 2002). Furthermore, fish yield depends on the primary production of phytoplankton, particularly in water bodies in which fish fauna is primarily composed of planktivorous species such as tilapia (FLDP, 1998).

Many studies have been done on the community structure and primary production of phytoplankton in various East African Lakes and reservoirs (Talling and Lemoalle, 1998) however non-perennial floodplain reservoirs were given less attention. The trend is similar in Ethiopia, which has several floodplains however the rift valley lakes and some highland lakes have a better look at; and also few studies which were conducted on the phytoplankton of Ethiopian reservoirs (Hadgembes Tesfay, 2007).

Shesher and Wolala floodplain Wetland are highly exposed to degradation because of unwise utilization of the water resource. Thus, to alleviate this mismanagement of the resource, awareness creation is very important then the potential should be determine. Therefore the aim of this study was to assess the phytoplankton composition, abundance and productivity and to evaluate the fisheries potential of Shesher and Wolala Wetlands.

2. Materials and Methods

2.1.Description of the Study Area

Shesher and Wolala floodplain wetlands are located in eastern side of Lake Tana with in Amhara Regional State, South Gondar Province of Fogera Woreda in Nabega Keble. They are 620 km far away from Addis Ababa which are situated at 11058'00" N latitude and 37041'00" E longitudes. The Woreda has area coverage of 117,405 ha with an altitude of range between 1774 m a.s.l. and 2410 m a.s.l and its mean annual rainfall 1216.3 mm (Bogale Kibret, 2008). Its annual temperature ranges from 22 ºC to 29 ºC (see map 1 below). The estimated area of wetlands in the Woreda is 25052 hectares; out of this 2000-3000 hectares are flooded and wet all year round (EWNRA, 2005). Most of the eastern portions of the Shesher and Wolala Floodplain wetlands were ploughed when the water shifts ("Bahir Shesh") and canalization were made for irrigating field crop. As a result, the ponds water surface shrinks from time to time when post rainy season ends and they diminish their size until the main rain starts. Nowadays, the water sources for Shesher and Wolala floodplain wetland ponds are precipitation, over flow of Lake Tana and the top up over flooding of Rib River although the obstruction of the Rib River reduces the inflow of those water bodies.

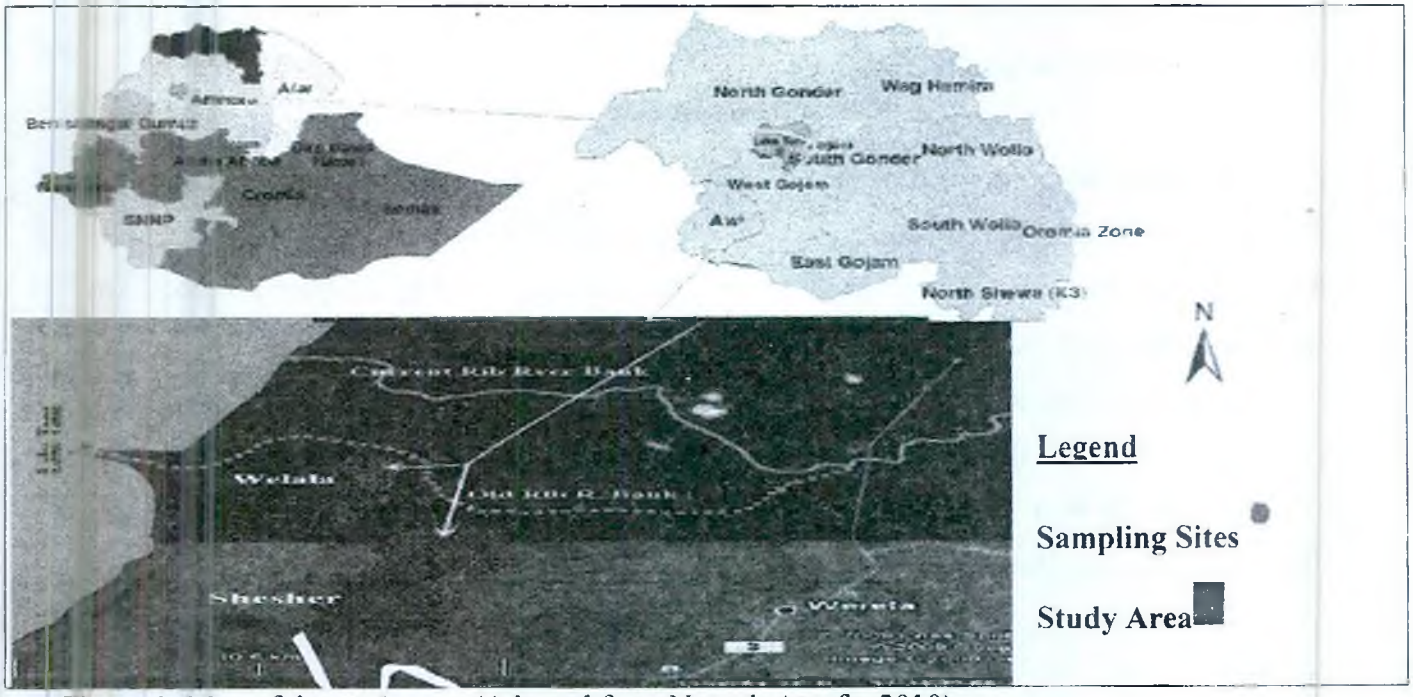

Figure 1. Map of the study area (Adapted from Negash Atnafu, 2010)

The research was conducted from July, 2009 to May, 2010 for four seasons (rainy season from July – September; post rainy from October –November; dry season from December – April; pre-rainy season from May – June). There were four sampling sites from littoral and open water of each wetland. GPS was used to fix the sites that the samples were taken. The sampling time ranged from 10:00 am to 3:00 pm when there was optimum radiation of sun.

Physicochemical Parameters

Temperature and Dissolved Oxygen (DO) were measured by Combined Portable Oxymeter Probe (OXY-315WTW 8262). pH, Total Dissolved Solids (TDS) and Conductivity were measured by combined portable pH, TDS and Conductivity meter probe (Syberscan PC 300: Wetzel & Likens, 2001). Transparency of the pond was measured by Secchi-disk of 20 cm diameter with alternate black and white color.

Major nutrient ions such as nitrate, phosphate and silicate were measured using HACH spectrophotometer. Nutrient analysis were made from water samples filtered through Whatman GF/C 47 mm. Estimation ion concentrations were measured in the field immediately after

collecting the speciments using portable spectrophotometer (Hack Kit, DR/2010) following the instruction of the manufacturer.

Phytoplankton Sampling

Phytoplankton community were sampled by integrating with Van Dorn water sampler and filtered through plankton net of 55 µm. The phytoplanktons were equally sampled and pooled at each sampling station and then the samples were preserved with lugol solution. In each sample, 100 ml was allowed to settle in graduate cylinder overnight and the supernatant was siphoned till 10 ml remained. From the remainder concentrated sample 1 ml was used in a Sedgwick-Rafter Cell of which 100 microscopic field were counted for major species. Identification was based on Prescott (1962) and slides from Internate sources. The relatively short settling time ca. 20 hr (Ayalew wondie et al., 2007) would have a probabilty of underestimating small algal species in the phytoplankton. The samples were observed by Olympus type Microscope (100x). According to Wetzel and Likens (2001), Cells/individual per one ml of sub sample was computed.

Chlorophyll a

Chlorophyll a concentration was measured from litoral and open water. From each site, 250-500 ml of the pondwater was filtered through Whatman GF/C 47 mm. The filters were folded with alluminium foil, labeled and transported to the laboratory in an ice box which was stored not more than one day. Pigments were grinded and extracted in 90% acetone. After grinding, the algal material were centrifuged. Then, the extract was decanted in to 5 ml cuvette and the absorbance of chlorophyll a at wavelength 665 and 750 nm were measured spectrophotometrically before and after acidification. The concentration was done according to Wetzel and Likens, (2001).

Primary productivity

Primary productive were measured by Winklwer methods with 3 hr incubation during midday (10:30 am-2:30 pm). The water samples were integrated along depth with one depth profile because of shallowness of the floodplain wetlands. Winkler a & Winkler b Fixier chemicals were used to fix the oxygen from intial, light and dark bottels. After fixation, sulferic acide was added to stop any biological activity and mixed thoroughly. Then the incubated bottels were

taken to laboratory for titration. Calculations of gross and net photosynthetic rates and respiration rates were done based on the change in oxygen concentration bettween intial(I), light(L) and dark (D). Gross primary productivity (GPP) = (L-D)/3hr =mgO2/l-1 h-1, Net Primary Productivity (NPP) = (L–I)/3hr= mgO2/l-1 h-1 and Respiration/R/ = (I-D)/3hr =mgO2/l-1 h-1 (Wetzel and Likens, 2001). The results were extrapolated in to daily production of the wetlands and the day length was taken at 10 hrs (Ayalew Wondie et al., 2007).

Data Analysis

Spearman correlation was used to show the relationship between physicochemical parameters and phytoplankton. Kruskal-Wallis test was applied to show spatial and temporal variation. Data analysis was done with Statistical Package for Social Science Students (SPSS Inc., software version 16.0) and Microsoft Excels.

3. Result

Physicochemical Parameters

Most of the Physicochemical parameters did not show significant variation along sites with Kruskal Wallis Test ($P>0.05$). However, there were significant variation among seasons especially with temperature, dissolved oxygen and conductivity (Table 1, $P<0.01$). The range of minimum and maximum temperature was recorded 22.00 0C and 27.20 0C, respectively, with slight variation of the two floodplain wetlands. Among the parameters, very high seasonal variation was observed on conductivity and its minimum and maximum values were 50 and 255 µs/cm, respectively ($p=0.000$). The dissolved oxygen was found in the range of 5.05 _ 11.39 and 4.43 _ 7.79 mgl-1 in Shesher and Wolala, respectively. Transparency was found to be very small which was more pronounced at main rainy season and its range was 3-14cm. It showed also strong significant temporal variation ($P<0.01$).

Table 1. Environmental parameters and their mean ± SD per season of Shesher and Wolala Wetlands

	Shesher				Wolala			
	MRS	PORS	DS	PRS	MRS	PORS	DS	PRS
T (^{0}C)	24.3±0.32	26.80±0.1	22.5± 0.5	23.93±1.3	26.73±0.5	25.5± 0.4	23.3±1.3	25.5±0.2
DO (mg/l)	5.2± 0.16	7.59±0.38	10.4±1	5.8±0.14	6± 0.3	4.98±0.1	7.58±0.21	4.73±0.3
Conductivity (µs/cm)	57.5± 6.45	173.3±10.4	247±6.8	249.5±5.3	80.75±3.0	150±4.1	222.5±6.5	197.3±0.2
pH	6.74± 0.12	7.32±0.1	7.23±0.2	8.54±1.05	6.43± 0.3	7.02± 0.0	7.87±0.1	6.8± 0.3
TDS (ppt)	0.02±0.01	0.08±0.01	0.16±.03	0.12±0.01	0.04± 0.0	0.21±0.3	0.14±0.03	0.4±0.4
Secchi-Depth (cm)	3.00±0.00	13.0± 0.41	9.50±0.9	8.75±2.06	3.0±0.00	14.0±0.4	10.25±0.5	9.50±2.7
NO_3-N (mg/l)	3.06±0.3	0.24±0.0	1.26±0.2	0.25±0.1	2.09±0.6	0.16±0.0	1.06±0.06	0.38±0.03
P O_4-P (mg/l	0.74±0.04	0.00±0.0	0.2±0.04	0.68±0.59	3.32±0.6	0.16±0.0	0.04±0.07	1.18±0.12
SiO_2 (mg/l)	8.48±0.67	0.22±0.01	0.00±0.0	0.55±0.01	19.36±0.7	0.00±0.0	0.00±0.0	0.76±0.01

MRS=main rainy season, PORS=post-rainy season, DS= dry season, PRS= pre-rainy season, T=temperature, DO=dissolved oxygen, TDS=total dissolved solids and SD= standard deviation.

Major nutrient such as nitrate, phosphate and silicate showed temporal variation (sig. $p<0.05$). There was maximum record of all those parameter on main rainy season (MRS, August. 2009) for both wetlands (the minimum and maximum range of nitrate, phosphate and silicate at Shesher were 0.17_3.06 mg/l, 0.16_0.74 mg/l and 0.00_8.48 mg/l, respectively and that of Wolala were 0. 16_2.1 mg/l, 0.03_13.32 mg/l, 0.00_19.36 mg/l, respectively; Table 1). However, at the end of rainy season all nutrients showed very small concentration. After main rainy season silicate was found to be much lower than nitrate and phosphate. Spatial variation of these parameters were shown to be non-significant at $p>0.05$.

Phytoplankton composition and abundance

The list of phytoplankton was grouped under 7 classes with 36 genera/species which were being identified in the study period from Shesher and Wolala floodplain wetlands (fig. 2; Table 2). These included 4 genera of blue green algae, 18 genera of green algae, 10 genera of diatoms and 4 other groups which had single representative genera. The most diverse and abundance group was Chlorophyceae (Green Algae) which had over 50% of the coverage from the total phytoplankton diversity of Shesher and Wolala wetlands.

From green algae, Pediastrum spp., Actinastrum spp and Closterium spp were the dominant species in Shesher with abundant proportion of 41%, 26% and 11%, respectively (fig.3a) and Closterium spp and Pediastrum spp were also dominant in Wolala with abundant proportion of 46 and 19 %, respectively (fig.3b). The second dominant groups were the diatoms in both wetlands (fig.2). The most abundant species in this group were Melosira spp which accounts 73% of the total diatoms of Shesher (fig.4a) and that of the Wolala was Cyclotella spp (48%; fig.4b).

The third prominent group was the blue green algae which were more represented by Microcystis spp. from both wetlands with abundant percentage of 69 and 95% from Shesher and Wolala respectively (fig.5). It was also the top of all phytoplankton genera in its numeric density. The rest groups were represented only with one species (Chrysophyceae with Mallomonas spp, Euglenphycea with Euglina spp, Desmidieae with Cosmarium spp and Dinophyceae with Peridinium spp; Table 2). Generally, in main rainy season the composition and abundance were low and the rest of the seasons showed a slight increase in composition and a considerable increase in abundance during the study period of the phytoplankton. There was a strong negative relationship between blue green and nitrate (r2 =-0.842; P=0.000; Table 3). There was also a moderately negative correlation between diatoms and silicate (r2 =-0.624; P=0.01; Table 3).

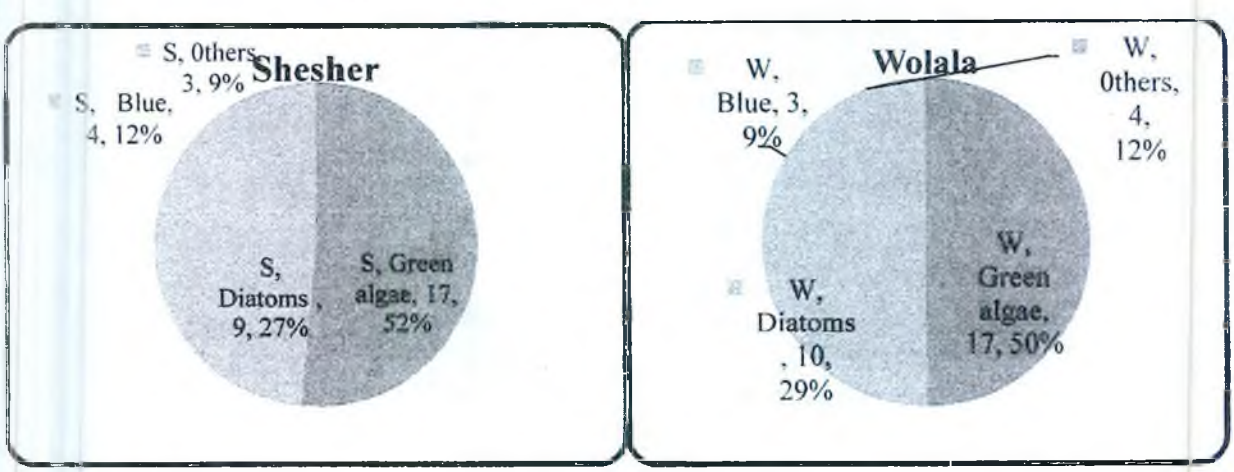

Figure 2. Total abundance percentage of major phytoplankton taxa of Shesher and Wolala floodplain wetlands during the study period

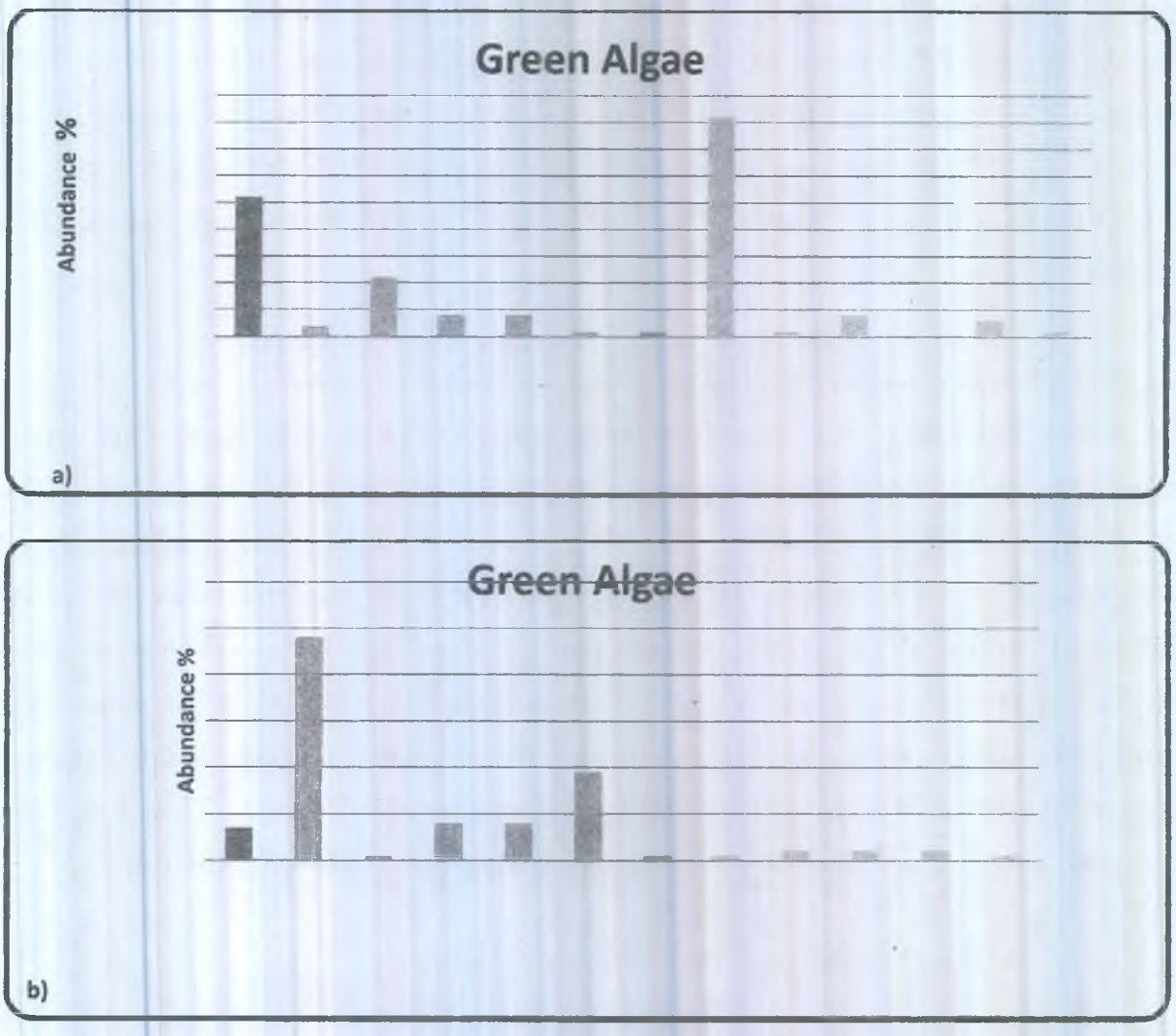

Figure 3. Abundance Percentage of green algae in Shesher (a) and Wolala (b) floodplain wetlands

Figure 4. Abundance percentage of diatoms in Shesher (a) and Wolala (b) floodplain wetlands

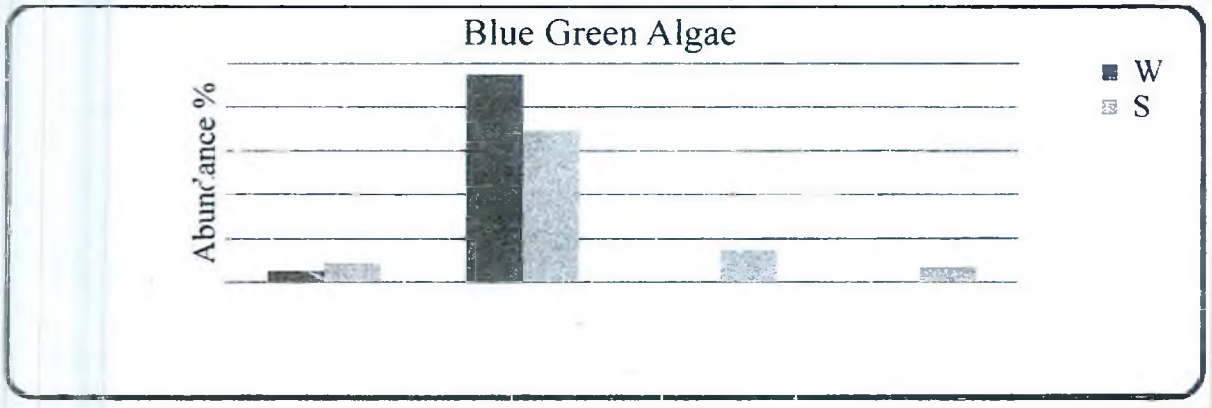

Figure5. Abundance percentage of Blue Green Algae in Shesher (S) and Wolala (W) floodplain wetlands

Table 2.Major Taxa of phytoplankton identified in Shesher and Wolala wetlands during the study period.

Cyanophyceae(Blue green Algae)	**Chlorophyceae (Green Algae)**	**Bacillariophyceae** (Diatoms)
Anabaena sp.c	*Actinastrum sp. **	*Cyclotella sp. ***
*Microcystis sp. ***	*Ankistrodesmus sp.*	*Cymatopleura sp.*[c]
*Oscillatoria sp. * c*	*Chlamydomona sp.* [a]	*Cymbella* sp.[b]
Phormidium sp. [ac]	*Closterium sp. ***	*Melosira sp. ***
Chrysophyceae (Haptophyceae)	*Coelostrum sp.*	*Navicula sp* [c]
Mallomonas sp.	*Cruciginia sp. **[c]	*. Nitzscha sp. **
Euglenphycea	*Eudorina sp. **[c]	*Pinnularia sp.*
Euglena sp.	*Kircherella sp.*[c]	*Surirella sp.*
Desmidieae	*Monoraphidium sp.*	*Synedra sp.*
Cosmarium sp. [bc]	*Oocystis sp.*	*Tabellaria sp.*
Dinophyceae (Dinoflagellates)	*Pandorina sp.*[c]	

Peridinium sp.	*Pediastrum sp.* **	
	Phacus sp.	
	Schroederia sp.	
	Sendesmus sp.	
	Sphaerocystis sp. [b]	
	Staurastrum sp.	
	Volvlox sp.	

a=Species present only in Shesher, b=species present only in Wolala, c= species not present in L. Tana, *= dominant,** = most dominant species.

Table 3. Correlation of major groups of phytoplanktons and major nutrients of Shesher and Wolala Floodplain wetlands, r^2=correlation coefficient, sig. = significant value

		Green	Diatoms	Blue
NO_3-N	r^2	0.047	-0.287	-0.842**
	Sig.	0.862	0.281	0.000
	N	16	16	16
PO_4-P	r^2	0.032	-0.471	-0.186
	Sig.	0.905	0.065	0.490
	N	16	16	16
SiO_2	r^2	-0.126	-0.624**	-0.428
	Sig.	0.643	0.010	0.099
	N	16	16	16

** Highly significant at the 0.01 level

Chlorophyll a and Primary Productivity

The chlorophyll *a* concentration in the two wetlands was within the range between 5.39 and 217.83 μg l^{-1} and showed marked seasonal variation (Fig.4; $p<0.01$). The highest chlorophyll *a* concentration was recorded in the Pre-rainy season. The mean value of Shesher and Wolala were 67.51 and 90.64 μg l^{-1},respectively. Chlorophyll *a* concentrations were higher in Wolala than Shesher although the variation between them was not significant ($p=0.36$). There was also no relationship between the chlorophyll *a* and transparency (Secchi-disk depth) of the two floodplain wetlands ($r^2=0.12$, P=0. 64).

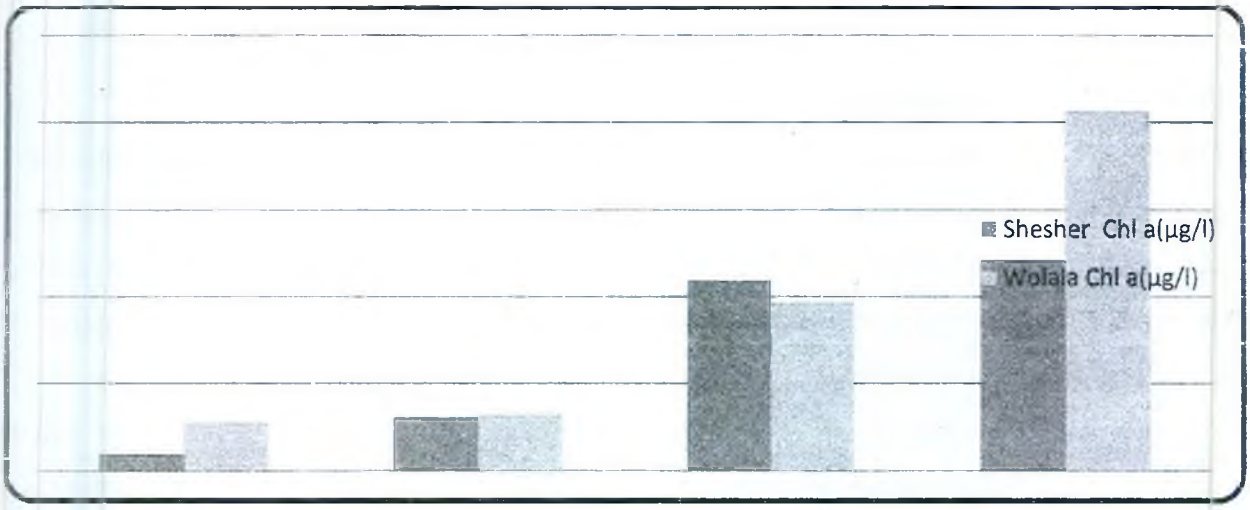

Figure 6. Spatial and temporal dynamics of Chlorophyll *a* of Shesher and Wolala floodplain wetlands

Gross Primary Productivity (GPP) of Shesher and Wolala varied between 1.2 and 19.8 mg O_2 l^{-1} d^{-1} (av.10.5 and 7.44 mg O_2 l^{-1} d^{-1} for Shesher and Wolala, respectively) and showed distinct significant seasonal variation ($P<0.05$). The maximum record was observed in dry season (January, 2010) in both Shesher and Wolala. The average Net Primary Productivity (NPP) was 7.7 mg O_2 l^{-1} d^{-1} for Shesher and 3.65 mg O_2 l^{-1} d^{-1} for Wolala and had the same seasonal pattern with that of GPP (Table 4). There were a strong relationship between GPP and chlorophyll *a* ($r^2=0.97$, P= 0.00). In pre-rainy season, due to absence of incubational depth, the primary production was not determined. The maximum depth was less than 25 cm with high inconstancy of water level.

Table 4. Mean spatial and temporal record of gross primary productivity and photosynthetic biomass of Shesher and Wolala floodplain wetlands. Gross productivity (GPP), Net primary productivity (NPP), Respiration (R) in mgO_2 $l^{-1}d^{-1}$and Chlorophyll *a* (Chl *a* (µg/l)

	Shesher				Wolala			
Season	**GPP**	**NPP**	**R**	**Chl *a***	**GPP**	**NPP**	**R**	**Chl *a***
MRS	1.2	0.6	0.6	9.25	1.8	0.84	0.96	27.5
PORS	1.88	0.13	1.75	30.3	2.95	1.25	1.70	31.52
DS	19.8	14.8	5	109.31	13.0	10	2.7	97.07
PRS	-	-		121.2	-	-	-	206.47

4. Discussion

Physicochemical parameters

The highest value of major nutrients (phosphate, nitrate and silicate) would have seasonally a great variation which revealed the inflow of contaminants from miss-managed watershed catchment to these wetlands. All the major nutrients were observed to have high concentration during the rainy season. Among those nutrients, silicate showed a considerable high concentration during the rainy season and was almost nil during the post rainy and dry season. The nutrient concentration was affected by the abundance of phytoplankton. The silicate concentration showed a negative correlation with diatoms because of high consumption rate and similar relationship was found between nitrate and blue green algae. The dynamics of the nutrients were also more influenced by the hydrodynamics of the two wetlands which was highly affected by natural condition (rainfall, evaporation) and anthropogenic effect (canalization and farming practice inside both wetlands).

Phytoplankton Composition and Abundance

Seven phytoplankton taxa namely, green algae, diatoms, blue green algae, Desmidieae, Euglenphycea, Dinoflagellates, and Chrysophyceae and 36 genera/species were identified in the present study (Table-2). The species compositions of phytoplankton of Shesher and Wolala with some exception were almost similar to Lake Tana, however, the diversity was very low (85 species; Ayalew Wondie, 2006). Green algae contribute the greatest proportion in terms of % numerical density (over 50%) than other phytoplankton groups in Shesher and Wolala with persisted in appreciable numbers for a relatively longer period of time in all sites.

Temporal changes in the dominance of algal groups were observed in the phytoplankton community in Shesher and Wolala. In main rainy season (August, 2009) the species composition and biomass were low this might be the increment of turbidity due to high precipitation and over flooding of Rib River as well as Lake Tana that deposited hug amount of silt and sediment. On the other hand, much of the areas of the Shesher and Wolala were water less in the long dry season as a result in the rainy season, the two wetlands were started to fill their maximum volume. This phenomenon would probably create a gap in phytoplankton succession. Therefore,

the only dominant taxa in the rainy season were green algae (Actinastrum spp.) and then next dominant were diatoms (Cyclotella spp.) in both Shesher and Wolala that with stand the above ecological constraints. After the rainy season the composition of the species were also dominated by green algae and increase with uniform fashion although minor decreases in composition were observed in pre-rainy season. However in numeric density, there was a shift from green algae to blue green algae during the post rainy season. This would have probably related to the availability of nitrate which was also supported by their correlation (blue green vs. nitrate) and showed strongly negative relationship because of high consumption rate ($r2=-0.842$, $p<0.01$, Table 3).

In the dry and pre-rainy season the composition and the abundance shifted to green algae. There was also a r. duction exhibited by Cyanobacteria which was pronounced in the dry season (from the total popul.tion only 6% were observed) flowing the decrease temperature and nutrient depletion. Then it rose with considerable amount during the pre-rainy season which was supported by the reduction of wa'er volume of the wetlands due to high evaporation rate that leaved the nutrient concentration to increase. The small amount rainfall would have probably washed in nutrients into the water bodies. The above reason was supported by the presence of Microcystis spp which dominated the whole sample in both wetlands. Diatoms showed a general reduction through the study period although their maximum record was observed in dry season (contributes 51% of the total population of diatoms). The reduction of diatoms might be the result of high sedimentation of silica to the bottom surface during the post-rainy season and then availability of silica would be low. The correlation of diatom with silicate showed moderately negative relationship ($r2=-0.624$, $P<0.010$; Table 3) which indicated that there might be consumption of silicate. The predation of the diatoms through phytoplanktivore zooplanktons may be one of the reductions of their abundance. Most of the diatoms probably sink when there is low turbulence in the water column (Hutchinson, 1967).

Chlorophyll a

Chlorophyll-a (Chl a) concentrations varied widely across season of both Shesher and Wolala ($p<0.001$). The mean phytoplankton biomass in terms of chlorophyll a of Shesher and Wolala was recorded as 67.52 and 90.64 μ g l-1 respectively. As compared to Uba and Ruwe floodplain

lakes in Tanzania (av. 42.43 and 31.38 μ g l-1 of Uba and Ruwe floodplain lakes, respectively; Ramadhan, 2003) and Lake Tana (ranged from 0.03 to 13.44 μ g l-1 Ayalew Wondie et al., 2007), these two wetland ponds had high chlorophyll a (Chl a) concentration. They were also much productive than the three productive lakes of Rift valley (Ziway, Awassa and Chamo Chl a showed an average value of 40, 20, and 30 μ g l-1 for the three lakes, respectively; Girma Tilahun and Ahlgren, 2009).

The correlation coefficient revealed that there was weak positive relationship between chlorophyll a and nitrate and phosphate (see Appendix 1, r2=0.3 and 0.2 respectively). There was also similar result from Lake Tana (r2=0.17 and 0.1 for nitrate and phosphate, respectively; Ayalew Wondie, 2006). Bennion and Smith (2000) reported that the relationship between total phosphate and chlorophyll-a is expected to be weaker in shallow reservoirs/lakes, where total phosphate is often largely particulate due to sediment re-suspension, and thus a small proportion of total phosphate is biologically available. Temperature had moderately correlated with chlorophyll a (r2= 0.69) and would have influential effect on the biomass of phytoplankton. Chlorophyll a had also weak relationship with water transparency. This situation is so similar to the nearby water body Lake Tana. This implies that water transparency was only controlled by the concentration of suspended silt rather than the phytoplankton.

The lowest phytoplankton biomass measured as Chl a was observed in main rainy season (August, 2009) at both stations. This seasonal minimum of Chl a coincided with a period of heavy precipitation that resulted in land runoff which brought particulate materials into the floodplain wetlands with consequent reduction in light penetration even though inflow contaminants were very high. The occurrence of low phytoplankton biomass in lakes during periods of heavy rainfall is not unusual and has been reported for Lake Victoria (Lungayia et al., 2000). The peak in phytoplankton biomass which was observed in pre-rainy season (May, 2010) for both ponds, coincided with in a slight increase of nitrate and phosphate levels due to high evaporation rate that left the nutrients to be concentrated. The abundance of Microcystis spp. had also a responsibility of increasing of the Chl a biomass.

Gross primary productivity

As high temperature and light throughout the year allow for primary production to occur all year round in tropical lakes (e.g. Dusart et al., 1984, Lewis, 1987) and expected to have persistent productivity. However, there are factors that influence the primary productivity: turbidity and nutrient availability because of the incoming of flood source silt and sediment from the degraded catchment. In this study the average gross primary productivity (GPP) was 10.5 and 7.44 mg O2 l-1 d-1 for Shesher and Wolala, respectively. As compared to Lake Tana (av. 3.4 mg O2 l-1 d-1; Ayalew Wondie et al., 2007) and Lake Kuriftu (av. 4.04 mg O2 l-1 d-1, Zelalem Dessalegn, 2007), Shesher and Wolala had higher average GPP. This might be due to high available nutrient concentration which was assisted by the shallowness of the ponds and evaporation that leaved the nutrient to be concentrated. However, they were less productive than Koka reservoir (av. 14.4 mg O2 l-1 d-1; Hadgembes Tesfay, 2007). The mean oxygen consumption rate of Shesher and Wolala during the incubation period was 2.45 and 1.79 mg O2 l-1 d-1, respectively and it was higher as compared to most of African lakes (av. 0.5; Ayalew Wondie, 2006).

The maximum (19.8 and 13.0 mg O2 l-1 d-1 for Shesher and Wolala) gross photosynthetic rate at light -saturation was observed in dry season (January, 2010) coinciding with a phytoplankton biomass of 109.31 and 97 µg l-1 of Shesher and Wolala, respectively while the lowest gross photosynthetic rate (1.2 and 1.8 mg O2 l-1 d-1 at Shesher and Wolala, respectively) was observed in main rainy season (August, 2009) associated with a biomass of 9.25 and 27.5 µ g l-1 of Shesher and Wolala, respectively. GPP were strongly correlated with Chl a which would probably coincide with phytoplankton abundance. The low gross photosynthetic rates at light-saturation were associated with a period of the main rainy season during which runoff brings particulate materials that reduce light penetration (Table 4).

In the overall result, the phytoplankton biomass, primary productivity and their abundance reveal that these wetlands are productive in nature even though their hydrodynamics had a great influence. Hence, the high nutrient level coincided with high phytoplankton productivity and this lead to high production of zooplankton as a result there could be a probability of high fish production. As rice production is highly propagating in the area (Negash Atnafu, 2010) there is a chance to use with integration of fish farm which might be ecologically conducive to protect the ecosystem.

Generally, overall dynamics of phytoplankton productivity of the Shesher and Wolala floodplain wetlands were most likely controlled by the hydrodynamics which is highly affected by anthropogenic influence (i.e. traditional farming system in and near the wetlands that drains much of water contents of the ponds (more pronounced at Shesher) and total obstruction of the Rib River from the wetlands for building of irrigation dam). This destruction of wetland ecosystem has resulted from unwise utilization of the water resource and inputs from unprotected catchment which causes huge sedimentation in the wetland. Therefore integration of different stakeholders should participate in management and conservation of these floodplain wetlands.

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Integrating the Formal and Informal Wheat Seed Supply Systems to Improve Farmers' Access to Modern Cultivars in the North Shewa Zone of the Amhara Region

Yealembirhan Molla (MSc.) and Eshetu Mulatu (Phd)

Yealemtom@yahoo.com, mulatueshetu@yahoo.ca

+002510911484680, +002510911419771

Abstract

Currently farmers can obtain seed from several sources. These sources are generally grouped in to two major classes; informal and formal seed supply systems. These days, some 85 percent of the Ethiopian farmers are believed to depend upon the informal seed supply system. A single system has been found less efficient in addressing the diverse seed needs of small-scale farmer. A critical synthesis of both the formal and informal seed supply systems is essential to seek a way that will make them efficient. Hence, the objective of this study was to assess the strengths and weaknesses of both informal and formal seed supplying systems so that they can complement each other and improve farmers' access to modern wheat cultivar seeds by small-scale farmers. Both purposive and random sampling procedures were employed to identify sample at individual and community levels. Relevant data that enabled seed systems analysis were generated through individual interviews. Besides, data that enabled fine-tuning of the information obtained from individual respondents was also generated through community and market surveys. Data analyses were done using descriptive statistics and weighted average index. Statistical software called the SPSS version 12 was used to analyze the data. The finding highlights the complex nature of small-scale farmers' seed selection criteria resulted in diverse MC seed demand that mainly revolve around economic and household consumption criteria. Higher price of MC wheat seeds and chemical fertilizers and their unavailability when needed were among the critical problems. To alleviate such problem, the organization of local level seed producers groups that give due attention to both the production and marketing aspects of seed with genuine support from governmental and non-governmental organizations is so essential.

1. INTRODUCTION

1.1.Background to the Study

Recent estimates on poverty levels showed that approximately 41.5% of the Ethiopian population lives below the poverty line (Mekonen et al., 1998). A more recent and comprehensive analysis by MEDaC (MEDaC, 1999) based on Central Statistic Authority (CSA) rural HH welfare monitoring data indicated that close to 47 % of the total rural population live in

absolute poverty. This, to some extent, portrays that half of the Ethiopian population is living in food insecure condition. Ameliorating food insecurity for less-developing countries depends, more than any other thing, on maximizing the domestic food production. While attainment of food self-sufficiency depends on assortments of factors, the most important is ensuring seed security for farmers (Scowcraf and Polak, 2000). According to the authors, securing the supply of seeds (any living organized plant propagule or organ capable of being planted and grown to produce another crop) at the farm level will help combat food-insecurity situations. It means, securing the supply of seeds and planting materials of the important food crops is one way to ensuring food security.

In Ethiopia, being an agriculturally dependent country, increasing crop production is one of the pre-requisite to attain food self-sufficiency. Most of the required increases in crop production now and in the future are likely to come from yield growth rather than area expansion. Therefore, among others, further deployment of modern crop cultivars (MCs) is critical. Due to various associated problems such as lack of MCs that meet producers needs and inaccessibility of MCs seed, over 80% of Ethiopian farmers are growing traditional cultivars (Hailye et al., 1998) that are assumed to be low yielding and lacking attributes such as resistance to diseases, early maturity, etc., as compared to the MCs.

Seed is considered as a basic input for agricultural development because it ensures grain production and adds new genetic resources to the total crop gene pool (Abera and Beyene, 1997). It has been widely recognized that modern seed, more than any other input, holds the key to enhance farm productivity and increasing farm income (CTA, 1999). As a basic input for production of any crop, seed is probably the most important input in all crop based farming systems (Abdissa et al., 2001), as the productivity of a crop is directly linked to the genetic potential of the seed used with management practices exerting a profound influence on the attainment of the genetic potential. The better the seed adapted to its growing environment, the higher is the improvement in the yield and farm income with immense direct contribution to agricultural development (FAO, 2000).

1.2. The status of wheat production in Ethiopia

It is known that wheat is one of the major cereal crops grown in the highlands of Ethiopia. It is produced largely in the southeast, central, and northwest parts of the country with small amount being also produced in parts of northern and southern Ethiopia. The national wheat area coverage is over 1.02 million hectare from which 14.1 million quintals are produced annually (CSA, 2003).

Two wheat species, bread wheat (Triticum aestivum L.) and durum wheat (Triticum turgidum L var durum), are dominantly grown in the country. Wheat grows at altitudes ranging from 1500 to 3000 meters with the most suitable areas being located between 1900 and 2700 meters where the annual rainfall ranges between 600 and 2000 mm. Small-scale farmers who rely on rainfall and traditional methods of production are the main wheat producers in Ethiopia.

In Ethiopia, formal crop development program that focused on introduction and testing of exotic wheat germplasm under local conditions was started as early as the 1930s, date that also marked the beginning of organized crop research in Ethiopia. Prior to the 1930s, crop research dealt mainly with germplasm collections, identifications, and characterizations. Since the beginning, the formal sector has put a great focus on wheat; cultivar development, seed production and supply (Hailu, 1991). Accordingly, about 71 different high yielding wheat cultivars (both bread and durum wheat) have been released in Ethiopia through the endeavors of the national research system that comprises different research centers and universities (Legesse, 2002) (VRC, 2005). Nevertheless, they were not sufficiently made available to farmers due to, among other factors, socioeconomic related constraints that included under developed formal seed sector, and limited availability of MCs that meet farmers' needs.

It is largely recognized in Ethiopia that farmers can obtain seed from the formal (seed companies/enterprises, agricultural research centers and Universities) as well as the informal (local or traditional; including farmers' saved seed, local markets exchanges, etc.) seed sectors. The share of the formal sector in the total seed supply, however, is less than 20% as compared to the informal seed sources. Teshome (1998) explained that, around three quarters of the world's farmers use seed from informal sources, mainly farm saved seed. Lanteri and Quagliotti (1997)

and Tafesse (1998) showed that the area sown with seed obtained from the informal seed sector is higher than 85% for Ethiopia and 90% for Africa. Even in the technically more advanced South African Development Community, on-farm seed multiplication and farm saved seed comprises 95-100% of the planting material used in any one year (Scowcraf and Polak, 2000).

A secured seed supply system refers to access by farmers to sufficient, good quality seed of the desired type at the right time and price (Scowcraf and Polak, 2000). Due to having some of the above qualities, the informal seed sector has stood the agrarian community in good stead for centuries and supported the evolution of agriculture to the extent that there is a strong dependency on farmer and rural community-based seed supply systems to sustain crop production. Nevertheless, it is premature to be definitive about small-scale farmers seed practices throughout Africa because of the limited analyses conducted on this system (Walker and Tripp, 1998). One undeniable fact however is that, in countries where the formal seed sector is underdeveloped; both the informal and the formal seed sectors are essential and complementary to ensure an effective seed security strategy (FAO and Accademia dei Georgofilli, 1998).

Under a developing country perspective, a well functioning seed system is defined as one that uses the appropriate combination of formal, informal, market and non-market channels to efficiently meet farmers' demand for quality seeds (Maredia and Howard, 2000). Given the critical role that MC seed plays in increasing agricultural production, and the under developed formal seed sector, a key question is on how to facilitate the development of a seed system capable of generating, producing, and distributing MCs that meet the needs of small-scale farmers in a cost effective way. The question of how to achieve effective integration between the formal and informal seeds systems in such a way that they play complementary role is equally important.

The complementarity between the formal and informal seed systems offer multiple opportunities to develop a well-integrated seed sector in which both systems play significant roles. Farmers' capacity and knowledge regarding local circumstances, seed selection criteria, and traditional methods of exchanges are essential elements in the operation of the informal seed sector. Therefore, instead of attempting to replace the informal seed sector, the formal seed sector can

build on these elements to address the seed demand of small-scale farmers more effectively. An analysis of strengths and weaknesses of both the formal and informal seed sectors will pave the way for designing effective seed system that cater to the needs of small-scale farmers (Almekinders, 2000).

1.3. Statement of the Problem

The North Shewa Zone of the Amhara National Regional State (ANRS) that encompasses 19 Woredas (districts) is one of the major wheat growing regions of Ethiopia. Of the 19 Woredas, five including Gera Keya, Lalo Mama, Ginager, Angolela and Ephratana Gidim are identified as food insecure Woredas. Of the remaining 14, Moretina Jiru and Minjarna Shenkora Woredas are surplus producing Weredas, whereas the remaining 12 are identified as 'relatively' food secure. In North Shewa, "teff", wheat, sorghum and barley are the major cereals in terms of area coverage in that order of importance. Wheat is the first in terms of total annual production (Alemayehu and Wondafrash, 1998) with an increasing demand for food through time. At present, the consumer demand for wheat in North Shewa zone is higher than the supply from domestic production, particularly in Moretina Jiru and Gera Keya Woredas (Kemelew, 2003). Seeds from the formal seed sector, mainly that of wheat and lentils are, to some extent, supplied in Moretina Jiru and Basona Worana (near Debrebirhan town) Woredas. However, still the dominant source of seed for farmers in any one season is the informal seed sector with its variant sources (CSA, 2003). In the other Woredas, except Minjar Shenkora, formal sector seed supply is either minimal or inexistence.

Though farming in North Shewa has a long history and the informal seed sector has been serving producers for centuries, its role is yet to be investigated. Tilaye and Yealembirhan (2002) identified surrounding farmers (neighbors, relatives and friends) to be the most frequent sources of information for farmers on the existence of agricultural technologies and suppliers of seed in North Shewa zone. According to Cromwell (1992) in some parts of Africa, such informal external seed sources collectively form the next most important seed source after farm saved seed. This indicates how the informal seed sector is efficient in disseminating information under conditions where formal seed systems are underdeveloped. This also demonstrates that for

efficient production, multiplication and distribution of MC seeds, any underdeveloped formal seed sector should consider tapping the potentials that the informal seed system provides in addressing the needs of small-scale farmers.

Comparison between the total seeds produced and supplied by the formal seed sector and the total seeds demand shows the presence of large unsatisfied demand, which is covered with seed obtained from the informal sources. Seeds from the informal sector are, however, of low genetic, physical and phyto-sanitary standards due to inappropriate pre-and-post harvest handling systems. The current demand for MCs, all crops included is greater than 1 million quintals, whereas ESE's supply capacity is only 120,000 to 250,000 quintals (Getahun Alemu, Personal communication). The deficit is thus provided by the informal seed sector. As subsistence farmers give attention to the sustenance of production to meet their family needs, and due to lack of readily available cash for seed purchases they prefer sourcing local and recycled MCs seed from the local seed system to sourcing certified seeds. The Sasakawa Global-2000 (SG-2000) Ethiopia project report showed that from 1995/96 to 2000/01 the maximum yield obtained by MCs users (package clients using MCs seed with recommended management practices) and local seed users under traditional practices for wheat were respectively 29.9 and 12.2 quintals per hectare (SG. 2000, 2002). It means, about 148% yield increment was obtained from the package as compared to the traditional practice. However, farmers are not able to take the full benefit from such breeding gains due to the inaccessibility of MCs seeds and other reasons. It is thus high time now, to seek for strategies that ensure that small-scale farmers will benefit from gains made in breeding through improved access to MC seed. This calls for systematic study of both the formal and informal seeds systems and the possibilities of integration between them. The current study will contribute to the same.

1.4. The Research Questions

As stressed by Thiele (1999) and explained above, seed system studies should be area and crop specific. In view of that the major research questions this study attempted to address related to wheat seed use in North Shewa zone of the ANRS are:

- What are the strengths and weaknesses of the informal and formal seed supply systems,

- What is the HH level of farmers' demand for MCs seed of wheat and their access to such seed, and
- What strategies should be used to ensure farmers' access to modern wheat cultivars?

1.5. Objectives of the Study

The general objectives of the study is to assess the existing seed supply systems and their contribution in addressing the farmers' seed demand and to recommend the best strategy that would improve farmers access to modern wheat cultivars. The specific objectives try to:

- identify the strengths and weaknesses of both the formal and informal seed supply systems,
- asses the current level of farmers' demand for MC wheat seeds and the level of farmers' access to such seeds, and
- assess strategies beneficial in enhancing farmers' access to quality wheat seeds.

2. LITERATURE REVIEW

Definition and Importance of Seed

For a country whose main stake is crop production, the supply of quality seed of different crop cultivars is the critical factor to increase productivity. The genetic potential and other desirable characteristics of seed are the factors that limit production. Farmers' entire crop depends on the quality of the seed. If the farmer uses low yielder seed of inadaptable quality, it is less likely for him/her to get good yields in spite of best management he/she could make. A start with seed of low quality leads to low productivity meaning that seed is not just something planted by farmers but is the carrier of the genetic potential for higher crop production. Recently, farmers are becoming "seed" conscious and are willing to pay for quality seeds of MCs. To ensure sufficient production, however, the seed supply channel should be accessible to farmers (Girma et al., 2004).

Seed System

Seed system originally referred to the network of formal sector actors and institutions involved in developing cultivars and supplying seed (Venkatesan, 1994). But later it also referred to farmers' own seed provisions distinguished either as local, informal, or farmer seed system (Almekinders et al., 1994; David and Sperling, 1999; de Vries and Toenniessen, 2001; FAO, 1998b). Seed system is hence composed of organizations (which can be a set of individuals) and institutions involved in different seed system functions, i.e., the development (breeding and selection), multiplication, processing, storage, distribution and marketing of seed and other planting materials.

Seed systems include both formal and informal/local seed sectors. The informal sector is composed of individual farm HHs, each carrying out most seed system functions on its own, with little or no specialization, whereas the formal seed sector is composed of public and private organizations with specialized roles in developing, multiplying, and supplying new crop cultivars (Maredia and Howard, 1998).

2.1.1. Informal (local) seed system

The informal (local) seed system covers methods of local seed selection, production and diffusion. Cromwell (1992) described this system as traditional, informal, and operating mainly at community level through exchange mechanisms and involving limited quantities of seed per transaction. Informal seed system is a system in which seed selection; seed production and exchanges are integrated into crop production and socioeconomic including maintenance and use of crop genetic diversity practices of farming communities. All activities in the system tend to be integrated and locally organized, embracing most of the different ways through which farmers produce, disseminate, and access seed directly from their own harvest; through exchange and barter arrangements among friends, neighbors, relatives; and through local grain markets. While it encompasses a wider range of seed system variations, what characterizes the local seed system the most is its flexibility. Cultivars could be landraces or mixed races and may be heterogeneous (modified through breeding and use).

The local system follows similar general steps as the formal system in terms of cultivar choice, testing, selection, introduction, seed multiplication, storage and dissemination. All these activities, however, take place as an integral part of farmers' production systems rather than as discrete activities. The fundamental feature of the informal seed system is the interrelationship of diversity and food security that is, the use of diversity at genetic level, understanding diversity at the ecological level and sustaining diversity at the farm level. Moreover, some farmers treat "seed" especially or there is not always necessarily a distinction between "seed" and "grain." The steps do not flow in a linear sequence, and they are not monitored or controlled by government policies and regulations. Rather. they are guided by local technical knowledge and by local structure and norms (McGuire, 2001).

Despite the fact of being variable and location specific depending on farmers' needs and preferences, local channels provide most of the seed that most small-scale farmers use. Common figures suggest that somewhere between 80 and 90% of the seed farmers use comes from the local seed system (FAO, 1998). There are, however, variations by crop and region. The percentage of seed obtained by farmers from the informal seed system is high-estimated at 85% for Ethiopian (Tafesse, 1998) and 90% for Africa as a whole (Lanteri and Quagliotti, 1997). Even in the technically advanced South African Development Community (SADC), on-farm seed multiplication and farmer-saved seed constitute 95-100% of the seed used in any one year (Wobil, 1998).

Farmers' seed management consists of cultivar choice, selection of seed to be planted next season, seed storage, seed transfers, exchanges, or mixtures (Bellon, Pham and Jackson, 1997) referred to farmer seed management and its components as farmer breeding. Cultivar choice may include either those saved and selected for many generations on farm (traditional, ancestral, or landrace types), or MCs (hybrids or open pollinated cultivars). Seed selection may include mass selection practices or farmer breeding, as well as a re-use of hybrids or other commercial cultivars. As most farmers of the developing countries have access to seed through the informal seed system, efficient functioning of this system plays crucial role for the attainment of seed and food security.

Little systematic qualitative research has been done on seed sources and reasons for farmers' choice of a particular source. Because seed supply strategies are dependent on the cultural background of the farmer, biological and economic features of the crops, and other parameters one cannot generalize on how farmers in the tropics choose any seed to plant. Access to seed that could satisfy these various requirements is an important precondition for improving crop production and it remains the critical challenge for the formal seed system (Sonia, 2004). The author further stated that the major reason for the low adoption of MCs among small-scale farmers in developing countries is the inability of the highly centralized formal seed supply systems to meet farmers' complex and diverse seed requirements.

The informal seed system, despite its various advantages, is not without limitations. Some of its recognized limitations are (1) provision of sub-optimal seed quality due to disease and storage problems, (2) exchange between communities often do not easily cross physical and cultural barriers, (3) access to local seed for poor farmers is limited, (4) has limitations to function during periods of natural disaster, political and other turmoil just like the formal seed sector, and (5) once collapsed, cannot easily revive as local cultivars would easily be lost and replaced by relief-supplied seeds as observed in drought prone countries like Ethiopia, and several other war torn eastern African countries.

2.1.2. The formal seed system

Compared to the local seed system the formal seed system is easier to characterize as it is a deliberately constructed system involving a chain of activities leading to clear products which are certified seed of verified cultivars (Louwaars, 1994). The chain usually starts with plant breeding and selection that result in different types of cultivars, including hybrids, and promotes materials leading to formal cultivars release and maintenance. The guiding principles in the formal seed system are to maintain cultivar identity and purity and to produce seed of optimal physical, physiological, and sanitary qualities. Certified seed marketing and distribution takes place through a limited number of officially recognized seed outlets, usually for financial sale (Louwaars, 1994). Sperling (2003) noted the central premise of the formal seed system to be the clear distinction between "seed" and "grain", a distinction which is less clear in the local seed system.

2.1.2.1. The emphasis on the formal seed sector

It should be noted that an extensive organization is required to ensure that small amount of seed of a new and tested cultivar can be bulked to amounts that can be distributed to farmers. As in the mid-1970s governments and donors recognized the critical role of seed in agricultural transformation, they began to provide substantial support for seed system development. Since then, FAO has invested $ 80 million in 120 seed projects in 60 countries, the World Bank has supported more than 40 seed projects in Africa alone, and USAID has provided long-term support to public seed agencies in 57 countries (Maredia and Howard, 2000).

Governments largely invested in research and development of the formal seed sector so as to maintain or improve national food self-sufficiency. Many developing countries, including Ethiopia, have invested considerable resources to strengthen the research and extension capacities in the formal seed sector. For instance, from 1985 to 2002 almost 919 million Birr was allocated to EIAR, which made an average of 51.1 million Birr investment per year. Of this amount, the share from the government treasury on an average was 75.6% (Tesfaye et al., 2002). The formal seed sector's efforts, meaning that of the formal seed supplier ESE were however concentrated on a few main staple crops (Wolday, 1999). There was a general perception that the informal seed systems were backward and should be replaced by better systems that are based on successful western models.

2.1.2.2. Formal seed sector development in Ethiopia

The then Ethiopian Seed Corporation (ESC), (currently, the Ethiopian Seed Enterprise, ESE) was established in 1979 following the recommendations of a National Seed Council (NSC) formed in 1976. Its establishment has brought a marked change in the development of formal seed production, processing and marketing of cereals, legumes and oil crops. Initially, the ESE was established not in view of addressing the seed need of small-scale farmers, but, following the policy of the then socialist government, which believed to bring food self-sufficiency by producing much on such farms to supply seed to the then State and producer cooperative farms. The situation undermined the larger majority of the private small-scale farmers who produced the bulk of the grain that the country harvested. The ESC was the only state owned seed

institution charged with seed production and marketing in the country until 1990. Like in any other sector, by then, private initiatives were not allowed to enter into crop breeding and seed businesses. The ESC therefore sold the lion's share of the seed it produced to the then flourished State owned farms, which remained its major client until the early 1990's (Eshetu, 2002).

Although data on seed production and sales showed that the ESE was offering seed of 4-5 cereal crops (wheat, maize, sorghum, barley and teff), 5-6 legumes (haricot bean, soybean, chickpea, lentil, field peas, faba beans), 2-3 oil seeds (noug, rapeseed and linseed), in reality it was wheat and maize seed production and sale which were dominant (Eshetu, 2002). An investigation into the number of years a crop's MCs seed was sold between 1995/96 and 1999-2000 revealed that for most of the crops on seed production and sales list, MC seed sale other than wheat and maize was insignific nt not only in terms of the number of times they were made available, but also in terms of the quantity of seed sold. The share of wheat and maize was over 96% of the total MC seed sold between 1995/96 and 1999-2000. The crop names on the seed production and sales list available from ESE could therefore be misleading if not investigated from the point of view of the quantity of seed produced and sold (Eshetu, 2002).

2.2.3. Limitations of the formal seed system

According to Tripp (1997b) the formal seed sector is facing major limitations such as (1) offering cultivars selected for wide adaptation in relatively favorable agro-ecologies which often are not adapted to the needs of small-scale farmers, complex environmental stress and low input conditions, (2) offering small range of materials while farmers usually plant crops with more genetic diversity to maintain ecological sustainability (favorable areas) and to avert risk (marginal areas), (3) failure to address the differentiated and varied needs of farming HHs in marginal areas, and (4) setting seed prices beyond the economic reach of small-scale farmers. To these add other similar problems that retarded the successful dissemination and diffusion of MCs.

2.1.3. Farmers' demand for seed

The nature of farmers demand for MC seed poses perhaps the greatest challenge associated with the formal seed supply systems because farmers' actual demand for seed from the formal seed supply channels are often poorly understood (McGuire, 2005). Farmers demand for traditional or MCs seed from the formal channels could be low due to several factors that include (1) failure of formal seed supply system to offer crops or cultivars that small-scale and low input farmers desire as such farmers have a wide range of selection criteria and concentrate on family consumption needs (Fresco, 1985), (2) possibility for farmers to obtain seed from sources other than the formal sector, including their own harvest, neighbors and informal markets, (3) farmers cannot easily perceive the physical quality or genetic value of seed just by looking at it: as the value of any seed could only be proven long after its purchase and planting, and (4) large package size of formally supplied seed which often is larger than small-scale farmers demands who prefer planting smaller areas but various crops at a time for risk aversion purpose.

2.3. Poverty and Seed Availability

It is known that 85% of the Ethiopian populations are farmers who derive their livelihoods from subsistence agriculture. Poverty in Ethiopia has become a rural phenomenon as 90% of the poor are found there. For the last four decades, the average annual growth rate of the agricultural sector has been 1.2% and the sector could feed only 46% of the additional human population. Besides, a thorough analysis and evaluation of Ethiopian agriculture recently undertaken by the Ethiopian Economic Association (Befekadu and Berhanu, 2000) reveals that, despite the commendable numerous initiatives and measures undertaken by the government, the performance of the agriculture sector remained poor.

The production and dissemination of quality seed plays an essential role for achieving seed security thereby food security objective of the nation in general and the North Shewa Zone in particular. Most subsistence farmers in Ethiopia often have to rely on whatever seed they could access before planting time. Poverty hence strictly inhibits poor farmers from accessing MCs and benefiting from breeding gains and other agricultural technologies. It means, looking for an

alternative seed system that enhances poor farmers' access to MCs is of paramount importance in terms of fighting rural poverty. Almekinders and Louwaars (1999) stressed one such alternative to be designing a seed supply system that promotes the complementarity between the formal and informal seed supply systems.

2.4. Strengthening the Complementariness between Formal and Local Seed Systems

From a developing country perspective, neither local nor formal seed system is necessarily "better" or more effective than the other as each meet different kinds of needs, is suitable for different environmental niches, and different types of farmers. As discussed earlier, in developing countries there are no distinct or absolute demarkation between the formal and the local seed systems. Seed of different cultivars can flow between the two systems as farmers draw up on one or the other depending on their need and accessibility of the system. When 80-85% of small-scale farmers' seed needs are met through local seed systems, there are good reasons to give due recognition to this system which is a low-cost option for farmers to access seed. With a properly designed integrated system, the local system could hence be used as a vehicle to provide small-scale subsistence farmers with MCs seed at an affordable price (Rohrbach et al., 2002).

The complementarity between the formal and informal seed systems offers multiple opportunities to developing a well-integrated seed system where both systems play significant roles. Recognizing farmers' capacity and knowledge in terms of local circumstances, seed selection criteria, and traditional methods of exchanges are essential to improve the operation of the informal seed sector. It means, instead of trying to replace the informal seed system, the formal seed sector should build on these elements to effectively address the seed demand of small-scale farmers. Analyzing the strengths and weaknesses of both the formal and informal seed sectors will pave the way for designing effective seed system that cater to the needs of small-scale farmers (Almekinders, 2000). A secure seed supply system refers to: access by farmers to adequate, good quality seed of the desired type at the right time (Scowcroft and Polak Scowcroft, 1997).

2. RESEARCH METHODOLOGY

Description of the Study Area

The *Amhara* National Regional State (ANRS) is one of the constituent states of the Federal Democratic Republic of Ethiopia located in the northwestern part between 8^0 45' and 13° 45' North latitude and 35° 46' and 40° 25' East longitude. North Shewa is one of the eleven zones of the region. Accordingly, the study was conducted in Gera Keya and Moretina Jiru *Woreda*s of North Shewa zone (Figure 1) located, respectively, at about 300 and 190 km north of Addis Ababa (Helen, 1992). Wheat is the major staple crop in both *Woreda*s, Moretina Jiru being one of the best *Woreda*s for wheat production with the highest productivity of all wheat growing *Woreda*s of the zone. The average wheat yield attained in Moretina Jiru, *Minjar Shenkora, Insarona Wayu, Basona Worana,* and Gera Keya *Woredas*, respectively, was 1.96, 1.71, 1.46, 0.81 and 0.87 tones ha^{-1} (CSA, 2003).

3.1.1. Moretina Jiru Woreda

Moretina Jiru *Woreda* is one of the 19 *Woredas* of North *Shewa* zone covering a total area of 662.7 km^2. *Enewari*, the capital of the *Wereda* is located 190 km north of Addis Ababa. *MerhabeteWoreda* in the west and southwest, *Basona Worana* and Gera Keya *Woredas* in the North East, *Ensarona Wayu* in the East and Gera Keya *Woreda* in the North delimit its boundaries. It is characterized by mixed farming system whereby crop and livestock production are highly integrated with livestock providing draft power and manure for crop production and crops providing feed for the livestock sub-system (Hailu and Chilot, 1989).

Topography, soils and climate

The altitude of Moretina Jiru ranges from 1600-2700 meters above sees level (masl). Topographically 30%, 25% and 45% of the *Woreda, respectively,* is plain, gorge and undulating. The *Woreda* is thus largely plateau with some of its parts lying in the Blue Nile gorge. Based on the traditional agroclimatic classification, 50% of the *Woreda* falls in the *Dega* (2300-3300masl), 29.8% in *Weynadega* (1500-2300 masl) and 20.2% in *Kolla* (500-1500 masl) zones (Zone Bureau of Agriculture and Rural Development, unpublished report). The dominant soils of Moretina Jiru are heavy vertisols (*Merere)* characterized by water logging and drainage

problems. At *Enewari*, the average total annual rainfall over the past 10 years (1995 to 2004) was 898.2 mm and two years (from 2003-2004) average monthly temperature was 14.88°C (*Enewari* sub-center metrology, unpublished data). The dominant soils are vertisols characterized by water logging.

Population

According to the 1994 census (CSA, 1994), the total population of Moretina Jiru *Woreda* was 93,837 with a 3.3% increase per annum. In 2006 the *Woreda* counted 130,143 people making it one of the densely populated areas in the central highlands of Ethiopia. The majority of the populations are *Amharic speaking*, practicing dominantly the Ethiopian Orthodox Christian religion.

Land use

Greater portion of the land in Moretina Jiru was cultivated with only small portion being forest land (Table 2). Currently, land has become the scarcest resource for agriculture as all potential lands have been put under crop cultivation. As the population is growing rapidly, the land holding of individual households has become diminutive and a cause for food self-insufficiency. Intensification of agriculture, which demands the use of modern agricultural technologies including use of MCs seed, has not been largely practiced.

Table 2. Land use pattern of Moretina Jiru Woreda during the study period (2005/06)

Land use	Area (ha)	Percent
Cultivated area (rain fed)	31706	49.2
Annual crops (irrigated)	497	0.7
Perennial (irrigated)	130	0.2
Grazing/pasture	2850	4.3
Forest	**327**	**0.5**
Natural	221	
Man-made(artificial)	106	
Bush	9054	14.0
Rivers and ponds	427	0.6
Settlement areas	**1460**	**2.2**
Urban	78	
Rural	1382	
Others (gully and rocky areas)	17906	28.3
Total area	**64357**	**100.0**

Source: Moretina Jiru Woreda Office of Agriculture and Rural Development (OoARD)

3.1.2. Gera Keya Woreda

Gera Keya Woreda is one of the 19 Woredas of the North Shewa zone located at 300 km northeast of Addis Ababa. It has 29 rural peasant associations and two urban Kebeles with a total area of 1686.8 km2. The Woreda boundaries are Lalo Mama Midir in the West, Merhabete and Moretina Jiru in the South, Ephratana Gidim in the Northeast, Gish Rabel in the northwest and Wore Illu Woreda in the East (Helen, 1992). The Woreda is known for its large livestock population comprising about 154, 585 cattle, 2,560, 269 sheep, 24,681 goats and 146,446 poultry.

Topography, soils and climate

Undulating plains with valleys and gorges characterize the topography of Gera Keya, which is 39% plain land, 23% mountainous, 25% rugged terrain and 13% valleys and gorges. The altitude ranges from 1200-3400 masl, which, according to the traditional classification, is divided in to four agro-climatic zones including 8% lowlands; 28% mid-altitude areas, 60% highlands and 4% extreme highlands. It has two main rainy seasons, i.e., meher (June- August) with the longest and intense rainy period and Belg (February- April) characterized by short and less intensive rainy period. The mean annual rainfall and temperature range, respectively, from 900 to 1100 mm and 14 to 18 0C. The soil types of Gera Keya Woreda is composed of 53%, 27%, 13%, and 7% black, brown, red, and gray in same order (source: zonal Agricultural Department Basic Information unpublished document, 1997).

Population

According to the 1994 census report (CSA, 1994), total population was 133, 542 and by the year 2000, it was estimated to be 160, 912 of which about 93% are rural farming population and the rest are urban dwellers. The great majority of the population (99.5%) practices the Orthodox Christian religion, whereas Muslims and protestant Christians each comprise 0.25% of the population.

Land use

Of the total area of Gera Keya 30.1% is used for crop cultivation, 31.1% for grazing, 11.7% for forests and bushes and, 27.1% for settlement and other uses (Table 4).

Table 4. Land use pattern of Zigba and Zelan Kebeles in Gera Keya Woreda during the study period (2005/06)

Land use	*Zigba Kebele* (ha)	*Zelan Kebele* (ha)
Total area	8084.0	4319.0
Cultivated area	5093.2	2667.0
Cereals area	788.0	578.0
Wheat area	723.0	470.0
Percent of wheat area from total cereal area	91.8%	81.3%

Source: Gera Keya Woreda OoARD unpublished report

3.2. Research design

Formal survey method (ILCA, 1992) was employed to generate data for this study. To have an unbiased representation of the whole population, as recommended by Mantzopoulos (1995), a random sampling technique was used while sampling the respondents. Interview schedule, group discussion, yield (both certified and C1) analysis and market analysis was used for getting the required data.

3.3. Sampling and data collection techniques

The study Woredas were purposively selected for reasons explained earlier and then from each Woreda, two major wheat growing Kebeles were once again purposively selected. From the four Kebeles 130 sample farmers were selected using simple random sampling technique with proportional allocation of HHs to the different Kebeles. The 130 respondents were interviewed using interview schedule. Interviews with groups of people are frequently livelier and give better insight than with only one person (Mettrick, 1993). Moreover, group discussion in every kebele and market analysis was used to complement for the quality of the data. The sites for the market survey were selected based on their proximity to the sample HHs. These are market places where the sample HHs most frequently goes to sell wheat grain and to purchase wheat seed, among others. Therefore, as recommended by Tripp (1991) a range of tools and methods were employed to gather both qualitative and quantitative information and data. Secondary data and relevant information were collected from the ESE, concerned Woreda level OoARDs and other Governmental and Non-Governmental Organizations (NGOs) working in one way or the other in the area of seed system development.

There is no single methodological approach or technique recommended to collect the required information and data on seed systems. Household survey, market survey and farmer-based seed system case studies were the methods employed. Thus, interview schedule, group discussions, a sort of participatory rapid appraisal (PRA) such as identifications of farmers' seed selection criteria, preference ranking, seed source identification and their potential benefits and constraints, socio-economical opportunities and constraints as far as seed supply systems are concerned etc were used. Moreover, individual and group discussions with merchants were used to identify the cultivars that are found in the market, their prices difference, special purposes of each cultivar and others.

3.4. Data analysis

Hopkins, et al. (1996) stressed that each and every data analysis technique has its own advantages and disadvantages. It is hence recommended to select the one that helps to better answer the research question. Guided by this principle, primary data collected from individual respondents through the formal survey were analyzed using SPSS. In order to detect the degree of relationships between some of the quantifiable variables measured, Pearson's correlation was employed as advised by Gomez and Gomez, (1984). The relevance of using this statistical tool in establishing relationships between variables has been discussed by Warren (1996). The Statistical Package for Social Science (SPSS, Version 12) computer program was used to analyze the data.

Information collected through the community focus groups discussions was presented without alteration to capture the real assessment of the community. Information collected through the market surveys were analyzed using descriptive statistics. Such information included the type and number of cultivars, the purpose for buying, the price differences among wheat cultivars and the reasons for the difference. Secondary data and other related information collected from institutions were analyzed using descriptive statistics.

4. Resultand Discussion

Socio-economic data obtained through sample farmer interviews, market, and community surveys in four sample Kebeles in Gera Keya and Moretina Jiru Woredas is presented below.

4.1. Socio-economic Characteristics of Sample Households

4.1.1. Demographic features /Gender, HH size and age/

Most respondents, 77.7% (n=101) practiced labor exchanges for different farming activities while the remaining 22.3% (n=29) did not practice labor exchanges. Labor exchanges were done for ploughing 2.3% (n=3), planting; 5.4% (n=7), weeding 20.8% (n=27), harvesting 13.1% (n=17), and for threshing 36.2% (n=47). It means more farmers depend on labor exchange for threshing and less for ploughing. Labor exchange for weeding was only practiced in Gera Keya Woreda (Table 1), whereas labor exchanges for ploughing and planting were only reported by respondents from Moretina Jiru.

Table 1. Labour exchange practices for different farming activities in the study sites

	Frequency					
Farming practices	Moretina Jiru	%	Gera Keya	%	Total	Percent
No labor exchange	22	36.6	7	10.0	29	22.3
Ploughing	3	5.0	0	0.0	3	2.3
Planting	7	11.7	0	0.0	7	5.4
Weeding	0	0.0	27	38.6	27	20.8
Harvesting	7	11.7	10	14.3	17	13.1
Threshing	21	35.0	26	37.1	47	36.1
Total	60	100.0	70	100.0	130	100.0

4.1.2. Educational background and experience of using modern wheat cultivars

Most, 60.8% (n=79) of the respondents reported growing several MCs of wheat for the last 6-10 years, whereas 28.5% (n=37) had 11-15 years of experience in using modern wheat cultivar seeds. Respondents with more than 15 years of experience in using modern wheat cultivars were all, except one, from Moretina Jiru Woreda (Table 2). This showed the positive impact of proximity to the formal seed supply center in accessing MCs. In this regard, Almekinders and

Louwaars (1999) reported that remoteness and inaccessibility of formal sector seed as one major obstacle limiting MC seed access and use. Among the total respondents in the two Woredas 32.3% (n=42) illiterate, and the remaining 67.3% (n=88) respondents are literate (Table 3).

Table 2. Sample respondents' experience (in years) in using of modern wheat cultivars

Number of years	Moretina Jiru		Gera Keya			Total percent
	Frequency	%	frequency	%	Total	
≤ 5 years of experience	4	6.7	3	4.2	7	5.4
6-10 years of experience	37	61.6	42	60	79	60.8
11-15 years of experience	13	21.7	24	34.3	37	28.5
16-20 years of experience	3	5.0	1.0	1.4	4	3.1
21-25 years of experience	3	5.0	0.0	0.0	3	2.3
Total	60	100.0	70	100.0	130	100

Table 3. Respondents' education level

Education level	Frequency	Percent	Cumulative percent
Illiterate	42	32.3	32.3
Literate	88	67.7	100.0
Total	130	100.0	

4.1.5. Sample HHs involvement in off-farm/non-farm activities

Among the total respondents, 48.5% (n=63) reported engaging in off-farm income generating activities, whereas the remaining 51.5% (n=67) did not engage in any off-farm income generating activities (Table 4). In Moretina Jiru Woreda, respondents reported engaging only in fattening of animals as a means for generating off-farm income, whereas respondents from Gera Keya reported engaging in five kinds of off-farm income generating activities. This finding indicated how physical environmental (presence and absence of grazing land) and economical (livestock market incentives) conditions influenced farmers on which income source to depend.

Table 4. Types of off-farm activities undertaken by sample respondents from the study sites

Off-farm/non-farm activities	Moretina Jiru		Gera Keya.			Total percent
	Frequency	%	Frequency	%	Total	
No off-farm activity	33	55	34	48.6	67	51.5
Livestock fattening	27	45	10	14.4	37	28.5
Selling of milk and milk products	-	-	2	2.8	2	1.5
Selling of grain and/or vegetables	-	-	4	5.7	4	3.1
Animal fattening + wool selling	-	-	2	2.8	2	1.5
Fattening + selling of milk products	-	-	15	21.4	15	11.5
Fattening + selling of grain and vegetables	-	-	3	4.3	3	2.3
Total	60	100	70	100	130	100

4.2 Wheat and its Role in the Farming System

Wheat is one of the major cash crops in the North Shewa. Hence, farmers allocate the best farmland for wheat. Again most farmers, who either shared (in/out) or rented (in/out) land, used the major part for wheat production.

4.1.3. Land acquisition /arrangements/ in the study areas

Three types of land tenure arrangements were identified in the study sites; (1) own land on which farmers pay tax (2) land rented-in or rented-out and, (3) land shared-in or shared-out. The choice of crop and crop cultivar to be planted in any land was governed by the type of ownership in that specific cropping season. Likewise, the type of land management employed differed depending on the type of land ownership.

Land use and allocation for modern wheat cultivars

The size of land holding had a positive and significant relationship with the use of modern wheat cultivars (Table 5), meaning that as the land size allotted for wheat production increased, the number of modern wheat cultivars a respondent was growing increased and consequently the average wheat productivity increased considerably.

Table 5. Relationship between land holding, modern cultivar use and size of land allocation

	Modern wheat cultivars use
The average wheat yield	.405(**)
Total land size allotted for wheat production	.257(**)

** Correlation is significant at the 0.01 level (2-tailed). Pearson Correlation

4.2.3. Test of correlation between modern wheat cultivar use and total production

4.2.3.1. Oxen and sheep ownership with modern wheat cultivar use

Contrary to the findings of Hailye et al. (1998) who reported positive relation between livestock ownership and use of MCs in wheat growing farming systems of Enebssie region of Ethiopia; the findings of this study showed a negative relationship between the numbers of sheep a HH owned and the number of MCs grown (Table 6). It means, as the number of sheep per HH increased, the number of modern wheat cultivars grown by the HH decreased. The attractive market incentive for livestock might have forced farmers to give much attention to livestock management than crop production.

Table 6. Correlation of oxen and sheep ownership with local and modern wheat cultivars use

	The number of modern wheat cultivars used
The number of oxen	0.019
Number of sheep	-.222(*)
The number of local wheat cultivars used	0.166

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

4.2.3.2. Relationship between market distance and modern cultivar use

The relationship between the distances of the market place with modern wheat cultivar seed use was negative, meaning that, as the distance between the respondent's residence and the market was far the number of modern wheat cultivars that respondents were growing decreased and relatively increased for respondents nearer to markets (Table 7).

Table 7. Relationship between market distance and modern wheat cultivars seed use

	The number of modern wheat cultivars on use
The distance of market place	-.118

4.2.3.3. Off-farm income and its relation with the use of modern wheat cultivars

The average annual income generated from off-farm activity, the number of modern wheat cultivars being used by a respondent and the total land size allotted for wheat production had a positive relationship (Table 8). It means, as the off-farm income level a HH obtained increased, it provided opportunities that improved the HHs access to modern wheat cultivar seeds and improved management practices that brought about productivity increases. Similarly, Abdissa et al. (2001) reported the potential of off-farm income to provide necessary outlays for farmers who want to purchase and use modern inputs. Off-farm income was hence positively related to both modern cultivar seed and fertilizer use.

Table 8. Relationship among off-farm incomes, modern cultivar use and land allotted for wheat

Number of modern cultivars on use

	Number of modern cultivars on use
Annual off-farm income	.318(**)
Total wheat production land size	.257(**)

** Correlation is significant at the 0.01 level (2-tailed). Pearson Correlation

4.2.3.4. Respondents' farming experience and its relation in use of MCs seeds

Respondents' farming experience had a positive and significant relation (Table 9) with modern wheat cultivar use and this was in agreement with the findings of several authors (Ensermu et al. 1998; Hailye, et al. 1998) who reported positive relation between farmers experience's and use of modern wheat cultivars in Bale highlands, and the former Enebssie, and Chilalo Awrajas (an Awraja comprised 3-4 Woredas) of Ethiopia.

Table 9. Relationship of farmers' experience with the number of modern cultivars grown on-farm

	Modern cultivar use	Respondents farming experience
Modern cultivar use	1	0.182(*)

* Correlation is significant at the 0.05 level (2-tailed).

4.3. Demand and Supply of Wheat Seeds

Farmers' demand for both local and modern wheat cultivars can be measured using several ideas. For this study, the farmers demand is described only basing the seed quality in terms of their selection criteria and the quantity that they require from each supplying system. The formal and informal seed supply sectors provide with different wheat cultivars. Considering the farmers' wheat seed selection criteria and the potential of those modern wheat cultivars in satisfying the demand as well as the efficiency of the supply systems, cultivar replacement rate is used as an indicator.Cultivar selection can be measured in two ways which are (1) choosing the cultivar to be maintained and then (2) for each cultivar, choosing the seed stock to be planted in the forthcoming season. Cultivar selection processes done for both traditional and MCs are dynamic and influenced by the supply of seed populations from the surrounding including other farmers, markets, government agencies or seed companies. Be it for local or MCs farmers' employ several selection criteria classified into production. economic, agronomic and socio-cultural criteria that help them select the seed to be sawn in the coming cropping season.

4.3.1. Gender relations in seed selection

Most of the respondents in the community survey ascertained that decisions on cultivars to be grown in the coming seasons were taken by males in both male and female-headed HHs. In the case of the latter sons or male relatives take the decision. However, in the individual survey 77.7% (n=101) reported that seed selection was done by both male and female HH members (mainly husband and wife) (Table 10). Similar to the community interview, 16.9% (n=22) reported that only males were responsible for seed selection, whereas the remaining 5.4% (n=7) composed mainly of female-headed HHs reported that seed selection was done by females only. Similarly, Stuart (1978) discussed that seed selection is either accomplished or supervised by male HH heads.

Table 10. Gender in wheat seed selection and maintenance

Seed selection	Moretina Jiru		Gera Keya			Total Percent
	Frequency	%	Frequency	%	Total	
Males only	17	28.3	5	7.1	22	16.9
Females only	4	6.7	3	4.3	7	5.4
Both males and females	39	65.0	62	88.6	101	77.7
Total	60	100.0	70	100.0	130	100.0

4.3.2. Farmers' wheat cultivar seeds selection criteria

For 26.2% (n=34) of the respondents, the best selection criteria for local and modern wheat cultivars were grain yield and palatability of straw used for livestock feed, whereas for the 20% (n=26) combinations of grain yield and suitability for HH consumption were the mostly employed selection criteria. Besides, 18.5% (n=24) of the respondents considered combinations of high yield, straw palatability, and suitability for HH consumption to determine the best wheat cultivars and 8.5% (n=11) considered only yield potential to decide on the best local wheat cultivars. Moreover, eight (6.2%) and two (1.5%) of the respondents reported choosing cultivars based on suitability for HH consumption and palatability of straw, respectively (Table 11). It means, farmers in the study sites employed multiple selection criteria to decide the best wheat cultivars that meet their needs. This study corroborated the findings of Fresco (1985) that reported several of the criteria that farmers employed in selecting cultivars concentrated on family consumption and economic needs.

Table 11. Wheat cultivar selection criteria employed by farmers in the study sites

Criteria	Frequency			Total percent
	Moretina Jiru	Gera Keya	Total	
High yield	5	6	11	8.5
Suitability for HH consumption	4	4	8	6.2
Palatability /soft straw	1	1	2	1.5
High yield + suitability for HH consumption	14	12	26	20.0
High yield + palatability of straw	14	20	34	26.2
Suitability for HH consumption + palatability of straw	7	8	15	11.5
High yield + suitability for HH consumption + soft straw	9	15	24	18.5
Not growing local cultivars	6	4	10	7.6
Total	60	70	130	100.0

About 37.7% (n=49) of respondents favored seed that was free from disease, whereas 23.1% (n=30) preferred seeds that were adaptable to the farming environment mainly noting good grain filling properties by (22.3% (n=29)) of the respondents. The remaining 14.6% (n=19) preferred a highly pure seed that is not mixed with other cultivars. Respondents from Gera Keya stressed the importance of seed purity more than those in Moretina Jiru, somehow revealing the difficulty of obtaining pure seed in Gera Keya. The characteristic that was much emphasized in Moretina Jiru was seed health (Table 12).

Table 12. Wheat seed characteristics looked after by sample respondents

Desirable characteristics	*Moretin Jiru*		Gera Keya		Total	Total
	Frequency	%	Frequency	%	Total	percent
Good grain filling	19	31.7	10	14.3	29	22.3
Freedom from impurities	1	1.7	18	25.7	19	14.6
Adaptation to local conditions	12	20.0	18	25.7	30	23.1
Freedom from diseases	28	46.6	21	30.0	49	37.7
High germination rate	0	0.0	3	4.3	3	2.3
Total	60	100.0	70	100.0	130	100.0

4.3.5. Selecting seed for different purposes

Seed selection criteria were defined based on respondents' economic (financial), social (HH and community food habits and preferences) statuses, agro-ecological (disease prevalence, moisture stress), and other factors. These criteria influenced largely respondents' value to different wheat cultivars and seed sources..

4.3.5.1. Farmers' seed selection criteria for household consumption

The grain (seed) selection criteria for HH consumption were focused on color, taste, shape and suitability for food preparation. Majority of the respondents, 63.1% (n=82) gave higher value for a cultivar that is suitable for food preparation (baking, boiling, toasting, porridge, and others), whereas 27.7% (n=39) put higher value on the taste of the cultivar and the rest 6.9% (n=9) and, 2.3% (n=3), respectively, gave greater value for the shape and color of the grain as related to market (Table 13).

Table 13. Wheat selection criteria of respondents for household consumption

Selection criteria	Moretina Jiru		Gera Keya			Total
	Frequency	%	Frequency	%	Total	percent
Shape of the grain	3	5.0	6	8.6	9	6.9
Taste of the grain	13	21.7	23	32.9	36	27.7
Seed color	2	3.3	1	1.4	3	2.3
Suitability for food preparation	42	70.0	40	57.1	82	63.1
Total	60	100.0	70	100.0	130	100.0

More specifically, in the group discussion of the Moretina Jiru on gender relations in seed selection revealed that male farmers gave priorities to yielding capacity and market qualities, whereas female farmers preferred those cultivars suitable for HH consumption. As a result; women farmers, preferred ET-13A2 for its good Injera making qualities when mixed with any other grain flour. Next to ET-13A2 in the former days women farmers preferred the local cultivars Enat and Menzie for their good consumption qualities. In line with this Fresco (1985) and Sperling (1992) also reported that women farmers have a wide range of seed selection criteria which mainly revolve around family consumption needs, whereas male farmers tend to put more emphasis on market related characteristics.

4.3.5.2. Farmers' seed selection criteria for economic reasons

Early maturity, longevity in storage, and market qualities were critical economic criteria in seed selection. The criteria were governed by the agro-ecological and socio-economic circumstances of the particular HH. Accordingly, 62.3% (n=81) of the respondents gave higher value to early maturity, manifesting on the risk proneness of the farming system due to which farmers became risk averse. Whereas 36.9% (n=48) gave higher value to market qualities (Table 14). Only one (0.8%) respondent rated resistance to storage pests higher as more farmers considered it either manageable or do not store much grain. The priority for early maturity was because of early cessation of the Meher rains and occurrence of frost late in the season. In Moretina Jiru, however, 71.6% (n=43) of the respondents put higher market demand as the best economic criteria to choose cultivars. It could be concluded that cultivar or seed selection is largely

influenced by agro-ecological and socio-economic parameters such as access to markets and thus all these be considered in developing cultivars for specific locations.

Table 14. Economic criteria influencing farmers' seed selection in the study sites

Selection criteria	Moretina Jiru		Gera Keya			Total percent
	Frequency	%	Frequency	%	Total	
Early maturing	17	28.4	64	91.5	81	62.3
Market qualities	43	71.6	5	7.1	48	36.9
Longevity in storage	0	0.0	1	1.4	1	0.8
Total	60	100.0	70	100.0	130	100.0

In the community survey, focus groups (community seed specialists) prioritized the seed selection criteria in the study sites as follows:

1. Economic criteria – a. higher market demand, and
   b. Early maturity to escape either early rainfall cessation or late
2. Physiological and genetic criteria
   2.1 Disease resistance (particularly resistance to rust diseases)
   2.2 Size and palatability of straw for livestock feed. As highlighted earlier, due to the shortage of grazing land and economic importance of bull fattening, farmers in Moretina Jiru Woreda preferred tall wheat types with softer and palatable straws. 'Yejiru Bere' is a locally known fattened bull identity coming from this Woreda.

The same focus groups identified the following limitations occurring through time on the MCs they have in their stock currently:

- hardy straws less suitable for animal feed,
- poor bread making quality (particularly noted on ET-13A2 as time goes by),
- increasing susceptibility to rust diseases (largely observed on the cultivars HAR-710 and HAR-604), and
- decreasing straw yields (largely observed on the cultivar HAR-710).

4.3.6. Farmers' modern wheat cultivars selection criteria

Respondents' cultivar preferences in terms of the MCs in their repertoire were assessed. During the exercise, depending on their objectives of growing wheat, respondents identified 13 set of

criteria combinations they employed to select MCs. This revealed the diverse and complex nature of farmers' cultivar selection criteria. Such outcomes have also been reported by several authors (Ashby, 1982; Witcombe et al., 1996; Tripp, 1997b) who discussed that small-scale farmers' cultivar selection criteria was complex, and mostly goes beyond yield. In line with this, 20.8% (n=27) identified ET-13A2, HAR-710 and HAR-1685 as very good wheat MCs, whereas 14.6% (n=19) identified ET-13A2 and Dashen to be their best choices. The cultivar ET-13A2 appeared in all sets of best choices except only in one case where respondents preferred the cultivar Dashen over all others (Table 15). The choice of ET-13A2 in all the study sites though seemed an informed decision stood against the variety releasing committee's cultivar assessment criteria which mainly focused on yield advantages of later released cultivars that are better yielding than ET-13A2.

Such diversified cultivar demand by farmers was an indication of the difficulties associated in trying to address small-scale farmers' seed needs by the formal seed supply system which virtually focused on small number of cultivars in any one year to overcome operational difficulties. That was why formal sector seed supply endeavors were mainly successful in supplying seed to uniform high potential environments compared to what they achieved in marginal and more variable low potential areas. As discussed by Dabi et al. (1998), the overall patterns of seed distribution of ESE reflected its success in high potential areas and consequent concentration of seed facilities there. For example, the distribution of wheat seed was mainly done in Arsi and Bale in the Southeastern highlands, whereas maize seed distribution concentrated in Sidamo and Wolega in the South and West, and Teff seed supply was mainly done in Gojjam in the North West highlands. Such occurrences were the once that motivated authors such as Almekinders and Louwaars, (1999) to look for an alternative seed supply systems that better respond to small-scale farmers need in marginal and remote areas.

Table 15. Modern wheat cultivars preferred by respondents in the study site

Modern cultivars	Frequency	Percent	Cumulative percent
ET-13, HAR-710, HAR-1685	27	20.8	20.8
ET-13, Dashen	19	14.6	55.4
ET-13, HAR-710	18	13.8	84.6
ET-13, Dashen, HAR-1685	17	13.1	100.0
Dashen	15	11.5	70.8
ET-13, Dashen, HAR-1899	9	6.9	27.7
ET-13	5	3.8	59.2
ET-13, Dashen, Kenya	5	3.8	36.2
ET-13, HAR-1685, HAR-604	4	3.1	39.2
ET-13,HAR-604, HAR-710	3	2.3	86.9
HAR-1685, ET-13, HAR-1899	3	2.3	30.0
ET-13, HAR-1685, Kenya	3	2.3	32.3
ET-13, Dashen, HAR-710	2	1.5	40.8
Total	130	100.0	

Wheat Seed Supply Systems

Farmers can get wheat seeds from the informal as well as the formal wheat seed supplying systems. Both systems have their own advantages and disadvantages as far as seed availability, access and utilization by the small-scale farmers is concerned.

4.4.1. The formal wheat seed supply system

The formal wheat seed supply system is composed of those individual and organizations that are involved in every stage of cultivar development, seed production, multiplication, processing, certification and distribution. All these processes follow their own line of action governed by the general guiding principles promulgated in the seed policy. The formal seed supply system allocates specialized specific tasks to each stakeholder.

The MC seeds demand of small-scale farmers of each Woreda is collected and revised at the respective zonal level and this in turn is summarized at the regional level. Then, this demand is distributed to the formal seed supplying organizations, mostly to the Ethiopian Seed Enterprise (ESE). In this case addressing those location specific small quantity demands will get no room to be responded. In this regard the case of Buhe wheat cultivar that is distributed for Minjar Shenkora Woreda during the 2004 cropping season and several others can be mentioned (Mulugeta and Shitahun, personal communication). Small-scale seed multiplication and supply schemes were envisaged and implemented during 1996/97-1999/2000 and during 1997/98-2000/01 in order to supplement the seed supply system which could not contribute much (ANRS BoA, 2004). Despite the enormous potential seed demand and the Government effort to create conducive environment for the participation of private sector in the development of sustainable seed supply system, the participation of the private sector is so minimal.

In the distribution of MC seeds the rural credit policies offer an opportunity in saving, mobilizing, and lending activities managed by the private sectors, cooperatives and parastatals. The rural input credits to farmers are extended by the Agricultural Cooperatives (ACs) and Amhara Credit and Saving Institute (ACSI). Non-Governmental Organizations (NGOs) also extend rural credits to the community members in kind (in the form of seed) where the credit repayment shall be granted to the target community for future credit use by the needy community members as a revolving fund. These are the main actors in the seed supplying system.

4.4.2. Cultivar development

Sinana, Sirinka, Adet, Debrezeit, Kulumsa and Holetta agricultural research centers belonging to either the EIAR or regional agricultural research institutes coordinate formal wheat cultivar development programs in Ethiopia. Due to the work of formal wheat crop development 49 bread and 22 durum wheat MCs were released since 1966 Among the 22 released durum wheat MCs, five are out of production, whereas 17 are under production. Of all, the popular durum wheat MC in North Shewa zone during the time of the study was the cultivar Kilinto.

In Ethiopia, the NARSs shoulder the responsibility for cultivar development and generating appropriate technologies to better exploit the yield potential of the new cultivars. These cultivars need to pass through a series of tests and evaluations, release and registration before they enter production. As van Gastel et al. (2002) reported cultivars have to pass through two types of tests including Distinctiveness, Uniformity and Stability (DUS) and Value for Cultivation and Use (VCU) tests. A DUS test is a descriptive assessment that establishes the identity of the new cultivar by a way of morphological descriptors, as well as determination of its uniformity and stability. The test is a useful tool for the purpose of seed production, certification and plant cultivar protection. It is usually conducted for two years and during this time the new cultivar is compared with existing local or standard check to establish its distinctness. National multi-location cultivar trials enable identification of superior cultivars that meet diverse agronomic and consumer requirements. The VCU tests usually are conducted for three years including the on-farm verification trials under farmers' management. In Ethiopia, like in many other developing countries priority is given to agronomic (DUS) traits rather than VCU tests. This is also in line with the general agreement that while both tests are important, the benefits of the two tests need to be considered based on the immediate needs of the country.

In Ethiopian, the cultivar development wing of the seed system has been found to be successful to emanate technologies. Generally cultivars were mainly released for the basic reason of satisfying the yield advantage criterion measured against that of the local and/or standard checks. Although recently cultivar developers are considering some components of the VCU to determine the best cultivars, still the focus is more on wider area adaptation than on emphasizing consumers' demand for seed. The process hence did not enable to accommodate farmers' cultivar /seed/ selection criteria that are diverse and location specific. Wolday (2001) reported this to be one of the major reasons for the lower rate of wheat MC adoption by small-scale farmers in addition to adoption limiting other socio-economic factors.

The ESE has for many years been the single and the main company responsible for the multiplication and distribution of officially released MC seeds in the country. Seed sell for many years has focused on potential areas for each specific crop. As a result the level of adoptions of MCs by small-scale farmers was found to be limited in many parts of the country. Wolday

(2001) reported that, all crops considered the area covered with MC seed was not more than 2% of the country's cultivated area though some increases are being noted in recent years. To overcome the problem and facilitate the adoption process, the ESE together with other stakeholders had designed alternative strategies other than direct sells of seeds.

4.4.3. Seed distribution and price of the ESE seeds

Before the year 2001, the price of wheat seed showed a direct relation with the respective productivity of wheat of ESE, meaning that, as the productivity of wheat increases the price of wheat for the customer decreases. This critically showed how efficiency is associated with the price of seed for customers. But, after 2001 the linear relationship between productivity and price was not observed (Table 16). The ESE had started wheat seed multiplication under farmer growers' scheme just in 2001. It means the practice of on farm seed growers' scheme which could allow addressing farmers' seed needs have only a short history.

Table 16. Wheat seed production, productivity and price of ESE between 1995 and 2004

Year	Production area (ha)				Quantity produced (Qt)				Productivity (qt/ha)	Price (Birr/q
	ESE farm	Private farm	Others	Total	ESE farm	Private farms	Others	Total		
1995	-	-	4298	4298			80045	80045	18.6	227
1996	-	-	5530	5530			126496	126496	22.87	218
1997	-	-	7591	7591			197996	197996	26.1	213
1998	-	-	8017	8017			116514	116514	14.53	245
1999	-	-	8939	8939			72569	72569	8.11	249
2000	-	-	7257.5	7257.5			149088	149087.7	20.49	262
2001	39	-	8223	8262	416		139215	139631	16.85	256
2002	2666.74	-	-		75472		102564	178036		22
2003	2048.5	84.5	-	2133	64119	1781		65900	30.9	245
2004	1940	693.49	246.33	2880.2	71518.4	16911.7	9107	97537.12	33.87	245.0

Source: Several years (ESE 1995-2004, of ESE reports

In its former years as the Ethiopian Seed Corporation (ESC), the present ESE was blamed for its

Year	State farms	OoARD	FAO	Extension program	Private farms and cooperatives	Others	Total
1995	10427	2665	30136	19320	21262	17541	101351
1996	24889	1112	3887	54921	8503	437	93749
1997	13609	3574	941	58171	4708	824	81827
1998	10885	3216	2212	82690	11904	169	111076
1999	8928	2953	273	60039	9936	2314	84443
2000	Data unavailable	Data unavailable	Data unavailable	Data unavailable	Data unavailable	Data unavailable	125286.
2001	12802		4766	26043	7698.75	237	51546.7
2002	1396.5		2445	853.91	1823.55	8742	15261
2003	13834.5	1013	*24596	34406.12	14344.98	3198	91392.6
2004	Data unavailable	Data unavailable	Data unavailable	Data unavailable	Data unavailable	Data unavailable	138913
				Total			894845.2

mere focus on the then flourishing State farms and producer cooperatives. But from 1995 onwards the major share of the seed from the ESE was being distributed to small-scale farmers, who are the major clients of the Government extension program started in 1995 as the Extension Management Training Plots (MTPs). This period marked the shift in emphasis from serving the State farms and cooperatives to serving the small-scale farmers (Table 17). Such a shift in emphasis also required a shift in approach towards assessing the seed needs of the target group, i.e., small-scale farmers. This in turn required instituting alternative seed production and distribution approaches. This requirement, however, is not yet met by the ESE which has always been blamed for its weak seed popularization, and distribution system. In this regard Belay (2002) reported that in 2001 ESE was able to sell 18% of the 201,716 quintals it produced of which wheat and maize constituted 95%. It means the remaining 82% has to be kept as a carryover stock.

Table 17. Quantity (qt) of certified wheat seed distributed by the ESE between 1995 and 2004 to different buyers

Year	State farms	OoARD	FAO	Extension program	Private farms and cooperatives	Others	Total
1995	10427	2665	30136	19320	21262	17541	101351
1996	24889	1112	3887	54921	8503	437	93749
1997	13609	3574	941	58171	4708	824	81827
1998	10885	3216	2212	82690	11904	169	111076
1999	8928	2953	273	60039	9936	2314	84443
2000	Data unavailable	Data unavailable	Data unavailable	Data unavailable	Data unavailable	Data unavailable	125286.
2001	12802		4766	26043	7698.75	237	51546.7
2002	1396.5		2445	853.91	1823.55	8742	15261
2003	13834.5	1013	*24596	34406.12	14344.98	3198	91392.6
2004	Data unavailable	Data unavailable	Data unavailable	Data unavailable	Data unavailable	Data unavailable	138913
				Total			894845.2

Source: Compiled from several years (ESE, 2004; annual report) of ESE reports

*For ease of simplicity sales data to other NGOs summed up with sells to the FAO

As could be seen from Table 18, the amount of wheat seed sold in years following drought years was much higher than any other year. For example, the biggest sell for wheat seed was in 1985/86 cropping season just after the 1984/85 severe drought. This also holds true for the other crops seed, as in the same year ESE's seed sells reached a record high of 293,750 quintals. Once again following the 1992/93 drought, the ESE sold 193,197 quintals of seed of which 120,617 quintals were wheat seed. That was the next biggest seed sale for the ESE. In line with this Janssen et al. (1992) reported that subsistence farmers demand for formally supplied seed is 'counter cyclical' occurring mostly after poor years, when farmers have consumed or lost their own saved seed and other local seed sources are gone (Table 18).

Table 18. Annual seed sales (qt) of the ESE for different crops between 1979/80 and 2003/04

Year	Types of crop			
	Wheat (qt)	Maize (qt)	Total including other crops (qt)*	Percent of wheat
1979/80	190,790	11,623	209,279	91.2
1980/81	188,473	23,547	223,640	84.3
1981/82	164,338	14,187	188,127	87.4
1982/83	165,726	24,952	202,542	81.8
1983/84	46,160	10,220	77,744	59.4
1984/85	134,469	124,774	288,566	46.6
1985/86	165,776	86,022	293,750	56.4
1986/87	137,658	78,045	263,062	52.3
1987/88	128,083	45,132	250,585	51.1
1988/89	104,000	31,601	163,861	63.5
1989/90	55,806	29,568	107,827	51.8
1990/91	71,049	11,360	98,869	71.9
1991/92	69,614	15,287	120,718	57.7
1992/93	110,851	23,840	177,259	62.5
1993/94	120,617	36,102	193,197	62.4
1994/95	101,351	26,323	141,310	71.7
1995/96	93,749	18,892	121,743	77.0
1996/97	81,827	16,680	105,786	77.4
1997/98	110,835	42,526	155,820	71.1
1998/99	84,443	45,497	133,483	63.3
1999/00	125,286	71,198	201,542	62.2
2000/01	55,605	54,767	112,784	49.3
2001/02	7,934	25,683	36,112	22.0
2002/03	91,162	59,283	157,187	58.0
2003/04	135,846	50,204	208,669	58.0
Total	**2,741,448**	**977,313**	**4,233,462**	**64.8**

*including barley, sorghum, teff, haricot bean, linseed, faba bean, field pea, Soya bean, mustard, rapeseed, and some others

Source: ESE (2005)

4.6.Strengths and Weaknesses of Wheat Seed Sources

4.6.1. Local cultivar wheat seed sources

Farmers can get different local wheat cultivars from several sources. In the study sites, the sources for local wheat cultivars seed for 40% (n=52)) of the respondents were other farmers including friends, relatives and neighbors followed by farmers own saved seed for 21.5% (n=28) of the respondents. This finding contradicted with the finding of Cromwell (1992) who explained

farmers' own saved seed to be the most important local seed source followed by seed sourced from other farmers. A slight difference in the number of farmers using own saved seed was however observed between Moretina Jiru and Gera Keya study sites (Table 19). In Moretina Jiru only six (10%) of the respondents planted own saved seed, whereas in Gera Keya Woreda 22 (31.4%) respondents planted own seed. This was in agreement with the findings of David and Sperling (1999) that explained variations in the degree of reliance on own seed stock across and within regions depending on seasons, HH characteristics (mainly wealth status), and the level of production relative to subsistence needs.

Table 19. Main local cultivar wheat seed source(s) in the study sites

Seed sources	Moretina Jiru		Gera Keya			Total percent
	Frequency	%	Frequency	%	Total	
Do not use local cultivars	6	10	4	5.7	10	7.7
Neighbors, friends and relatives	31	51.7	21	30	52	40.0
Own saved grain (grain as seed)	6	10	22	31.4	28	21.5
Other farmers and local markets	7	11.7	19	27.1	26	20.0
Own saved seed and local market	10	16.6	4	5.7	14	10.8
Total	60	100.0	70	100	130	100.0

4.6.1.1. Number of local wheat cultivars in the study sites

Respondents had experience of growing one (3.1%) to 11 (0.8%) local wheat cultivars on their private farms. Communities in Moretina Jiru identified 15 local wheat cultivars, whereas those in Gera Keya identified 10 local cultivars (Table 20).Due to its remoteness, Gera Keya Woreda was originally assumed to have more local wheat cultivars compared to Moretina Jiru Woreda which was located near to seed supply centers. But later, the opposite appeared to be true. Similar findings were reported by Almekinders and Louwaars (1999) that low-input small-scale production systems with low level of genetic diversity could also exist because of limited access to new cultivars and poverty despite their location advantage to supply points.

Respondents highly appreciated several other qualities of the local cultivars and worried about the disappearance of local cultivars such as 'Enat sindie' and 'Menzie' despite their recent shift to growing MCs for their yield advantages. Disappearances of local cultivars are occurring

against what is stated in article 3, number 3.3 of the Ethiopian National Seed Industry Policy (NSIA, 1992) which reads as "the Government has to encourage some development works to preserve essential local cultivars through the application of in-situ and ex-situ conservation methods and balancing the alienating promotional works that hitherto focused on MCs at the expense of local cultivars." As pointed out by USAID (1993) seed and food security should have depended on pragmatic understanding of agro-biodiversity.

Table 20. The number of local wheat cultivars grown by respondents in study sites (n=130¬)

Number of local cultivars	Moretina Jiru		Gera Keya			Total percent
	Frequency	%	Frequency	%	Total	
1	3	5.0	1	1.4	4	3.1
2	3	5.0	1	1.4	4	3.1
3	7	11.7	24	34.3	31	23.8
4	17	28.3	27	38.6	44	33.8
5	19	31.7	13	18.6	32	24.6
6	5	8.3	1	1.4	6	4.6
7	5	8.3	1	1.4	6	4.6
8	0	0.0	2	2.8	2	1.5
11	1	1.6	0	0.0	1	0.8
Total	60	100.0	70	100	130	100.0

4.6.1.2. Advantages of local wheat seed sources

Farmers attached different values for each wheat seed source depending on their economic status, production objectives, and similar other factors that have strong influence on farmers' decision of seed sourcing. The price and quality of seed also varied depending on the type of the seed source. From the total sample, only ten (7.7%) reported not growing local wheat cultivars and thus did not obtain seed from local sources. Those who partly or entirely depend on local seed sources identified advantages such as cheaper price (53.1% (n=69)), adequate quality seed (24.6% (n=32)) and, combination of adequate quality seed and cheaper price (14.6% (n=19)), as the main advantages of obtaining local cultivar seeds from local sources (Table 21).

Table 21. Advantages of obtaining local cultivar seed from local sources

Advantages	Moretina Jiru		Gera Keya			Total percent
	Frequency	%	Frequenc y	%	Total	
Cheaper price	32	53.3	37	52.9	69	53.1
Adequate quality seed	5	8.3	27	38.6	32	24.6
Adequate quality seed+ cheaper price	17	28.3	2	2.9	19	14.6
Not growing local cultivars	6	10.0	4	5.6	10	7.7
Total	60	100.0	70	100.0	130	100.0

4.6.1.3. Weaknesses of local cultivar wheat seed sources

Respondents' views on the different local wheat seed sources were also collected. Out of the total respondents, 33.1% (n=43) characterized local wheat seed sources other than the on-farm saved seed as suppliers of lower quality seed or seed mixtures, whereas 17.1% (n=23) found no problem associated with seed obtained from local sources. Moreover, 30% (n=39) of the respondents stressed the critical problem of sourcing local cultivar wheat seed from local sources was a condition whereby the supplier considered the recipient as demanding seed out of jealousy and might be evil eyed. Only 4.6% (n=6) of the respondents reported seed sourced from other farmers as expensive and unproportionally bartered with any other crop seed. Related to differences between the study sites in the two Woredas, it was found that 31.4% (n=22) of the respondents in Gera Keya Woreda considered the local seed sources to have no problems. Contrary to this, only 1.6% (n=1) of the respondents in Moretina Jiru Woreda considered local seed sources to have no significant problems (Table 22).

Table 2. Weaknesses of the local wheat seed sources

Weaknesses	Frequency			Total percent
	Moretina Jiru	Gera Keya	Total	
Social problem (demand associated with evil eye)	22	17	39	30.0
Offering poor quality seed or seed mixtures	24	19	43	33.1
Social problem + Poor quality seed	2	7	9	6.9
Demanding higher prices	5	1	6	4.6
No problem associated with local sources	1	22	23	17.7
Not growing local cultivars	6	4	10	7.7
Total	60	70	130	100

4.6.2. Seed source for modern wheat cultivars

Major seed sources of wheat MCs were identified in the community surveys as well as the individual interviews. The seed sources for this cultivar were thus other farmers, local markets and own savings. The ensuing discussion hence referred to MCs other than ET-13A_2. Related to the cultivars still considered modern 48.5% (n=63) of the respondents reported accessing the seed through the respective *Woreda* OoARD, 33.8% (n=44) from other farmers and OoARD, whereas 16.2% (n=21) accessed them from other farmers (Table 23).

Table 23. Sources of modern wheat cultivars that respondents in the study sites get seed from

Seed sources	Moretina Jiru		Gera Keya			Total
	Frequency	%	Frequency	%	Total	percent
Other farmers	14	23.3	7	10.0	21	16.2
OoARD	24	40.0	39	55.7	63	48.5
Other farmers +OoARD	21	35.0	23	32.9	44	33.8
Other farmers+ local markets+ OoARD	0	0.0	1	1.4	1	0.8
Own saved seed +OoARD	1	1.7	0	0	1	0.8
Total	60	100.0	70	100.0	130	100.0

4.6.2.2. Respondents' assessment of modern wheat cultivar seed sources

Respondents reflected the strengths and weaknesses of the sources for wheat MCs depending on their seed selection criteria, economic condition, market situation, and other factors that influenced their decisions as discussed in the subsequent sections.

Respondents' assessment of other farmers as sources of wheat MC seeds

Among the respondents, 33.8% (n=44) appreciated this source for its flexible terms of exchange compared to other sources of wheat MC seeds, whereas 5.4% (n=7) preferred it for its supply of adaptable wheat MC seeds. Furthermore, 2.3% (n=3) liked the opportunity of reciprocity as it is dealt with neighbors, friends and relatives with whom the recipient has strong ties. Similarly,

McGuire (2005) reported that strong norms of reciprocity and general politeness make it difficult to openly refuse a request for small amount of seed from neighbors and relatives.

Major problems associated with other farmers as wheat MC seed sources reported by 23.8% (n=31) of the entire sample respondents, was hesitation of the needy to ask for seeds in fear of being considered jealous of others harvests (Table 24). This result is similar with the findings of Sperling *et al.* (1996) who reported the "circle of diffusion" among farmers is "socially narrow" meaning that not everyone who asks for seed obtains it. In this regard Sperling and Loevinsohn (1993) reported that, because their economic problems make it difficult to keep seed for their own use, let alone giving to others, poor farmers are unlikely to be major diffusers of MCs. Moreover, 16.9% (n=22) of the respondents censure this source for delivering lower quality seed, whereas 6.2% (n=8) classified it as incapable of supplying seed at adverse time and 4.6% (n=6) considered it being untimely seed supplier.

Table 24. Respondents' assessment of farmers as sources of modern cultivar wheat seeds

Assessment criteria	Frequency			Total percent
	Moretina Jiru	Gera Keya	Total	
Positive				
No response	24	39	63	48.5
Flexible terms of exchange	28	16	44	33.8
Supply adapted wheat cultivars	2	5	7	5.4
Reciprocity	0	3	3	2.3
Small amount of seed accessible	6	7	13	10.0
Total	60	70	130	100.0
Negative				
No response	24	39	63	48.5
Supply lower quality seeds	11	11	22	16.9
Social problem (jealous)	21	10	31	23.8
Untimely supply	1	5	6	4.6
No supply at adverse time	3	5	8	6.2
Total	60	70	130	100.0

No response = Do not get MC seeds from other farmers

Respondents' assessment of OoARD as a source of wheat MC seed

Most of the negative features of seeds from OoARD swivel around the price and the time of supply. In this regard, 34.5% (n=45) of the respondents complained OoARD for its untimely

supply as well as setting higher prices of seed. When disaggregated, 18.5% (n=24) of the respondents condemned this source for its unseemliness; 1.5% (n=2) for its high price and 17 (13.1%) for offering large package size not commensurate with farmers' holdings (Table 25). This finding is in agreement with that of Seboka and Deressa, (1997) who reported large package sizes and higher prices to be disincentives for small-scale farmers' use of MC seed. Despite the already discussed credit advantage, 10.8% (n=14) of the respondents complained for their lack of credit from the OoARD. Though it seemed paradoxical, the case showed the problem of access to credit by all farmers which could have facilitated MC seed use by small-scale farmer.

Table 25. Respondents' assessment of OoARD as a source for modern wheat cultivars seed

Assessment criteria	Frequency			Percent
	Moretina Jiru	Gera Keya	Total	
Positive				
No response	14	7	21	16.2
Supply good quality	32	36	68	52.3
Supply seeds with other inputs and advice	1	1	2	1.5
Get credit service	2	23	25	19.2
Good quality seeds+ associated inputs	11	3	14	10.8
Total	60	70	130	100.0
Negative				
No response	13	8	21	16.2
Untimely supply	3	21	24	18.5
Distribution complications due to committee	0	7	7	5.4
Demanding higher price	2	0	2	1.5
Lack of credit service	0	14	14	10.8
Untimely supply + higher price for seed	38	7	45	34.5
Large size of packages	4	13	17	13.1
Total	60	70	130	100.0

No response = Do not get MC seeds from OoARD

Grain yield obtained from different wheat cultivars

During the community survey, respondents expressed the yield obtained from the use of different kinds of wheat seeds as follows; 8-9 qt/ha from local seed, 22-25 qt/ha from recycled MC seed and 26-28 qt/ha from certified MC seed. In the individual interviews respondents reported the average yield obtained from the different wheat seeds which was 8.2 qt/ha for local seed, 23.6 qt/ha for recycled MC seed, and 24.6 qt/ha for certified MC seed (Table 26). The yield difference was hence larger only between that of recycled or certified MC seed and seed from local

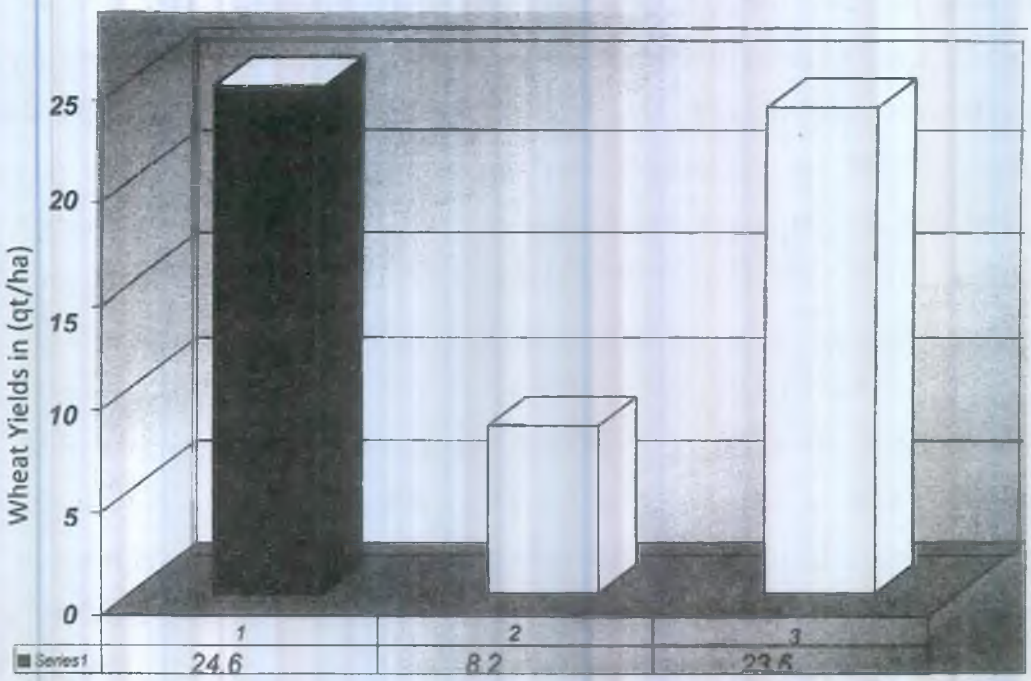
cultivars showing the lower yield difference between using certified and recycled MC wheat seeds (Figure 1). This indicated the presence of good seed management at the farm level. As farmers were, however, required to pay higher prices for certified wheat seeds compared to what they pay for recycled MC seeds obtainable from their surrounding and/or from local markets and the high priced seed did not give a significantly different yield, they preferred using recycled seed. Even this yield difference (almost 100 Kg) does not cover the seed purchasing price for the certified seeds, considering the current grain market price (200 Birr/quintal) of wheat.

CSA (2003) reported the average wheat productivity for the Amhara region and the North Shewa zone for the year 2003 to be 12.4 qt/ha and 11.8 qt/ha, respectively. The average wheat productivity for Moretina Jiru, 19.6 qt/ha was the highest productivity in North Shewa zone. The next higher productivity was reported to come from Minjar Shenkora and Insarona Wayu Woredas which was 17.1 and 14.6 qt/ha, respectively. Least of all was the 8.7 qt/ha productivity level attained in Gera Keya Woreda (CSA, 2003). Be it from recycled or certified seed, MC wheat productivity in the study sites was higher than the average yield attained in the Amhara region. The average yield obtained from local cultivars at regional level was even lower than the average productivity of Gera Keya *Woreda* (CSA, 2003).

Table 26. On-farm wheat grain yield obtained from different types of seed in the study sites

	Yield (qt/ha)			
Seed types	Minimum	Maximum	Mean	SD
Certified seed	14.0	38.0	24.63	4.59
Local cultivar seed	6.5	11.0	8.17	0.79
Recycled MC seed	12.0	38.0	23.59	4.78

The results summarized in Figure 3 revealed that recycled MCs seed produced on-farm and moving through the local seed supply system had comparable yield to that of certified seed purchased from the formal seed sector. This was in accordance with the findings of Bishaw (2004) who reported that; though blatantly poor quality seed hurts farmers, wheat seed produced in farmers' seed system had often comparable quality to formally produced seed. According to the same author, it was due to this that the Indian government instituted a rule that allowed certification of locally produced seeds with some support from the formal seed sector.



Average production of different wheat seeds

Key: 1= certified, 2= local, 3= recycled MC seed

Figure 1. On-farm wheat grain yield obtained in the study sites by using different seed types

Seed Storage

Farmers' stored wheat seed using different methods and in different storage structures. Storage methods and structures varied depending on, among others, social problems (theft at night) and physical environment (presence or absence of pests, insects, rodents and other factors). Most, 83.1% (n=108) of the respondents stored their seed in the granaries, 9.2% (n=12) in bags stored in separate room, and 7.7% (n=10) in bags stored inside living rooms (Table 27). The main reason of storing seed inside the farmhouse was fear of theft. Likewise, Rhoades *et al.* (1988) reported that farmers in Latin American Andean Plateaus stored seed inside farmhouses for security purposes.

Table 27. Seed storage systems practiced by respondents in Moretina JiruandGera Keya

Seed storage methods	Moretina Jiru		Gera Keya			Total
	Frequency	%	Frequency	%	Total	percent
In bags stored in separate rooms	4	6.7	8	11.4	12	9.2
In bags stored inside living rooms	7	11.7	3	4.3	10	7.7
In the granaries	49	81.6	59	84.3	108	83.1
Total	60	100.0	70	130	130	100.0

Problems associated with wheat seed storage

Problems associated with wheat seed storage were pests and insects. Accordingly, 45.4% (n=59) of the respondents complained about rodents, 16.2% (n=21) about weevils, and 22.3% (n=29) about combined damages by weevil and rodents. The remaining farmers complained about combined damages caused by weevils, rodents and theft (Table 28). Only 6.2% (n=8) respondents reported that they did not encounter wheat seed storage problems. The problems mentioned in both *Woredas* and their magnitude was almost similar.

Table 28. The major problems associated with wheat seed storage in the study sites

Storage problem	Moretina Jiru		Gera Keya			Total
	Frequency	%	Frequency	%	Total	percent
Weevils	13	21.7	8	11.4	21	16.2
Rodents	14	23.3	45	64.3	59	45.4
Weevils + rodents	17	28.3	12	17.1	29	22.3
Weevils + theft	2	3.3	0	0.0	2	1.5
Rodents +theft	3	5.0	1	1.4	4	3.1
Weevils+ rodents + theft	7	11.7	0	0.0	7	5.4
No storage problems	4	6.7	4	5.8	8	6.2
Total	60	100.0	100	100.0	130	100.0

Problems restraining attainment of wheat production goals

Multi-faceted problems thwarted respondents from attaining their wheat production goals. The majority, 60.8% (n=79) of the respondents reported the steadily increasing price of modern seed and chemical fertilizer as the one hindering them from attaining their goals, whereas 22.3% (n=29) was restrained by shortage of farmland (Table 29). This was in harmony with the findings of Amha (2002) who reported that Ethiopia's poor road infrastructure, limited financial

institutions and, lack of competition greatly restricted effective market development for seed. It was also the monopoly for fertilizer imports retained by the Agricultural Input Supply Authority that limited MC use by small-scale farmers, as in. The case of Moretina Jiru *Woreda*, the priority problems impeding attainment of wheat production goals were the steadily increasing seed and fertilizer prices. It should be noted that shortage of land was the second most important rooted problem hindering attainment of wheat production goals in both *Woredas.*

Table 29. Major problems hindering farmers from attaining their wheat production goals

Problems	Moretina JiruGera Keya					
	Frequency	%	Frequency	%	Total	Total percent
High price of seed and fertilizers	38	63.3	41	58.6	79	60.8
Shortage of land	12	20.0	17	24.3	29	22.3
Shortage of capital/money	7	11.7	1	1.4	8	6.2
Shortage of labor	2	3.3	1	1.4	3	2.3
Shortage of modern cultivars	0	0.0	1	1.4	1	0.8
Low price for grain/output	1	1.7	2	2.9	3	2.3
Water logging on farm land	0	0.0	1	1.4	1	0.8
Diseases and pests	0	0.0	6	8.6	6	4.6
Total	60	100	70	100	130	100.0

Framers' Perception of the major problems of using modern wheat cultivars

Problems stressed to hinder MC seed use included resource (land and money) availability, availability and access to wheat MCs, and availability and access to fertilizer and other essential inputs. From the total respondents, 54.6% (n=71) reported high price of fertilizer as the limiting factor for MC use and this was related to the necessity of using fertilizers for better yield from MCs. Problems that appeared as the second most important were high MC seed price (for respondents from Moretina Jiru) and unavailability of wheat MC seed (for respondents from Gera Keya *Woreda*). Respondents from both Woredas identified shortage of farm land as the third most important problem limiting wheat Mc use. Due to all these, farmers were hence forced to lead subsistence agriculture which relies more on recycled old MCs and local cultivars seed (table 30).

Table 30. Problems that hindered respondents from using modern wheat cultivars seeds

Constraints	Moretina Jiru		Gera Keya			Total
	Frequency	%	Frequency	%	Total	percent
High fertilizer price	39	65.0	32	45.7	71	54.6
Unavailability of modern cultivars	0	0.0	13	18.6	13	10.0
High price of modern wheat seed	14	23.3	6	8.6	20	15.4
Lack of credit facility	2	3.3	1	1.4	3	2.3
Low market price for products	2	3.3	0	0.0	2	1.5
Lack of knowledge on modern cultivars	0	0.0	4	5.7	4	3.1
Unsuitable weather condition	0	0.0	3	4.3	3	2.3
Shortage of farmland	3	5.0	10	14.3	13	10.0
Late input delivery	0	0.0	1	1.4	1	0.8
Total	60	100.0	70	100.0	130	100.0

5. Summary, Conclusion and Recommendation

HH heads education level, larger farm holding, proximity to markets, long farming experience and off-farm income opportunities showed positive relationships with the use of MC wheat seed at the farm level. However, as most farmers own holdings that are less than a hectare, they strongly relied on old wheat MCs the performance of which they trusted more. As the land holding of a farm HH gets larger, the MC wheat seed use and thereby wheat productivity increased improving subsequent farm management and farmland efficiency.

Farmers obtain certified MC wheat seeds from OoARD or recycled MC seed from the surrounding farmers through different exchange arrangements. Farmers appreciate the flexible terms of exchange, supply of quantities that they require and the opportunity to reciprocate that farmer-to-farmer seed exchanges provide, without forgetting the poor quality nature of seed from this source as well as the social problem of being labeled as jealous of others harvest when trying to obtain seed from this source. Likewise, farmers acknowledge the superior quality of seed and the associated credit facility while obtaining certified seed through OoARD while strongly criticizing the higher price and untimely /late/ supply of seed from this source.

Seed selection in both female and male-headed HHs was the responsibility of male HH members. Females share some responsibilities in seed selection and assigning plots to different

cultivars. Most farmers conduct seed selection while the crop is in the field although the extent of seed selection using this procedure varied from location to location. While selecting the future generation seed considerations such as level of disease resistance, grain filling capacity and, straw length are given prominence. Moreover, the selection of a cultivar from economic and HH consumption perspectives is done with high degree of integration with the prevailing socio-economic and agro-ecological conditions of an area. Most farmers stored seeds selected for planting purpose in granaries. Major wheat seed storage problems were found to be rodents, weevils, and theft.

The complex nature of small-scale farmers' seed selection criteria resulted in diverse MC seed demand as revealed by the 13 different combinations of best cultivar choices. Contrary to this, the formal seed supply system emphasized cultivar development for wider adaptation and for high potential areas. Such considerations did not enable the formal seed supply system to respond to small-scale farmers seed needs. For rural livelihoods to improve, in the study sites where wheat is an important economic crop improving wheat production and productivity is inevitable. This made the search for alternative seed production and supply system that better responds to small-scale farmers seed needs.

The grain yield from certified and exchanged MC wheat seeds was different on the average by 100 kg only. This difference cannot justify using certified seed as the value from a 100 kg grain could not cover the cost of the certified wheat seed. Besides, farmers have fears of the associated risks of using certified seed and other inputs under an uncertain physical environment conditions, as any crop failure could make them unnecessarily indebted. This was the underpinning reason for farmers to incline towards the use of recycled MC wheat seeds obtained through farmer-to-farmer exchanges.

Higher price of MC wheat seeds and chemical fertilizers and their unavailability when needed were the critical problems that hindered farmers from attaining their production goals which simply could have been achieved through increased production and productivity. The formal seed supply system was unable to address seed needs of small-scale farmers, among others, due to its supply of cultivars developed for high potential areas and wider adaptations.

The public extension programs have in the past focused on production and distribution of quality seed for farmers under a direct or an indirect subsidy programs that hindered the emergence of private seed enterprises. In the absence of a well-developed marketing system, the focus on distribution disabled the seed programs from responding to the needs of small-scale farmers.

Due to the self-pollinating breeding system of wheat with the minimum understanding of what seed is one can easily safeguard any genetic purity deterioration due to mixtures, meaning that loss of yield from such occurrences could be kept minimal. That was why, in the study sites, farmers depended more on on-farm seed of their own. In addition to being self-pollinating, wheat seed has a low multiplication rate (more seed for planting compared to crops like maize, for example), high-volume of seed to manage but only low-profit margins, all acting as elements of disinterest for the private sector to engage in seed production and supply. This implies that other alternative seed production and supply schemes should be designed and implemented for small-scale farmers to benefit from the gains made in breeding.

As revealed through this study, to enhance small-scale farmers' access to quality seed of recently released wheat MCs, serious thought be given to launching alternative seed production and supply systems that blend the strengths of the local and the formal seed supply. Lessons from past failures of such alternative seed supply systems should be brought to the fore while designing any such system. Evidences suggested that such farmers-based seed multiplication and marketing schemes failed in North Shewa zone in particular and the Amhara Region at large due to their focus on production without taking note of the marketing aspects. It means; the attempts failed to be demand driven. This has been acknowledged to be the weakness of the largely practiced on-farm seed production and supply scheme supported by the SARDP Project in the ANRS for years. Under the scheme, a number of Woredas were multiplying MC wheat seeds under the supervision of the respective Woreda OoARD experts, whereas they failed to design and implement practicable seed marketing strategies to at least reach the surrounding farmers. Seed growers under this scheme finally were forced to sell the seed to other organizations leaving the Project's original production target of enhancing the community's access to quality seed.

It has been noted in the earlier sections of this paper that seeds supplied by the local seed system had comparable qualities with the certified seeds supplied by ESE. It means provision of regulatory frameworks that allow the certification of such seeds should be sought as is being done in countries such as India, Afghanistan and many more. Such farmer-based seed production and marketing schemes could be started by organizing interested collective action groups that, with the appropriate support given, may later develop into specialized seed cooperatives. It means development agencies interested in seed initiatives should create an enabling environment that will encourage the development of farmers' seed production and marketing groups for easily managed crops like wheat. This is anticipated to enhance small-scale farmers' access to good quality seed of recently released MCs at relatively cheaper prices.

It has been acknowledged that farmers' seed producer groups can be efficient if given the necessary support and, as observed in countries like South Africa, have potentials to develop into seed specialized small or medium enterprises. Government agribusiness promotion programs and NGOs have to play a significant role in promoting such collective groups access to marketing and distribution channels. This may involve training group members in seed production and post harvest handling techniques, establishing linkages between the group and source of foundation seed suppliers, developing marketing and management skills and approaches, as well as promoting integration with potential buyers. Continuous support will also enhance the transformation of such collective groups into commercial seed entities with certain degree of specialization. For such alternative seed supply systems to become sustainable, any outside assistance should focus on building their capacity (knowledge, skill and material support), market development rather than on providing direct subsidies.

Until such rural micro-enterprises develop a consortium among ESE, farmers' cooperatives, seed multipliers, traders and NGOs involved in seed support should be created to facilitate the multiplication of basic, C1 and/or C2 seeds that could be sold to wheat growers in North Shewa zone with cheaper prices. In view of their small holdings farmers in North Shewa zone prefer having smaller quantity seed bags. The short-term alternative to enhance small-scale farmers' access to MCs could be the supply of small seed packets (about 10 kg) through NGOs for farmers' own multiplication. This will definitely be considered to imposing negative implications

on the annual returns of the ESE, but as farmers are not buying certified seed every year, the concern should be regarded as untimely.

It is, therefore, highly recommended for government development programs and NGOs to join hands to support the development of farmer-based seed production and marketing schemes that are entirely managed by collective specialized groups. Organizing such groups in selected locations, giving the required seed production, handling and marketing training, linking the groups with basic seed sources under a defined terms of agreement, enhancing the groups access to market information, and establishing collective group-market linkages are the activities that should be done without further delay. The key to success of such programs comes from improving collective groups' access to market information on available products and seed prices and from marketing opportunities to provide farmers with a reliable supply of quality seeds that are adapted to local agricultural conditions. Moreover, better linkage among research, variety release system, ESE, extension and farmers for accommodating the farmers' seed selection criteria and examining the potentials of local markets for farmers seed producers, using the cooperative systems for marketing are so critical.

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Analyzing Development in Ethiopia Through Rural – Urban Production Linkage: A Case Study of Debre Markos Town and its Rural Hinterlands

Berhanu Zeleke
Email :berhanuzget@yahoo.com

Abstract

The rationale for choosing the problem of Rural- urban production linkages is to find out the spatial development paradigm (i.e Micro and macro spatial scales) for Ethiopia's development endeavor. It is paradox that Ethiopia has abundant natural resources (water tower of east Africa, reach variety of ecological zone raging from desert to Alpine with a variety of fauna and flora,) and variety of agro climatic zone for different agricultural and agro- industrial development . It has also larger human population (about 85 million) third in Africa next to Egypt and Nigeria. However, the persistent poverty in Ethiopia is the best friends for many decades and the policies of the Ethiopian governments have not solved the problem for about half a century (see section 1.7.1) the persistent poverty in Ethiopia for many decades makes the country one of the poorest countries in the world --206th from 208 counties economically (Todaro and Smith, 2009). Most African governments, including Ethiopia have biased development policies and they have no any attempt to coordinate different sectors in their development policies. The Rural- Urban integrated development approach is tested in south –East Asian countries such as Nepal and China. In Nepal, the Rural – Urban partnership program (RUPP) donated by World Bank and UNDP has been resulting significant development. Much of the China's development in the 1980^{s} and 1990^{s} was due to appropriate rural- urban linkages by the policy – strategy of town village enterprises (TVEs) (Todaro and Smith 2009:193,Momen,2006:11). This paper will, therefore, attempt to show the coordinated and integrated development option derived from the dichotomy of urban biased development policy (i.e **growth pole theory**) and rural biased development policy (i.e **agricultural fundamentalism**) through Rural – urban production linkages (RUPLs).

Clarification of terminology and key worlds

- **Linkages** is rural – urban interaction and exchange of materials.
- **Hinterland** is a rural region that surrounds with close proximity to urban center. It is also called Influence zone
- **Primate city**- The population of the largest city in a national urban pattern is greater than two times the population of the second urban center. In the case of Ethiopia urban pattern, Addis Ababa is 14 time greater than the second urban center (Dire Dawa) based on from 1994 Census.
- 'Chat' is one type of beverage/ stimulant leaf.

- **Appropriateness** refers cultural and traditional (indigenous knowledge) acceptance, sustainability in technology, feasibility and affordability
- **Agro- processing industries** are industries that process and add value and create markets fro agricultural products as well as provide inputs to agriculture.
- **Backward linkages** is the source of raw material input of a sector from other sectors while
- **Forward linkage** is the out put linkage of the sector to othersectors and consumers. Fore example, agricultural backward linkage includes fertilizers, herbicides and its forward linkage consists sale of agricultural products.

Acronyms and Abbreviations

ADLI- Agricultural Development Leads to Industrialization

CSA – Central Statistics Office

DMT – Debre Markos Town

DMTID- Debre Markos Town Industrial Development

GEPLAUO- Gozamine Environmental Protection, Land Administration and use of

PASDEP- Plan for Accelerated and Sustainable Development to End Poverty

SDPRP –Sustainable Development and Poverty Reduction Programme

RUPLs -Rural – Urban Production Linkages

1. Introduction

1.1 Background of the study

African governments have usually followed unbalanced and biased development policy between urban center and rural settlements. They have focused on either rural area or urban centers. Hence, the application of rural-urban integrated development and their proper coordination as a development paradigm is a serious problem in Africa, mainly sub-Sahara counties that extends south of the Sahara desert from Senegal to Djibouti across Ethiopia and in the 21st century, the African development challenge lies in this region. The Sub-Sahara region is a challenge for development because it is characterized by chronic poverty, rapid population growth versus

weak economic growth, deteriorating economic performance and economic stagnation since 1970s (Hess and Ross, 1997:559-61) due to known reasons of policy and institutional problems and unknown reasons (Demse, 2007). This again has created a number of problems on the livelihood of both rural and urban people and their environment. On the other hand, Africa has the highest rate of urbanization (about 4%) in the world without industrialization and appropriate development with rapid mushrooming of towns. Migration from rural to urban is caused by mainly push-factors such as unemployment, underemployment, population pressure on rural land, lack of land, poverty and the like without important pull-factors in urban centers. Thus, employment opportunities in the urban centers are not available and this gives rise to large number of unemployed people living in shanties, squatter and roadsides engaged almost anti-development activities including different type of crimes. Trade linkages of the continent is also based on exporting raw materials at lower and fluctuating price but importing higher and increasing price manufactured goods that has resulted in trade deficit (Waugh 2000).

The rapid conversion of rural people and land to urban society and urban land use in Africa presets large challenges everywhere. Hence, the continent view urbanization as negative and threatening for environmental, Social and economic development. "urban scenarios are surprisingly neglected and often misunderstood in the larger development context. Rural and urban life and economics are often seen as quite separate but they are mare intimately linked and interdependent than many people realize" (Tannerfeldt and Liung, 2006:5). However, urbanization is inevitable and irreversible process everywhere in the world and the whole world will be based on urban way of life. It is also both a requirement for and a result of economic, cultural and social development. Thus, government's policy need to encourage the development of sectors with key backward and forward linkages as well as spatial integration through many ways: subsides for domestic industries (like South Korea), provision of advanced training (like a policy followed in Singapore) and establishing a few key public enterprises to act as pioneers in an industry (like south Korea and Taiwan) (Momen, 2006:5).Despite the fact that urban and rural areas are interdependent and reinforcing continuum in development, development debates and policies have been contested on either rural or urban priority. Scholars and development planners (Douglas, 2006:126 and Tacoli, 1998:149,) see these development debates into the following two broad categories:

A. Rural-oriented (Agricultural fundamentalism) model

Scholars, organizations and LDCs governments support the agricultural and rural-oriented development policies, mainly in Africa due to agrarian nature of majority of the population. For example, WB (2003:105) argues that agricultural led development is important strategy for mass poverty reduction in LDCs. Similarly, Hess and Ross (1997:122) argue that agriculture is the key to overall development and a precondition for boosting non-agricultural activities. Hence, it provides food and raw material to the urban sector and stimulates demand for industrial and urban services. They concluded that LDCs need to follow policy-strategy of agricultural demand-led industrialization (Hess and Ross, 1997: 123). In the same way, rural professionals consider rural development, rural industrialization and non-agricultural employments without considering urban economies and people (Tacoli, 2006:1; Douglass, 2006; 126).

B. Urban-biased (Growth pole) development model

This model is derived from Perroux's growth pole theory that advocates an urban industrial development in selected few growth urban centers can result in agglomeration of economies that can spill over and trickle down modernization and development to it rural hinterlands (Tacoli, 2007:49). In the same way, Handelman (2011:186) argues that some third world governments are urban-biased influenced by modernization theorists who promotes the spread of urbanization and industrialization for urban and rural development. Consequently, urban based manufacturing has got leading position for regional and national development while rural areas considered as parasites for multiplier effects of urban centers (Handelman, 2011:186). Similarly, Professional bias aggravates the dichotomy of development in LDCs and urban specialists consider urban development and industrialization without rural agriculture and people (Tacoli, 2006:35; Douglass, 2006:126).

However, different scholars (Douglass, 2006:126; Owusu, 2005: 169) argue against either of the sectoral development approaches that the rural-oriented development could not bring change without urban development and progress as well as growth pole model has backwash effects on its hinterlands rather than multiplier effect in current LDCs. Hence, the debate between growth pole and rural-oriented development underlie the need for URLs development approach

(Tegegne, 2005:145). Many other scholars (Baker, 2006:54; Gantsho, 2008:358; Momen 2006:7; Tacoli, 2006:15) also criticize the development policy and administrative divisions between urban and rural areas and they argue that the division of urban and rural development is without ground and hence, URLs need to be taken as an essential precondition for sustainable development in Africa and other third world countries. These scholars also argue that the sectoral division in development is against the reality of households who are multi-sectoral and multi-spatial on both urban and rural areas for production intensification, income and employment diversification (such as survival mechanism for the poor, consolidation of wealth for middle class and/or accumulation of wealth for the rich).

Presumably, the highest rate of urbanization and its inevitable expansion in LDCs call integrated development with its partner hinterlands for using urban centers as opportunity for engines of development (mutual benefits and reinforcements) and for minimizing urban negative externalities. For instance, Handelman (2011:191) explains that world urban population has exceeded rural population in 2008 for the first time in human history and it has more than 3 billion people of which 95% could come from Africa and other third world countries. The changes of LDCs urban population is more rapid and it will change 44% in 2007 to 67% in 2050; Sub-Sahara Africa will change from 36% in 2007 to 61% in 2050 and Ethiopia will change from 17% in 2007 to 42% in 2050 (Handelman, 2011:191). In the same way, numbers of urban centers are rapidly increasing in LDCs. For example, in Ethiopia the number of urban centers was 648 in 1984 while their number rises to 925 in 2004 (CSA, 2007:85). According to WB (2003:108), urban population of LDCs is rapidly increasing and hence, urban centers need to facilitate socio-economic and institutional transformations by improving access to ideas, knowledge or innovation, technology, employment and services at a scale sufficient for residents and new arrivals. Some other scholars (Satterthwaite and Tacoli, 2006:170 and Douglas, 2006:149) claim that urbanization is opportunity for engines of development if they are properly linked by policy, institutional settings and other infrastructures with their hinterlands.

Contrary to the ongoing consensus of URLs development approach for complementarities and mutual reinforcement, many LDCs' governments have still followed the dichotomy development policies, institutional and administration in their development endeavour (Baker, 2006:41; Douglas, 2006:124-5; Tacoli, 1998: 149; Todaro and Smith, 2009:16; Fan et al, 2005:4).

Handelman (2011:167) claims that Africa and Latin America countries have still suffered from sharp URLs gaps, political and socio-economic tensions between urban and rural areas and this urban-rural gap will remain among the most difficult challenges facing most LDCs.Waugh (2000: 569) explains Gunnar Myrdal's reasons why inequalities were likely to develop between regions and countries. Myrdal's model of cumulative cassation states that an establishment of affirm in an area would create more jobs in the service sector and construction industries as well s attracting more firms linked to the original industry .As growth pole develops, there will be and influx of migrants, entrepreneurs, capital and new ideas, and technologies. Diagrammatically, Myrdal's model of cumulative causation can be like this.

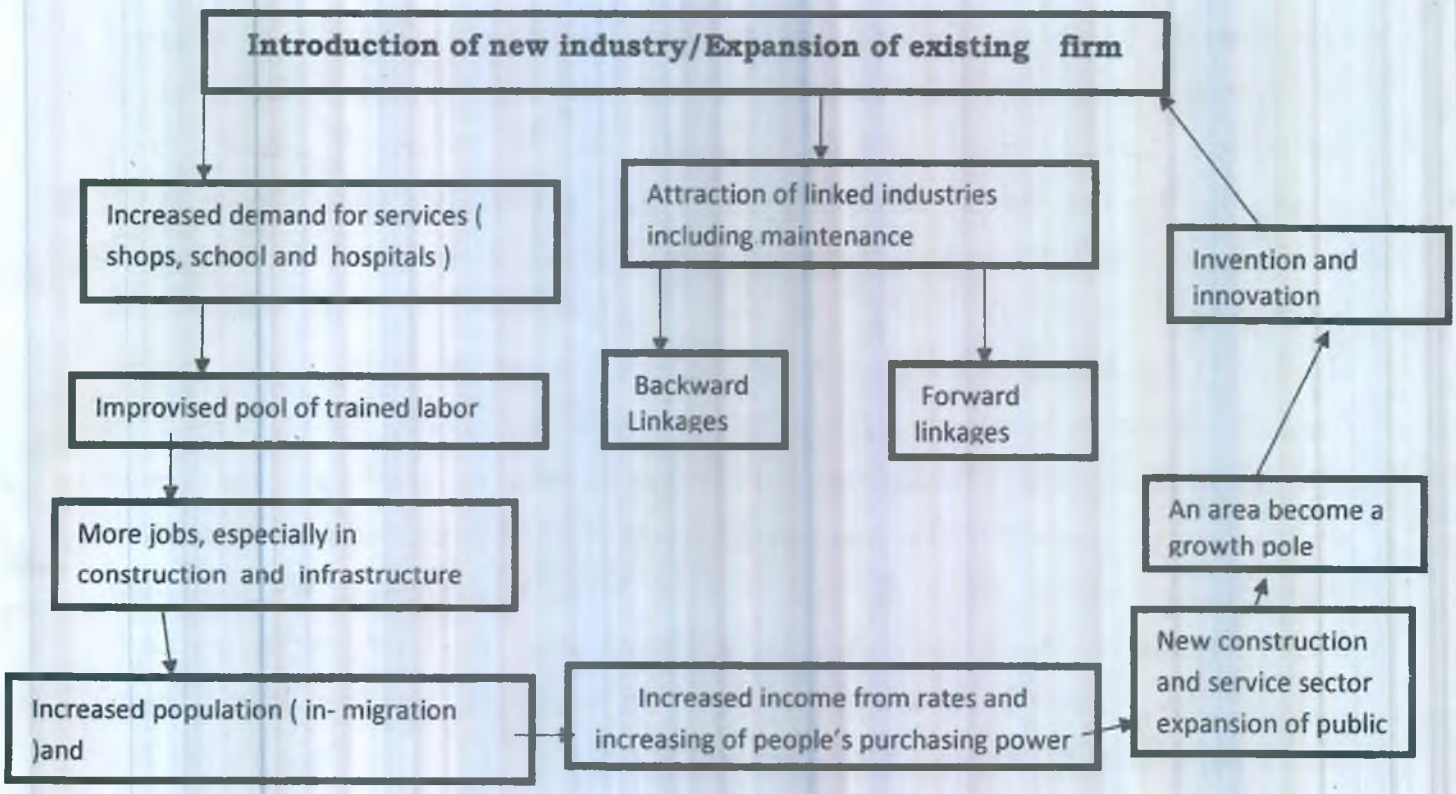


Figure-1 Myrdal's model to show cumulative causation of an industrial region
Source: Adapted from Waugh 2000:569

According to growth pole model, industrial development needs great emphasis for development Contrary to this view; Todaro and Smith (2009:238) claim that the rural concentration of poverty in least developing countries is because of the urban biased development and high investment expenditure directions of governments.

The researcher argues that both the agricultural fundamentalism and the growth pole theory have no corrected and realist ground fort priority of one sector over the other. The agricultural fundamentalism view has not realized that agriculture cannot develop alone and the concomitant development of industry with its supporting infrastructures is very essential for the advancement of agricultural backward and forward linkages and also for growth of national economy (GDP). In the same way, the growth pole theorists have not also realized that agriculture is the natural resources–base of industry especially in least developed nations like Ethiopia.

The structural transformation of rural people and land into urban population and land is inevitable and common process in all parts of the world. In developed world, this transition from rural to urban ways of life was/is the result of development that has created urban–pull factors such as demand for increasing urban employment opportunities. According to Tegegne (2005), LDCs' urban areas are not capable of producing goods and services in sufficient quantity for rural areas and rural areas in turn are not producing enough food and raw material for urban centers in Ethiopia. Thus, urban industry and rural agriculture have evolved separately and there is no any policy–plan for their interdependence relationship, especially the available potential of agro industrial development of the country. Urban centers are areas of political, military and administrative centers rather than centers of production and development activities and rural hinterlands are cut-off physically from the main urban centers in infrastructures like roads and air transport, telecommunication due to lower flow of sectoral linkages (agriculture and industry, public services), labour, finance, market information.

The total effect of dichotomy development endeavour in LDCs generally transformed Africa where Ethiopia is a part from development to retrogression and Vicious circle of poverty or low level of equilibrium trap (low saving, low income, low investment, low rate of economic growth and therefore, low productivity, low living standards and low development). Hence, development

without breaking this trap is illusion rather than reality. Breaking these trips follows the law of cumulative causation/ series of positive factors like higher level of investment, higher technology, higher education and training and appropriate policy which can lead and form Virtuous circle of progress (Todaro and Smith 2009).

From 1978 to 2006, China showed Miracle development and an unprecedented achievement in history .The economy of China grew at an average rate of approximately 9% per year and China's income per capita by 2006 was more than five times higher than it was in 1978. Much of the china's development in the 1980s-1990s was due to rural- township and village enterprises (TVEs) as a quasi- cooperative character (Todaro and Smith, 2009:193). This can show that appropriate spatial and sectoral linkages in any case (rural- urban, region to region, country to country , continent to continent, MDCs to LDCs) can bring development .For instance, China-Hong Kong linkages that integrated and used the abundant capital from Hong Kong to capital scarce but high quality human capital and infrastructure of China opened the beginning of China's rapid growth in the late 1970s (Todaro and Smith .2009:195).However, the problem lies to identify the appropriate linkages between the two areas and initiative for social and political in transformation to promote community based organization (Tacoli,2007:125).

In Ethiopia urban centers, which were mostly designed and situated for the purpose of administration and military force, have important geographical sites, appropriate for reinforcing development through urban–rural linkages and mutual interaction. For example, different from most African capital city, Addis Ababa (capital city of Ethiopia) is located at the central part of the country. It is presumable that the main problem in Ethiopia is not the urban site and its influences zone but it is the lack of appropriate policy and institutional setting for rural-urban linkages within context of development opportunity.

1.2 Statement of the problem

Agriculture dominates the Ethiopian economy for accounting more than 80% of national employment, 41% of gross domestic product (GDP), 70% of merchandised exports is generated by subsistence farming (Alemayehu :2007.142). Ethiopia has also some light industries with

which agriculture has direct backward linkages. However, these agro processing industries (light industries and cottage industries) in the country have faced problems mainly due to the subsistence nature of agriculture in the country. The subsistence agriculture is persisted for many years because of many and complex variables of which lack of appropriate rural-urban production linkages in development focus is the main determinant (see section 1.9.1). Since the first development plan in 1957 and the EPRDF government (since 1991), Ethiopia has not get integrated development through rural-urban linkages in sectoral and spatial aspects. The prevailing government has some attempts to modify or change the previous rural- biased development strategy (ADLI) to the integrated development by establishing different development strategies such as plan for accelerated and sustainable development to end poverty (PASDEP) and sustainable development end poverty reduction program (SDPRP). These strategies contain Rural-Urban Linkages as minor and elementary sub topic of integrative and holistic development approach (MoFEd, 2006:161-5). PASDEP was proposed for five year plan from 2005-2009/10.The other devised development strategy for filling ADLI's gap was sustainable development and poverty reduction program (SDPRP). Both strategies phased out without any significant contribution for integration of rural and urban linkages in development. Moreover, based on the ongoing government arguments, the current five year development plan (2010/11-2014/15) of Ethiopia called 'growth and transformation plan-GTP' has also designed by experts at Marco-level and its main objective is enhancing rural-oriented development policy emphasizing on improving smallholder farmers and pastoralists for surplus or commercial production (MoFED, 2010:35&47).

According to Tegegne (2005&2007) in almost all cases in Ethiopia, national development policies and strategies are biased; either rural or urban development in isolation. ADLI also encourages and aims industrialization and urbanization as derivative process with rapid development of agriculture. The dichotomy as piecemeal fashion of urban center and rural area in development focus has created a variety of problems such as migration, unemployment , environmental degradation and pollution and lack of income diversification and poverty. Gete (2007:31) argues that extreme poverty and serious environmental degradation and pollution in Ethiopia are often caused by lack of proper Rural–Urban linkages and biased national

development policies with uncoordinated development strategies (Assefa, 2007:184)claims that urban centers have not been capable of producing manufactured goods and providing services for its influence zone. The influence zones in turn have not produced enough natural resources – based products such as food, raw material for the town economic base. Tegegn (2005) also claims that in LDCs, urban areas are not capable of producing goods and services in sufficient quantity for rural areas and rural areas in turn are not producing sufficient food and raw materials for urban center. The situation in Ethiopia attests to these facts as urban industry and rural agriculture have evolved separately and there is no policy–plan for their reinforcement and interdependence relationships, especially the available potential of agro-industry. Urban centers are areas of political, military and administrative centers rather than centers of production and development activities. The rural hinterlands are cut-off physically from the main urban centers in infrastructures like roads and air transport, telecommunication due to lower flow of sectoral linkages (agriculture and industry, public services), lower flow of labour and finance and lack of market information. The sectoral linkages, even agro industrial processing (such as local oil-mills, powder industries) which can be based on indigenous knowledge, employment opportunity and raw materials have intermittent and seasonal functions due to substances agricultural in the rural hinterlands.

In one way or the other, there have been poor and weak spatial and sectoral production linkages between urban centers and their influence zone in Ethiopia. The appropriate urban industries (mineral-based, forest-based, agro-based, textile, service, polymer and chemical–based, engineering and energy–based) and rural opportunities of natural resources for forward and backward production linkages in the development process are given less focus and insignificantly utilized. The absence of strong rural-urban linkages in spatial and sectoral aspects would result in persistence subsistence agriculture without transformation for two decades and farmers use copping strategies of land use change from subsistence indigenous food crops production to other cash crop production such as *Chat and* eucalyptus trees. This rural land use conversion is empirically observed especially in Peri-urban areas and along main roads where intensified agriculture is expected. The conversion of crop production plots into perennial cash crops (*Chat*, Eucalyptus trees and *Egesho*) may be the greatest risk in the rural-urban linkages. The regular and daily market supply from the rural hinterlands to Debremarkos town has

increasingly become *Chat* and sometimes with fruits and vegetables. Consequently, it is unexpected risk for losing of the valuable and rich nutritional indigenous food crops and creating many leaf-addicted productive age groups as well as losing the industrial raw materials. However, perennial cash crops aspect of rural–urban interaction has been increasing between Debremarkos town and its hinterland.

In Ethiopia, urban pattern has a problem of urban primacy and all (except Addis Ababa) urban centers have medium and small town category (less than 300,000 people). The Ethiopia urban hierarchy and context is also different form canalized nations whose capitals are around the port for the interest of colonizers. Most literatures on Rural–urban linkages in Africa and other parts of the world show either city (may be port cites) and its influences zone such as Dareselam city and its hinterland in Kenya by Mushi,2003, or macro level working papers such Tegegen's (2005 and 2007) studies.Hence, the study of rural-urban production linkages on zonal urban capital and its hinterlands is timely and crucial issue for the development endeavour of governments in Africa and Ethiopia. Tacoli (2007) concludes that research on rural-urban linkages is highly relevant in least developed countries where the development of small scale enterprises in urban centers is essential for livelihood diversification and agricultural development.

1.3 Objectives of the study

The general objective of the study is to bring spatial and sectoral development paradigm shift from vicious circle to virtuous cycles of rural and urban production linkages and development in Ethiopia. The specific objectives include to:

1. Appraise the existing RUPLs of agriculture and industry.
2. Identify factors of weak RUPLs
3. Analysis the key potential RUPLs for sustainable local and national development
4. Explore and show appropriate policy implications.

1.4 Research Methodology

Research methodology is a procedure for collecting, analyzing, interpreting and reporting data in research studies. Survey method is designed and used for this s research. Unlike longitudinal approach, cross-sectional survey method is efficient for one time data collection and analysis.

1.4.1 Description of study area

The urban center

Debre Markos town is founded in 1774 for serving as the main administrative and service center of the whole Gojjam region. Since 1991, the prevailing government has divided this region into two administrative regions: East Gojjam zone and West Gojjam Zone. As a result, Debremarkos town is the administrative and service center of East Gojjam zone even though its geographical position is at the center of the two zones. It is located at the north-west region of the country with 300kms from Addis Ababa, the capital and 265km south–East of BahirDar (Capital of region-3).Its astronomical location is at about an altitude of 2425m A.S.L and around $10^{0}21'$ latitude north and $30^{0}43'$ longitude east. The town has rapid sprawling in every direction and the municipal administrators facilitate sprawling by demarcation of about 4kms additional radius on the built-up area from the rural hinterlands. As a result, it has an area of about 6,160 hectares (DMTID, 2009:67).

The demographic character of the town is that it has 102,630 populations of which 47,557 are males and 55,074 are females. Language composition of people in the town reveals that only Amharic speakers accounts 97%, Tigrigna 1.5%, Oromifa 0.7%, Agewigna 0.6% and others 0.4%. People have engaged in various economic activities ranging from petty trading and hoes polishing to large business and trade, industry, hotels and tourism, industry and civil services (DMTID, 2009).

1. The rural hinterlands population

Hinterland is the main geographic unit that has immediate interface and bound with the town. It is productive and fertile region which is well- known by the production of *Teff* (most demanded and stable food crop in Ethiopia). The altitude of study area ranges from 800m to 3748m above sea level with corresponding temperature ranges from 11^0c to 25^0c and rainfall rages 1448-1808 mm (GEPLAUO,2002). Agriculture is the only and dominant economic activity of this rural hinterland with their own governmental administration system which is called peasant association/*kebele*. *Kebele* is the smallest political unit in the administrative system of Ethiopia. The target population will be confined to the geographical areas of Gozamin district (*Woreda)* that has 25 rural and one rural town) and part of the Aneded district (that has 18 rural and one district town). The hinterlands total population has about 350,000 in the two districts of which about 98.66% live in rural areas (CSA, 2008). The small towns which are found surrounding Debre Markos within the average distance of about 25Kms are Amanuel, Debre Elias, Yejube, Amber, and Rebu- Gebya. These small towns have their own urban–urban production linkages that need other further study.

Generally, Households in both urban and rural areas are female–headed, male–headed and both parents-headed. Most of the urban households (75% of respondents) are headed by females but most rural households (87%) are headed by couples (parents). There are a few households without any parents (8.9%) in both urban and rural areas (Field survey, 2010).

1.4.2 Target population, Sample frame and sample size

In the Ethiopian urban pattern, all urban centers in Ethiopia except the capital Addis Ababa are medium and small town's category (less than 300,000 populations). And Ethiopia urban primacy has very wider gap due to the absence of second and the next urban hierarchy. Hence, larger number of medium and small towns are common and available everywhere in Ethiopia and the study of medium urban center's problem, Debre Markos–Zonal capital town and its rural hinterlands, is important for more or less representing other zonal towns and their hinterlands in the country.

The target population of this study is the total population of Gozamin (having 26 Kebeles) and two farmers' association/*kebeles* of Aneded districts and Debre Markos town. Based on 2008 population forecast, Debre Markos town has 75000 population and its rural hinterlands have about a total 240,000 with a total population of small towns.

The **sample frame** is the four rural districts: Wonka, Yemaqa, Chemoga and Yebrage are selected purposively for quantitative data depending up on distance from the urban center, financial basis and main road accessibility. The sample for urban population is approximately divided into inner city, middle and outer city.

Sample size is selected by quota sampling and 30 questionnaires are distributed for each rural district (total of 100 respondents returned the questionnaire) assisted by data collectors for illiterates. Sunday was selected for this data collection for all farmers since they could be available around their home or church. These respondents were selected randomly from clustered villages. 20 questionnaires are distributed for each urban division and 55 questionnaires returned and by screening ; only 50 respondents are selected and used.

After the collection and analysis of quantitative data from rural and urban areas, the qualitative data has been designed and two key informant farmers and one administrator were interviewed in sample rural areas. Then, about 12 rural people were interviewed. The interview was designed based on the result of quantitative data. In urban areas, industrialists, municipal workers, Debre Markos town administrators, the Gozamine agricultural sector, East Gojjam zone agriculture administrators, were interviewed on issues of RUPLs.

1.4.3 Data Sources and Methods

Both Primary and Secondary sources are collected and use. Secondary sources include primary literature (files ,(unpublished) documents, office memos) and secondary literature (published books, Journals , articles , pamphlets, booklets, reports, e- resources). The primary data include data from field survey (questionnaires, interview, Focus group discussion, observation). The

secondary data are collected from published and unpolished sources (books, documents, related literatures, e- resources, journals, etc).

The method or approach of study is mixed methods research. The purpose of qualitative approach is to learn participants views about particular phenomenon for understanding inductively while the intent of the quantitative approach is to test how data provided by participants fit an existing theory (model, framework, explanation) deductively to support or refute it (Creswell, 2007:28-9). Moreover, using mixed methods design supports to solve problems that one type of method may not tell the complete information. Mixed methods of research triangulate gathering and analyzing data about the same phenomenon for eliminating or minimizing the inherent biases from using only one method (Creswell, 2007). The possibility of discovering inconsistencies as an integrative fashion of the two methods serves the researcher to extend the breadth and range of inquiry by using alternative method. Different scholars (Crumb,2008, Creswell,2007) show that mixed methods are used for expansion (the rage, depth, breadth and scope), initiation (fuller understanding in our original data), triangulation (convergence in the analysis and interpretation of results for balance and check), develop (sequential timing of the implementation of different methods) and complementarity.

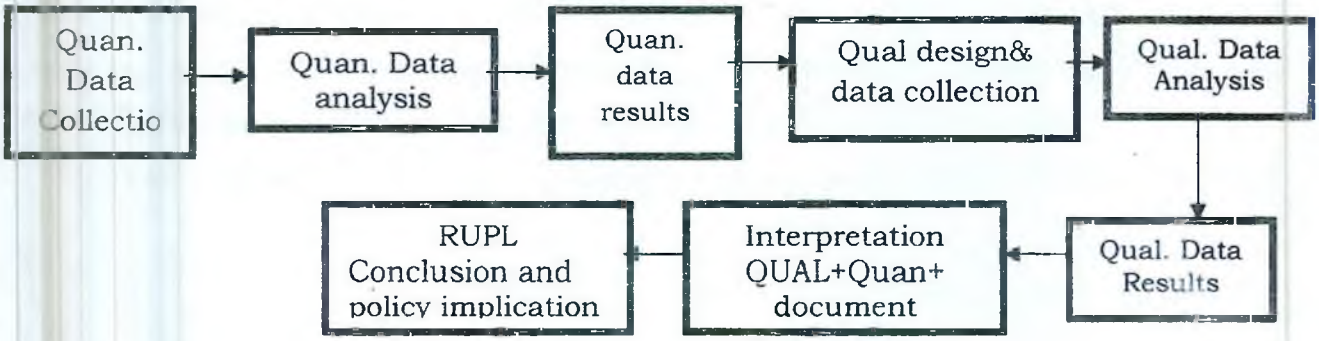


Figure 2 the procedure of sequential exploratory method of research

Source : Adapted from Creswell,2007:140-1,2009; Taddli,2009:141&153

Figure-2 indicates that in the sequential explanatory method, quantitative method is applied in the first phase and then qualitative method is used in the second phase. The purpose of using sequential explanatory design is that the quantitative method first used as a basis for surveying larger areas and samples further exploration of the detail factors in both rural and urban areas.

then qualitative method then focused on exploring how and why these factors cause weak rural-urban linkages between Debremarkos Town and its rural hinterland.

1.4.3 Instruments and procedures for data collection

First, work plan was arranged and then permission and appointment was secured with respondents. Following this, training was given for dates collectors. Data collection will be triangulated by using different tools. Qualitative data collection will be conducted by the researcher in both urban centers and rural hinterlands. Pilot study is conducted for screening and editing questionnaire before the actual work. Data collection is triangulated from instruments of both quantitative and qualitative approaches. The Quantitative tools are structured questionnaires while the qualitative data are mainly collected through open-ended and unstructured interviews with focus group discussions (FGD) and photographs.

1.4.4 Analysis and discussion

The first task was data organization such as editing or checking , dividing in to different categories or groups, scaling in degree /matrices ranking, free or closed scoring, pairing the data in a way of appropriate analysis and results. The quantitative data are organized by interview protocols and observation protocols for great depth and detail investigation of the data. The codes are organized into themes and quotes in accordance to their own appropriate categories.

1.5 Rationale and Significance of the study

The rationale for selecting the problem of rural–urban production linkages in Debremarkos town and its rural hinterland is to develop a model that will contribute for appropriate rural-urban linkages in the region and Ethiopia. The conclusion and generalization on Zonal capital, Debremarkos town and its rural hinterlands may be helpful to other similar urban centers in the Ethiopia and other countries of Africa. The researcher is motivated by the empirical experience of birth place, accessibility for working institution (Debremarkos University) and feasibility in time, finance, socio-cultural and local language interpretation. According to Tacoli (2007),

research on rural urban linkages is highly relevant in least developed countries where the development of small-scale enterprises in local towns is essential for livelihood diversification and development of both urban and rural areas.

The effort is guided by the first millennium development goal (MDGs) of "Eradicate extreme poverty and hunger" in Sub-Saharan countries through appropriate design and use of rural-urban production linkages in the country. Then bridging symbiotic and complementarily nature of urban centers and rural areas will create diversified livelihoods' for both urban and rural people. The research finding may also initiate other researchers to do research on the 'divides and bridges' of Rural-urban areas in development at either micro spatial (village) or macro spatial (regional or above) scale. In addition, the study may help macro and micro policies development in the endeavour of Ethiopia to escape from vicious circle of poverty to the virtuous model of progress.

1.5 The Scope and limitation of the study

The study is limited to Debremarkos town and its some rural hinterlands in the northern-western part of Ethiopia. Most of the rural respondents found illiterate and the enumerators read each question for their response. This may influence their interest and response as well as enumerators might give some clue and direction while reading for these illiterate respondents.

1.6 Ethical Considerations

Humans are the focus of this research and the first work plan was distributing consent form that describes the nature of the research project and one's participation has created smooth and honest relationship between the researcher and respondents to keep their rights to privacy and confidentiality. In short, the research is tried to keep the international research ethics and the criteria for ethical issues. The research data collection, analysis, findings and conclusion will be done in a complete and honest fashion.

2. Review of Literature

2.1 Development plan-policy in Ethiopia

The necessary policies, especially in the case of developing countries, must be formulated and implemented in the proper and integrated manner. Agricultural policies have two forms: Agrarian reform policy and land reform policy. The agrarian policy includes pricing policies for both export and import commodities, development of adequate infrastructure and transpiration facilities to overcome constraints in the delivery of inputs to farm and market and provision of marketing facilities, credit, extension, education and research services. Land reform policy deals with tenurial rights and private ownership. It is designed to encourage adoptions of sustainable production practices, conductive to conservation and proper use of farming environment. Appropriate laws and regulations are necessary to protect peasant farmers from the exploration by landlords and large scale farmers (Jagasothy,1999).

The rural-urban linkages in Ethiopia are extremely loose and weak. This is because of the development policies and institutional settings that have failed to integrate the two spatial units in a meaningful way but they were/are either urban or rural biased. It is better to see the historical trends of policy in Ethiopia (Asefa, 2007; Ayele, 2006 and Tegegn, 2005).

1. During the **Imperial era**(1920-1974), the Ethiopian economic and ideological systems was mixed economy where the private and public sectors co-existed. Ethiopia was perhaps the first African country to prepare comprehensive planning for socio-economic development. This regime had drafted three successive five year development plans between1957-1974: The first five year plan was for the development of infrastructures and manufacturing as growth pole theory. The development of industry and urbanization (growth pole model) was expected to bring spill over and trickledown effect to rural hinterlands. This gave little attention to the agricultural and rural sector development. The second development plan is based on realizing the poor agricultural and rural sectors development and it gave priority to commercial agriculture (coffee, sugar cane, cotton some tobacco). Hence, the majority of household and small-scale agriculture faced problems and lack policy encouragement. Then, third development plan

considered the development of both commercial and small scale agriculture with less emphasis to urban and industrial development.

In general, the Imperial ear employed two main strategies: Export-oriented (export-trade) and import- substitution strategies. In import substitution strategy aimed to protect the infant home industries from completion from the developed foreign industry. The protection was practiced by means of higher tariff imposition on similar imported goods. However, the strategy has made no meaningful contribution to development. The plans were failed to recognize the inherent interdependence between rural and urban development and they focused entirely either on rural or urban development. This resulted in the fall of domestic production and local market and consequently declined exports and acute shortages of foreign exchange. Deterioration in the balance of payments was aggravated by famine and political unrest. By all indices, the country's performance remained distinctly poor and on the eve of 1974 revolution, Ethiopia was one of the leas developed countries of the world.

2.The Ethiopian people Democratic Republic Government/Derge regime has changed the course of development from market oriented mixed economy to command and centralized economy. A number of changes in the economic policy and institutions were made as a precondition for the construction of socialist economy and socialist society. The major changes were:

- The abolition of private ownership of land both in rural and urban areas
- Nationalization of extra dwelling houses
- Nationalization of major enterprises in manufacturing industries, banking and insurance
- Agricultural policy based on state and cooperative farms
- Peasant resettlement and villagization programs
- Increased government role and discouraged private sector

In short, different short and long term development plans were launched. The government successfully implemented agrarian reform, a national education mainly adult literacy campaign and the establishment of a unique rural institutional structure including cooperative farming.

Resettlement scheme and commercial farming were heavily supported to produce sufficient food by bringing more land under cultivation in fertile areas and thereby reducing migration to urban centers. However, the government adopted rural-based development by undermining the urban-based activities. The immense problems of transforming a deeply traditional society and the subsequent rigid and stifling policies of the Derg eroded the first good beginning and the expected progress, in 1990, the EPDRG transformed its development policy into mixed economy. However, as the system was on the verge of the failure, the change in policy could not rescue it from collapse. The misguided policy, economic mismanagement due to inefficient management, bureaucratic red-tape, embezzlement of public funds, bribery, the protracted civil war, the recurrent drought supplemented by population pressure, and structural problems in agriculture and industry were some of the factors of economic crisis. These all show that there was the absence of appropriate development plan-policy. As a result, the local industries lacked raw materials and the contribution of small–scale industries was nil or zero output due to the absence of inter-sectoral coordination mainly with agriculture.

1. The Prevailing government (EPRDF since 1991 to date)

The underling paradigm of development that was prevailed during the Derg regime has not fundamentally changed during the EPRDF regime. The state ownership and the controls of many industries, important services and land have been still effective in this regime. However, theoretically the development policy of the nation has been market-based economy which is transformed from the command economy. The overall development strategy of the country is "Agricultural development lead to industrialization, ADLI." ADLI has two main components: the external sector (export–led) part and the internal sector (rural-centerd development strategy) part. In the external sector, in addition to agriculture, mining is also expected to play major role. The Internal part is believed to bring rapid productivity growth in peasant agriculture through sustainable supply of export products.

However, critic argues that the agricultural sector would be greatly promoted in the presence of vibrant manufacturing and service sectors that proved forwards and backward linkages for agriculture. The present small holding subsistence agriculture without having landownership for

collateral and other mortgaged will not develop into commercial agriculture. Though more roads, schools and other transport and communication infrastructures have been constructed, poverty in the country is intensified. World Bank report reveals that on the biases of 1999-2000 survey year, 44.2% of the Ethiopian population lives below the national absolute poverty line. The percentage of population living below poverty lines is 45% and 37% for the rural and urban poverty respectively. By the international poverty lines ($1 and $2 a day), 81.9% of the Ethiopian population lives below the international absolute poverty line and 98.4% is below the relative poverty line. The extreme poverty shows the absence of basic necessities of life. Moreover the per capita gross national income of Ethiopia is one of the lowest per capita incomes in the world, standing at $100. Adult literacy is also very high at a about 65% of adult above 15 years, compared with 53% for all sub-Saharan Africa. (Befekadu, 1999/2000). In such situation, the EPFDF is expressing its commitment to meet the millennium development goals (MDGs) for 2015. Hence, the Ethiopian economy is in the depth of poverty.

To conclude, the main problem for the underdevelopment is the biased development policy that has been made once again by different governments. This calls for innovative and integrative development policy and strategies. The main objective of the three governments has been accelerating the rate of development with the final goal of improving living conditions and raising the standards of living. However, there have been some discouraging cases of breaking the vicious circles of poverty. Thus, the overall development records make Ethiopia one of the least developed countries in Africa and in the world.

2.2 Lessons from related literature

Related literatures will give cross-learning values/lessons, a frame for logical structure and communicate a clear story line. Douglas (2006:134-138) claims that there is a need for new paradigm of spatial development to overcome a number of major obstacles such as dichotomization into rural and urban development planning. He also emphasizes agro-politan or rural-town approach with in district or provincial scaleas the most appropriate spatial unit for frequent access to urban functions by rural households and to overcome the limitation of using

village as regional development unit. He points out the uses of local scale agropolitan approach: access to agricultural land and water, devaluation of administrative authority to the local level (i.e. decentralization and democratization), a shift of national development polices in support of diversified agricultural production, and incorporate indigenous knowledge better into planning processes. Central place theory as a framework, rural- tons need to be identified in relation to each other to ensure appropriate spacing and functional composition by size and position in the urban hierarchy.

Based on his empirical work in Indonesia, Douglas recommends that polices need be based on clusters of settlements of various sizes with careful understanding of local context. The dichotomy relationship between rural and urban economies must be rejected and the two need to be treated as interdependent and complementary. Local policy makers and officials must also be given decentralized power since they are at the best position for local development. The administrative division in rural areas and urban centers results in lack of coordination in work at cross purposes (Sheng, 2004).

According to Tegegne (2005), key factors underlying weak rural-urban linkages in Ethiopia are: process and pattern of urbanization, lack of balanced rural- urban development policy, land tenure policy and land size, lack of entrepreneurial outreach to agriculture and others. He also pointed some possible solution for bridging the rural-urban divide in Ethiopia (Tegegn, 2005):

1. Shift in development thinking
2. Sufficient inducement of urban entrepreneurial investment in rural areas.
3. Strengthening physical and market (social) infrastructures that facilitate rural- urban interaction.
4. Promoting seasonal and circulatory rural-urban migration to diversify household economy.
5. Strengthening off-farm activities for agricultural diversification which requires off-farm activities such as distribution of inputs , output marketing, processing and packaging, transport , merchandize goods.
6. Resource–based industrialization (example, agro processing industries like mineral, forest , vegetables and fruits, milk processing, honey processing , coffee and others) for fostering backward and forward production linkages.

7. Agricultural specialization by designing new agricultural policy that capitalizes on regional comparative advantages and specializations.
8. Strengthening the private sector, particularly in the distribution and marketing activities of agricultural inputs for strengthening Rural- urban linkages.

Muluadam(2009) studied Debremarkos town and its hinterlands market linkage. His discussion shows that most hinterland farmers faced various agricultural problems mainly shortage of land, subsistence nature of agriculture, lack of market facilities, inflation and price fluctuations, shortage of agricultural inputs, lack of agro-processing industries. It is also found that farmers have better marketing interaction with urban dwellers than urban traders. The town is identified as the major market place of farmers to sale horticulture products (such as fruits and vegetables) and buy and sale livestock.

Hess and Ross(2004:566-77) argue that Sub–Saharan Africa agriculture has been hindered and failed by absence of a credible government with which it becomes nearly impossible to design and implement effective development policies. The economic activity is also dominated by government activity. The other problems of agriculture that have direct and indirect connection to governments are the following:

- Drought due to the fragility of semiarid Sub–Saharan and vicious cycle of drought, deforestation, desertification that reduced the profitability of mixed farming.
- Lack of economic diversity and dominated by agriculture and informal services.
- Growing population with over cultivation in an attempt to address land shortages.
- Land rights by the governments and hence, farmers with uncertainty about the permanency of their tenancy have an incentive to over cultivate a land and refrain from long-term investments in the land.
- Low producer process have discouraged production and sale of agricultural commodities
- Poor performance in export agriculture coupled with failure in worldwide commodity price
- Poor agricultural extension efforts by governments, low level of rural people education, lack of drought resistant plant varieties, shortage of agricultural inputs and absence of green revolution.

Gantsho (2008:17) argues that most African governments have lacked the opportunities of urban centers for serving as engines of economic growth because so lack of the following prerequisites:

- Well managed cities and towns
- Fostering entrepreneurship
- Promoting economic modernization and diversification
- Reducing urban and rural poverty by offering a deeper labour market, higher income earning opportunity, and better infrastructure and services; and
- Creating the practical necessity for effective local governance and administration

Todaro and Smith argue that the difference between China and Russia development lies on the institutional settings in transition. China practiced its old centralized institutions with the free market institutions (mixed type) and recorded miracle development without relatively endowment of natural resources and political freedom or democracy. This gives a lesson that miracle and real development is possible with limited local factors in China (Todaro and Smith, 2009).

Agriculture is broadly and commonly affected by:

1. Physical factors include:

- Climatic factors that includes light , temperature, precipitation , humidity, wind etc
- Edaphic or soil factors: texture, structure, workability, fertility, water retention, PH values ,Aeration, etc
- Topographic factors: aspect, slope gradient.
- Biological factors: plant disease such as what a rust, sigatoka that affects banana, swollen shoot diseases and blights (pests) such as locust, testify, phyloxera and Colorado beetle etc.

2. Cultural and human factors that affect agriculture include:

-Methods of cultivation are closely related to productivity .Thy include: crop rotation systems, the use of manures and fertilizers, degree of mechanization, the use of irrigation and selective breeding of animals and plants (such a green revolution).

-Labour organization refers land holding system and the workers organization or the way in which the available labour supply organized. It affects agricultural productivity by influencing efficiency of farming and land care and improvement. The major forms of labour organization and land holding system:

1. Individually owned land
2. Various forms of tenancy
3. Cooperative farming
4. Estate employing hired labour
5. Community collective farm system (where small firms joined with their neighbours to form large units)

- Inheritance law and fragmentation of holdings which makes mechanized agriculture impracticable and usually operated at subsistence level.
- Government intervention /action

3. Economic factors that partly influence the type of development and spatial organizations of agriculture include: Transport, markets, capital and technology. Various authors (Parr, 1999, Henderson, 2002, Kessides, 2005 in Gantsho, 2008) have identified a number of factors as necessary prerequisites for urbanization to generate economic growth:

A. Possession of a critical population mass

There is positive correlation between the proportion of a country's population living in urban areas and the country's level of income. High population concentration in urban areas is source of economic-scale, richer market structures, lower costs of providing public facilities and infrastructures, and faster diffusion of knowledge. However, economic growth is generated at a certain optimal level of urban concentration. Excessive urban concentration without infrastructural and other services creates congestion and higher cost of production and degradation of quality of life as well as insufficient urban concentration prevents the synergistic effects of economies of scale and a dense customer base.

B. Favorable economic environment

Adjusting enabling environment fosters growth-minded entrepreneurs and urban centers can serve as platforms for showcasing entrepreneurial expertise. The role of urban centers as engines

of economic growth does not stem from merely physical concentration of people and firms, but also from the urban areas' ability to create an environment where economic agent can easily interact to use productive resources efficiently for the provision of goods and services. Thus, urban centers must possess the ability to attract capital and labor from other regions.

C. The prevalence of the capacity for innovation

Creating a competitive economy requires not only risk- taking entrepreneurs, but also innovative idea, mobilization of available local and international knowledge, skills and technology. These are elements that are mostly fostered in an urban setting.

D. Equally important conditions that should prevail for urbanization to result in economic growth include the following:

- Stable economic and strong political institutions (good governance)
- Availability of public facilities / infrastructure, including transportation , potable water, sanitations and waste management systems;
- Efficient urban governance;
- Comprehensive growth management policies for sustainable urban growth, and reduction of social and environmental problems;
- Provision of information technology and faster diffusion of knowledge;
- Respecting the rights of women and the urban poor;
- Availability of job and city's ability to match them with available skills, both local and expatriate labour force.

2.3. Theoretical framework and paradigm

In the contemporary models of underdevelopment and development theory, coordination failure (Todaro and Smith, 2009:126-192) is selected for this study.**The rational** for using this theory the absence of complementarities and reinforcement in urban and rural development in Africa where Ethiopia is a part. Theory of coordination failure also emphasis on the Sub-Saharan Africa causes and effects of poverty trap. My study is one of the Sub-Sahara countries, Ethiopia. It also suggest devising effective polices and strategies to redress vicious circles of underdevelopment into virtuous circle of sustainable development. However, it does not mean that the theory has no limitations. For example, theorists are based on free market economic

system as the only means of development. It is also claimed that a bad policy today could push development into a bad equilibrium (poverty traps).

The main content of this theory relevant for RUPLs in development

The contemporary of development and underdevelopment theory argues that development is both possible and extremely difficult to achieve. For instance, it shows new insights to what makes development too hard to achieve as witnessed in Sub-Saharan Africa and also possible as witnessed in East Asia. Coordination failure model is agents/institutions' inability to coordinate their behaviour (choice) leads to an outcome that levels all agents worse off and has leaved development stuck in a bad equilibrium (underdevelopment traps) or with a class of citizens trapped in extreme poverty. Government itself is increasingly analyzed in contemporary development and underdevelopment model as one component of the development process since it is the important contributor to the problem in many LDCs as well as it is part of development trajectory solutions (in MDCs). The other sub-component of contemporary development and underdevelopment (O-ring model) argues that the value of upgrading skills or quality depends on similar upgrading by other agents as well as the other sub-component of the theory (big-push model) failure in production decision or policy-strategies can result in circular causation of positive feed-back in least developed countries like Ethiopia. The government failure in establishing institutions and financial systems and coordination problems in spatial and sectoral aspects are common problems in least developed countries thereby resulting the existence of country's poverty trap. This is the reason why many of the least developed countries mainly sub-Sahara Africa are essentially caught in bad equilibria. The authors of this theory claim that Dictators in LDCs such as Mobutu SeseSeko (former ruler of democratic republic of Congo) have deliberately preferred to keep their country in underdeveloped traps (bad equilibrium) for their poor relationship of the economic standard and political challenge. As a result, most governments in these regions keep people doing inefficient and poor since it is rational to keep cake and bread for them.

In conclusion, unless complementarities among several things must work enough at the same time and in the same progress, coordination failure will have bad equilibrium and poverty trap.

For example, the price a farmer can hope to receive for his produce depends on the number of middle men which in turn depends on a number of other farmers who specialize in the same product. One strategy for solving coordination problems is to focus government policy on encouraging the development sectors with key investments that have backward and forward linkages and the linkages approach need to target on reinforcing investments.

Paradigm

Paradigm is philosophical assumption that provides a foundation for research. It shows how we view the world and go about conducting research. Research needs a foundation for its inequity and inquires need to be aware of the implicit worldviews they bring to their studies (Creswell, 2007:21).

This research will be conducted by the mixed methods of research (qualitative and quantitative approaches). Hence, **pragmatism** is more important worldview that may provide legitimacy for mixed methods inquiry. It is pluralistic and oriented towards' what works' and practice in the real world. Its approaches and methodology can combine deductive and inductive thinking or participatory as researcher mixes both qualitative and quantitative data for multiple perspectives of reality. Its epistemology is practically what works from the researcher's collected data and it has multiple stances that include biased and unbiased perspectives in the role of the researcher (Axiology) (Creswell, 2007; 21-34). In short, pragmatism gives freedom of movement and it is based on consequences of actions, problem-centerd, pluralistic and real-world practice oriented. The researcher is, therefore, selected the practical application for the problems in urban-rural production linkages in Ethiopia.

2.4 Analytical Framework for rural-urban production Linkages (RUPLs)

Sana (2003) and explains that conceptual framework can be any or all of the following

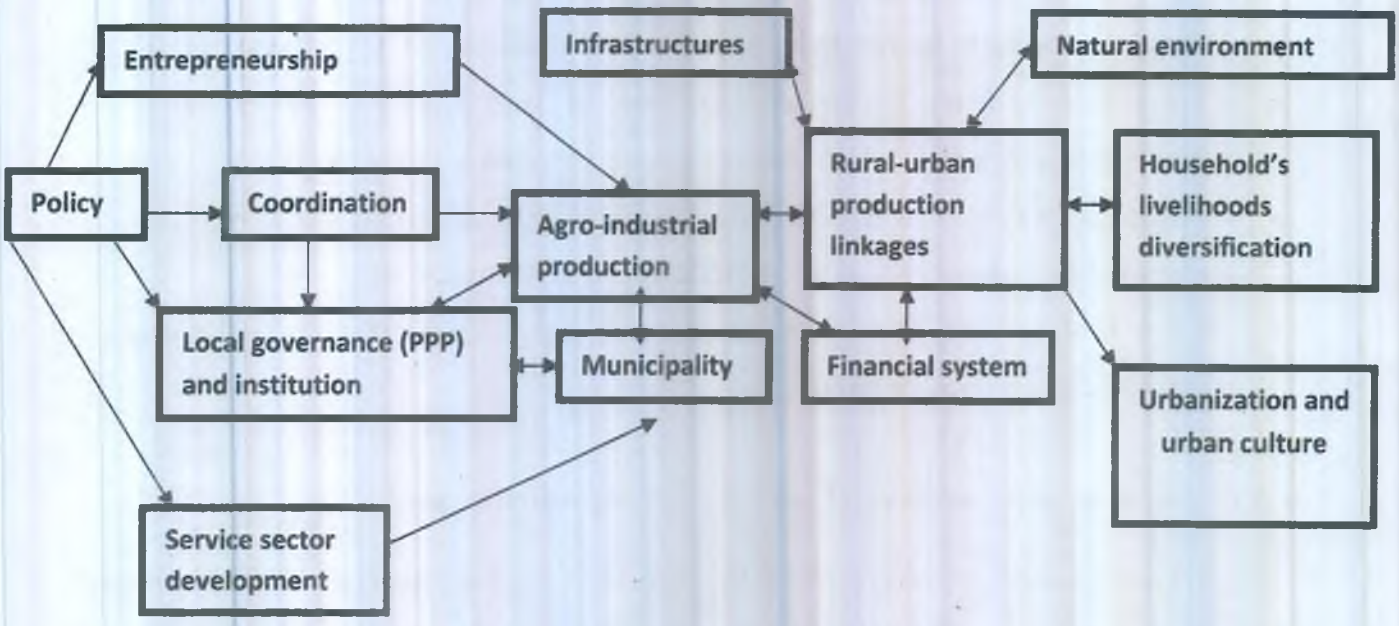
- It is a conceptual map for identifying, defining and elaborating the concepts of policy problems and its proposed solutions and different socio-economic forces influencing these solutions.

- It shows the major variable and their relationship among themselves
- It imparts meaning to the research findings and the generalizability problems
- It is a structure to delimit the boundary and scope of investigation and exploration
- It provides promises from which research goal and objectives can be deducted
- An organized way of thinking about what (the conceptual structure), why (a project takes place) and how (we understand its interrelationship and interaction).
- An overview of ideas or a set of assumptions and practices that shape the way of accomplishment a research project.

The preparation of conceptual model can have five sequential steps:

1. Reviewing prior design stages for policy variables need exploration of policy-making process at its earliest stage. This will give independent and dependent variables, implementation variables and adjunct variables, constraint variables, bridging variables, and other side effects in the process of implementation of policy and attainment of objectives.
2. Clarifying concepts for both global and sub-concept
3. Deducting or inducting missing variables
4. Locating variables in the framework
5. Checking the frame work deductively or inductively

The conceptual framework is designed based on my empirical experiences and proposed assumptions with the consultation of prior literature. It is appropriate in the study of rural-urban production linkages which is related to policy-problems. The heart of the conceptual framework is the relationship between the alternative courses of action and rural-urban production linkage. The public policy and strategy (ADLI) has more of unintended consequences of service sector like hotel and tourism development than the intended agricultural development. Finally, the researcher has tried to check the conceptual frameworks' accuracy, consistency and validity by doing actual investigation with the framework in the study area.



Source: Adapted by the research from Sana (2003)

Figure-3 the Analytical framework on rural-urban production linkages

The conceptual variables (mainly a policy problem) can have dependent, independent, intervening, control (adjunct and constraint variables) and causal- relationship, and sometimes unintended consequences and latent consequences. A variable may function as cause- effect and effect- cause relationship . Clarification / operational definition of concepts in the conceptual model:

A. Independent variable (Alternative action) ⟶ Policy (DALI strategy)
B. Implementation variable (policy makers can manipulate) ⟶ Coordination of different sectors (administrative strategy)
C. Bridging variable (linking policy and objective) ⟶ Agro- industrial production
D. Adjunct variable (Decision /Policy-makers have no control but it enhances policy effectiveness) ⟶ land tenure
E. Constraint variable (the policy is ineffective for some subgroup) ⟶ Natural environment and characteristics or livelihoods of target population.
F. Dependent variable (policy-makers objective) ⟶ rural-urban production linkages

G. Latent consequence of policy ⟶ rapid rate of urbanization without industrialization

H. Unintended consequence of policy ⟶ Services sectors development

3. Analysis and Discussion

The production linkage is a sectoral linkage which is one part of demand linkages (production, consumption and financial linkages). This paper analyses the production linkages of agriculture and industry in Debremarkos town and its hinterlands. The rural-urban production linkages centerd on two forms:

1. Backward production linkages represent the input demand for producing in the sector
2. Forward production linkages are the output demand for the produced goods and / or services by other sectors.

Input-output relationships (coefficient) empirically show the direction and strength of the backward-forward linkage. Example, agriculture is the dominant and back bone economy of Ethiopia by all aspects. It demands fertilizers, fuel and pumps, farm tools and implements, tractors, harvesters, services for its backward linkages and selling of the agricultural products to industries as inputs or consumption (forward linkages).

1.1 Rural households in RUPLs

1.1.1 Demographic factors

Table-1 Family size of rural households (HHs)

Family size	No of HHs	%
2-4	24	24
5-8	59	59
>8	17	17
Total	100	100%

Source: Field survey, 2010

Table -1 shows the large family size of the rural respondents. This type of large family size needs larger production for its own consumption and surplus for market

Table 2 Land distribution and Farm size

Farm size in Timad	No.of HHs	%
Landless	8	8
<=2	21	21
3-4	25	25
5-6	24	24
7-8	17	17
9-10	5	5
>10	0	0
Total	100	100%

Source: Field sruvy,2010

Timad is local land measurement unit which is the same as about ¼ of one hectare.

Table-2 shows small fragmented farm plots which do not correspond to the larger family size in rural areas. According to Gozamin distract land administration and sue informant (2010), there are many households who have one *Timad*, half *Timad* and even a quarterly *Timad*. This is especially common on the young and productive age groups. The government has designed a possible solution for land shortage problem. The oral law of land renting states, any farmer who is either unable to do or has excess farm land has the right to rent his/ her land for 25 years. Assefa (2007:180) claims that declining soil fertility, land fragmentation, drought and landlessness are common features of rural Ethiopia. In my opinion, land redistribution would alleviate the land fragmentation problem and landlessness. The encouragement and expansion of non-farm and off-farm activities could diversify the livelihoods or rural people, especially small and landless farmers.

1.1.2 Socio - economic factors

Table -3 the total annual income of a farmer in cash

Income category (in birr)	No. of HHs	%
<12000	85	85
1200-24000	12	12
24001-30000	2	2
30001-40000	1	1
>40000	0	0
>10	0	0
Total	100	100%

Source : Field survey, 2010

The calculation is based on the assumption of 600birrs/42.9$Us for a quintal of any food crop because most farmers responded in total number of their output of quintals in 2009. Table-3 indicates, most rural farmers have less than 12000 birr (858 dollar) per annum. Thus, in per month can be computed less than 1000 birr (72 dollar). The average family size for majority of the farmers is bout 6 and hence the per capita of the family can be 1000/30*1/6 = 5.6 birr = 0.4 dollar per day. Thus, by the international poverty measurement, most famers may be found under extreme poverty (<1 dollar pry day) and the rest are found in relieve poverty (<2 dollar a day). Rural poor can be very poor scratching out their livelihoods from subsistence agriculture either as a small farmers and/or low-paid farm workers or petty services. Other farmers on the urban fringes and marginal areas or along main roads (peri-urban areas) engage in various forms of **non-farm** and **off-farm** self employment such as street hawking, trading, petty services, and small scale commerce. However, the increasing rural livelihood diversification could not bring changes from subsistence life. (Todaro and Smith, 2009:238) point out that on the average, in Africa; about 80% of the target poverty groups are located in rural areas. Hess and Ross (204:571) claimed that the average annual growth of agricultural output has lagged the growth in population in Africa. Thus, agriculture could not satisfy for domestic food self- sufficiency and people become increasingly dependent on external food sources.

Table-4 Small and /or large scale irrigation technology of agriculture in the study *Kebeles*

Rural district /Kebele	Using HHs	%	Not using HHs	%
Yemeka	15	15	10	10
Wonka	20	20	5	5
Chemoga	10	10	15	15
Yebrage	3	3	23	23

Source: Field survey,2010

The irrigated land is dominantly used for perennial cash crops. *Chat* is the dominant irrigated crop followed by *Egesho* both in peri-urban areas and rural *kebeles*. In the north-west of Debremarkos town, Leqleqit and Demash, are currently the two well known rural localities for *Chat* production. Coffee is also started in some farm plots though it is not productive due the cold climatic condition. Farmers, who are found along main roads from Debremarkos town to Bahirdar and to Addis Ababa have greater land allocation for cash crops, mainly chat, implicitly, better road accessibility that strengthens RULs can be indicative of the expansion and

development of cash crops production such as *Chat* in the study area. This can lead to conclusion that irrigated food crop production such as potatoes, barely; maize and horticulture are replaced by cash crops. Thus, this can lead to the conclusion that there will be risk of food crops production unless some type of development intervention will be taken. Tegegne (2007) argues that agriculture in Ethiopia is rain-fed and **subsistence** employing traditional tools and implements. There is also negligible small and / or large scale irrigation. Consequently, the use of modern input such as fertilizers, pumps and pump related equipments, tractors is very negligible.

Table -5 the type of small scale industry in Debremarkos Town

Type	Number	Use	RWM in hinterland
Mills	74	Powder preparation	Yes
Household furniture	40	HH furniture	Yes
Factory of Sand and blockate	6	Sand & blocket	No
Bakery	5	Bread	Yes
Oil mills	4	Edible oil	Yes
Garage	1	Metal welding	Yes
Powder factory	1	Powder	Yes
General machinery	1		Yes
Printing press	1	Paper	Yes
Sweater enterprise	1	Sweater	No

Source: adapted from Debremarkos town office of industry, 2010 license list RWM is raw materials

Tables-5 indicates that most of the small scale industrial enterprises have forward and back ward linkage to agriculture. However, the production linkage of industry and agriculture is very week and some oil mills are season (interviewee stated) because of the absence of enough oil seeds in the surrounding rural areas. One powder factory has totally stopped and lacked. This implies that the agriculture should produce surplus output for agro- industrial raw materials and the industry need to agglomerate economies for the production of modern equipment and inputs for agriculture.

Table 6. Agricultural forward and backward linkages with other non-agricultural sectors

Description	Birr/HH	% of HH using
Backward linkage		
Expenditure on fertilizer	63	45
Expenditure on manufactured farm implements such as tractor, pumps and related equipment	2	10
Selected seed	57	43
Others	3	21
Forward linkage		
Sale of crop out put	6	60
Sale of livestock products	98.4	67
Sale of trees and logs	160	78
Fruits and vegetables	34	25
Chat and other cash crops	58	31

Source: Field survey, 2010

Table-6 indicates that the forward linkages greater value than the backward linkages (356.4>125). In the forward linkages, the sale of trees and logs has higher value because there are many sawmill and household furniture industries (40 in number) in DMT which can process the forest raw material. Sales of food crops and almost the lowest value. The rural interviewees stated that let alone selling of food crops such as *teff*, they are not enough for the family .They also added that it is other economic activities that complement our livelihoods such as selling eucalyptus tree and chat. The small traders play an important role in connecting producers to markets and thus, market problem may not be the factor for farmer's low marketing. This may imply that it may be due to the subsistence agriculture. Bagachwa and Stewart (2007:173) stated that forward linkages are very much bigger than backward linkages fro sub- Saharan Africa. The production linkages between rural and urban large-scale industries are very little in this region due to import substituting industrialization and absence of subcontracting arrangements between farmers and mall and large firms.

The import substituting industries emphasize import-dependent assembly. The insignificance of subcontracting activities in Sub- Saharan Africa is partly in the backward linkage and fertilizer has the largest share with very low input because of its higher price (about 900 birr/quintal at 27/04/2010 in the study area). Tegeng (2007:63) claimed that one of the reason for weak agricultural and industrial linkage in terms of processing agricultural raw materials in Ethiopia is

the subsistence nature of agriculture. The forward and backward linkages of agriculture can be improved if the traditional equipments are replaced by factory- made equipments . In the same way, production investment in the study area has been lacking in the industrial sector.

Table 7 Trends assessment of food crops productivity

Description	No of HHs	%
Showing improvement	7	7
The same year to year	19	19
Declining from year to year	65	65
Other	9	9
	100	100%

Source: Field survey, 2010

Table-7 indicates that majority of the farmers (655) have declined their agricultural productivity. The interviews mentioned that the increasing price of chemical fertilizers, land degradation and climate change are the main factors for declining agricultural productivity .some interviewees associated the conversion of land use to chat and other perennial cash crops from food crops production with declining productivity. Hess and Ross (2004: 566-77)argue that Sub- Saharan Africa agriculture has problem of fragility of semiarid Sub- Sahara, land shortages for rapid population growth and vicious cycle of drought, deforestation, desertification that reduced the profitability of mixed farming. Demese (2007:95) claims that the economy of Ethiopia I found in a continuous and persistent underdevelopment and specifically rural areas to remain in abject poverty with a declining agriculture while agriculture is the main economic basis.

Table -8 Participation of farmers on rural development policies and strategies

Participation	No of HHs	%
Yes	97	97
No	0	0
Other	3	3
	100	100%

Source: Field survey, 2010

Table 8 shows the absence of farmers' participation on the national and regional rural development policy and strategy. In addition to the expertise's work, the concerned

community's indigenous knowledge and experiences need to be incorporating in policy development from the beginning to its implementation.

Table 9 local administrative support to agricultural development and productivity

Description	No of HHs	%
Supporting	3	3
No support	87	87
Other	5	5
	100	100%

Source: field survey, 2010

The local administrative has not contributed in the agricultural development. Most of the respondents (87%) and the interviewees stated the same idea that the administrators usually state some other issues at the church. However, development agency (DA) of agriculture ahs some role in how to prepare compost that will help to overcome the problems of chemical fertilizer. Hess and Ross (2007:67) stated that Sub- Sahara agriculture has major problems due to absence of a credible government with which it becomes nearly impossible to design and implement effective development polices. Hence, poor agricultural extension efforts by governments, low level of rural people education, lack of drought resistant plant varieties. And shortage of agricultural inputs and absence of green revolution are common problems in sub Saharan region.

Table 10. Participation

Participation at any stage	No of HHs	%
Yes	99	99
No	0	0
Other	1	1
	100	100

Source: Field survey, 2010

In the process of urban development planning (including currently going on Debremarkos Master plan), the surrounding farmers who are regularly lose their farm land and production have any participation on their concern. The municipality workers were interviews about rural hinterland farmers' participation and they confirmed the absence of participation and also the preparation of

urban master plan is given for other professional by bide/ auction. However, any scholars (such as Clyton and Pralt, 1998:15) argue that the key resources have been the capabilities of local people to participate in all phases of a project from planning, implementation to evaluation in their concern. Community participation also develops local skills and ablates and encourages local people to play par in and to take some responsibility' for supporting and implementing a range of physical infrastructure workers. Participatory development is seen as a process whereby local people collaborate and a goal as empowering of people in terms of their skills, knowledge and experiences to take greater responsibility for their development.

Table -11 Agricultural development support form Debremarkos town administrators

Item description	**No fo HHs**	**%**
New production tech training	2	2
Provision of agricultural inputs	2	2
No any support to farming	95	95
Other	1	1
	100	100%

Source : Field survey, 2010

Table -11 shows the absence of Debremarkos administrators to rural development. This is confirmed from the urban administrators themselves in the interview that the Debremarkos administrative has no any common issue and plan with rural people and rural administrative of Gozamin district. This shows that the urban development coordination failure in production administrative linkages to its partner rural people and agriculture.

Table 12 the availability of farm micro-finance credit to agricultural support

Users of MFC	**No. of HHs**	**%**
Yes	76	76
No	23	23
	100	100

Source: Field survey, 2010

Table-12 shows that most farmers use the micro-finance institution. The respondent confirmed that the rate of interest is 12 birr for 100 but some deposit would be repaid after returning the principal;(main credit) at the end of the year. Though this interaction needs detail investigation, the Micro-finance credit has good beginning for supporting the farming community for

agricultural development. According to the informants, the problem of MFC is the absence of grantee during human and natural hazards such as drought or other problems. Hence any farmer should pay the money even selling the house or the land or any property in times of failure. In poor community of the study area, the risk of MFC is as increasing their poverty since most are in vicious circle of poverty.

1.2 Urban household's analysis on rural – urban production linkages

Table -13 Family size of urban respondents

No. of family	No HHs	%
2-3	7	14
4-5	29	58
6-7	7	14
>7	7	14
	50	100%

Source K Field survey,2010

The dimorphic character of urban households in table-13 shows that the 4-5 family size for most residents.

Table 14 Monthly incomes for urban respondents

Income category (Eth. Birr)	In Dollar ($)	No of HHs	%
<1000	<71.5	26	52
1000-2000	71.5-142.9	13	26
2001-3000	143-214.3	11	22
30001-4000	214.4-285.7	0	0
>4000	>285.7	0	0
		50	100%

Source: Field survey, 2010 $1≈14 birr

Table-14 indicates that majority of the urban dwellers (52%) have lived less than 1000 birr (71.5 dollar). However, majority of the respondents have about five family sizes. Hence, it is possible to conclude that most urban dwellers of Debremarkos town are living in absolute poverty. Based on international standard poverty line (absolute/extreme poverty line=$1 a day and relative poverty line=$2 a day) for an individual, all urban dwellers of Debremarkos town are found in poverty and most (78%) are found in absolute poverty. According to Assefa (2007:188), majority

of the urban population in Ethiopia are under extreme poverty from the lowest level urbanization (16%).

Table-15 support of urban people to rural agricultural productivity

Description	No of HHs	%
Yes	2	4
No	48	96
	50	100%

Source: Author, 2010

Table-15 indicates that almost all the urban dwellers have not given and support to rural agriculture. This implies that RUPLs are dissected without any sectoral linkage for their complementary and symbiotic relationship. 4% of the respondents may have social relation and remittance character for part of family in rural areas.

Table-16 Debremarkos town administration's role for mobilization of urban dwellers towards the surrounding rural agricultural development.

Description	No of HHs	%
Yes	49	98
No	1	2
	50	100%

Source : Field survey, 2010

The urban administrative confirmed that urban dwellers have not given any type of support for the development of rural agriculture. This urban administrative government system has no any common issue with rural administrative system of Gozamin district concerning agricultural productivity and development. The phenomena of urban poverty in Africa reflect the existence of daily functional economic and institutional linkages (Gantsho, 2008:11).

Table-17 Chat consumption habits either of the family members

Description	No of HHs	%
Daily	0	0
Often	0	0
Sometimes	0	0
Not at all	50	100
Other	0	0
	50	100%

Source: Field survey, 2010

Table-17 shows the urban dwellers have no any relationship to chat chewing. However, the actual *chat* market in shops and many *chat* houses serving for chat chewing and perhaps gambling have higher interaction. Therefore, I think the respondents did not give the correct responses, may be because of the negative connotation of the society towards chat chewing.

Table -18 where do you buy your consumption food crops?

Description	No of HHs	%
Factories	4	8
Traders	35	70
Producers	47	94
Other	2	4
	100	100%

Source: Field survey, 2010

Table-18 shows that there is little factory that can convert the surrounding agricultural produces more value-added commodities and supply of consumption. According to the urban administrator interview, two investors are on the process of establishing factories for wheat powder, *Pastni* ad macaroni production that will have strong agricultural linkages. One of these investors has been starting the process and he is producing wheat and maize in Elias district for its factory raw material. If this may be actualized, it is a good beginning for production linkages of the two sectors; agriculture and industry. This production linkage may coordinate other sector developments such as service provision development and off-farm entrepreneurial activities. However, the researcher could not get any other reality and cross-checking for these factories establishment.

In general, local institutions of Debremarkos town, Gozamin district, local villages and other stockholders have no coordination in production. The coordination failure of one institution negatively affects all the others. Urban and rural dichotomy in development, therefore, can bring poverty of the two areas rather than supporting each other. Steve Bass (2004) in Gantsho,2008, claimed that "ditching the dichotomy" of rural and urban areas for development strategies cold worsen the livelihoods of both areas. This , an urban growth strategy designed and implemented in isolation of the surrounding rural areas is sub- optimal and can only be detrimental and costly for the concerted region as a whole.

In general, Debremarkos town and its rural hinterlands have extremely weak rural-urban production linkages. Rather than production linkages, consumption linkages for agricultural forward linkage are found the single and most dominant linkage in the study area. Agricultural forward and backward linkages with industry are found almost none- existence due to the subsistence nature of garniture and the poor livelihoods of both urban and rural people, the dichotomy strategy of ADLI that results weak coordination of the two sectors. The urban people and administrative system have insignificant contribution to rural and urban linkages. It is found that the rural and urban administrators have no any coordination in the development of sectoral and spatial aspects in general and rural urban production linkages in particular. The unintended development of the policy strategy ADLI I Debremarkos town is the rapid service sector development, especially hotel and tourism.

4. Summary and conclusion

4.1 Summary and conclusion

The spatial and sectoral dichotomy in development policy and strategy has brought poverty and destitute livelihood in Ethiopia for many years. Thus, designing new development paradigm of the rural people and place with the urban people and palace seems a must. Urbanization which has faster rate in Ethiopia is inevitable. It is a must and logical to accommodate urbanization in the development policy and strategy.

In this study, agriculture has better forward production linkages than its backward industrial linkages. For this reason, the researcher deduces that due to poor and subsistence agriculture, the farmers in the study area have developed a copping mechanism of land use conversion from food crops production to cash crops such as *Chat* production for their daily immediate income source. As a result, Demesh and Leqleqit localities have demonstrated this reality.

Urban respondents have not admitted *Chat* chewing habit in their family member but there are about 57 chat chewing houses in Debremarkos town and I have observed that different from other markets, chat market is available every day. I have also observed that there are always many people in the chat houses especially in the afternoon. Most of the chat users are productive age groups (probably 20-40 years old) and most of them are playing cards and/or watching TV or film with chewing *Chat*.

Most of the Ethiopian farmers produce on small fragmented plots and the rural people in the study area stated that production is diminishing every year due to land degradation and lack of agricultural inputs such as fertilizers. The price of the chemical fertilizers has been increasing every time and now reached utility margin (informants). The problem of chemical fertilizer is not only shortage but also not provided in the appropriate time of production period. The production of compost by farmers themselves supported by development agencies (DAs) is a good beginning to overcome the problem of chemical fertilizers. It seems sustainable for the quality of products and the skill and knowledge use of indigenous raw material.

However, farmers state the problem of compost preparation that it is exhaustive and tiresome and has shortage of raw materials. Because of these and other problems, we can prepare composts maximum for one plot of farm area and thus, other plots could not be covered. Because, large amount preparation of compost needs huge amount of raw materials and labour that we could not have. This implies that wider training and guidance with new techniques and technology is needed for these farmers in composts preparation. The agricultural tools and techniques are also traditional. All ploughing materials are prepared by indigenous knowledge and local production.

The modern tools and equipment such as water pump, rope pump, motor pump supplies and services are not provided by urban centers.

Measuring the actual income source of farmers is difficult because they have diversified income sources both in kind and in cash. It is also found that farmers have no actual data of what number and type of quintal they have produced. Based on their response, by international standard of poverty measurement, both rural and urban dwellers are found in relative poverty ($2 per day per head) and most urban dwellers and, all rural people are found in extreme poverty ($1 per day per head) in the study area. The urban dwellers showed that subsistence agriculture and rural poverty affect their livelihoods. The absence of rural-urban administrator's coordination, lack of urban entrepreneurship and lack of urban people support for agricultural development are also the cause for both rural and urban poverty. However, the study area has high potential in production of livestock and livestock products, variety to food crops and horticulture production in a variety of agro- industrial zone ranging from tropical climate (locally kola) to Alpine climate (locally *Wurch*). Hence, the powder industry, fertilizer production, fruit and vegetable factory and animal and animal product processing industries can have high potential and could create sustainable rural- urban production linkages.

Generally, vicious cycle of poverty has been strengthened on both rural and urban people and unemployment, underemployment and poverty make both urban and rural people destitute livelihoods.

4.2 Policy implorations

- The rural and urban policy and institutional settings needs to integrate the symbiotic and reinforcing nature of urban and rural production since Rural- urban interactions and linkages play an increasingly important role in local economies and livelihoods of large numbers of people.

- Agriculture needs to have well- planned and developed backward and forward linkages a symbiotic nature of agriculture and industry by catering to the urban consumption from the rural production there by helping to develop the rural and urban economy.
- Strong Rural- urban linkages can diversity the livelihoods of both rural and urban people and can be good option to alleviate poverty.
- Government needs to intervene and give incentives for local food production and develop mechanisms for land use conversion from food cop to cash crop production. This is a risk for agrarian society like Ethiopia.
- Infrastructure improvements, institutional reforms with a well-considered pro- poor policy that can link Rural- urban production are tools and prerequisites for breaking the patterns of urban and rural poverty. The non-farm and off-farm sectors need to be supported and encouraged for the poorest rural people.

Areas for further research:

1. Proliferation of urban sprawl and municipal intervention
2. Premature conversion of rural agricultural land and timberland into urban uses
3. Urbanization and degradation of environmentally sensitive land and ecological system;
4. Land use interaction and dilemma of pri-urban livelihoods
5. Linkages of Debremarkos and other surrounding small urban areas (urban-Urban production linkages)

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Concentration of Ammonia-Nitrogen generated from UDDT toilets Using Adsorption and Solar Evaporation Techniques

Tamru Tesseme ,Ababu Teklemariam (PhD) , Kinfe Kassa (MSc.)

Arba Minch University, PO box 21, Arba Minch, Ethiopia, Tel. :-+(251)9 13 91 11 10, Fax: +251-468810279, email: -tessemetamru@yahoo.com

Abstract

In developing countries like Ethiopia, new sanitation concepts based on Urine-Diversion-Dehydration-Toilet (UDDT) have been proposed as a promising alternative to achieving maximum recovery of nutrients (Nitrogen) not contaminated by hazardous compounds such as heavy metals for replenishing depleted soils for growing plants. But it's problematic with regard to storage, handling transportation of huge volume of urine from the source of generation to point of the farm land and the acceptance of human urine for social and cultural aspects. In addition higher rates of urine application tended to depress yields due to increased salinity in soils, which in turn led to rather high levels of sodium in plant tissues. In order to solve the technical problems related to urine used as a fertiliser, a pilot and bench scale laboratory experiments were done to concentrate nutrients (Nitrogen and Phosphorus) from urine on Solar Evaporation, precipitation as Struvite (MgNH4PO4) and Adsorption on Zeolite. A sample of 1500ml of stored urine was evaporated for 24 hours in pilot model to check concentration efficiency and recovery nutrients. From the pilot model, it was found that 1245ml original volume reduction and 88 % nutrients concentrated. From bench scale laboratory experiments it was found that after dissolved and washed by running strong sulphuric acid 920 mg/l (NH_4^+) as solid precipitate and 1287mg/l (NH_4^+) ionic form of nutrients as ammonium sulphate in Struvite and Zeolite Adsorption process respectively were found from 1250 ml of Solar concentrated urine. Even though a direct use of concentrated urine after Solar Evaporation in farm land is an option for a direct improvement toward smaller storage volume needs everywhere, this concentrated stored urine has easily volatilized, and highly smell near residential areas. In addition to this the concentrated stored urine the buffer capacity is so high the addition of acid to prevent ammonia loss is not economical. Generally, a preliminary treatment for this residual concentrated stored urine can prevent the ammonia volatilization through capturing ammonia nutrients before being delivered to plants in slow release form. To achieve maximum recovery Struvite precipitation was followed by ammonium adsorption with 1.15 mm zeolite. Adsorption on Natural Zeolite has good performance of capturing ammonium from residual urine after Struvite precipitation.

Key Words: - Human urine, Nutrient concentration, Natural fertilizer, urine separation toilet, Solar Evaporation

1. Introduction

Adequate drinking water supply, sanitation, drainage and solid waste disposal services are the crucial problems in developing countries (Yara & IFA, 2006). On the other hand soil fertility degradation is becoming a serious problem facing the developing countries. Methods to control soil degradation and improving productivity were limited due to high cost of importing, manufacturing and distributing chemical fertilizers. Not only this but also, the increasing price of chemical fertilizer is limiting the productivity of conventional agriculture for smallholder farmers (Blouin, 1979).

Introduction UDDT[1] toilets in countries like Ethiopia by different NGO (Arba Minch, Rosa Project) has created opportunities, to achieving maximum recovery of nutrients (Nitrogen) from human urine. Even though the extent of Human urine use for replenishing depleted soils for growing plant growth in different countries, obstacles for using urine separation technology on a larger scale are still found in the storage, transport and spreading of large amounts of urine (Jenssen P.D, 1997) ; (Larsen T.A., 1996).

Different researchers have dealt with urine processing techniques (Kinfe, 2008),Attempt to modify of the current UDDT toilet; ((Hellström, 1998); (Lind & Beden, 2001), Volume reduction and concentration of nutrients in human urine; (Benini & Miletti, 1999),Factors Promoting and Inhibiting Struvite Crystallization (magnesium ammonium phosphate hexahydrate) recovery; (Jørgensen, 1976);use of minerals and adsorbent minerals: zeolites for improved nutrient recovery.There are different available technical options for water scarcity, insufficient sanitation facility and low financial capacity for urine storage in urine diverting toilets. Nevertheless, they need further enhanced technology to meet the need of people who are incapable of providing fund and space for storage of urine and difficult to afford transportation of huge volume of liquid urine. Therefore, a locally available low cost, easily operated and maintained technology is needed for concentration of urine.

[1]Urine-Diversion-Dehydration-Toilet

In this research concentrated urine volume by Solar Evaporation for recovery of maximum ammonium nitrogen combination with Struvite precipitation and Adsorption on Natural Zeolite were evaluated. Based on the result the technical problems of storage, transport and handling of liquid urine have been dealt with and ways of changing from huge volume of liquid to small volume of ionic form of readily available plant fertilizer and solid that can slowly release nutrient fertilizer was devised.

2. Materials and Methods

To maximize the quantity of nutrients recovered from human urine different techniques' such as Solar Evaporation, Struvite precipitation and Adsorption on Natural Zeolite surface were conducted consecutively in the pilot model as well as bench scale laboratory tests.

The samples of Human urine were transported to Arba Minch University using 20 liters of jerry-cans after collected it from Rosa projected UDDT toilet. Double solar Evaporator was filled by 1500 ml urine samples after mixing of different jerry-cans sample and exposed to incident solar radiation. The parabolic shape of solar evaporator consists of an airtight rectangular basin constructed with galvanized iron sheets (GI) and with 4mm thickens inclined top clear glass cover and painted black color underneath the red color. The temperature gradient created by filling constant head of cold water in small tank at 3 hours intervals to assist the movement ammonia gas from urine solution to the parabolic shape of condenser and then to diluted in the 0.01 N sulpheric acid solutions to be trapped as ammonium sulphate.

Struvite precipitation experiments were conducted using 400 ml of residual urine sample from the double Solar Evaporator basin followed solar evaporation in 500 ml beaker. The time period used to mix solar still residue and Magnesium chloride($MgCl_2.6H_2O$) is 10, 20, 30 and 40 minuets respectively and $NaOH$ was used for pH adjustment. The precipitate solution was filtered using Whatman Cat No541 (90 mm) filters, followed by washing with about 50 ml of distilled water.

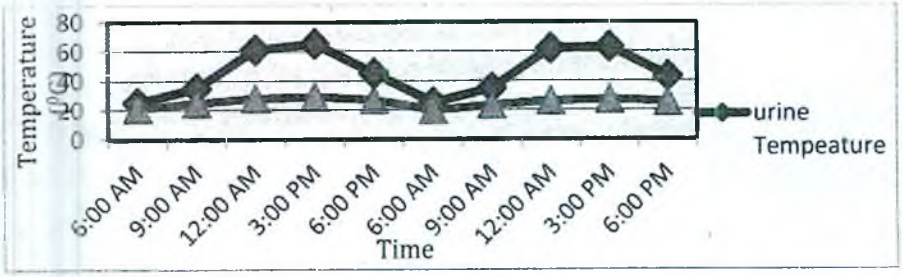
The collected Clinoptilolite samples were grounded and sieved to trap the ammonia- nitrogen that was leftover the precipitation reaction and passed the Whatman Cat No541 (90 mm) filter paper. To determine the actual ion exchange capacity of Natural Zeolite per liters of concentrated human urine after Struvite precipitation for 72 hours contact in batch and column test were conducted using 50 g 1.15mm size zeolite and 500ml of concentrated stored urine and fixed the mass and volume requirements of Natural Zeolite to adsorb at least 50 % of ammonium-nitrogen.

All bench scale experiments were carried out at room temperature approximately 25°C in the water quality laboratory of Arba Minch University. Each experimental data was taken at least three times, and the result presented as a mean. Samples were analyzed for soluble phosphate, soluble magnesium and ammonia. Soluble phosphorus (PO_4^{-3}) was analyzed using spectrophotometer. Soluble magnesium was analyzed with atomic absorption spectrophotometer. Ammonia was analyzed using Standard Methods for distillation and titration, (Standard Methods , 2005).

3. Results and Discussion

Double Solar still efficiency

The double solar still efficiency was checked interms of concentration of human urine volume and amount of recovered nutrients in pilot mode experiments from1st to 25th of April 2010. Its result was crossed checked using ambient air temperature from meteorology data and presented as in Figure 1.



Source: Own survey, 2010

Figure 1: Urine Temperature and Ambient Temperature of the air with Time

Figure 1, illustrate: It can be concluded that as the solar intensity increases, the heat loss decreases and the urine and ambient temperature increases considerably due to the increase of the urine temperature through conduction process between the black base and the urine as a result the efficiency also increases.

Results Recovery of nutrients from solar concentration

The quantity nutrients recovered from Solar Evaporation presented in the table 1. Table 1 below indicates, Ammonia content depleted from the original stored human urine in double solar still very well after 2 days. The ammonia concentration in the depleted double solar still was in nearly all cases less than at least 10% of the original value with 17 % initial volume reduction. Thus correspond to the amount of ammonia in sulphuric acid solution is 750 mg/l reached. In the condensate limited phosphate was detected. Therefore, PO_4^{-3} concentration nearly completely the original value, obviously no precipitation occurred within the solar still. This was proved by visual observation of the basin of solar evaporator material as well as of parabolic shape condenser pipes.

Table 3: Summary of Nutrient recovered from Solar Evaporation

Parameters	Original Human Urine in the solar still before exposing to sunlight	Concentrated Stored Human Urine after exposing to sunlight	Trapped evaporate from the solar still in Strong Acid
Volume of urine (ml)	1500	1250	-
NH_4^+ (mg/l)	5750	5050	750
PO_4^{-3} (mg/l)	1600	1552	-

Source: Own survey, 2010

3.3. Precipitate analysis

By adding Magnesium chloride($MgCl_2.6H_2O$) as magnesium source to make molar ratio of 1.5:1 and adjusting the stored urine pH 9.0 before mixing 10 min. Because $MgCl_2.6H_2O$ is slightly acidic (pH of 5.5), it does not increase pH as MgO does (Burns, 2001). The addition of NaOH to raise pH in struvite formation is more efficient than the addition of lime or Mg (OH) $_2$(Webb,T.L and Ho, 1992) . In this particular experiment magnesium chloride was used. Precipitate from solar concentrated human urine was analyzed after dissolving 0.0308g Struvite

(solid precipitate) by 100ml of 0.01N dilute sulphuric acid. Struvite is highly soluble at an acidic pH and highly insoluble at an alkaline pH (Buchana, 1994). The pH for maximal struvite recovery lies in the range of 9.0 to 9.5 (Joko, 1984). The results presented in table 2 struvite precipitate contained an average of 920 mg/l NH_4^+ and 1142mg/l of PO_4^{-3}, respectively. The ratio of NH_4^+: PO_4^{-3} of the precipitate was 1:1.2. The formed precipitate is enhanced with phosphorus from the formation of brushite and other phosphate containing compounds that may have been formed but not yet identified. Since the overall goal of this work was to maximize phosphorus and nitrogen from stored human urine, this method is also one option to increasing the amount of nutrient recovery and gives a favorable result.

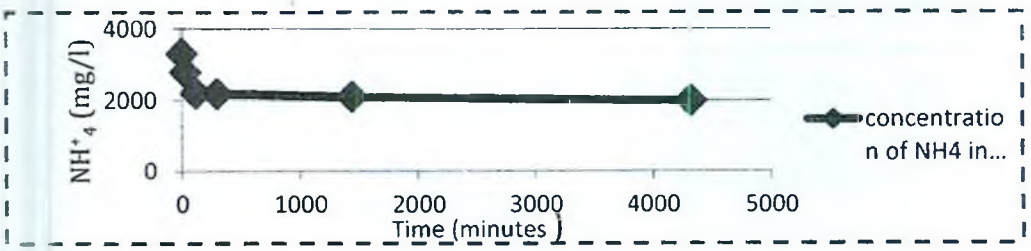
Table 4: Struvite Precipitate analysis

	NH_4^+	PO_4^{-3}
Dissolved by acid (mg/l)	945	1174
Dissolved by water (mg/l)	895	1110

Source: Own survey, 2010

Batch adsorption systems from concentrated stored urine

The batch adsorption result presented in Figure 2 shownsignificant difference observed in the concentration of ammonium nitrogen from stored urine after struvite precipitation. 500 ml of stored urine and 50 g of 1.15 mm size zeolite mixtures exhibited significance decrease in the concentration of ammonium –nitrogen in the supernatant in comparison with the initial ammonium–nitrogen in stored urine after 72 hours contact and this observation start as early as after 30 minute. The fine granules of zeolite resulted in the highest ammonium exchange capacity. (Jørgensen S. E., 1976) .The addition of zeolite results in almost 50 % decrease in ammonium-nitrogen concentration from stored urine.



Source: Own survey, 2010

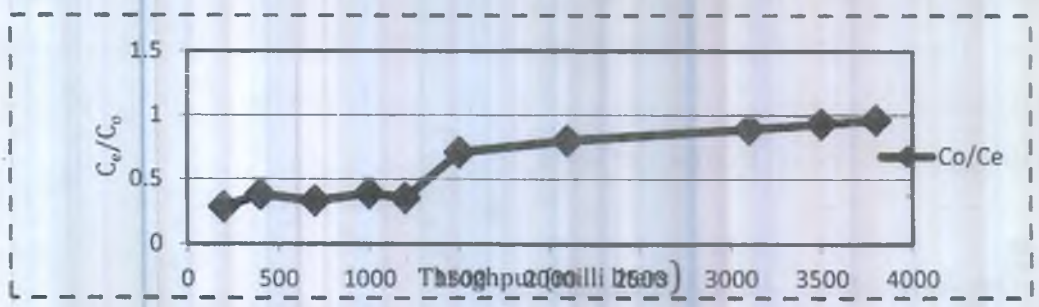
Figure 2: Batch adsorption studies from concentrated human urine

This corresponds to the urine ammonium concentration lowered from 3300 mg/l to 1900 mg/l. The consequences of 50 % ammonium –nitrogen removal from stored urine related to the recovery of 1287 mg/l of ammonium sulphate after washing the surface of zeolite with1 N of strong sulphuric acid. When using zeolite with grain sizes of 1.15 mm higher exchange, the higher ammonium exchange capacity is probably caused by a higher mass transfer into the zeolite (Nguyen, 1997).

Breakthrough adsorption capacity

The breakthrough capacity on natural zeolite $(^{x}/_{m})_{b}$ results indicated in Figure 3. Total CEC[2] NH^{+}_{4}-N was determined between 14.5– 21.0 mg/l but the operating ammonium exchange capacity is 1.25 meq/l this seems to be just less than CEC value found that a higher influent concentration resulted in a faster breakthrough. (Hlavay, 1982) .conducted experiments to investigate the effects of influent concentrations of ammonium in the interval 17–45 mg NH_4-N/l.

Due to some practical error and the existing of both cation and an ion at least reduced the ion exchange capacity by 50 % (Metcalf and Eddy , 1991). From the bench scale test in this thesis 50 % ammonium nitrogen removal accomplish from stored urine after struvite precipitation. To remove this 50% ammonium nitrogen from 1 liters stored urine required having ion exchange capacity 183.33 meq/l, 293.3045g resin and 4.19×10^{-4} m^3 of volume 1.15mm size zeolite required.



Source: Own survey, 2010

Figure 3: Breakthrough curve

[2]*Cation-exchange capacity*

4. Conclusions and Recommendation

The aim of this study was to produce concentrated and of plant readily available nutrients from urine. For this purpose, Adsorption, Struvite precipitation and Solar Evaporation techniques was used. The results this paper showed that the double Solar Evaporation is a promising method for effective concentration of valuable nutrients from stored human urine. By solar evaporation methods 88% of N can be concentrated in residual stored urine in solar still, with 17% of the original volume reduction and 750mg/l N trapped as$((NH_4)_2.SO_4)$ in 0.01N of sulphuric acid after evaporation.

Because the limiting ion for Struvite formation in human urine is usually magnesium, residual concentrated stored human urine is typically amended with magnesium chloride to force the precipitation of struvite. After solid struvite precipitation and dissolved 956 mg/l N as solid form of fertilizers was recovered. To achieve maximum recovery struvite precipitation must follow by ammonium adsorption with 1.15 mm Zeolite.

The clinoptilolite rich Natural Zeolite used in all experiments has good ammonium selectivity and the total-N recovery value is 50 %. From Natural Zeolite Adsorption process, 1287 mg/l N was trapped as ammonium sulphate.

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GIS, GPS and Satellite Imageries: A tool for identifying suitable locations for agricultural practices in Debre Markos, Ethiopia

Ajay Babu Gangidi

Department of Geography and Environmental Studies, Debre Markos University

E- mail:ajaygangidi@gmail.com

Abstract

Urban agriculture is a phenomenon that can be observed world-wide, particularly in urban areas of developing countries. Only little is known about the actual extent of inner city areas used for agricultural purposes, and the spatial distribution of such areas. A methodology for identifying suitable locations for urban agricultural activities on open spaces has been successfully studied in the town of Debre Markos, Ethiopia. The identifying procedure comprised classification of satellite imagery, collecting GPS points, and integration of the results into GIS. The main aim of this study was to elaborate an inventory of all open spaces used for vegetable production in and around the study area in 2010/11. The total area of the study is around 3499 hectares out of this the share of open lands 1300(37.15%), grasslands 933(26.66%), urban forest (including urban agriculture) 666(19.03%), and constructions 600(17.16%) hectares. The majority of the area is occupied by open lands followed by grasslands, urban forest and constructions.

Key Words: Agriculture, GIS, GPS, Satellite Imagery, Urban

1. Introduction

Urban agriculture, i.e. agriculture in the city or in peri-urban areas, is a phenomenon that can be observed world-wide. This is particularly true for cities of developing countries, where food production for subsistence and marketing contributes to the improvement of livelihoods, food security and urban ecology (Smit et. al., 1996, Mougeot, 2005). In spite of all ongoing research on urban agriculture, in most of the developing countries' cities few systematic surveys have been carried out on the actual extent of urban agriculture in terms of inner city areas used for agricultural purposes. Also little is known on the spatial distribution of urban agriculture in the cities. Many questions are still open: Where do urban agricultural activities concentrate and why, who is involved, what kinds of crops are grown and by which groups of city dwellers, which kinds of soils are occupied, how is water availability and quality, what is the distance to markets, are there potential health risks? Furthermore, only few data and knowledge is available regarding the extent, the importance, the development and the output of urban agriculture, as well as and its connection to small enterprise development.

In the world-wide context, only very limited experience with the application of Geographical Information Systems (GIS) to urban food production activities is available. For Santiago de los Caballeros (Dominican Republic) a GIS based database has been developed by the University of Santiago (Del Rosario et. al., 1999). In Ouagadougou (Burkina Faso), a mapping of urban and peri-urban agricultural areas has been carried out based on IKONOS satellite imagery (Kemeling 2001). The 'Resource Center of Urban Agriculture and Food Security'(RUAF, 2006) recently conducted mappings of the presence of urban agriculture and available open spaces in six cities: Villa Maria del Triunfo (Lima, Peru); Pikine (Dakar, Senegal); Accra (Ghana); Bulawayo (Zimbabwe); Hyderabad (India); and Beijing (China). To date, the city with the most comprehensive experience in this respect is Debre Markos, Ethiopia. A survey carried out in 2010/11 showed that one possible way to close the information gap is to map urban agricultural areas by combining analysis of satellite images with field work, and using GIS as a tool.

1.2. Why using Geographical Information Systems (GIS)?

For the purpose of this study, the following advantages of using a GIS proved to be most useful:

- Visualization of spatial data, particularly the distribution of agricultural open spaces in a city
- Potential for updating digital maps in the future, and extension to a greater range of topics and layers
- Possibility to print hardcopies of maps showing any desired selection of topics and areas in any scale, for discussions with stakeholders
- Linkage of vector data in maps with attribute data such as type of crops grown or number of farmers
- High flexibility: According to the respective local contexts and available data sources, a wide variety of spatial data can be integrated and combined for optimal outcome: Satellite imagery, aerial photography (digital or analogue), topographic or thematic maps of all scales, cadastral maps, GPS measurements etc.

1.3. Description of the Study Area

Debre Markos, the capital of East Gojjam Administrative Zone is located in the north west of the capital city of the Federal Democratic Republic of Ethiopia, Addis Ababa at a distance of 300 kms and 265 kms to the capital of Amhara Nation Regional State Bahir Dar (Fig. 1). Geographically, it is located between 10°17′00″ to 10°21′30 N Latitudes and 37°42′00″ to 37°45′30″ E Longitudes. Attitudinally it ranges between 2350-2500 m asl.Average annual rainfall is 1380mm and minimum and maximum temperature ranges between 15° C and 22° C respectively. The town has 1380 mm average annual rainfall and minimum and maximum temperatures of 15° C and 22° C respectively.

Based on figures from the Central Statistical Agency (2005), Debre Markos has an estimated total population of 85,597, of whom 43,229 are men and 42,368 are women.

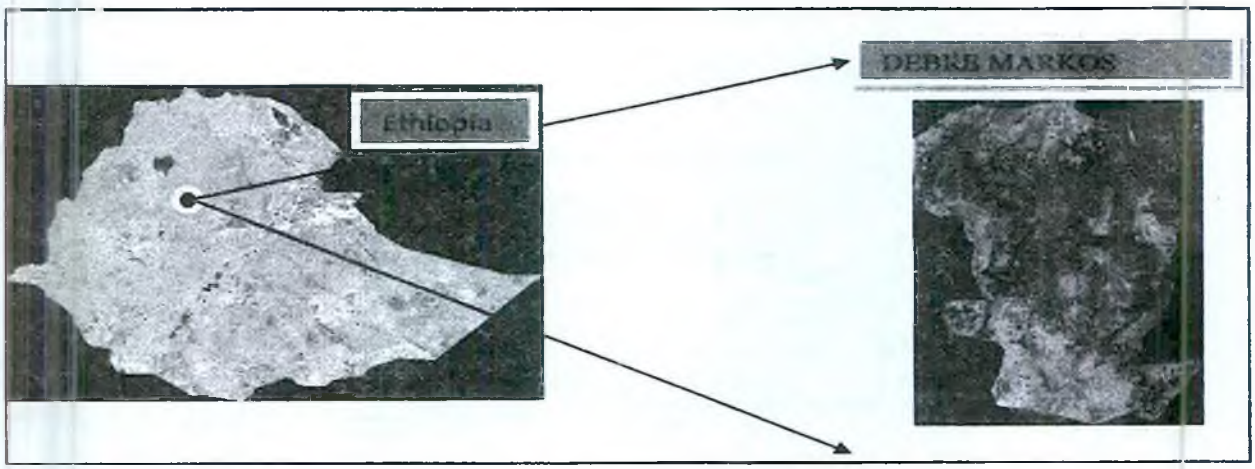


Fig.1 Location map of the study area

The town has an estimated area of 21.53 square kilometers, which gives study area a density of 3,975.70 people per square kilometer.

2. Database and Methodology

In and around Debre Markos, a total area of 30.25 km² was surveyed using Global Positioning System to locate exact locations. Different working techniques were used: (1) field work (2)

Georectifcation of Satellite Images and (3) classification, visualization and analysis of results by using GIS and Remote Sensing.

In this study, both primary and secondary data sources are used. Most of the data are obtained from primary sources such as satellite images, GPS, field survey and observation. The secondary data is collected from internet, published and unpublished documents from the town municipality and town administration offices.

This study makes use of satellite images dated: Jan 22, 2004 and current GPS points from the town to locate coordinate points on satellite imagery. In the first stage coordinate points (latitudes and longitudes) of the town were collected from the field with the help of Global Positioning System. Then GPS points used to georeference the satellite images to adjust the coordinates with the help of ArcGIS 9.2 software to built relationship between satellite images and ground controlling points (GCPS).(fig.2).

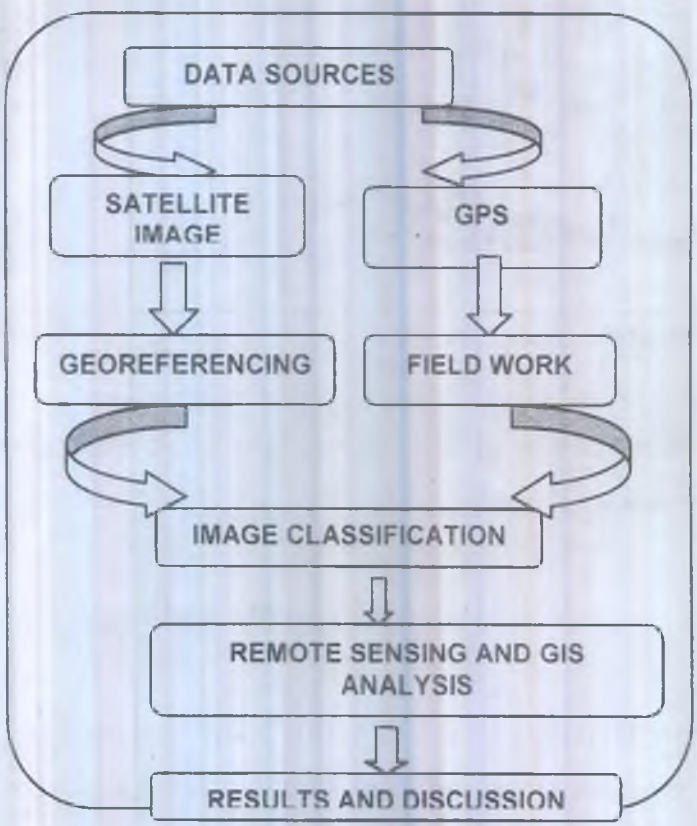


Fig.2 Methodology of the study

Then supervised classification method is used to analyze the satellite images by using Remote Sensing software ERDAS 8.7. The classification method is carried out for extracting different layers of data. The customization and analysis of classified data is performed with the help of ArcGIS 9.2 software.

2.1 Field work (using GPS)

Some areas identified as productive open spaces during the satellite images classification were visited. All important sites were checked and photographed. However, some sites turned out to be inaccessible (e.g. army land).In almost all cases this was possible simply by working with GPS and observation. With the help of GPS instrument the geographical coordinates of agricultural open spaces were measured and saved. Experience showed that it was much more efficient to work with GPS receivers for the purpose of the study.

2.2 Georectification and Classification of Satellite Images

This was an essential step which made it possible to map a large area in a short time, and to get very precise results. The analysis was based on the most up-to-date available set of satellite Images of the Debre Markos Town taken in 2004. The images were georectified with the help of ArcGIS 9.2 software and classified with ERDAS 8.7 software in order to identify open spaces used for vegetable production. For ground control, several field visits were done to avoid mistakes during the study period.

2.3 Survey of open space agriculture in Debre Markos

As Per the survey (table.1), the total area of the town is around 3499 hectares out of this the share of open lands 1300(37.15%), grasslands 933(26.66%), urban forest (including urban agriculture) 666(19.03%), constructions 600(17.16%) hectares. The majority of the area is occupied by open lands followed by grasslands, urban forest and constructions.

Table.1 Land Use and Land Cover status in Debre Markos

Type of LU/LC	Area in Hectares	Area in Percentage
Open Lands	1300	37.15
Grass Lands	933	26.66
Urban Forest	666	19.03
Constructions	600	17.16
Total	3499	100

Source, own survey, 2010

The town is dissected by three swampy areas (mainly flood plains) and to some extend ridges, escarpments and streams associated with gullies. There are major slope categories that can be classified as follows:

- Land with 0 – 2.5 percent slope: this area refers to the swampy areas which cover 20% the urban landscape.
- Land with 2.6 – 20 percent slope: land with this slope class constitutes 75% of the area of the town. This is suitable for settlement and other functions.
- Land with >20 percent slope: this refers to the land characterized by gullies, ridges and escarpments which accounts 5% of the land resources.

Fig. 3 Potato cultivation in Summerland Park

Fig. 4 Cabbage cultivation around cattle market

Fig. 5 Maize and gomman cultivation in peacock

Fig. 6 Mixed agricultural practices around Mkutia

Figures 3, 4, 5 & 6 are showing open spaces used for agricultural activities in the city of Debre Marko in 2010. In most of the places urban farmers are cultivating vegetables which are essential in daily life such as local cabbage (gomman), potato(dinich), green chilli(karia), onion(shinkurth), carrot and tomatoes. Majority of the open spaces have small quantity of land especially in the middle of the town. The study shows that some of the areas are shifting form one status to another status. For example the land in fig. 3 & 6 are recently converted from grasslands to agricultural land. These grasslands have a greater potential for growth of crops, vegetables and livestock.

Table . 2 Selected open spaces, their latitudes, longitudes and elevation in Debre Markos

Figure No.	Location Name	Latitude	Longitude	Elevation in meters (above MSL)
3	Summerland park	10°20'30" N	37°44'19" E	2407
4	Cattle market	10°20'50" N	37°44'30" E	2415
5	Peacock	10°20'59" N	37°43'45" E	2489
6	Mkutia	10°18'04" N	37°44'30" E	2390

Source, own survey, 2010

Table . 2 show latitudes, longitude and elevations of open spaces used for vegetable production in the study area. These areas are located between the altitudes of 2385 and 2420 meters above sea level. The majority of these open spaces are located around streams and rivers.

3. Results and Discussion

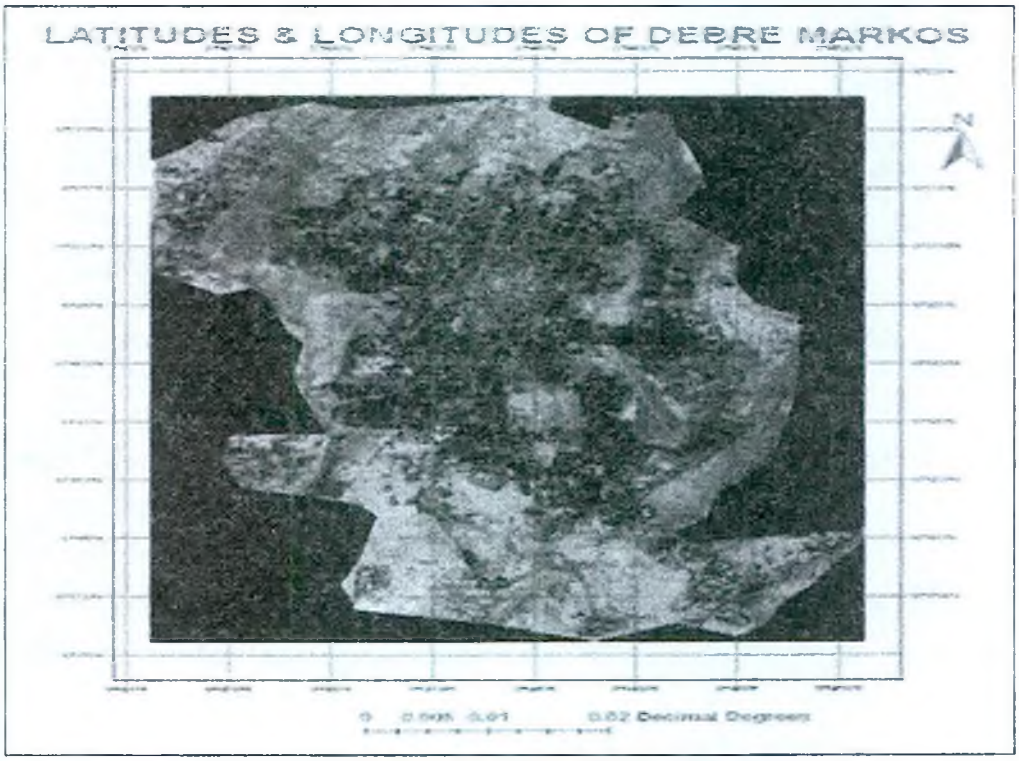


Fig. 7 Distribution of latitudes and longitudes of Debre Markos

Fig .7 shows the exact geographical coordinates of each location in and around Debre Markos town. The city is passing through by 10° N Latitude and 37° E longitude. The total study area has an estimated area of 36.25 square kilometers. The majority of area is covered by undulated topography. The distance from north to south and west to east of the study area is 8.50 and 5.32 kms respectively. The major flood plains (low lands) are located in NW, NE & SE directions of the town.

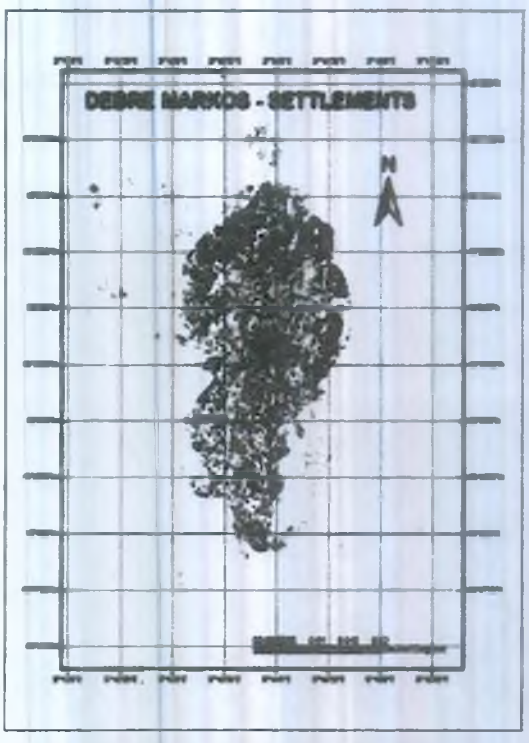


Fig. 8 Debre Markos – Settlements

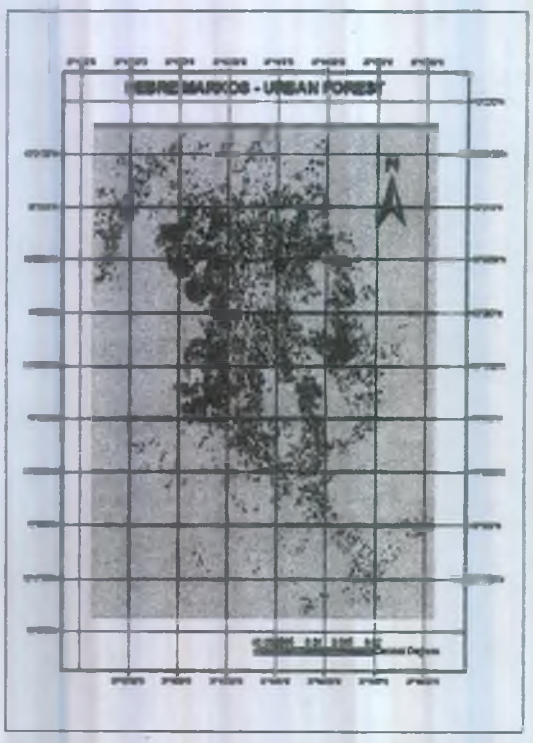
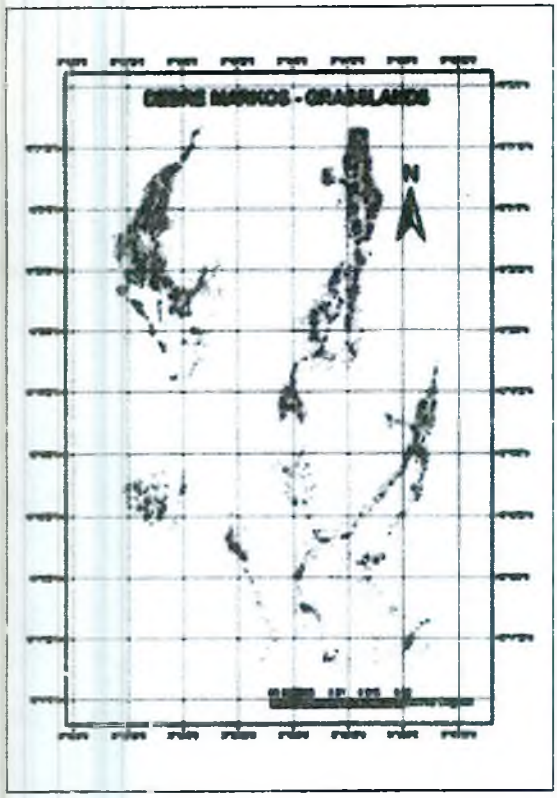


Fig. 9 Debre Markos – Urban Forest

Fig. 8 shows the settlements location in the town. The majority of these settlements are located within the boundary of 11.42 sq kms and remaining are sparsely distributed in the study area. The geographical location of this area is covered in 10°18′ to 10°21′ N latitudes & 37°43′ to 37°45′ E longitudes.

According to Fig. 9 the town has covered with plenty of trees and majority of these are covered with eucalyptus plants and are unevenly distributed. Some parts of the town is covered with dense trees which are located between 10°19′ to 10°21′ N latitudes and 37°42′ to 37°44′ E longitudes.



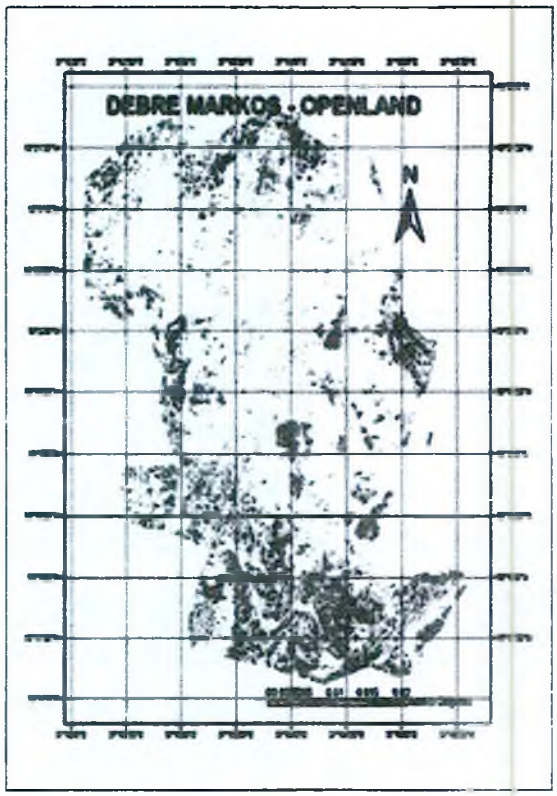


Fig. 10: Debre Markos – Grasslands

Fig. 11: Debre Markos – Open land

Fig 10 & 11 are showing the areas which are covered by grasslands and open areas in and around the town. The majority of the grasslands are located in NW, NE and SE directions of the city, where as open Lands are located in northern and southern part of the town. By naturally study area has located in highly rain fall zone and there is no scarcity for water. The most of the open spaces were found around low lands in swampy areas. As per the study we can consider both grasslands and open lands as open spaces and are suitable for urban agricultural activities. The total area covered by the grasslands and open spaces is around 2233(63.81%) hectares. As per the study, it may be possible to consider both grasslands and open spaces which are suitable for urban agriculture activities. But the government policies towards urban farming are not as such encourage because it is not a major source of income source for urban dwellers.

4. Conclusions

Urban agriculture contributes to food security and food safety in two ways: first, it increases the amount of food available to people living in cities, and, second, it allows fresh vegetables and fruit

and meat products to be made available to urban consumers. Urban greening and afforestation can improve the quality of urban life and livelihood in many ways, providing both tangible (e.g. food, energy, timber, fodder) and less tangible environmental and societal benefits and services. Evidence suggests that urban agricultural resources can play an active role in providing goods and services to alleviate poverty, improve livelihoods, and enhance wellbeing in developing countries.

Food from trees in private agroforestry gardens or allocated plots in public gardens can contribute significantly to food security in developing countries. Forest related activities and urban agroforestry practices can be labor intensive and can provide work opportunities. This may be especially important for livelihoods and survival strategies of the very poor. Today the main focus of attention in urban areas is the dissemination of in-depth knowledge about the functions of urban trees in microclimates, air quality improvement and carbon dioxide reduction in developed and developing countries.

Apart from the urban water supplies, wastewater treatment systems and storm water management is increasingly being articulated, especially in semiarid and arid zones and peri-urban areas. Protection of the suburban and rural areas that serve as the sources of the cities' water is a traditional urban forestry linkage. In this study, urban agriculture comprises the production of crops, livestock and vegetables. Over the past few decades, Remote Sensing and GIS techniques have been increasingly used to support the urban landuse studies because of their cost-effectiveness and technological soundness. This research paper has reviewed the status of Remote Sensing and GIS applications in developing broad scale landuse and landcover for identifying the open spaces which are suitable for urban agriculture or other purposes. The created database can be used by urban farmers and town administration for further analysis and planning purposes, and to make overlays with other relevant spatial data.

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PART III. HEALTH AND RELATED

The Prevalence of *Giardia* and *Cryptosporidium* Species Infection among Children and Cattle in North Shewa Zone, Oromia Region, Ethiopia

Teklu Wegayehu[1], Beyene Petros[2]

[1]Department of Biology, Faculty of Natural Sciences, Arba Minch University, Arba Minch, Ethiopia; [2]Department of Biology, Faculty of life sciences, Addis Ababa University, Addis Ababa, Ethiopia

Abstract

Giardia lamblia and *Cryptosporidium parvum* are infectious protozoan parasites capable of causing gastrointestinal illness in both humans and animals. The dramatic emergence of waterborne zoonoses involving these parasites as a co-infection with HIV has caused great public health concern in the international community. The purpose of this study was to determine the prevalence of *G. lamblia* and *Cryptosporidium* species infection among children and cattle to assess possible zoonotic transmission. Cross-sectional study was conducted from November 2008 to April 2009 in Girar Jarso and Dera Districts of North Shewa Zone, Oromia Region.Study participants were selected using systematic and simple random sampling method. Data were gathered through house-to-house survey using standardized questionnaire. Stool specimens were processed using direct wet mount, formol-ether concentration and modified Ziehl-Neelsen staining techniques. Out of 384 children examined, 53 (13.8%) and 28 (7.3%) were found positive for giardia and cryptosporidium infection, respectively. Similarly, out of 384 cattle examined, 9 (2.3%) were found positive for *Giardia lamblia* and 30 (7.8%) were found positive for *Cryptosporidium* species infections. The prevalence of giardiasis in children who had close contact with cattle (18.7%) was significantly different ($P<0.05$) from those who had no contact with cattle (9.6%). This finding suggests the existence of possible zoonotic transmission of the two pathogenic protozoan parasites in the study areas. Health education related to personal and environmental hygiene, appropriate management of cattle and proper handling of their manure will be necessary to reduce risk of infection.

Key words/Phrases: *Cryptosporidium, Giardia,* Prevalence, zoonotic transmission

1. Introduction

1.1.Background

Giardia and *Cryptosporidium* are intestinal protozoan parasites that are recognized as prevalent and widespread pathogens of humans and many other species of mammals. Waterborne outbreaks of these two parasites are well documented with more than 120 outbreaks infecting over 600 million people worldwide (Fayer *et al.*, 2000). *Giardia* and *Cryptosporidium* infections are common cause of gastroenteritis known as giardiasis and cryptosporidiosis, respectively. In recent years, massive outbreak of enteritis in people including a high incidence of disease in AIDS patients has increased public awareness of these parasites (Ghimire *et al.*, 2004).

Giardia lamblia (also known as *G. intestinalis* or *G. duodenalis*) is a cosmopolitan parasite with worldwide distribution and the most common protozoan isolated from gastrointestinal tract (Adam, 1991). In developed countries, it is currently referred as a reemerging infectious agent because of its increasing role in outbreaks of diarrhea in day-care centers and water and food born outbreaks affecting the general population. The prevalence of infection varies from 2% up to 7% in industrialized countries to 40% in tropical/subtropical regions with poor sanitation and hygienic conditions (Odoi *et al.*, 2004).

As cited in Adam (1991), *Giardia* was first identified by Van Leeuwenhook in the 1600's. Although it was the first protozoan parasite described, its role as pathogenic organisms was not recognized until the 1970's. However, now it is accepted that *Giardia* can cause an epidemic and endemic diarrheal illness in humans and in a wide range of domestic and wild animals (Adam, 1991).

Cryptosporidium, a parasite classified as an emerging pathogen by the Centers for Disease Control and Prevention (CDC), was first described in 1907 by Ernest Edward Tyzzer (Tyzzer, 1907). The organism infects the gastrointestinal epithelium to produce self-limited diarrhea in immunocompetent persons but potentially life threatening in immunocompromised and immunosuppressed individuals. The prevalence rate of the disease is varying from 1-4% in the

developed world (Baxby and Hart, 1986) and 6-17% in the developing world (Enriquez *et al.*, 1997).

Since 1976, when *Cryptosporidium* was first recognized as a human pathogen (Nime *et al.*, 1976), understanding of the epidemiology of this protozoan parasite has increased substantially. Currently, several species of *Cryptosporidium* are considered valid and of which *Cryptosporidium hominis* (*C. hominis*)and *C. parvum* are most commonly detected from various water samples and feces of humans and domestic ruminants (Hunter and Thompson, 2005). *C. hominis* isresponsible for human-to-human (anthroponotic) transmission, whereas *C. parvum* isresponsible for animal to human (zoonotic) transmission (Fayer *et al.*, 2006).

Cryptosporidiosis continues to be a series problem in immunocompromised patients and in a worldwide scale in undernourished infants and children. The lack of effective treatment and propensity of the parasite to survive in and transmitted through source water make an important public health threat. At present, cryptosporidiosis is very common in patients with HIV/ AIDS and a threat to public health. It remains clinically significant crisis in patients without access to highly active antiretroviral therapy (HAART) and in people with a transplantation surgery and chemotherapy (Clark, 1999).

Giardia and *Cryptosporidium* areshare a broad host range and believed to be zoonosis (Monis and Thompson, 2003). Despite our knowledge of the distribution of these species among more than hundred mammalian species and numerous reports from human communities, the root of environmental transmission are still not well defined (Appelbee *et al.*, 2005; Smith *et al.*, 2006). This is attributed to the fact that each genus is believed to comprise complex of species and genotypes within the species, some of which are pathogenic, others specific to particular hosts and some zoonotic, and hence of public health significance (Caccio *et al.*, 2005; Smith *et al.*, 2006).

Epidemiological surveys had indicated that the most important source for human infection was contaminated drinking and recreational water, food, household animals and infected people (Dillingham *et al.*, 2002). Source of contamination of water and food might be diverse, but a

particularly important, albeit varying, role was played by different host groups that act as reservoirs of infection. Farm animals were believed to play the most significant role in this context, contributing parasite cysts/oocysts in large proportion because of their high abundance on farms. The use of fecal materials as fertilizer for arable fields and pastures was another important contributory factor (Dillingham *et al.*, 2002).

1.2. Statement of the problem

Farmers in Ethiopia are engaged in mixed agricultural practice and use cow manure as a fertilizer and dried dung as fuel. In such localities where people have close contact with animals and their manure, the possibility of infection with waterborne zoonotic pathogens such as *G. lamblia* and *Cryptosporidium* species is extremely high. Although a number of studies have been conducted on the distribution and prevalence of intestinal parasites in Ethiopia, none of the previous works had indicated the importance of cattle as contributing factor for the high prevalence of giardiasis and cryptosporidiosis in human. Therefore, this study focuses on determining the infection prevalence of giardiasis and cryptosporidiosis both in humans and cattle to see the importance of cattle as contributing factor for the high prevalence of these diarrheal illnesses.

1.3. Significance of the Research

Morbidity and mortality caused by these parasites is very significant. The rate of infection is remarkably high in sub-Saharan Africa, including Ethiopia. Because of the worldwide importance of the parasites and the absence of comprehensive data on the occurrence of these parasites in the study area, the present work will have the following contribution:

- It will help to create awareness among the society about the risk factors of infection.
- It will help to develop control strategies in which the parasites.
- It will provide baseline information for further research work.

2. Materials and Methods

2.1. The study areas

A cross-sectional study was conducted from November 2008 to April 2009 in Girar Jarso and Dera Districts of North Shewa Zone, Oromia Region. The zone is located north of Addis Ababa at about 1000 – 3500 meters above sea level and is characterized by three geographical regions: Dega (42%), Woyina Dega (35%) and Kolla (23%). Fiche, the administrative center of the Zone, is located 112km north of Addis Ababa at the sides of Bahir Dar highway. North Shewa Zone has an average human population of 1,189,580 and livestock around 1,410,831.

Girar Jarso, one of the 180 districts in the Oromia Region, is bordered on the South by Yaya Gulele, on the West by Degem, and on the East and North by the Amhara Region. Geographically the district has 60% Dega and the remaining 40% Woyina Dega and Kolla. It is located 1300 – 3419 meters a.s.l. and receives an annual rainfall of 840 – 1110 mm. The average annual maximum and minimum temperatures are 11.5 and 32^{0} C, respectively. The administrative center of Girar Jarso is the zonal center, Fiche, which represents the study area.

Dera is located approximately between $10^{0}02'$ to $10^{0}24'$ North latitude and $38^{0}26'$ to $38^{0}55'$ East longitude. It is the second largest district in the Zone which contains 33 farmer's associations and one urban Dwellers Association. The district has common boundary with Warra Jarso and Hidhabu Abote districts in the South and South West as well as with the Amhara Regional State in the North West, North East and South East of its land mass. Its capital town, Gundo Meskel is situated at about 110 km Fiche and 265 km from Addis Ababa via Alam Katama.

In both study areas, the district capitals had small householder dairy farms and the rural kebeles practice mixed agriculture. The livestock mainly owned by the people are cattle, sheep, goat, equine and poultry. The inhabitants have poor socio-economic situation because of lack of adequate income both in urban and rural areas. The problem emanates mainly from the recurrent failure of the "Belg" rains, decreasing fertility of the soil and insufficiency of the land due to increasing population. As a means of compensating these problems, people are rearing domestic

animals such as cattle and use their feces as compost and dung as a fuel which would expose them to zoonotic infections. The two districts were selected because of the existence of small household dairy farms and large number of domestic animals living in close association with humans.

2.2. The study population

Although residents of both districts were used as the sources of sample population, the study included inhabitants of 1 to 15 years of ages from both sexes. Infants with ages less than one year, new settlers less than 2 weeks duration, individuals who were on anti-parasitic drugs at the time of the study or 2 weeks prior to the study were excluded.

In estimating the sample size (n), 50% prevalence, 95% confidence interval for Z statistics which is conventionally 1.96 and 5% precision were used to determine n using the statistical formula:

$$n = \frac{Z^2 P (1-P)}{d^2}$$

Where: n = sample size Z = Z statistic for a level of confidence

d = precision p = expected prevalence of the parasites

In line with it, 384 households for the sample were calculated and of which 768 unit of analysis, 384 children and 384 cattle of different age groups, were selected. About 378 subjects (187 children and 191 cattle) were sampled from Girar Jarso district and 390 subjects (197 children and 193 cattle) were sampled from Dera district. Out of 384 children examined, 176 were live together with cattle or had cattle at their vicinity and hence close contact with cattle and their manure. The remaining 208 had no contact with cattle and their manure i.e. they do not have cattle at their home and vicinity.

Two well-trained persons collected the data through house-to-house survey to obtain information regarding age, sex, educational background, abdominal health status, stool consistency, contact with domestic animals and their manure, and drinking water source on a pre-designed questionnaire. The first household was randomly selected in each districtand then the remaining

households were selected using systematic sampling method. Accordingly, a simple random sampling method was employed in the selection of children. Calve and diarrheic cattle were taken priority in the selection to maximize the chance of getting the parasites.

2.3. Stool collection and processing

A single fresh fecal sample was collected from each consenting study subject in a labeled stool container. The fecal samples from the cattle were obtained either directly from the rectum using a disposable latex glove or from the ground immediately after defecation. At the time of sampling, the name of the children, date of sampling, age, sex, consistency of the feces (soft, pasty, watery or normal), and tag number of the cattle were recorded for each subject on a recording format. A portion of stool was examined at the field by direct method described below and the remaining part was preserved with SAF (15g sodium acetate, 20ml glacial acetic acid, 40ml formalin in 925ml distilled water) and transported to the biomedical research laboratory, Department of Biology, Addis Ababa University (Figure 5) and processed by the following methods.

Figure 5. Photograph shows processing preserved stool samples at biomedical research laboratory Department of Biology, Addis Ababa University, April 2009.

2.3.1. Direct wet mount method

The direct wet mount with saline (0.85% NaCl solution) was used to observe for motile intestinal parasites and trophozoites under light microscope at 100X and 400X magnifications. Lugol's iodine staining was also done to observe cysts of the intestinal protozoan parasites.

2.3.2. Formol-ether concentration method

A portion of preserved stool sample was processed by formol-ether concentration method as described by Ritchie (1948) with some modification. The stool sample was sieved with cotton gauze and transferred to 15ml centrifuge tube. Then 8ml of 10% formalin and 3ml of diethyl ether was added and centrifuged for 2 minutes at 2000rpm. The supernatant was discarded and the residues were transferred to microscopic slides and observed under light microscope at 100X and 400X magnifications for the presence of cysts and ova of the parasites.

2.3.3. Modified Ziehl – Neelsen staining method

In this method, thin smears were prepared directly from fresh as well as sediments of concentrated stool samples and were stained (Adegbola *et al.,* 1994) with some modifications. Air-dried thin smears were fixed with absolute methanol for 5 minutes, air-dried and stained with carbol-fuchsin for 30 minutes. Smears were washed with tap water and decolorized with 1% acid-alcohol (1ml HCl and 99ml of 96% ethanol) for 2 minutes; washed with tap water and counterstained with 1% methylene blue for another 2 minutes, rinsed again in tap water and air-dried. The slides were then examined using a microscope at 1000x magnification for the detection of *Cryptosporidium* oocysts and the oocysts were measured with calibrated microscope to presume the species.

2.4. Ethical clearance

The study was reviewed and approved by the ethical committee of Biology Department, Addis Ababa University. Ethical considerations were addressed by treating positive individuals for giardiasis using the standard drugs and the drugs were administered by the site physicians. Written consent was sought from parents or guardians of the selected children. Besides, parents or care givers were asked to fill the questionnaire and assist during stool sample collection.

2.5. Data analysis

Data were entered into a computer and analyzed using SPSS software version 15. The relationships between proportion of intestinal parasitism and determinant factors for intestinal parasitism such as age and sex were analyzed. Chi-square test was used to see crude association of infection and exposure to different factors. P-value less than 0.05 was considered as statistically significant. Data quality were assured by two senior laboratory technicians.

3. Results

3.1. Overall prevalence of intestinal parasites among children and cattle

Based on the objectives of the study a total of seven hundred sixty eight fecal samples were collected from 384 children and 384 cattle. Parasitological stool examination by direct, formol-ether concentration and modified Ziehl-Neelsen techniques showed that infections with various protozoan parasites and intestinal helminthes were common in the study areas among children and cattle. The prevalence of infection with different protozoan parasites and intestinal helminthes in children and cattle are shown in Table 1 and 2, respectively.

According to table 1, nine species of intestinal parasites were detected from 123(32.0%) of the children. Out of which 63(33.7%) were detected from Girar Jarso and 60(30.4%) were detected from Dera. Regarding cattle, 77(40.3%) and 84(43.5%) were found positive for thirteen intestinal parasites from Girar Jarso and Dera districts, respectively which make an overall prevalence of 161 (41.9%).

Table 1. Prevalence of intestinal parasites among children in Girar Jarso and Dera District, North Shewa Zone, Oromia National Reginal state, Ethiopia (November 2008 and April 2009)

Parasite identified	Girar Jarso No. observed (%) n = 187	Dera No. observed (%) n = 197	Total No. observed (%) n = 384
Protozoa			
Giardia lamblia	33 (17.6)	20 (10.1)	53 (13.8)
Cryptosporidium species	15 (8.0)	13 (6.6)	28 (7.3)
Entamoeba histolytica/dispar	5 (2.6)	9 (4.5)	14 (3.64)
Helminthes			
Ascaris lumbricoides	3 (1.6)	4 (2.0)	7 (1.8)
Hymenolopis nana	5 (2.6)	6 (3.0)	11 (2.8)
Enterobius vermicularis	1 (0.53)	3 (1.5)	4 (1.0)
Strongyloides stercoralis	-	2 (1.0)	2 (0.52)
Trichuris trichiura	-	2 (1.0)	2 (0.52)
Hookworm	1 (0.53)	1 (0.5)	2 (0.52)
Overall Total	**63 (33.7)**	**60 (30.4)**	**123 (32.0)**

Source: Own survey, 2010

Table 2. Prevalence of intestinal parasites among cattle in Girar Jarso and Dera District, North Shewa Zone, Oromia National Reginal state, Ethiopia (November 2008 and April 2009)

Parasite identified	Girar Jarso No. observed (%) n = 191	Dera No. observed (%) n = 193	Total No. observed (%) n = 384
Protozoa			
Giardia lamblia	6 (3.1)	3 (1.55)	9 (2.3)
Cryptosporidium species	23 (12.0)	7 (3.6)	30 (7.8)
Other Coccidia	5 (2.6)	22 (11.3)	27 (7.0)
Helminthes			
Fasciola species	35 (18.3)	27 (13.9)	62 (16.1)
Haemonchus contortus	1 (0.52)	5 (2.6)	6 (1.56)
Ostertagia circumcincta	3 (1.57)	3 (1.55)	6 (1.56)
Oesopagostumum radiatum	---	5 (2.6)	5 (1.3)
Trichostrongylus species	1 (0.52)	3 (1.55)	4 (1.04)
Ascaris vitulorum	1 (0.52)	3 (1.55)	4 (1.04)
Bunostomum trigonocephalum	----	3 (1.55)	3 (0.78)
Chabertia ovine	2 (1)	1 (0.51)	3 (0.78)
Paramphistomum cervi	----	2 (1)	2 (0.52)
Trichuris globulosa	----	1 (0.51)	1 (0.26)
Overall total	**77 (40.3)**	**84 (43.5)**	**161 (41.9)**

Source: Own survey, 2010

3.2.Prevalence of giardiasis and cryptosporidiosis among children and cattle between the study sites

As indicated above, a total of 384 fecal samples of children were examined during this study. Of 187 samples examined from Girar Jarso 17.6% were found positive for giardiasis and 8.0% were found positive for cryptosporidiosis. Similarly, out of 197 samples examined from Dera 10.1% and 6.6% were found positive for giardiasis and cryptosporidiosis, respectively. The overall infection prevalence of *Giardia* was 13.8% and *Cryptosporidium* was 7.3%. The prevalence of giardiasis has shown significant difference ($P<0.05$) between Girar Jarso and Dera district. However, there was no significant difference ($p>0.05$) for cryptosporidiosis (Table 3).

Among the 191 stool samples collected from cattle in Girar Jarso, 3.1%were found positive for giardiasis and 12.0%were found positive for cryptosporidiosis. In the same expression, out of 193 fecal specimens collected and examined from Dera 1.55% and 3.6% were found positive for giardiasis and cryptosporidiosis, respectively. The overall prevalence of *Giardia* was 2.3% whereas the prevalence of *Cryptosporidium* was 7.8%. The prevalence of cryptosporidiosis in cattle between the study sites showed a significant difference ($P<0.05$) whereas the prevalence of giardiasis was statistically insignificant ($P>0.05$) (Table 3).

Table 3 also shows the prevalence of giardiasis and cryptosporidiosis in comparison among humans and cattle between the study sites. In Girar Jarso, the prevalence of giardiasis was 17.6% in humans and 3.1% in cattle whereas in Dera it was 10.1% in humans and 1.5% in cattle. Similarly, in Girar Jarso the prevalence of cryptosporidiosis was 8.0% in humans and 12.0% in cattle whereas in Dera it was 6.6% in humans and 3.6% in cattle.

3.3.Prevalence of giardiasis and cryptosporidiosis among children in relation to contact with cattle

To see the distribution of *Giardia lamblia* and *Cryptosporidium* species infection among children in relation to contact with cattle, data were arranged and summarized in Table 4. Out of 187 children sampled from Girar Jarso, 75 had contact with cattle and the rest 112 had no contact

with cattle. Similarly, from 197 children examined from Dera, 101 had contact and 96 had no contact with cattle.

Closer analysis of the infection prevalence of giardiasis among children in Girar Jarso in relation to contact (28.0%) and no contact (10. 7%) with cattle showed significant difference (P<0.05). Although it is insignificant in Dera, high prevalence (11.8%) was observed in those who had close contact and relatively low prevalence (8.3%) was detected in those who had no contact.

The prevalence of cryptosporidiosis between children in Girar Jarso in relation to contact and no contact with cattle was 9.3% and 7.1%, respectively. Similarly, in Dera for children who had close contact and no contact with cattle, the prevalence of cryptosporidiosis was 7.9% and 5.2%, respectively. In both cases, no statistical significant difference was established (P>0.05), but relatively higher in contact groups.

The overall prevalence of giardiasis in those children who had contact with cattle (18.7%) and who had no contact (9.6%) showed significant difference (P<0.05) in the study site. However, the prevalence of cryptosporidiosis was insignificant (P>0.05) but relatively prevalent in those who had contact with cattle (8.5%) than those who had no contact with cattle (6.2%).

Table 4. Prevalence of giardiasis and cryptosporidiosis among children with respect to contact with cattle between sites, North Shewa Zone, Oromia National Reginal state, Ethiopia (November 2008 and April 2009)

Study sites	Relation with respect to cattle	No. of examined children	Parasite detected			
			Giardia lamblia		*Cryptosporidium Species*	
			No. of Positive n (%)	P-value	No. of Positive n (%)	P-value
Girar Jarso	Close contact	75	21(**28.0**)	0.00*	7(**9.3**)	0.58^{NS}
	No contact	112	12(**10.7**)		8(**7.1**)	
Dera	Close contact	101	12(**11.8**)		8(**7.9**)	

	No contact	96	8(8.3)	0.41^{NS}	5(5.2)	0.44^{NS}
Total	Close contact	176	33(18.7)	0.01*	15(8.5)	0.39^{NS}
	No contact	208	20(9.6)		13(6.2)	

Source: Own survey, 2010

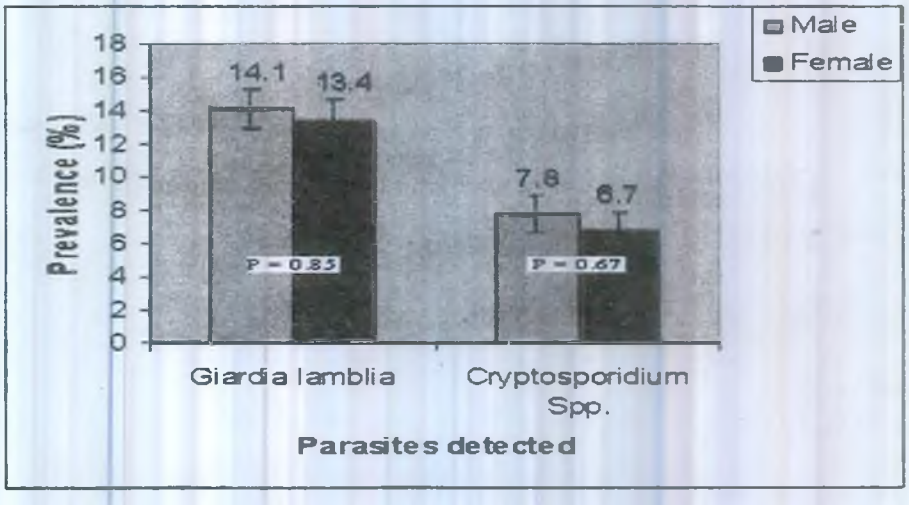
Key: * - Represent statistically significant difference (P<0.05)

NS - Represent statistically non-significant difference (P>0.05)

P-value – Compare prevalence with respect to contact with cattle between the study sites

3.4. Sex relatedprevalence of giardiasis and cryptosporidiosis among children

Out of the 384 study participants, 191 were males and 193 were females. The prevalence of giardiasis was 14.1% in maleand 13.4%in female children. Similarly, the prevalence of cryptosporidiosis was 7.8%and 6.7%in the male and female children, respectively. The calculated P-values were 0.85 for *Giardia* and 0.67 for *Cryptosporidium* infection. These indicates that the difference in the prevalence of giardiasis and cryptosporidiosis between males and females was statistically not significant (p>0.05) (Figure 6).

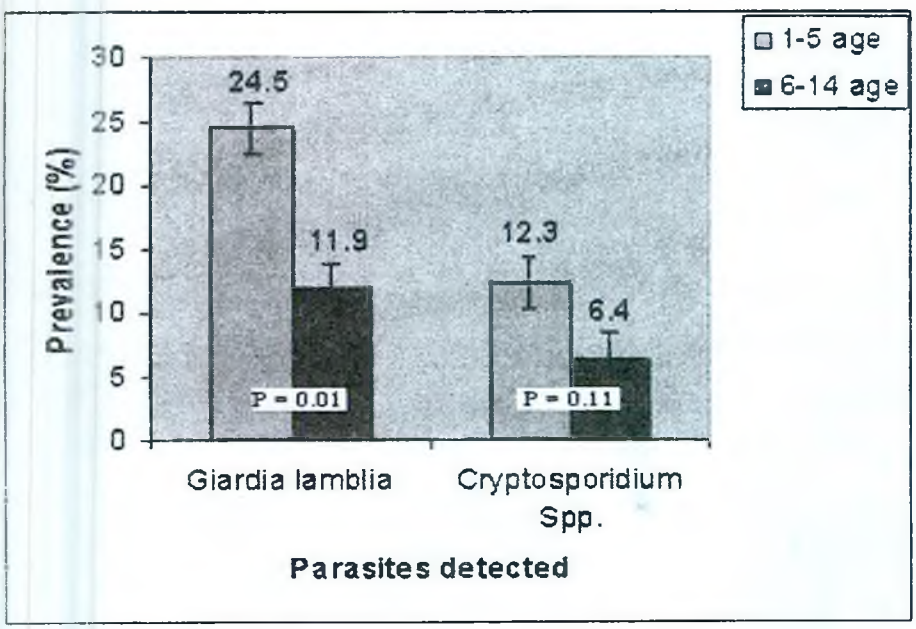


Source: Own survey, 2010

Figure 6. Sex related prevalence of giardiasis and cryptosporidiosis among children in North Shewa Zone, Oromia National Regional state, Ethiopia (November 2008 and April 2009)

3.5.Giardiasis and cryptosporidiosis among children at different age group

Regarding age groups, out of the 384 children, 57 were 1 to 5 years and 327 were 6 to 14 years age category. Among the 57 children in the 1 to 5 years age category, 14 (24.5%)were found positive for giardiasis and 7 (12.3%)for cryptosporidiosis. Of the 327 children of age between 6 to 14 years, 39 (11.9%)and 21 (6.4%) were found positive for giardiasis and cryptosporidiosis, respectively. The P-values obtained were 0.01 for *Giardia* and 0.11 for *Cryptosporidium* infections. Therefore, the difference in the prevalence of giardiasis was significant ($P<0.05$) among the age group but insignificant ($P>0.05$) for cryptosporidiosis (Figure 7).



Source: Own survey, 2010

Figure 7. Prevalence of giardiasis and cryptosporidiosis among children at different age group in North Shewa Zone, Oromia National Regional state, Ethiopia (November 2008 and April 2009)

3.6. Status of co-infection

Although single parasite infection had the highest prevalence, there was also double infection. Overall co-infection was detected in 10 (2.6%) of the study subjects. Among the double parasitic

infection, *G. lamblia* and *Cryptosporidium* comprised the highest proportion followed by *Giardia* / *Trichuris trichiura* (*T. Trichiura*) and *Hymenolopis nana* (*H. nana*)/ *Strongyloides stercoralis* (*S. stercoralis*) (Table 5).

Table 5. Co-infection prevalence of intestinal parasites in Girar Jarso and Dera District, North Shewa Zone, Oromia National Regional state, Ethiopia (November 2008 and April 2009)

Co-infection	Girar Jarso No. observed (%) n = 187	Dera No. observed (%) n = 197	Total No. observed (%) n = 384
Single infection	59 (31.5)	54 (27.4)	113 (29.4)
Double infections			
Giardia / Cryptosporidium	4 (2.1)	4 (2.0)	8 (2.1)
Giardia / T. trichiura	-	1 (0.5)	1 (0.2)
H. nana /S. stercoralis	-	1 (0.5)	1 (0.2)

Source: Own survey, 2010

3.7. Description on oocyst size

Oocysts of *Cryptosporidium* were found in the fecal samples of 30(7.8%) cattle (Table 2). Out of which oocysts of *Cryptosporidium* weremeasured 4.5–5.5µm from 12 samples and 5.5–7.4µm from 18 samples. The red stained oocysts of *Cryptosporidium* in modified Ziehl-Neelsen stained fecal preparation are shown in Figure 8.

Source: Own survey, 2010

Figure 8. Red stained oocysts of *Cryptosporidium* in modified Ziehl-Neelsen stained fecal preparation observed under microscope (magnification 1000x).

4. Discussion

The public health importance of intestinal parasites in most developing countries has been pronounced with the co-occurrence of malnutrition and HIV/AIDS. With HIV/AIDS pandemic, many intestinal parasites, previously considered sporadic infections, have become opportunistic parasites causing uncontrollable life threatening diarrhea (Lindo *et al.*, 1998a). As compared to developed countries, the prevalence of opportunistic intestinal parasites would be expected to be higher in developing countries among HIV infected populations. Therefore, zoonotic opportunistic parasites like *Cryptosporidium* species and others that take the advantage of immunosuppression to establish in humans have become an issue of serious health concern in the developing parts of the world.

It is now known that giardiasis and cryptosporidiosis are zoonotic infections which can be transmitted to humans from infected cattle, sheep, cats and dogs. Zoonotic pathogenic species of *Giardia* and *Cryptosporidium* found in cattle can infect humans through contact with cattle and drinking water contaminated with their dung (Olson *et al.*, 2004). Since *Giardia* and *Cryptosporidium* species have a wide range of hosts, their eradication is unlikely and efforts to prevent water contamination should focus on control of these pathogens.

The overall prevalence of 32.0% with one or more intestinal parasites found in this study was much lower than what was reported (82.8%) from residents of four villages in southwestern Ethiopia by Yeneneh (1994) and from that of Legesse and Erko (2004) (83.8%) from school-children around Lake Langano. However, the prevalence of human giardiasis in the present study (13.8%) was not much different from (9.3%) reported by Seyoum *et al.* (1981) from preschool children in Addis Ababa. On the other hand, the present finding was far lower than that reported from children in Lege Dini, where Ayalew *et al.* (2008) recorded 35.3% prevalence. The possible explanations for the discrepancy between the present and previous study finding might be the result of variation in sampling techniques used, the difference in the quality of drinking water source, and variation in the environmental condition of the different study localities rather than the overall improvement in the health service of the country over the past 5 to 15 years.

The level of cryptosporidiosis observed in this study, where 7.3% of fecal samples were positive, was lower than that of giardiasis (13.8%). The prevalence was in agreement with the situation in northwestern Ethiopia as reported by Mersha and Tiruneh (1992) where *Cryptosporidium* infections among children were 9%. The result was also comparable to the12.2% prevalence reported from children from Lege Dini, Dire Dawa by Ayalew *et al.* (2008).

Although none of the infected children had symptoms and their stool samples were all formed, the prevalence was higher than that reported earlier in symptomatic Ethiopian children with diarrhoea with rates of 5.6% (Assefa *et al.*, 1996) and 3.3% (Gebru and Girma, 2000). However, it was much lower than the 25.9% detected in AIDS patients with chronic diarrhoea from Addis Ababa Hospitals (Fisseha *et al.*, 1998). A possible reason for differences in prevalence figures is probably because immunodeficient state is a risk factor for *C. parvum* infection and urban settings have better hygienic condition than rural settings.

The zoonotic potential of giardiasis is under debate for many years. However, the high prevalence of infection in cattle and sheep together with reports that cattle and sheep can shed cysts of a genotype that infect humans (O'Handley *et al.*, 2000; Keulen *et al.*, 2002) warrants further attention. The 2.3% of *Giardia* infection in cattle in this study is more or less similar to the 3.7% reported by Degerli *et al.* (2005) in cows and calves from Turkey. Nevertheless, it was much lower than the 23% prevalence in healthy calves in Sweden (Bjorkman *et al.*, 2003).

C. parvum in livestock has been shown to be an important reservoir for cryptosporidiosis in humans, and contaminated water may be a key vehicle for the parasite (Olson *et al.*, 2004). It is therefore noteworthy that 7.8% of the cattle in the present study were oocyst shedding, which may account for environmental contamination of the study area. When compared to the few published sources overseas, the present finding is within the reported range ofprevalence (0 to 40%) in adults and unspecifiedage group (Anderson, 1987; Ralston *et al.*, 2003). However, it was lower than 17. 6% reported by Abebe *et al.* (2008) in dairy calves on selected dairy farms of central Ethiopia. The variation could be owing to the age differences since *Cryptosporidium* species infection is high in calves than adults (Graaf *et al.*, 1999).

The species of *Cryptosporidium* identified in cattle in this study could be both *C. parvum* and *C. andersoni* based on morphometric measurements of the oocysts. The morphological characters found in this study, 4.5–5.5µm and 5.5–7.4 µm fit the morphometric size of *C. parvum and C. andersoni*, respectively(Wade *et al.*, 2000). *C. parvum*, which is the major pathogenic species and the common cause of calf diarrhoea in different parts of the world, was found in a relatively low proportion (3.1%) as compared to *C. andersoni* (4.7%) in the cattle examined in this study. However, further molecular characterization is required to confirm the presumed genotypes and sub genotypes of parasites detected.

Giardia and *Cryptosporidium* speciesfrom cattle are potential zoonotic pathogens, and contact with animals, manure or contaminated water is believed to lead to infection in humans (Olson *et al.*, 2004). The prevalence of giardiasis (18.7%) and cryptosporidiosis (8.5%) among children who had close contact with cattle in this study was relatively higher than the 9.6% *Giardia* and 6.2% *Cryptosporidium* infection among children who had no contact with cattle. The possible reason for these differences between the two study groups is that, in addition to anthroponotic transmission, there might be zoonotic transmission from the infected cattle. The significant difference in the prevalence of giardiasis in this study might be associated with the existence of zoonotic genotype of *G. duodenalis* (Assemblage A) in cattle (Graczyk *et al.*, 2002).

The prevalence of human giardiasis and cryptosporidiosis was high in Girar Jarso than Dera district. The existence of relatively high prevalence of human giardiasis (17.6%) and cryptosporidiosis (8.0%) in Girar Jarso might be associated with the relatively high prevalence of giardiasis (3.1%) and cryptosporidiosis (12.0%) in cattle in this district. As contamination of the environment by these parasites is possible through the process of manure spread on farm land, the children may get infected with the zoonotic genotypes of *Giardia* and *Cryptosporidium* species (Minvielle *et al.*, 2008).

The possible explanation for the high prevalence of *Giardia* and *cryptosporidium* species infections among cattle in Girar Jarso district could be contamination of water supply with *Giardia* cysts and *Cryptosporidium* oocysts. It was observed that in Girar Jarso district there were several ponds and streams from which the cattle drank and these watering sources may

have been contaminated with the infective stages of the parasites. Thus, it is possible that the difference of prevalence in the cattle population may account for the difference of human giardiasis and cryptosporidiosis between Girar Jarso and Dera districts.

AlthoughSalas (1997) had reported *G. lamblia* infection tobe higher in males than in females amongchildren 0 to 10 years of age, no such sex-associated prevalence was observed in the present study. This lack of difference in the prevalence rates ofboth *G. lamblia* and *Cryptosporidium* species inchildren was in agreement with a study in Philippines where the gender of the children did not influence the rate of infection with these parasites (Natividad *et al.*, 2008). The possible reasons for the absence of sex-related difference in the prevalence among the children could be explained by the observation that all children irrespective of their sex participate equally in the domestic chores that included cattle herding and manure handling in the study communities. Besides, the hygienic practices exercised by children of both sexes were also essentially similar.

The significantly ($P<0.05$) high prevalence of giardiasis among children in the age groups 1-5 years in the study sites is in agreement with what was reported elsewhere (Isaac-Renton and Philion, 1992; Harter *et al.*, 1982). Similar report by CDC (2000) also showed age-specific incidence of giardiasis to be highest in children aged 1-4 years followed by children aged 5-14 years in Los Angeles. The possible justifications for the higher prevalence of infection occurring in the 1-5 years old age group could be due to the incremental development of immunity in adults to the protozoan parasites and better awareness in washing hands and maintaining other personal hygienic measures with increasing age.

Although significant difference was not observed, *Cryptosporidium* species infections were slightly higher among 1-5 year olds than among 6-14 year olds. This is in accordance with report of Casemore (1990), who showed peak incidence of cryptosporidiosis to be among children aged 1-5 years. Similarly, in Manitoba, Canada, *C. parvum* was isolated much more frequently from fecal specimens collected from children under five years of age (Mann *et al.*, 1986). However, this finding is dissimilar to the observation of Lindo *et al.* (1998b) in Jamaica, and others (Adegbola *et al.*, 1994; Tumwine *et al.*, 2003) from sub-Saharan African countries, including

Uganda and Gambia, and Assefa *et al.* (1996) from Ethiopia, where a difference in prevalence between age groups was observed.

The level of double infections with intestinal parasites determined in the present study (2.6%) was much lower than what was reported from southwest Ethiopia portraying a double infection of 35.8% among urban communities (Mengistu *et al.*, 2007). The possible difference in the socio-demographic condition of the study population and the involvement of all age group might explain the observed difference in double infection in the two study localities.

In this work some helminthes (*Ascaris lumbricoides, Hymenolopis nana, Enterobius vermicularis, Strongyloides stercoralis, Trichuris trichiura and* Hookworm) and *Entamoeba histolytica/dispar* infections were also identified among the children. Unlike reports from other localities, the prevalence of intestinal helminthes was much less than what was reported from 10-33 years age (McConnel and Armstrong, 1976; Seyoum *et al.*, 1981; Ali *et al.*, 1999) in Ethiopia. The low prevalence of helminthes in the present study localities might be associated with the de-worming program launched by enhanced outreach strategy (EOS).

The finding that fasciolosis was the most prevalent helminth parasite is in agreement with earlier reports that it is a widespread ruminant health problem causing significant economic loss to the livestock industry in Ethiopia (Asrat *et al.*, 2005).

5. Conclusions

- In the present study, 13.8% and 7.3% infection prevalence of *Giardia lamblia* and *Cryptosporidium* species, respectively has been found among children below 14 years of age. Similarly, 2.3% *Giardia lamblia* and 7.8% *Cryptosporidium* species infection prevalence have been found among cattle of different age groups.

- One of the remarkable findings of the present study was the higher prevalence of giardiasis and cryptosporidiosis among children who had close contact with cattle than those who had no contact with cattle. Although this work did not evaluate the genotype

and sub genotypes of the parasites, the result might suggest zoonotic transmission of giardiasis and cryptosporidiosis in humans in addition to the anthroponotic transmission.

- In this study, protozoan infections were in general higher in children especially in those under 5 years of age while there was reduction as age increased. On the contrary, sex related prevalence of giardiasis and cryptosporidiosis were not observed in this study, which implies that male and female children have equal chances of infection since they are equally engaged in cattle handling activities.

- These findings also indicated relatively higher prevalence of *Giardia lamblia* and *Cryptosporidium* species infections among humans and cattle in Girar Jarso than in Dera district.

6. Recommendations

In light of the high prevalence of giardiasis and cryptosporidiosis among children in relation to contact with cattle in the present study:

1. Institution of treatment, prevention and control measures of these infections amongst children in Girar Jarso and Dera districts will be advisable.
2. Health workers should mobilize the community to improve the health situation through:
    a) Health education in their local languages related to personal and environmental hygiene.
    b) Appropriate management of domestic animals and proper handling of their manure.
3. Research should be conducted in the general population to obtain a clear picture on the epidemiology of giardiasis and cryptosporidiosis in humans and domestic animals in these areas.
4. Genotypes and sub genotypes of *Giardia* and *Cryptosporidium* species should be characterized by molecular techniques to clarify the sources and transmission pattern of the two parasites.

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PART IV- GOVERNANCE AND RELATED

Public Interest Environmental Litigation (PIEL) by Civil Society Organizations (CSOs) in the FDRE: A Study on the Legal Framework/Infrastructure

Ayalew Abate (LLB, LL.M)

Abstract

Public interest environmental litigation has been undertaken by CSOs around the world in an innovative effort to protect and improve the quality of the human environment. In the Federal Democratic Republic of Ethiopia (FDRE), where environmental problems have been adversely affecting the lives of millions of people and have led to the loss of a great deal of biodiversity, no CSOs have been seen involved in public interest environmental litigation. The reasons for this might be numerous. But this study is meant to canvass the legal infrastructure to determine/find out law related problems to employ PIEL as environmental system tool and for CSOs participate in PIEL. And hence by this study the major legal frameworks (including the Constitution, the Civil Procedure Code (CPC), the Charities and Societies Proclamation (CSP) and other related environmental legislations with bearing to the issue such as the Environmental Impact Assessment Proclamation (EIAP) and Pollution Control Proclamation (PCP)) are examined so as to scrutinize its impact on public interest environmental litigation by CSOs. To evaluate Ethiopia's legal infrastructure and determine and/or find out its problems I use essential legal and constitutional preconditions that a certain national legal system should uphold for public interest environmental litigation by CSOs be fully in operation. And as studied the legal infrastructure is found out to be one significant factor to barricade public interest environmental litigation by CSOs in the environment arena. And the problems relate to specific legislations on the issues such as locus standi, access to justice, judicial review, freedom of association and operation, cost of litigation and/or court fee, res judicata, freedom of information and expression; and although public interest environmental litigation by CSOs has a lot to do with in the country's environment and is an innovative approach and fashion of the day the world has been relied upon, the Ethiopian legal system doesn't rejoin essential conditions in clear and comprehensive manner to accommodate the system in. To fix these problems are recommendations forwarded.

Key words (terminologies): Public Interest Environmental Litigation, Civil Society Organizations, Essential legal and constitutional Preconditions.

1. INTRODUCTION AND JUSTIFICATION

Public interest environmental litigation by CSOs has been employed as an innovative environmental approach in many legal systems of the world. It has been used as classic legal tool to bring about environmental law and policy reform, environmental law enforcement and compliance and thereby to help attain sustainable development. Further it is an important

instrument to enforce legality in governance and ensure executive accountability, to assist in the progressive and principled development of environmental law and policy, improve the quality of executive decision making and foster environmentalism and environmental consciousness within a state.

Although PIEL and the involvement of CSOs in PIEL has such national and world wide environmental importance/significance there is ,I can say, almost complete disregard and/or underutilization of such a multifaceted and multi- functional approach in the Federal Democratic Republic of Ethiopia. And to disregard and/or underutilize such a system tool (PIEL by CSOs) where there are many environmental deficiencies to heal, may amount with no doubt to let the problem goes from worse to grave.In fact, its complete disregard or underutilization couldn't be without factors. And this study is one of its natures to examine our legal infrastructure so that problems on the law will be investigated and whether the law sets conducive environment for employing such a system tool will be analyzed. And hence it scrutinizes some of the major legal frameworks to find out whether it has impact on PIEL by CSOs in the Federal Democratic Republic of Ethiopia (FDRE).

The study, as the first of its nature in the country, serves a number of purposes. First, it may encourage policy makers to formulate law in such a way as to recognize public interest environmental litigation by CSOs. Second, it shows that PIEL by CSOs is an important supplement in the environmental law enforcement and reform. Third, it would remind best the judiciary its core public interest function and problems linked therewith. Fourth, it would be an important document to show particular regimes of the law in which CSOs are to urge against the government for its reform. And last it will be an important input for further study on the area.
This study contains three basic sections. The first section deals with the conceptual frameworks and basic concepts. As can be observed from its content, it lays the foundation for the subsequent parts. It tries to highlight the concept and essence of civil society organizations and public interest environmental litigation. It defines basic terms such as civil society and public interest environmental litigation and describes the importance of public interest environmental litigation in environmental protections, law and policy reform, and environmental enforcement and compliance.

The second section deals with essential constitutional and legal preconditions/parameters to employ public interest environmental litigation as a system tool in defending the environment and environmental interest and for CSOs to play the lead/the upper hand role in the area. It marks out among boldly known constitutional and legal preconditions necessary for public interest environmental litigations by CSOs operate in the state.

In the third section, against the reverberation/resonance in the first two sections, the situation in the legal system of the Federal Democratic Republic of Ethiopia will be assessed. It in particular examines the constitutional law, the civil procedure law, the environmental legislations and the charities and societies proclamation (CSP) of the federal democratic republic of Ethiopia. The study concludes with a number of recommendations for change.

2. METHODOLODY

The research is not of an empirical nature, but involves a literature study of books, journal articles, legislations and case law. It envisage relevant international legal instruments, practices, standards and initiatives necessary for employing PIEL as environmental system tool and for CSOs involve to practice PIEL in certain legal system. And on the basis of these standards pertinent legal instruments in Ethiopia are examined. The study is primarily a critical analysis of the Federal Democratic Republic of Ethiopian constitution, civil procedure law, charity and society proclamation, the pollution control proclamation and the environmental impact assessment proclamation.

SECTION ONE

CONCEPTUAL FRAMEWORKS AND BASIC CONCEPTS

1.1 Introduction

In this section I deal with definitions and elaborate basic concepts. And hence what is CSO and what it is for? And what is PIEL and what environmental significance it has about is discussed so that it gives good insight for subsequent sections understanding.

1.2. Public Interest Environmental Litigation

For public interest environmental litigation is fluid a legal concept, it is arduous to come up with a comprehensive and universally applicable definition. Besides the concept varies according to the context it is used in. Sarat and Scheingold in general have admonished that, "providing a single, cross-culturally valid definition of the concept is impossible" as the emphasis and strategy used in might differ accordingly. Still, however, a working definition of the concept-public interest environmental litigation is believed to be pretty useful for the purpose of this paper. And indeed it is possible to derive its working definition from public interest law and litigation since public interest environmental litigation is at the crux of the two. Thus, with a view to facilitating a systemic inclusion of environment with in public interest litigation and law, definitions ranging from narrow to broad assertions have been provided for.

First and foremost, a narrow and rather very technical definition of public interest litigation has been provided for in Blacks Law Dictionary as:

public interest litigation is a legal action initiated in a court of law for the enforcement of public interest or general interest in which the public or class of the community have a pecuniary interest or some interest by which their legal rights or liabilities are affected.This definition seems to confine the scope of public interest litigation to a purely court action in pursuit of financial or other interests and liabilities. The emphasis placed in this definition seems to be more on the legal rights and/or other entitlements of the class or the group affected. However, public interest environmental litigation may not be limited to only seeking enforcement of existing legal rights. This is because, as we shall see subsequently, public interest litigation goes to the extent of creating legal and social norms that could be used to shape future legislative and administrative action.

Further, since public interest environmental litigation involves representing the environment and environmental rights it is inextricably related to the rights of future generations. In other words, the definition does not fully reflect the very purpose of public interest litigation as a strategy to achieve broader environmental goals than mere vindication of legal rights and interests of

individuals and groups. For instance, public environmental interest can mean more than group or individual interests. As Sax has identified, public interest environmental litigation has a role not only in the enforcement of individual and group environmental rights but also in environmental management, upholding and implementing system of democracy, governance, and law, and in promoting other social values. Environmental litigation can also enforce compliance with the law by the executive arms of government. It can further assist in the progressive and principled development of environmental law and policy as could be seen below. And hence, public interest environmental litigation could mean more than court action in pursuit of some interest affected.

A fairly broad definition of public interest litigation could be derived from Durban Symposium which defines rather public interest law. The definition negatively describes public interest law as: 'public interest law is not a specific field of law. It is not public law, not administrative law, not criminal law and not civil law'. It is "a way of working with the law and an attitude towards the law".

As Yoseph has rightly described/articulated, this definition provides a valuable lead towards a comprehensive and practice-oriented understanding of public interest law and litigation; and it makes the rather deliberate failure to confine the ambit of public interest law to a specific field inconsistent with the inherent flexibility and innovative characteristics of public interest litigation. He otherwise stated that any law affecting the public in any way could be the subject of public interest action either to be used as a tool or itself being a target. Law in this context could broadly be understood to include legislation, policy measures, executive orders or governmental action and inaction.

And, therefore, public interest environmental litigation should not be confined to bringing selected environmental cases to courts (by a certain lawyer or law associations); it should rather include other endeavors for environmental law and policy reform, environmental education, literacy training, environmental advocacy and legal services. And hence, from my beginning when I say that CSOs have no or have only limited involvement in public interest environmental litigation, it is with the additional assumption that public interest litigation is not an endeavor

reserved to lawyers and law associations only. It rather involves the concerted efforts of other professionals, who do not necessarily have expertise in the field of law as it has to be complemented by lobbying, research, advocacy environmental education and others. Stated concisely public interest litigation is "a demonstrated attempt at rights empowerment too". And this is also the other very reason for me to seek the involvement of CSOs in public interest environmental litigation in Ethiopia.

This broad formulation of public interest litigation shows that public interest litigation contains goals to achieve both in the process and in the outcome-public interest litigation is both a means to an end and an end in itself. In other words, the overarching notion of rights empowerment caters to the multifaceted importance of public interest litigation ranging from vindication of rights(interests) to bringing about participatory environmental management(decision making) which in effect could raise democratic values in a society. Therefore, it is only natural that its success is contingent upon the broad based participation of activists and professionals-CSOs of various sectors apart from lawyers.

Viewed from this perspective, the definition could serve as a basis for evaluating the wide ranging aspects of public interest litigation as well as the far-reaching effects it might have both as a process and as an end in itself. And hence it could also serve to delineate the scope of the legal framework against which the study has basically to examine. At the third rank is the definition provided by Abram Chayes. He, writing about public interest litigation in the American context says the following:

Public law litigation refers to the practice of lawyers [...] seeking to precipitate social change through court ordered decisions that reform legal rules, enforce existing laws, and articulate public norms.

By this definition he touches upon the purposive endeavor to bring about change both in the law, environment and society. He uses public interest environmental litigation as an important tool striving to lobby for legislative, administrative and judicial actions to rectify environmental problems. He emphatically asserts the role of public interest litigation to observing legality in

governance. The definition further indicates that public interest (environmental) litigation has social transformation role.In relation to this transformation role of public interest litigation, it is said that particularly in the United States where law and courts play a significant role in both public and private life, public interest litigation has often served as a vehicle for social reform for those with commitments to social justice and the rule of law. With the prevalence of the rule of law comes an increased respect and protection to the environment and human rights and constitutional and statutory guarantees are given effect too in a manner that makes them applicable to a wider section of the public at a time.

It is also said in this connection that even when public interest suits prevail in court, often their most lasting legacy is not the relief ordered by the court but the lawsuit's contribution to the ongoing community discourse about an important public issue. It is said that public interest litigation is a particularly interesting mobilizing tool because, nearly by definition it provides a nexus where a number of societal actors, institutions and systems are forced to interact in such a way that they engage the machinery and negotiate the aspirations of democracy for both political and legal ends. Therefore, as an integral part of the aspirations and ideals of any free society, environmental values can to a large extent be promoted through the use of public interest litigation as part of an overall effort to overhaul and strengthen the institutions of democracy.

In conclusion, there is every reason to emphasis the notion that public interest environmental litigation by CSOs is more than just an engagement with courts to win or lose a claim involving the environment. It is rather a mechanism that allows CSOs to become active participants in the political and legal system in such a way that their actions create wider effects that allow for learning and institutional and structural modification and improvement in the environment. And, therefore, Public interest environmental litigation is the practice of law and (beyond) to further environmental interests shared by the entire population or significant segments of it.

a. What is Civil Society?

The concept of civil society goes back many centuries in the Western thinking with its roots in Ancient Greece. It, as a concept, has a long history of different usages. It has been variously defined and conceptualized. The concept has evolved overtime period. In light of political

theorists like John Locke, society becomes civil when it strives to define and establish political authority; in which case it determines the rules as well as norms of political legitimacy. Hence, in this classical usage, civil society was equated with the state.

The modern idea of civil society originated with the enlightenment of 18th century when civil society began to be referred to as a domain parallel to but separate from the state where citizens associate according to their own interests and wishes. In similar fashion, Gordon White has discussed what the term at times means to most people in the world by saying "...the term 'civil society' is that of an intermediate associational realm between state and family populated by organizations which are separate from the state, enjoy autonomy in relation to the state and are formed voluntarily by members of the society to protect or advance their interests or values."

This modern idea of civil society emerged in the 18th century and has been influenced by political theorists from Thomas Paine to George Hegel, who developed the notion of civil society as a domain parallel to but separate from the states. The 19th century brought about renewed interest in civil society, as the trend towards democracy opened up space for civil society and the need to cover increasing gaps in social services created by structural adjustment and other reforms in developing countries. And accordingly civil society has been considered as a sphere of social interaction between the household (family), micro-community and the state, macro-community which is manifested in the norms of community cooperative, structures of voluntary association and networks of public communication and community. And the structure of association refers to the full range of informal and formal organization through which citizens pursue common interests.

In similar fashion the 1999 Code of Conduct accepted and adopted by several CSOs in Ethiopia has defined civil society as "formal and informal groups and associations that are not of the public (government) and business sectors" . It further is defined by proclamation No.621/2009 as the "association of persons organized for non-profit making and voluntary basis for the promotion of the rights and interests of its members and to undertake other similar lawful purposes as well as to coordinate with institutions of similar objectives"; in which case public interest environmental litigation can be one act among others.

"Civil society" is composed of autonomous associations which develop dense, diverse and pluralistic networks. As it develops, civil society will consist of a range of local groups, specialized organizations and linkages between them to amplify the corrective voices of civil society as a partner in governance and the market" . Further internationally, we can find much more definitions of civil society as been provided for by several authors. And among these methods of conceptualizing and defining civil society, the one which is the most detailed and chosen for this paper is the one provided for by London School of Economics as:

Civil society refers to the arena of uncoerced collective action around shared interests, purposes and values. In theory, its institutional forms are distinct from those of the state, family and market, though in practice, the boundaries between state, civil society, family and market are often complex, blurred and negotiated. Civil society commonly embraces a diversity of spaces, actors and institutional forms, varying in their degree of formality, autonomy and power. Civil societies are often populated by organizations such as registered charities, development non-governmental organizations, community groups, women's organizations, faith-based organizations, professional associations, trades unions, self-help groups, social movements, coalitions and advocacy group. One should be reminded that, environmental groups and environmental activists are also grouped under civil society organizations.

In summary, it is clear that there are a number of divergent and almost diametrically opposed viewpoints regarding its exact composition/ make up, purpose and origins. It is also clear that the term civil society remains to a large extent ambiguous and fluid as a concept, referring to a multiplicity of interests, groups and motivations equally and synonymously. Still, however, it should be clear that civil society organizations in this study refers to citizen groups whose concern include environmental protection, enforcing environmental rights, bringing environmental justice and in general relates either directly or indirectly to the environment; but which are distinct from the government or the state and profit based organizations. It includes traditional Ethiopian institutions such as Iddir, Mahiber and Iquib.

1.4. The Significance of Public Interest Environmental Litigation by CSOs

So far, I have dealt with issues such as what civil society and public interest environmental litigation is meant and tried to determine the scope of its application herein. And in this section an attempt is made to describe the significance of public interest environmental litigation in environmental law reform, environmental law enforcement and compliance. Besides, it serves to bring about awareness to the society.

1.4.1. Enforce legality in governance and ensure executive accountability

Environmental litigation by CSOs can enforce compliance with the law by the executive arm of government. The legislative arm of government proclaims its will and establishes fundamental standards and parameters for executive decision making and conduct, in the form of environmental legislation and legislative instruments. The executive is bound to implement the will of the legislature, by applying and enforcing these statutes and legislative instruments.

The judiciary, the third arm of the government, has a vital role to play in enforcing executive compliance with the law or, put another way, enforcing legality in governance and also makes the executive accountable to the people. It also can ensure adherence in environmental decision-making to the legislative object and mandate. Agency decision makers may stray from these for many reasons. Goldring observes that the professional socialization of agency staff and decision makers is more likely to stress values of loyalty to the agency and to the agency or the government of the day may also be at variance with the legislative object and mandate. In the world of real politic, it is often inconvenient or impolitic to enforce environmental legislations and uphold its objects, values and terms. Litigation by citizen groups can remedy or restrain breaches of environmental laws, expose agency capture and compel the regulator to perform its public duty of upholding and enforcing environmental law.

1.4.2 Helps for Shaping Environmental Law and Policy

Environmental litigation by CSOs and the judicial adjudication of it can expose weaknesses in the law and suggest law reform. Not all laws are "pure and thoroughly considered" Particular environmental disputes may reveal short comings. Courts can, through their reasons for decision, identify these shortcomings and call for law reform.

Environmental litigation can help to reform existing laws that hinder or prevent members of disadvantaged groups from participating fully and fairly in society. It can also enforce rights that existing laws guarantee, but which are not followed in practice. Litigation can also complement a broader political movement, or foster mobilization and encourage alliances that then produce political action. Furthermore, litigation can help change attitudes towards the law and create a culture in which government and private entities respect and enforce environmental values. Thus, in Ethiopia where environment laws are only nominal and the major environmental problems are from the legal lacunae and from the government, public interest litigation and the involvement of CSOs therein stand in a good position to alleviate the problem.

1.4.3 Improve the Quality of Executive Decision Making

Environmental legislation such as the EIA statute usually structures the discretionary decision making process by mandating the preparation, the obtaining and the consideration of some written form of environmental impact assessment such as environmental impact statement and the consideration of prescribed relevant matters such as the various impacts of the development on the environment and means to mitigate those impacts. Compliance with these procedural requirements for decision making not only ensure legality in governance and executive accountability, but also improves the quality of decision making. Environmental impact assessment and consideration of relevant matters are not ends in themselves. They are a means to achieve the desirable objectives of informing the decision-maker. By improving the quality of the decision by ensuring environmental impact assessment occurs in the circumstances and to a standard required by law, public interest environmental litigation by CSOs ensure that these objectives are achieved.

By requiring that projects aren't approved or carried out until all relevant environmental matters have been properly, genuinely and realistically considered, challenges to permits and other kinds of approvals, as well as regulations, can also improve the quality of executive decision making. Environmental litigation can promote intelligent planning and assessment of large, long-range issues. The courts can ensure that projects are not approved or carried out until all relevant environmental matters have been properly, genuinely and realistically considered. The duty of a decision-maker to consider relevant matters requires more than simple advertising. There has to be an understanding of the relevant matters and their significance to the decision required to be made, as well as a process of evaluation sufficient to warrant the description of the matters being taken into consideration. Courts can restrain projects that have not been adequately planned and assessed by insisting they not go forward unless and until those who wish to promote them can demonstrate that they have considered, and adequately resolved, all matters affecting the environment. Courts can help promote the sort of continuous review and re-evaluation that any large-scale program needs. This all happens through public interest environmental litigation by CSOs.

1.4.4. Fosters Environmentalism and Environmental Consciousness in Society

Environmental litigation can also have a broader beneficial effect, developing environmentalism and environmental consciousness. The serious threats to outstanding natural environments by activities and litigation against can heightened public awareness and raised the profile of the disputes and the importance of the issues at stake. It can encourage society to debate public values and sense of place. Through environmental litigation courts can explicate and give force to environmental values. Adjudication of environmental litigation is "not to maximize the ends of private parties, nor simply to secure peace, but to explicate and give force to the values embodied in authoritative texts such as the constitution and statutes; to interpret those values and to bring reality into accord with them".

1.4.5. Lobbying for Legislative and Administrative Actions

Environmental litigation and movement by CSOs can play a role in the passage and implementation of effective environmental laws. They can obtain judicial review when the environmental authority takes actions that are inconsistent with the law or facts.

1.4.6. Attain Environmental Justice

Public interest environmental litigation by CSOs can help promote environmental justice. As can be seen from the next chapter relating to access to justice, CSOs can also enforce environmental rights of the disadvantaged so that environmental justice will be ensured.

1.4.7. Others

Public interest environmental litigation has also other functions too. It serves as a means of securing environmental and natural resource rights. It explicates and gives force to the values embodied in authoritative texts such as the constitution and statutes; to interpret those values and to bring reality into accord with them. It can ensure rational discourse on environmental issues and disputes etc. In nutshell it is against these backgrounds of the critical importance of environmental litigation in the environmental law reform, enforcement and compliance that one should appreciate the whole essence and significance of public interest environmental litigation by CSOs.

1.4.8. Conclusion

civil society organizations are distinct citizen groups from either the government/ the state or from profit based organizations and whose concern include ,among others, environmental protection, enforcing environmental rights, bringing environmental justice and in general relates either directly or indirectly to the environment. Public interest environmental litigation is the practice of law and (beyond) to further (protect) environmental interests shared by the entire population or significant segments of it. And the involvement of CSOs in public interest environmental litigation (PIEL by CSOs) can bring into effect environmental law and policy reform, environmental law enforcement and compliance and thereby to help attain sustainable

development. It is also an important instrument to enforce legality in governance and ensure executive accountability, to assist in the progressive and principled development of environmental law and policy, improve the quality of executive decision making and foster environmentalism and environmental consciousness within a state. And thus a study to examine the legal infrastructure and determine whether it creates problems affecting engagement and use of PIEL by CSOs and has a lot to do with identifying law related problems of our/this fragile environment.

SECTION TWO

BASIC LEGAL CONDITIONS FOR PIEL BY CSOs_ GENERAL

2.1. Introduction

PIEL and the involvement of CSOs therein are instrumental to environmental protection, environmental law and policy reform, environmental enforcement and compliance and thereby ensure implementation of the right to a clean and healthy environment which is enshrined in the modern constitutions of many legal systems in the world. And for civil society organizations operate in public interest environmental litigation and PIEL achieve the objectives listed, herein above, are certain constitutional, procedural, environmental law requirements widely recognized in most legal systems of the world and against which ground works the Ethiopian legal system is examined in the next chapter. And, among others, the major ones include: international principles protecting civil society such as the right to entry (freedom of association), the right to operate free from state interference, the right to free expression, the right to communication and operation, the right to seek and secure resources and state duty to protect civil society in which all relates to PIEL by CSOs. And other important requirements include the right of access to justice, locus standi, environmental standards and grievance redress mechanisms and the existence of independent judiciary. Thus, in the subsequent discussion each will be treated.

2.2. From Some Basic International Principles Protecting Civil Society

CSOs as described above are quite essential institutions especially for promoting and reflecting public interests such as environment. Their involvement in environmental protection endeavor has marvelous and enormous advantages. For CSOs fully operate in a certain public interest activity, such as the environment, need to have legal footing, ground and/or protection both internationally and in the domestic legal system. And among others, the basics of essential international principles that safeguards CSOs are recognized in various international instruments, practices, standards and initiatives. The Universal Declaration of Human Rights, the International Convention on Civil and Political Rights and the International Economic, Social and Cultural Rights all evince or express the right to form independent associations, and the rights of citizens to organize around certain interests, the right to freedom of information and expression, and operation free from unwarranted state interference.

CSOs requires at minimum constitutional rights of freedom of association and freedom of expression. While the recognition of right to healthy and safe environment as individual human rights is obviously a vital aspect of a democratic society, so too is the opportunity to join with others to advance a common cause, for effective functioning of civil society depends on recognition of group or collective rights. To function effectively, they also require a degree of access to government-held information. Access to information is the cornerstone of effective public participation at all levels of environmental decision making. For environmental enforcement through public interest litigation, both the public and CSOs need access to specific information concerning discharges and emissions, such as the discharge monitoring reports or the toxics release information required with the pollutant register systems. The legal framework of freedom of information laws, the scope of any relevant exceptions, the appeal and enforcement process and the rights of standing to utilize these provisions are therefore, all significant. Therefore, any legal barriers in the domestic legal system, to entry in to associations, operational activity, freedom of information and expression, to public policy engagement, or barriers to resource that badly affect CSOs affects them to function in public interest environmental litigation and should be avoided. And rather the domestic legal frameworks need to afford these essential elements by its specific legislations

2.3. Right of Access to Justice

Access to justice is a very broad concept. It as a complex concept has somehow broad speculation in different contexts it is used. It may for example mean to guarantee every person has access to an independent and impartial court and the opportunity to receive a fair and just trial in cases where individual's right to a clean and healthy environment or environmental rights of groups is at stake. It may also mean the availability of appropriate means of environmental redress or remedies to aggrieved individuals or groups. It also otherwise means the right to be heard and to appeal the decisions as it is guaranteed by the Human Rights Conventions. It could further connote that appropriate means of ensuring governmental accountability are put in place.

Access to environmental justice can also mean two things. In a broad sense it means ensuring that everyone has an equal right to a clean and healthy environment regardless of his or her means, where they live or their background. Otherwise, it environmental justice also means being able to secure access to the law against environmental problem. And therefore, so much so access to justice is critically important factor in public interest environmental litigation by CSOs, the national legal system in effect need to efficiently regulate it. And important legal barriers to the right of access to justice such as the question of standing, scope of judicial review, inability to obtain injunctive relief and cost of litigation should be specifically addressed in the legal system. Otherwise public interest environmental litigation by CSOs will remain only remote possibility in Ethiopia.

2.4. Locus Standi (Right to standing)

Central to the issue of how civil society organizations can use public interest environmental litigation in the environmental protection, law enforcement and compliance is the question of their group status. Unless the law recognizes group standing (i.e. the right to litigate collectively or on behalf of group members), much of civil society organizations will be excluded from using the law. Without group standing, it will be impossible for civil society to mobilize the laws as a resource for holding the government accountable and polluters liable. And the right to standing of CSOs in bringing public interest litigation is vital. A lone individual may be what Marc

Galanter calls a 'one shot' in challenging the government in isolated court case. CSOs on the other hand, have better prospects of facing government on more equal terms as 'a repeat player'.

The notion of standing is closely associated with access to justice as described above. As the basic threshold in the initiation of legal proceedings, locus standi is an important factor in any discourse on the rights of access to justice. It could be termed as the gateway of access to justice. Standing can also be defined as a party's right to make a legal claim or seek judicial enforcement of a duty or right. This duty or right may be either government duty to ensure clean and healthy environment to its citizen or the right of citizens to live in a clean and healthy environment which enforcement in the court of law may, among other, things depend on whether there is standing granted to the subjects. For instance whether judicial review is possible for government inaction or abuse is the issue of standing as can be seen from the next chapter.

A very broad definition of the term locus standi can also denote the existence of a right on an individual or group of individuals such as CSOs to have a court enter upon the adjudication of an issue brought before that court by proceedings instigated by the individual or group. The right once found exists apart from the factual or legal merits of the issue before the court or the jurisdiction of the court to adjudicate upon the issue. Standing to sue is not dependent on the success or merit of the case. It is rather a condition precedent to a determination on the merits. It follows therefore that if the plaintiff in our case CSO has no locus standi or standing to sue, it isn't necessary to consider whether there is a genuine case on the merits; his/her case must be struck out as being incompetent. And hence standing could directly affect CSOs public interest environmental litigation.

For CSO to engage in public interest environmental litigation, therefore, are traditional and liberal approaches to standing. Traditional approach to standing requires parties to show whether they have real and personal interest affected to bring the case before courts in which public interest environmental litigation by CSOs may be affected. Standing is the first very requirement for CSOs to approach courts against any environmental grievances. It is the first gateway to the right of access to justice. The traditional rule of standing in many legal systems require the existence of a real interest affected or threatened for a petitioner to approach a court of law and

seek remedies. Historically, only proprietary or economic interests were the bases of a 'special interest' sufficient to warrant standing, perhaps best outlined in the often quoted extract from the decision of Buckley J. in Boyce Paddington Borough Council:

"A plaintiff can sue without joining the attorney General in two cases: first, where the interference with the public right is such that some private rights of his is at same time interfered with.....and, secondly, where no private right is interfered with, but the plaintiff, in respect of his public right, suffers special damage peculiar to himself from interference with the public right....." Persons with no private grievances are often left without remedy, for the law largely protects private interests.A broader and more liberal approach to standing on the other hand results in enhancing access to justice. This is an important component in building a legal and social order that is applicable to the powerful as well as the weak. Such an equitable order helps to build a civil society that provides the essential element for participatory democracy.

Relaxed rules of standing imply a deviation from the traditional rules of locus standi, which requires parties to have some real interest in the proceedings. Thus, citizen groups who are interested to bring cases to a court of law on matters affecting the public interest are allowed standing even though they don't have a real and personal interest in the matters. Therefore, whether the Ethiopian legal system adopts the liberal approach to standing or traditional approach, has a tremendous effect on whether public interest environmental litigation can be readily undertaken by CSOs.

2.5. Environmental Standards and Grievance Redress Mechanisms

Another most important prerequisite which absence totally impairs the role of environmental litigation by CSOs is whether the environmental legislations set clear environmental standards against which the behavior of potential violator can be compared. The provision of citizen groups with specific emission levels, deadlines for compliance, or permits would make public interest environmental litigation by CSOs easier to identify and prove the violations. And as such is the most important prerequisite environmental legislations need to contain. Besides grievance redress mechanisms shall be clearly stipulated.

2.6. Independent Judiciary

Furthermore, as courts are central to public interest environmental litigation, they need to be independent in functioning. The judiciary, as the third arms of the government, has a vital role to play in enforcing executive compliance with the law or, put another way, enforcing legality in governance and also makes the executive accountable to the people. It also can ensure adherence in environmental decision-making to the legislative object and mandate. Agency decision makers may stray from these for many reasons. Goldring observes that the professional socialization of agency staff and decision makers is more likely to stress values of loyalty to the agency and to the agency or the government of the day may also be at variance with the legislative object and mandate.

And, therefore, in an endeavor of activists to engage in public interest litigation and promote the ideals of environmental rights, judiciaries need to respond adequately to encourage the participation of public interest environmental litigation. This is because, beyond formal legal rules and protections, public interest litigation reinforces an essential constitutive and sustaining component of a democratic society namely, accountability through dynamic linkages between the state and its citizens, irrespective of initial underlying conditions that may be perceived as possible impediments to achieve such goals. This is largely because public interest litigation provides the judiciary as well as activists with the leeway which enable them to loosen or to set aside strict procedural requirements of a traditional litigation process. And for its functioning, need to be fully independent.

2.7. Freedom of Information and the Right to Know

Public access to government information or the right to know is a sine quo non to enable the citizen and CSOs to exercise their role in public interest environmental litigation meaningfully. The right to be informed also helps check the abuse of executive power. It has especial importance in environmental matters. For example, government decisions to site dams may displace thousands of people and deprive of their livelihood. Similarly, information regarding proposed location of nuclear power stations and hazardous industries directly affects the life and

health of neighboring communities. Surely the government is obligated to fully disclose the proposed hazardous factories and to consult the local communities before reaching a decision. From a civil society perspective, Principle 10 of the Rio Declaration is probably the most important that critically stipulated: "Environmental issues are best handled with the participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided." And, therefore, freedom of information and right to know is another important condition precedent essential for public interest environmental litigation by CSOs.

2.8. Remedial Flexibility

The need for remedial flexibility arises from the understanding of the inadequacy of existing remedies intended to deal with situations where private rights are pursued. As far as remedies are concerned, in most cases of law suits between private parties the enforcement of the applicable legal right is achieved through the attainment and execution of monetary judgment quantifying the established harm. A flexible remedy may involve the courts' ongoing follow up and supervision of the enforcement and sustainability of the relief it gave in a public interest litigation action.

To conclude for PIEL by CSOs be operational the domestic law of a state, such as Ethiopia in our case, should endorse the above necessary specific legal speculations.

SECTION THREE
ASSESSMENT OF THE ETHIOPIAN SITUATION

3.1. Introduction

In the preceding two sections, I have discussed the basic legal requirements for proper employment of public interest environmental litigation and explored the essential legal and constitutional preconditions necessary to its use by CSOs. In this section, some of the major components of Ethiopian legal frameworks will be examined against the backdrop of the essential legal and constitutional preconditions that I explored in section two.

3.2. The Legal Frameworks for PIEL by CSOs

A legal framework is a springboard for CSOs to operate in public interest environmental litigation and use public interest environmental litigation as a system tool in defending the environment and enforcing environmental rights. And among others, the FDRE constitution, the civil procedural law, CSP and environmental legislations such as Pollution Control Proclamation (PCP), the Environmental Impact Assessment Proclamation (EIAP) are relevant legal frameworks selected to be examined against those essential legal preconditions.

As has been indicated in the previous chapters, this paper has about two major issues; examining the legal frameworks (the constitution, civil procedure law, CSP and environmental legislations) against essential conditions for CSO operation in public interest environmental litigation and to check whether the existing legal infrastructure permits public interest environmental litigation to be used as instrument in environmental protection, law enforcement and compliance. Thus, the scrutiny of the legal framework is couched in such a way that facilitates the evaluation of its conduciveness, comprehensiveness and clarity.

3.2.1. The Constitution of Federal Democratic Republic of Ethiopia, 1995

3.2.1.1 The Right of Access to Justice

The Constitution has a bill of rights chapter which incorporates readily justifiable rights including civil and political rights, social and economic rights and environmental rights and the

right to development. The right of access to justice is part of this catalog of rights contained in the bill of rights chapter. And the constitution, in this chapter, has granted 'everyone with a justiciable claim' the right of access to justice -to approach judicial bodies and to receive remedy.

The right of access to justice has been further recognized as a fundamental right in the major international human right instruments that Ethiopia has ratified. Specific instruments that guarantee these rights include: the Charter of the United Nations Universal Declaration of Human Rights (UNHR), the International Covenant on Civil and Political Rights (ICCPR), and the International Covenant on Economic, Social and Cultural Rights (CESCR). These international instruments ratified by Ethiopia are integral part of the law of the land.

The Constitution under Art.37 seems to expressly guarantee the right of access to justice for all persons which includes CSOs. In fact, the article seems to be referring to individual parties pursuing their own interests when it says 'everyone'. Nevertheless, it could also be interpreted broadly to include juristic persons (CSOs) who seek to litigate in pursuit of group or public interests. This is because in the specific provision there seems to be no condition attached to interest specific to the person approaching the court.

This kind of construction, indeed, has found strong support from sub article-two of the same provision. And this sub article seems to ensure that the door is wide open for CSOs to satisfy its needs of access to justice. What this means is that the constitution is in favor of broad, social-issue-oriented employment of the law and its institutions rather than a narrow legalistic approach that makes the law distant from the everyday concern of the society and difficult to access. In this way the constitution would work for making the law and the court truly people's law and people's court rather than merely lawyers' law and lawyers' court. Beyond the traditional issues the law and the courts would interest themselves and actively engage in broad social issues, such as entertaining public interest cases and ensuring the right to a clean and healthy environment.

Nonetheless, although the Constitutional law granted everyone, including CSOs, with the right of access to justice, practically speaking there has been only a case (in the public interest environmental litigation by CSO) approaching courts in the environmental public interest. And

according to the expression of some organs, the legal system of accessing justice falls short of ideal, and the country's legal trend is making the current outlook on access to justice quit bleak.

3.2.1.2. Locus standi (the Right to Standing)

The notion of locus standi is, above all, an important determining factor for public interest environmental litigation by CSOs. It is an overriding factor to the use of public interest environmental litigation by CSOs in the environmental proceeding. In as much as environmental litigation is all about defending the environment, representing the right of future generation, or group or collective rights and to play a role in the environmental law enforcement, locus standi is primary legal factor. This is so because, locus standi determines the competence of a plaintiff to assert the matter of their complaint before competent body-administrative or judicial. Since an individual or any other interested party such as CSOs lacking locus standi is an incompetent plaintiff, it follows that, in public law, government can exceed, inaction or abuse its powers with impunity provided no such "qualified" litigant seeks the intervention of the court. Furthermore, the complaints lodged against polluters would simply be quashed by the courts' order with out the need to see the substance of the cases. And, to take a case to court given no right to standing amounts to call for someone with wrong number. It also appears directly in conflict with the constitutional requirement of legality.

And the fact that a country's legal system has adopted either a modern (relaxed) or traditional rule of standing also has direct impact on the issue of public interest environmental litigation by CSOs. Given the legal system has liberal approach CSOs would possibly engage in public interest environmental litigation and thereby play a role in the enforcement of environmental laws and policies. And in cognizance of these important facts about what standing is meant to CSOs in public interest environmental litigation, let see the constitutional stand whether CSOs have been provided with the right of standing to approach judicial bodies for remedy in cases of both state and private actions and claim for the constitutionality of environmental laws.

The Constitution in its bill of rights chapter has included the right to standing before competent judicial body, as part of the fundamental rights. Art. 37(1) entitles 'everyone' with justifiable claim to approach judicial bodies and get remedies. This article seems to be referring to

individual parties pursuing their own interests when it says 'everyone' as I described above. But still, it could also be construed broadly to include juristic persons (CSO) so long as there is no condition attached to interest specific to the person approaching the court.

This liberal approach to locus standi is further reflected in sub article (2) (b) of Art.37 and article 84(2) of the same constitution. The first provision seems to ease the strict requirement of Art. 38 of the civil procedure code, which requires the consent of all interested persons for a representative to institute class action. Indeed, environmental claims connote beyond group interest it represents diffused or collective rights, rights of future generations, biodiversity and ecological balance etc.

The latter lends further credence to the argument in favor of broader locus standi particularly in cases concerning the constitutional validity of laws which includes administrative or environmental regulations and directives. The sub article outlining the powers and functions of the Council of Constitutional Inquiry provides: Where any federal or state law is contested as being unconstitutional and such a dispute is submitted to it by any court or interested party(emphasis added), the Council shall consider and submit it to the House of federation for a final decision.

One can, therefore, argue that the law in this context is not confined to the legislative acts of a federal or state legislature and can also include administrative or environmental regulations and directives of state organs as provided above. Thus CSOs may assert that claims against the constitutionality of environmental or administrative laws (see section 2.2 below).

Indeed the term 'interested party' could be understood both in its narrow and broad sense. In the narrow sense it could be limited to refer to a person who is actually a party to litigation. This could be the case where an issue of constitutional dispute arises during litigation in court. The broad understanding implies any person or entity who seeks to challenge the constitutional validity of a law irrespective of him/her having a personal interest affected by the challenged legislation. This broader understanding is indeed adopted by the Council of constitutional inquiry. The Rules of Procedure of the Council which have been approved by the House of

Federation as per Articles 84(4) of the Constitution added the word 'body' to the Constitution's interested party. Thus, any 'interested party or body' can challenge the constitutional validity of laws before the Council and the House of Federation. It is submitted that an 'interested party or body may mean any person or body directly affected by the legislation or an interest group, environmental association, CSOs, a federal or regional agency etc.

In sum, there are sufficient grounds to assume that the Constitution envisages a broad locus standi regime that is conducive to public interest groups, CSOs to defend the environment and play a role in the enforcement of environmental rights. It seems for these groups such as CSOs and public spirited individuals to engage courts and other organs with judicial competence by taking up cases of significance to the development of public interest environmental litigation in Ethiopia.

3.2.1.2.1 Standing to Government Authority's Inaction or Abuse_ Judicial Review

In Ethiopia, environmental authorities are vested with enormous powers. Among them includes: formulating policies, laws, and strategies. Further, they are vested with the power to ensure the implementation of environmental laws in the country. While discharging these huge responsibilities, they may delay; miss deadlines, convert mandatory standards to discretionary ones, create loopholes, water down strict statutes in the regulatory process, or simply refuse to use their enforcement powers when faced with blatant violations. In such cases, if environmental problems cause legal injury to a person or a specific group of persons, a private action for redress would lie under the traditional doctrine of standing. At times, however, the injury arising may be diffused, for example, where environmental authorities inaction threatens to harm the environment. In such cases the traditional doctrine precludes relief and renders the environmental authority's inaction or abuse immune from judicial scrutiny.

Thus, whether CSOs have standing to review government environmental authority's inaction or abuse in such situations is an issue to be seen in this section. The concept of judicial review in our context is somehow blurred an area where many of the legal scholars are still debating. Some says that so long as all judicial power is vested in courts, the judiciary is vested with power to

review legislative and administrative acts. Where as others argue that so long as the power to interpret the constitution is given for the federation council and the issue of constitutionality is central to judicial review, still courts in Ethiopia don't have the power to judicial review. Though there are such constructions I personally support the first, yet what constitutes constitutional and not, isn't clear.

The Environmental pollution control proclamation is the first and prototype to provide for the power to review administrative actions in clear manner. It states as:

Where the authority or regional environmental agency fail to give a decision within thirty days or when the person who has lodged the complaint is dissatisfied with decision, he may institute a court case within sixty days from the date the decision was given or the deadline for decision has elapsed.The article as such has granted public interest groups the right of standing against the action/inaction of the authority. In case where the public authorities do not act at all, or not properly, CSOs as public interest groups have the right to take legal action. This includes when damage is done to the environment. Thus, CSOs have the right to standing to defend the environment with out the need to show vested interest in the case. They could also claim as joinder plaintiffs in the case.

CSOs, as dissatisfied claimants, are not only granted the right to challenge the decision of the public authorities not to recover damage, but they may also challenge any relevant decision, including the one regarding the selection of the most appropriate restoration alternative if they can make a plausible case that the selected alternative is inappropriate. The latter might be the case if the selected restoration alternative is inadequate to fully restore at a reasonable price the damaged natural resources, or if a full restoration would take too long.

In fact, CSOs must respect the waiting period of thirty days during which the environmental authorities have the exclusive right to take action and decide on the necessity of restoration measures and the extent of measures. In cases of urgent situations, however, there is a legal ground to grant such CSO or public spirited individuals the right to directly ask a court for an injunction in order to prevent significant damage or avoid further damage to the environment.

3.2.1.2.2 Standing to Challenge the Constitutionality of Environmental Laws

In Ethiopia, the power of interpreting the Constitution is entrusted to the House of Federation. Article 62 (2) of the FDRE Constitution authorizes the House of Federation to establish the Council of Constitution Inquiry. Besides, as per Article 83 of the same, all constitutional disputes have to be submitted to the House by the Council of Constitutional Inquiry. That is, the council of constitutional inquiry after making the necessary investigation of the case is required to submit its recommendation to the House of Federation for a final decision. Still, however the remedy mayn't be satisfactory.

Since issues of constitutionality are to be finally decided only by the House of Federation upon the recommendation of the council, any constitutional dispute relating to administrative acts can only be decided by the House of Federation, and consequently the litigant is not expected to exhaust any administrative and regular court remedy in such cases. Where substantial constitutional issue is raised over an action of administrative authorities, the case must be taken to the House of Federation. Since administrative officials and regular courts are not empowered to decide upon constitutional disputes, there is no remedy available before administrative officials and regular courts.

Thus, a person challenging the constitutionality of an administrative action is not required to proceed to administrative officials and regular courts. That is, he should be excused from exhausting administrative and regular court remedies, and he can directly take his case to the House of Federation if he proves that he is an interested party. At this juncture, it is important to raise the question of what interested party stands for. In this respect, the phrase "interested party" may have different meanings in different contexts. In case of issues of constitutionality of administrative acts in relation to the environment, however, it is important to read Articles 83 and 84 in tandem with Articles 44(1) and 92 (4) of the constitution, and Art. 11 of the Environmental pollution control proclamation to address the question to which an interested party stands for. When we read the above legal provisions in conjunction, they imply that every one has the right to live in a clean and healthy environment, and the duty to protect the environment. So, everyone is presumed to have vested interest when damage is done to the

environment due to unconstitutional acts of administrative organs, so that any alert citizen or public interest group challenging the constitutionality of environmental authority's action in relation to the environment, can directly take his case to the House of Federation without the need to show vested interest on the case. Still, however, the issue of constitutionality and interpreting the constitution isn't pretty clear in Ethiopia.

3.2.1.2.3 Standing before International Court and Tribunals

In the previous sections I have discussed whether CSOs have the right to standing in the environmental proceeding at domestic level. And equally important is the circumstance in which CSO could invoke the right to standing in the protection and enforcement of environmental statutes at international level. And in this section whether CSO have the right to standing to claim for remedies before international court and tribunal is an issue discussed.

The issue of environmental standing to international remedies would take one to the principle of permanent sovereignty of the State to freely dispose of natural resources within its territory. Nevertheless, whether the state still has the right to freely dispose its natural resources against the well-being of its people and the environment remains consequential issue. It should be remarked that standing before international organs after the exhaustion of local remedies is the reflection of the corollary duties of the principle of permanent sovereignty which entail among other things, proper management of natural wealth and resources, and due care for the environment . Further the right to live in clean and safe environment is the right recognized in different international human right and environmental instruments on the basis of which remedies are to be claimed at regional or international level. And therefore, in as much as local remedies are exhausted and when the State fails to provide with possible remedies, it seems proper and possible for CSOs to claim before international tribunal or court for remedies though the formal opportunity for CSOs to play an enforcement role at international level is extremely limited.

And hence in the eyes of the researcher, the Ogoni case in Nigeria has a paramount importance in that it has clearly revealed the existence of regional and international remedies at the time when national remedies are exhausted and/or fail to address the problem adequately and

promptly. The Ogoni case has been lodged by two NGOs; Social and Economic Rights Action Centers (SEAC) in Nigeria and the Center for Economic and Social Rights (CESR) in New York, against the government in Nigeria. The complaint alleged that the military government of Nigeria had been directly involved in irresponsible oil development practices in the Ogoni region. The Nigerian National Petroleum Company (NNPC), the State oil company, formed a joint venture with Shell Petroleum Development Corporation (SPDC) whose activities in the Ogoni region allegedly caused environmental degradation and health problems among the Ogoni people, resulting from the contamination of the environment. In particular the complaint denounced the widespread contamination of the soil, water and air; the destruction of homes; the burning of crops and killing of farm animals; and the climate of terror the Ogoni communities had been suffering of, in violation of their rights to health, healthy environment, housing and food. In terms of African Charter, these allegations included violations of Article 2 (non-discriminatory enjoyment of rights), 4 (right to life), 14 (right to property), and 16 (right to health), 18 (family rights), 21 (right of people to freely dispose of their wealth and natural resources) and 24 (right of peoples to a satisfactory environment). In addition, the complaints argued that the Nigerian government neither monitored the operations of the oil companies nor required safety measures.

And the decision of African Commission in the Ogoni case represents a giant stride towards the manifestation and realization of the African human rights charter. Its decision has ensured the effective enjoyment of these rights. And the Nigerian government's failure to protect the Ogoni people from the activities of oil companies operating in the Niger Delta is contrary to international human rights law. Its findings show that these rights of the people of Ogoni are not incapable of judicial enforcement. Following the same approach, CSOs, alert citizens in Ethiopia can invoke the right to standing to initiate legal action in relation to the right to live in a clean and healthy environment before Regional and International Organizations.

3.2.2 Law Regulating Civil Society Organizations in Ethiopia-CSOs Law

CSOs laws legislated is required to uphold standards set by international instruments and the constitution and best assure the partnership that ought to exist between civil society and

government. And hence, CSOs could freely and fully engage in public interest environmental litigation.

3.2.2.1 The Constitution of Federal Democratic Republic of Ethiopia, 1995

The constitution of the federal democratic republic of Ethiopia is fundamental legal document in any discussion relating to fundamental rights such as the right to association, assembly and expression. It is the fountain from which government and non governmental organizations trace the source of power. In the FDRE one third of the constitutional provisions are devoted to human rights, including those of individuals and groups. And the constitution, among other things, guarantees freedom of expression, association, and assembly, which are crucial for the operation of active CSOs. Specifically, Article 31 of the FDRE Constitution provides that "[E]very person has the right to freedom of association for any cause or purpose. And, therefore, it guarantees freedom of association for "every person" regardless of nationality, race, color, etc. In addition, it guarantees freedom of association irrespective of the cause or purpose for which the association is established.

And the only limitations put forward by the constitution is if the organization or association is formed in violation of appropriate laws, or to illegally subvert the constitutional order, or one which promotes such activities. The first ground of limitation "in violation of the appropriate law", however, is too wide and open to subjective interpretation. And the provision should have been explicitly stated under what grounds the appropriate law can limit freedom. Besides the constitutional provisions are international human right instruments that Ethiopia has ratified which declares about those rights mentioned above.

3.2.2.2 The Charities and Society Proclamation (CSP) of Ethiopia, 2009

The 2009 CSP has been known as the first modern law regulating CSOs in Ethiopia since 1960s. It regulates both the formation and operation of charities and societies. As the regulatory framework to CSOs, it has a direct impact on civil society organizations formation, operation, development and their involvement in public interest environmental litigation.Though the proclamation has been called modern, yet it remains the most contested and one of the most

controversial of its nature in the country affecting the growth and development of CSOs. It has been said to be the most repressive CSOs law.

And among others, the restrictions on activities, access to justice and access to foreign fund, membership, workplaces and administrative and operation cost are identified as the highest priority legal issues confronting CSOs and affect their involvement in public interest environmental litigation. The proclamation first, has imposed limitations/restrictions on the activities of CSOs that don't fit the CSP definition of Ethiopian charities/societies. It defines Ethiopian charities/societies as "NGOs formed under Ethiopian law that consist exclusively of Ethiopians and receive no more than ten percent of their income from foreign sources". And Ethiopian resident charities/societies as "NGOs formed under Ethiopian law that receive more than ten percent of their funds from foreign sources".

"Ethiopian Resident" NGOs, though formed under Ethiopian law and by Ethiopians, are regarded by the CSO law as "foreign" merely because they obtain more than ten percent of their income from foreign sources, which encompasses Ethiopian who reside out side of Ethiopia. "Foreign" Charities, a third category of NGOs, encompass NGOs whose members include foreign nationals, NGOs formed under foreign laws or NGOs that receive funds from foreign sources. Once an CSO/NGO is labeled "foreign" or "Ethiopian Resident" under the above definitions—a label that will be ascribed to the majority of NGOs in Ethiopia under the CSO law—it is prohibited from participating in a plethora of essential activities reserved exclusively for "Ethiopian" Charities/Societies, including: the advancement of human and democratic rights;...; the promotion of the rights of the disabled and children's rights which includes the right to clean and healthy environment; the promotion of conflict resolution or reconciliation; the promotion of the efficiency of the justice and law enforcement services, where public interest environmental litigation by CSOs to be grouped therein.

The CSO law's distinctions between "Ethiopian," "Ethiopian Resident" and "Foreign" CSO/NGOs have far-reaching consequences on practicing public interest environmental litigation by CSOs. This is because public interest environmental litigation, as innovative legal practice falls under activities exclusively reserved for Ethiopian societies and it seems that no

Ethiopian CSO may be found there under the definition given above. Thus, Article 2(2)-(3) of the CSO law, when read in conjunction with article 14(2) (j)-(n), effectively muzzles the activities of other independent civil society organizations.

Second, it unjustly denied the right to appeal administrative decisions. The administrative body established to oversee the implementation of this law, the Charities and Societies Agency (CSA), makes final decisions to approve, deny or revoke registration of associations. Under article 104(3), only "Ethiopian" Charities/Societies can appeal decisions of the CSA. As an initial matter, this provision arbitrarily deprives "Ethiopian Resident" and foreign NGOs of recourse to judicial remedies simply because they obtain more than ten percent of their funding from foreign sources. Access to justice is a right guaranteed to everyone under article 37 of the Ethiopian Constitution and is a fundamental human right guaranteed to every person irrespective of nationality under the International Covenant on Civil and Political Rights (ICCPR), to which Ethiopia is a party.

Third, it imposes vague and arbitrary criminal sanctions on those who violate its provisions. The CSO law makes clear that those who violate its provisions are punishable under the criminal code as well as by administrative sanctions. The law provides that "any person" who violates its provisions is subject to punishment. Thus, punishment is not limited to officers and could potentially extend to members, volunteers and recipients of services. The law is vague with respect to which provisions of the penal code will be applied to determine the level of culpability and punishment individuals could face. In addition to imprisonment and fines, criminal charges can lead to the cancellation of an NGO's license. Article 92(2) (e) states that the license of any Charity or Society shall be canceled where "it commits a crime by violating the provisions of the criminal code or that of this proclamation." Based upon this language, it is very difficult for NGOs to ascertain the potential grounds for cancellation and the specific penal code violations that may lead to such a measure. Thus, the CSO law fails to provide adequate notice regarding, first, the actions that could result in imprisonment, and, second, the extent of criminal liability for offenses. The vagueness of these provisions opens the door to arbitrary criminal prosecutions.

The other area where CSP has imposed its restriction is on membership to CSOs. Article 31 of the Constitution does not require any qualification on membership while guaranteeing freedom of association. The CSP, however, requires organizations to meet certain criteria in relation to membership composition. Article 58 of the CSP states that where "the Society has Federal character and nomenclature, its work place and composition of the members shall show the representation of at least five Regional States." Failure to observe this requirement may lead to refusal of registration as stated under Article 71(5) of the CSP, which reads, "[the] Agency shall refuse to register a Charity or Society where the nomenclature of the Charity or Society is countrywide and the composition of its members or its workplace do not show the representation of at least five regional states." And by such requirement one may be refused permission to establish an association of his interest.

Another inextricably related issue is the restriction placed on workplaces. As stated above, organizations that have federal character and nomenclature are required to represent at least five Regional States in their workplace. In other words, these organizations must show that they are operating in at least five Regional States. The law defines "place of work" as "the place where a person's records and books of account are kept or the place where a person conducts work."Accordingly, organizations may not have branch offices per Se, but are required to operate in five Regional States from their headquarters.

The last is the one related to Administrative Cost vs. Operational Cost-Art.90 of CSP. Article 90 of the CSP provides for the regulation of administrative and operational costs. This provision reads; "Any Charity or Society shall allocate not less than 70 percent of the expenses in the budget year for the implementation of its purposes and an amount not exceeding 30 percent for its administrative activities." In tandem with Article 2 (14) of the same Proclamation, this provision places organizations in a challenging situation regarding the administration of their costs. The definition given to "administrative cost" is very vague and circular. Second, the definition of expenses, classified as "administrative costs," is too broad, incorporating expenses that were previously considered to be operational costs.

The restrictions by CSP, discussed above, have otherwise directly inhibited basic democratic rights of CSOs which includes the right to association, assembly and free expression. This is because the rights of CSOs to exist and function are inextricably linked to freedom of association, assembly and free expression. Thus though the CSP in its preamble provides that the law is required to ensure the realization of citizens' right to association enshrined in the constitution , it meant nothing so far as the above restrictions remains in this law. And equally important is its effect on public interest environmental litigation.

For the right of association to have real meaning, mere permission to form an NGO is not enough; rather, the Constitution requires that NGOs, once formed, be permitted to exist and properly function. And the source of an NGO's income, as long as it is lawful, should not serve as a basis to unreasonably deprive citizens of their right to form an association.

Freedom of expression is necessary for the effective and proper functioning of CSOs. The Ethiopian Constitution guarantees this right under article 29(2), which reads: "Everyone has the right to freedom of expression without any interference. This right shall include freedom to seek, receive and impart information and ideas of all kinds, regardless of frontiers, either orally, in writing or in print, in the form of art, or through any media of his choice."

This right is also guaranteed under article 19 of the ICCPR and article 9 of the ACHPR. NGOs promote human rights through education, monitoring and advocacy, all of which require the ability to express thoughts and information. Many CSOs perform their core activities by disseminating information through means such as publications, audio recordings and video recordings. But if NGOs are prohibited from carrying out their work- advocacy, consultancy and serving the promotion of justice and law enforcement- their staff and volunteers can no longer engage in these forms of expression without risking civil or criminal penalties.

3.2.3 The Civil Procedure Code, 1960s

In addition to the constitution and the CSP, the civil procedure law lays down procedural requirements for approaching courts. Courts are known to play central role in the public interest

environmental litigation and as such the merit in the civil procedure law could highly affect the public interest environmental litigation by CSOs.

And to begin with, the Ethiopian Civil Code (1960) has a negative impact in addressing the issue of standing to public interest cases such as environment. And no public interest litigation is said to be recognized there under. Art.33 (2) provides for a very strict requirement of interest for a person to a party in a suit. It placed a requirement of the existence of a vested interest (personal and property interest affected) as a precondition for locus standi. In fact the negative formulation of the provision might have been typical to a civil law jurisdiction and the drafter might have believed that public interest is exclusively of the public prosecutor interest. And with the advent of the more liberal approach taken in the constitution and the supremacy of the same over existing or future laws this provision of the civil procedure code couldn't be a bar to CSOs activities to litigate in the public interest. Similar to the civil procedure law, the tort law of Ethiopia provides that, before a plaintiff can recover compensation in tort, he must show that he/she has suffered damage.

Further, in respect to disputes involving a class action, the civil procedure code provides that groups can litigate their case through a representative who must be among the persons having the same interest in the suit . Therefore, according to this provision too, CSOs to initiate a suit need to show their interest (affected) in the case. Nevertheless, with the advent of the more liberal approach taken by the constitution as well as the supremacy of same over existing or future laws (see Art. 37 as discussed above) and Art. 11 of PCP, 2002, these provisions of the code should not be a bar to public interest environmental litigation by CSOs in representing the environment to defend for group and public interest, in claiming for environmental law enforcement and compliance, and to stand for environmental rights of weaker sections of the society.

Another important issue in the civil procedure code is res judicata. Res judicata comprises of two doctrines concerning the preclusive effect of a prior adjudication. The first doctrine is splitting of claims, according to which a judgment is treated as full measure of relief to be accorded between the same parties on the same claim or cause of action. The second doctrine recognized that suits addressed to particular public policy in favor of minimizing redundant litigation, issues

adjudicated between the same parties in a previous suit may not be relitigated in a subsequent suit.

Despite the valuable purposes or policies promoted by res judicata, its application may leave to harsh consequences in some cases to public interest environmental litigation by CSOs. It has harsh consequences because a prior judgment ends litigation, not only as to every ground of recovery that was actually presented in the actions, but also as to every ground which might have been presented. Since the scope of res judicata extends beyond what actually has been litigated, it prevents CSOs from fragmenting its environment case into many separately prosecuted claims which might be done because of difficulties to do so in environment. This may be difficult because some environmental problems may result in different effects the proof of which may not be possible at a time.

The danger of this effect of res judicata is that what might be presented in an action is not always evident during litigation, and the parties may discover after trial that claims not presented have been foreclosed by the judgment. So res judicata can preclude a plaintiff in this case CSOs from pursuing an otherwise meritorious claim that was not litigated because of a seemingly minor procedural error or because a party has failed to anticipate, at the time of first action, the effect that the judgment word brings on future litigation.Another is that res judicata forecloses re litigation of whether the original decision was correct. Res judicata ignores the substantive merit of the judgment it enforces. Decisions that are wrong and that would be reversed on appeal are final judgments for res judicata purposes. Res judicata therefore, reflects the view that sometimes it is more important that a judgment be stable than it be correct.

In similar fashion article 5(4) provides that where persons litigate in good faith in respect of public or private rights claimed in common for themselves and others, all persons interested in such right shall, for the purpose of this article, be deemed to claim under the persons so litigating. And therefore affects environmental cases unless due measure is taken to make the above cited procedural laws to come in tone with the line and spirit of article 37 of the constitution and give special concern to environment.Last is the litigation cost which includes the court fee and other expenses including attorney's fees. According to the civil procedure law

parties are expected to pay court fee and cover other necessary litigation expenses which hinders interested parties to participate in public interest environmental litigation.

When we see the civil procedure law, litigation costs may be awarded to any party to the litigation which means that the plaintiff may be obligated to pay the litigation cost in the proceeding. Accordingly, high costs of civil procedure and especially the risk of losing the case and as a result of having to pay the costs incurred by the other party may deter public interest groups. In other words, unless public interest groups are protected from awards of litigation costs for all but extreme instances of bad faith and frivolous assertion, the ends of public interest environmental litigation measures will be served poorly. So, to have actual public interest environmental litigation, the government should improve public participation in the legal process by changing the cost rules for cases brought forward by CSOs in the public interests.

3.2.4 Environmental Legislation

The other relevant legal regime that require examination as to whether it causes impediment, one way or the other, to public interest environmental litigation by CSOs is environmental law. In fact, it is in the environmental legislation such as the environmental pollution control proclamation that, among others, we can get a provision which explicitly vests CSOs with power to initiate a case (with out a need to show vested interest) against any person who is allegedly causing or is likely to cause environmental damage. And the damage might be of against environmental rights of an individual or to the collective/diffused rights and to the environment itself.

Still, however, the fact that such a provision is provided in some environmental legislation and not in others and the practical difficulty (of proving pollutants while they are many) to employ Art.11 cited above may result in obscurity to the use of public interest environmental litigation by CSOs. The first brings about intricacy because one can argue that it is only in that where locus standing is explicitly provided CSOs can initiate an environmental case to an organ with judicial power while others allege in other legislations too tracing Art. 37 of the constitution that vests power to any interested party in as much as the case is justiciable.

With regard to the latter the provision isn't crystal clear whether EPA can/can't be made a party to the court case, along with, or in exclusion of the alleged polluter. So it might create confusion to CSOs as to who they should go against and it leaves scope for two possible interpretations.One is that it will be difficult/ impossible for them to know the reasons and factors that prompted the EPA for not taking a decision or taking a decision that is neither sound nor appealing unless the former is made a party to the case. And EPA should be made accountable for failing in its statutory obligations.

On the other hand EPA oppose this on the ground that Art.11 gives the complaint the "the right to standing" to initiate an action against a person who is causing or is likely to cause damage to the environment and not against the supervisor. So therefore, there should be legislative solution for CSOs rightly operate on the area.Another most visible problem is in the EIA proclamation regarding grievance redress mechanisms in the EIA proceeding. The proclamation, unlike the pollution control proclamation, doesn't provide for any judicial remedy against the decision of EPA. Article 17 says:

17. Grievance procedures

1. Any person dissatisfied with the authorization or monitoring or any decision of the authority regarding the project may submit a grievance notice to the head of the authority
2. The decision of the head of the authority shall, as provided under sub article (1) above be issued within 30 days following the receipt of the grievance.

The absence of a provision relating to review exhibits the legislative intent of keeping these decisions away from judicial scrutiny which avoids accountability of the agency and looks to be in tune with the legislative policy of keeping decisions of the EPA beyond judicial purview defeats the idea of public interest environmental litigation by CSOs. In fact, this seems to vitiate a constitutional right of access to justice by an ordinary legislative instrument.

The other important factor that have been affecting public interest environmental litigation by CSOs relates much to the delayed approval/issuance of environmental standards and EIA norms

to apply. For this reason the proclamations have been dormant for long and to seek compliance by CSOs have been highly impaired.

3.2.5 Access to Information and the Right to know

Access to information is the cornerstone of effective public participation at all environmental decision making. For the environmental enforcement, the public including CSOs need access to specific information concerning discharges and emissions. Unless this information are required to be displayed and made displayed it might be difficult to engage in public interest environmental litigation. Nonetheless, still we don't have administrative procedure act to require agencies to display relevant information and equally important is that we don't also have such provisions in the environmental legislations. And hence I can only say that development and/or growth of public interest environmental litigation by CSOs have been badly affected and call for its enactment and/or reform deem imperative.

3.2.6 The Judiciary

So long as courts are expected to play the upper hand role in the public interest environmental litigation and institutional framework is to a large extent a reflection of a legal framework, to scrutinize its legal establishment whether it allows them to exercise their power to the extent of expectation couldn't be out of reach of this paper.

As mentioned above, given the innovative aspect of public interest environmental litigation there is a need for the judicial organ to operate in flexible and progressive manner rather than strictly adhering to formalistic requirements set by law. And to this effect, the judiciary, above all, needs to be independent and hold all adjudication power. And all judicial power should be given for courts. The constitution of the Federal Democratic Republic of Ethiopia declares the establishment of an independent judiciary. And pursuant to Article 79(1) of the constitution all judicial power is made to rest on the courts. Nevertheless, there seems to appear an apparent paradox in that the judiciary isn't vested with the right to interpret the constitution but the duty to enforce it. And it questions the power of courts to review legislative and administrative actions

unconstitutional so long as it highly relates to constitutional interpretation which is said to be under the purview of HF.

In fact the paradox deem not real according to some legal scholars in the country. This is because what is to be interpreted and reviewed here is the administrative or legislative actions, and to do so is the daily activity of courts. And therefore, though it appears difficult to fully state that courts are vested with the power to judicial review, it is at same time really difficult to say they are short of this power for they are doing their daily business of interpreting laws mandated by and in tone with the constitution. The same is true too, to say that they don't have to interpret the constitution. This is because so far as they interpret other laws and this is expected to be in line with the constitution, still they are interpreting the constitution. And hence what aren't clear as to my stand too is what is, constitutional interpretation and what isn't, what constitutional dispute is and what isn't.

Others on the other hand argued that so far as constitutional interpretation is the power given not for courts but to House of Federation (HF) as per the constitution, by all odds, the judiciary doesn't have the power to interpret the constitution and add that judicial review is missed concept. They further said that courts do have only the power to ask for constitutional interpretation and pronounce the decision given by HF.

Both the arguments, in fact, have weight yet the second deem to take the balance (so far as the principle of separation of power and judicial review is concerned) notwithstanding that it doesn't look in tone with the spirit of the constitution. This is because to give the power to constitutional interpretation and to decide over constitutional disputes to a certain organ called the HF, which is to be considered as neither legislative nor judiciary in the strict sense of the term, is beyond the concept of separation of power and judicial review.

And the fact that courts are made rather parties to apply for constitutional interpretation to HF gives me no sense for courts should have been rather empowered to interpret the constitution. Still, however, to adhere to the second argument fully may completely corrupt the idea that courts do review legislative and administrative actions, even in cases where constitutionality

isn't at issue for to do so still require constitutional knowledge and interpretation. Further the spirit of the constitution doesn't look to favor the second argument. This is because as per the constitution the HF deems to involve in constitutional interpretation when either the parties or the court believe that the case at hand has constitutional question that call for decision from the HF.

So it may be preferable to argue that courts do still have the power to judicial Review of legislative and administrative actions so far as to do so don't bring about constitutional issue and dispute. Indeed the issue is controversial and debating in which many are confused with. And the fact that no CSO has ever involved against certain legislative or administrative action as such might be for this reason.

CONCLUSION AND RECOMMENDATION

1. Conclusion

The legal infrastructure in the federal democratic republic of Ethiopia isn't inspirational and in no way is without impact on use, development and/or growth of public interest environmental litigation by CSOs. And indeed, is one significant factor to barricade public interest environmental litigation by CSOs in the environment arena.

In fact, the constitutional provisions of the right of access to justice, locus standi, and freedom of association and expression coupled with locus standi of the pollution control proclamation, looks rather to boost public interest environmental litigation by CSOs in Ethiopia. Nonetheless, its critical evaluation has revealed that the legal infrastructure in Ethiopia lack comprehensive framework and clarity and it badly limits the rights and freedoms of CSOs to engage and operate freely in public interest environmental litigation. Yet the constitution is still by far in a better position compared to other legislations save the issue of constitutional interpretation and JR.

Specific legislations on the civil procedure law, charities and societies proclamation, the environmental control proclamation and the environmental impact assessment proclamation has

highly affected public interest environmental litigation by CSOs. In the civil procedure law, the traditional and strict requirement of interest, res judicata, lack of legal and institutional framework to refund cost of litigation are factors to affect public interest environmental litigation by CSOs. The restrictions imposed on activities, access to foreign fund, membership, working place, unjust denial of the right to appeal, and unnecessary interference by the government on CSO, as declared in the CSP, 2009 are other important factors to impede CSO involvement in Public interest environmental litigation. Lack of clearly stipulated environmental standard and grievance redress mechanisms and complete absence of administrative procedure act (APA) to grant CSO the right to obtain information from administrative agencies is also basic weakness from environmental legislations that affect PIEL by CSOs.

Although public interest environmental litigation by CSOs has a lot to do with in the country's environment and is an innovative approach and fashion of the day the world has been relied upon, the Ethiopian legal system doesn't rejoin essential conditions in clear and comprehensive manner to accommodate the system in. It should be noticed, therefore, that for countries like Ethiopia in which the civil law legal system predominates and often the power of the judiciary is restricted only to the interpretation and application of the laws, by all odds, the legal framework shall be highly comprehensive or all-embracing and clear to regulate the utmost societal issues such as the issue of public interest environmental litigation by CSOs. Equally important is the independent establishment and functioning of courts and civil society organizations. The judiciary, above all, need to be autonomous and its power to review the constitutionality of legislative and administrative actions need to be clearly stipulated, otherwise the existing constitutional provision relating to constitutional interpretation could result in the misguided belief that constitutional interpretation is the sole jurisdiction of the federal council. And CSOs law shouldn't limit CSOs rights to form association and operate freely in public issues such as environmental litigation.

2. Recommendations

It is to be noted that public interest environmental litigation by CSOs is, above all, subservient an up-to-date approach which employment to the existing Ethiopian situation deemed

indispensable. And it looks very important that both the government and CSOs should take concrete steps to make the legal framework conducive to inspire/enthuse public interest environmental litigation by CSOs in Ethiopia. And therefore, restrictive laws regarding CSOs and their engagement in the public interest environmental litigation should be harmonized with the more liberal and progressive tenets of the constitution through legislations. And hence, there is a need for legal reform. Specific legislations on the issues such as locus standi, access to justice, judicial review, freedom of association and operation, cost of litigation and/or court fee, res judicata, freedom of information and expression, essential for public interest environmental litigation by CSOs need to be reformed so as to give effect for nominal or general constitutional provisions as stipulated above.

And in particular the following measures need to be taken to bring about the effective functioning of public interest environmental litigation by CSOs.

1. **Reform on the law which governs res judicata, court fees, and other litigation costs and expenses to create an environment conducive to public interest environmental litigation by CSOs**

For there is no legal arrangement of fund to public interest environmental litigation by CSOs, there should exist proper institution and legal framework to ensure regular funding. This may be made/effected by subsidizing CSOs, supplement direct funding with financial incentives, offer financial rewards for successful litigation and through tax policy. And the government should facilitate and encourage fund raising programs by CSOs. And further there should be a reform on the laws that govern res judicata, court fee, and other litigation costs and expenses.

To this effect, the government should enact laws which stipulates no costs shall be awarded against any person who fails in any action if the action was instituted reasonably out of concern for the public interest or in the interest of protecting human health, biological diversity and in general the environment. Further the law relating to res judicata should be amended in such a way to avoid loosing a public interest case by mere fact that similar cases should have been included in the prior case. It should give especial regard for the environment in as much as there might be scientific uncertainties, some acute environmental problems that need immediate legal response and often ever changing circumstances in the environment.

2. **Reform on the law which governs environmental standards and grievances redress mechanisms**

The rules on standing in environmental cases need to be modified to reflect the distinctive role of citizen groups and NGOs in upholding environmental law, to recommend changes to the law, to ensure that NGOs and citizen groups actively promoting environmental protection have an automatic right of standing in environmental cases.

3. **Amending the constitutional provisions which regulate judicial review of constitutional matters**

The constitution as part of body of law shall be interpreted by the court and should be amended to the effect that it gives the power to judicial review fully for the judiciary. And it deems necessary to amend necessary to amend particular provisions of the constitution that regulate JR and constitutional interpretation (Art. 62(1), 83 and 84)

4. Amending the Charities and Societies Proclamation

As could be observed from chapter three CSOs are confronted with many challenges from CSP in a number of ways and I recommend that the legality or the constitutionality of the law should be challenged both at the national and international levels. CSOs should involve in comprehensive legal advocacy activities to improve environmental law; there should be continuous dialog among CSOs, government and international community to improve the law; establishing a strong system of monitoring the impact of the new legislation and using findings for advocacy activities; organizing comprehensive public outreach activities on the role and contribution of CSOs in Ethiopia; and ensuring that members of the international community make use of their leverage in dealing with the government, and that their development assistance also includes CSOs. It should be amended to the effect that restrictions on workplace, activities, membership, denial of access to justice and foreign fund are avoided.

5. Enactment of Enabling Legislation

In order to have actual public interest litigation by CSOs in environmental proceeding, the subsidiary regulations and directives which have not yet been enacted should be enacted by the delegated responsible organs of the government. The enactment of this subsidiary law is

important, because they are a means to realize the right to a clean and healthy environment under the constitution, and other relevant environmental laws. To this effect, it is a pressing need to grant the right of locus standi and the right to get environmental information for CSOs to panacea the gap in relation to environmental proceeding.

6. Amending the Pollution Control Proclamation

In judicial review in relation to environmental proceeding, the complaint is that the environmental authority either allows harmful or polluting activity to be carried out or does not prevent the pollutant/s from continuing polluting the environment. This can move the focus of the campaign away from the polluter on to the regulator, which may not be a helpful part of the campaign. So, public interest groups should take care in entertaining environmental issues, not to move the focus of the campaign away from the polluter on to the regulator. That is, the legal action should be against both the environmental authority, and the polluter's by and through applying the law of joinder of defendants. Otherwise, to avoid such controversies, Art.11 and 12 of the pollution control proclamation should be clearly modified to this effect.

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PART III- ACADEMICS AND EDUCATION

A Comparative Study of Masculine and Feminine Styles of Leadership in Primary School Improvement Activities in Hawassa City Administration

Fitsum Gebremichael Solomon

Lecturer, Department of Educational Planning and Management

Hawassa College of Teacher Education

E-mail: fitsumg2010@gmail.com

Abstract

The main purpose of this study was to compare masculine and feminine styles of leadership in school improvement activities in the primary schools of Hawassa city administration. To this end, descriptive survey method was employed and primary and secondary sources of data were used. The study was conducted in twelve randomly selected governmental primary schools that were chosen from a total of thirty four governmental primary schools found in Hawassa. Among the210 total distributed copies of two kinds of questionnaires,125 for the school leaders,85 for the teachers,121 leaders ,81 teachers questionnaires were properly filled and returned. The primary data from leaders, teachers' were collected through questionnaires .Availability, simple random and purposive sampling techniques were used to select the leaders, teachers and experts respectively. The data obtained from questionnaires were analyzed by using appropriate quantitative statistical tools such as percentage, mean, chi-square and independent t-test. Moreover, the primary data from 8 educational experts were collected through interview. Then it was analyzed qualitatively in narrative mode so as to substantiate the quantitative values analyzed from the questionnaires. Secondary data were secured through document consultation of different relevant materials from MoE, Hawassa city administration education bureau statistical abstracts, and sample schools. Findings from indicated that the female leadership style depended mostly on face-to-face contacts, win-win conflict resolution, participatory teachers decision making ,sense of vision, soft emotional expressions, magnified positive efforts, shared information, good listening and empathetic towards the teachers. The male leadership style relied mostly on communicating through meetings and office memos, win-loss conflict resolution, good in distributing leadership, maintaining school system, rigid emotional expressions, magnified the negative weaknesses, bold in taking leadership risks. Hence, it is concluded that, the female school leaders styles are being replaced in the schools, promoted healthy and collaborative work environments, enhanced the moral and efforts of the teachers, students' results and quality teaching, built mutual trust. Even if the male leaders' styles were good in dealing with uncertainty, crisis, executing policies and regulations in the schools, mostly the male leaders' styles developed antagonistic and competitive work groups impeded the moral and self-efficacy of the teachers and negatively affected students results and quality teaching. On the basis of this findings and conclusions increasing female teachers, school principals, arranging trainings, providing financial support for staff development, providing opportunity of in-service training of the principals in educational leadership and management, reorganizing school management to follow down-top approach, searching feminine and masculine qualities in appointing and selecting leaders at various levels in the school leadership so as to realize school improvements were recommended for the education bureau and the schools.

1. Introduction

1.1 Background of the Study

Identifications of an individual as a male or as a female in terms of behavior is a controversial issue. Hence, various explanations are given about the fundamental reasons behind the variation of men's and women's behavior. However; most differences between men and women are often described in terms of biological and social factors (Sanday, 1994). Biologists claim that gender is the result of biological factors. They assert that chromosomal inheritance is responsible for the development of gender differences. According to this argument, behavioral differences between boys and girls start at early stage of infants when cultural influences don't begin to operate human behavior. However, this assertion faces criticisms from various researchers .The criticisms claim that the evidence given for behavioral differences in new infants is inconsistent and not reliable from one study to the other (Linda, 2005).

In contrast to biologists, sociologists argue that behavioral differences between men and women are mainly attributed to the socio-cultural factors. They assert that the way children are brought up in the society is responsible for the vast majority of differences between males and females. At their early age, children spend more time practicing with gender related objects and activities and this provide more opportunity to learn more about one's own gender (Nielsen, 1995). Similarly, Linda, (2005) stated that gender differences exist at early age and the roles are learned very early in the life of the children. Thus, gender becomes an integrated part of a person's identity. As a result of this, starting at about the age of 5 children believe that females are soft, empathetic, helpful and weak. But males are strong, tough and self-confident. This believes will continue to be manifested at adult age of individuals.

In most cases behaviors associated with men such as aggressiveness, forcefulness, independence, rationality and competitiveness were more valued than characteristics allied with women such as patience, helpfulness, accommodation, caring and cooperativeness. Masculine styles of leadership in most cases remain synonymous with charismatic leadership and effective careerism

such as such as objective oriented leadership, decisive, independent, ideal and confident (Whitehead, 2006).

Recently, however, feminine behaviors are started to be praised as good qualities especially for modern trends of contingency leadership theories which are characterized by people-oriented, cohesive and democratic (Malinga, 2005). According to (Riches and Morgan, 1999), feminine styles of management proved to be more appropriate for school management since feminine styles are claimed as more accepting differences than masculine styles. Male styles are strongly conformist and peer related while female styles are much more tolerant of deviance. Similar studies on educational leadership asserted that women styles of leadership are effective in building positive school climate, perceiving and solving problems and facilitating positive school- community relationships (Ozga, 1993). Similarly, feminine styles of leadership are praised for effectiveness to manage school finance handle disciplinary problems smoothly and anticipate potential problem situations (Whitehead, 2006).

Newly emerging concepts on gender and leadership argues that an application of pure feminine or masculine style of leadership is not effective to implement modern contingency and transformational leadership. Rather, there should be certain mix of the two styles so as to entertain good qualities from each leadership styles for effective organizational improvement including schools (Wirth, 2001).

Despite this fact, mostly the issue of gender and leadership focused either on the under representation of women in school leadership or slight increment of women's participation in school decision making activities. It is because of this fact that the researcher has decided to make a comparative study of masculine and feminine styles of leadership and their significance to school improvement activities.

1.2 Statement of the problem

In the vast literature pertaining to leadership and management very little attention and coverage has been given to gender perspectives of leadership styles. Some few authorities explained

gender as a variable that can affect the leadership styles of a leader. According to the study conducted by Eagly and Johnson (as cited by Rey, 2005), women and men show different traits in their leadership activities. Men leaders often tend to apply hierarchical, rigid, autocratic or directive styles in giving order to their subordinates and follow a win-loss approach in their conflict resolution mechanism, whereas, women leaders mostly apply more democratic or participative specifically consultative decision making trend and promote collegial work places.

Despite this fact, the prevailing models of leadership styles either ignore gender as variable to influence leadership styles or make their explanation considering leadership as masculine domain. Though women have been engaged in the work sites which were previously occupied by men, work place systems retain a discourse of masculinity (Bonvillain, 1998). Many of the belief systems and values that still sustain the modern capitalist world of work consider men as ideal on being independent, emotional and logical and make decisions easily and act as a leader and are associated with commitment, dedication and careerism. Consequently, male are now most numerous and visible gender at the top leadership and management positions in almost all countries in the world (Whitehead, Stephen,2006).Women on the other hand remain marginalized from leadership positions almost all over the world both in developed and developing countries including Ethiopia (Almaz, 1991; Wirth, 2001).

Having recognized this fact the government of the federal democratic republic of Ethiopia is striving to increase women leaders, managers and decision makers at all levels and all sectors (FDRE Constitution, 1995: NAP-GE, 2006). But while assigning and selecting female and male leaders for different levels of school leadership structure especially in primary schools much attention has not been given to analyze and entertain masculine and feminine leadership styles in relation to ongoing school improvement activities. Having recognized this fact, this study compared women and men leaders' leadership styles in the primary schools found in Hawassa town and their implications on the school improvement activities going on. In doing so, this research made an attempt to answer the following basic questions;

1. To what extent are women and men considered in the primary school leadership?

2. What are the different styles of leadership that are often preferred by women and men leaders at the selected primary schools?
3. What are the factors that influence women and men to follow certain specific leadership styles?
4. To what extent does women and men leadership style affect the school improvement activities?

1.3 Objectives of the study

General objective

The study has an overall objective of comparing women and men styles of leadership in school improvement activities in the governmental primary schools of Hawassa town.

Specific objectives

The study has the following specific objectives;

1. To assess the extent of women and men in the leadership and management positions of governmental primary schools.
2. To examine the factors that affect women and men to follow certain specific leadership styles.
3. To investigate the preferable styles of leadership by men and women in the primary schools.
4. To examine the effect of men and women leadership styles on the school improvement activities

1.4. Significance of the study

The available literature regarding leadership particularly, school leadership gives low attention to gender as an important perspective to determine leadership styles of school leaders. Hence, different leadership styles of men and women leaders have not been adequately and extensively studied despite their greater significance to school improvement .Thus, the researcher selected the topic so as to make an attempt to minimize the observable knowledge gap regarding the issue.

Moreover, as the researcher tends to compare different leadership styles of men and women leaders in relation to school improvement activities in Hawassa city administration , it will provide information to the stakeholders of the sector such as education bureau coordinators, Parent Teacher Associations, School Improvement Committees, Schools' management to create gender balanced appointment, election of school leaders at all levels so as to entertain important leadership styles from both genders so as to facilitate school improvement activities going on in the primary schools in the city administration. Finally, this study will also serve as a spring board for future researchers to conduct further studies on area.

1.5. Delimitation of the study

Hawassa city administration is divided in to eight sub cities where there are both private and governmental primary schools. But the researcher considered the governmental primary schools only. In these sub cities there are thirty four governmental primary schools. From these the researcher selected a total of twelve sample primary schools from each sub city.In the selected sample primary schools the researcher compared the male and female leaders' styles of leadership in school improvement. Thus the targets of the research were principals, vice principals, teacher representatives in parent teacher associations and school improvement committees, unit and department heads.

The study was delimited to focus on the masculine and feminine styles leadership in school improvement. Thus, the researcher compared the extent of male and female styles of leadership, the different preferable styles of male and female leaders, the factors the influenced the male and female styles of leadership, the impact of male and female styles of leadership in the school improvement activities.

1.6. Limitations of the Study

This research has not reached this level without certain obstacles. Among the major problems was the lacks of necessary literature on the area of distinctive leadership styles of male and female leaders in primary schools. Even if the literature describes that there is a strong impact of

feminine and masculine styles of school leadership on school improvement, the issue has been scarce in the domestic publications and research out puts .In addition, leadership books and journals from abroad mostly give slight cover ages .Thus, the researcher managed to get the literature with all this pieces of opportunities.

Inaccessibility to get educational officials and cluster supervisors was another problem as they were engaged in series trainings and meetings. This some what elongated data collection duration. Thus the researcher has solved this with a great patience and endurance.

1.7. Operational Definition of Terms

Educational Experts ----refers to experts in teacher and educational leadership development core work process, cluster supervisors in the educational quality assurance core work process in the and the head of the education bureau.

Feminine – Thoughts that are traditionally associated with women / girls as gender appropriate behaviors to women / girls (Linda, 2005) Gender Socialization – formal or informal teaching of children or adults to show gender appropriate feminine or masculine behaviors (Linda, 2005)

Gender Stereotypes – is generalization of male gender as naturally acquainted with certain talent to do some work while women are unfit to do the same work. It ignores individual difference with in the same sex (Mann and Crompton,1994)

Leadership Style—indicates the behavior and approach followed by the leader in providing leadership.

Manager- a person who is nominated by the government or an official with certain delegated responsibilities and authorities

Masculine – A traditional manly character; having traits or qualities traditionally associated with men / boys rather than women/ girls (Miescher and Lindsay, 2003) School leader – refers to principals, vice principals, teacher representatives in parent teacher associations and school improvement committees, unit leaders, department heads.

School Improvement--- is an approach to educational change that includes teaching and learning activities of the school, knowledge transfer process, leadership arrangements and its receptiveness to external learning (Hopkins et al, 1994).

Strategic Leadership –indicates leadership as principals, vice principals, teacher representatives in Parent Teacher Associations (PTAs), School Improvement Committees (SICs), and Unit Leaders and Department Headships.

2. Research Design and Methodology

This chapter presents the research methodology followed in conducting the study, the sources of data, the sample, population and sampling techniques carried out for the selection of the respondents, the types of instruments used to collect the data, the procedures pursued and the methods applied to analyze the data.

2.1. Research Method

This research focused on comparing men and women leaders' leadership styles in primary school improvement activities. To this end, it used descriptive survey research method both qualitatively and quantitatively. Descriptive study describes and interprets what is. It is concerned with conditions or relationships that exist, opinions that are held, processes that are going on, effects that are evident, or trends that are developing .It is primarily concerned with the present, although it often considers past events and influences as they relate to current conditions(Best and Kahn,2005).Typically, descriptive research method gathers data at a particular point in time with the intention of describing the nature of existing conditions, or identifying standards against which existing conditions can be compared, or determining the relationships that exist between specific events(Cohn,1994).

2.2. Sources of Data

In order to achieve the objectives of this study, both primary and secondary types of data were collected from various sources. The primary data were obtained from the school leaders such as principals, teacher representatives in PTAs and SICs unit leaders, department heads and teachers,

educational bureau officials through school leaders' and teachers' questionnaires and in-depth interviews respectively.

Secondary data were collected through document analysis from Hawassa city administration education bureau statistical reports, MOE annual abstracts, school related records, figures and documentations.

2.3. Sample Population and Sampling Techniques

2.3.1. Sample Population

The sample of this study covered all of the eight (100%) of the sub cities found in Hawassa city administration. From each sub city one government primary school was taken. But in the case of Hawella Tulla sub city five sample schools from fourteen total schools found in the sub-city were selected. Thus a total of 12 (35%) of sample primary schools out of a total of thirty four government primary schools (100%) were included in this research.Regarding, the educational experts, 8 (100%) were incorporated in the study from education bureau and cluster supervisors .Concerning the school leaders, all (100%) of the principals, vice principals, teacher representatives in PTAs and SICs, unit leaders, department heads were considered in this research. Concerning the number of teachers 15% from each sample school was comprised.

Table.1. Number of Governmental primary schools by sub city in 2002E.c in Hawassa City Administration

No	Name of sub-cities	No of Primary schools	No of Sample primary schools		Sampling Techniques
			No	%	
1	Tabor	3	1	33	Random
2	Menaheria	3	1	33	Random
3	AddisKetema	3	1	33	Random
4	HaiqDar	3	1	33	Random
5	Mehal Ketema	2	1	50	Random
6	Misrak Ber	3	1	33	Random
7	Hawella Tula	14	5	35.5	Random
8	Bahil Adarash	3	1	33	Random

Source; Hawassa City Administration Education Bureau 2002 Statistical Abstract on governmental and private schools in the city administration

Table.2. Sample Primary Schools, Sample Leaders and Teachers

No	Name of the sample school	Sex	Leaders		Teachers	
			No	%	No	%
1	Betekihnet primary school (1-8)	M	6	5	2	2.5
		F	10	8.3	7	8.6
2	Tabor primary school (1-8)	M	10	8.3	5	6.2
		F	3	2.5	5	6.2
3	Ethiopia Tikdem primary school(1-8)	M	6	5	3	3.7
		F	4	3.3	6	7.4
4	Haiq Dar primary school(1-8)	M	7	5.8	1	1.2
		F	2	1.7	3	3.7
5	Gebeya Dar primary school(1-8)	M	6	5	1	1.2
		F	3	2.5	4	4.9
6	Bethelhem primary school(1-4)	M	4	3.3	0	0
		F	2	1.7	2	2.5
7	Nigist Furra primary school(1-8)	M	8	6.6	2	2.5
		F	2	1.7	3	2.5
8	Tulla primary school(1-8)	M	7	5.8	4	4.9
		F	7	5.8	7	8.6
9	Gemeto Gale primary school (1-8)	M	6	5	2	2.5
		F	4	3.3	6	7.4
10	Gemeto Sahula primary school (1-4)	M	0	0	3	3.7
		F	4	5.8	2	2.5
11	Edget Beandnet primary school(1-4)	M	0	0	0	0
		F	8	6.6	6	7.4
12	Hogoba primary school(1-6)	M	5	4.1	0	0
		F	4	3.3	7	8.6
	Total	M	65	53.7	23	28.4
		F	56	46.3	58	71.6

Source; Hawassa City Administration Education Bureau 2002 Statistical Abstract on governmental and private schools in the city administration.

2.3.2. Sampling Techniques

In order to select the school leaders such as principals, vice principals, teacher representatives in parent teacher associations and school improvement committees, unit leaders, department heads from the sample schools the researcher employed availability sampling techniques. Teachers were selected for the study using simple random sampling technique. Education bureau officials and cluster supervisors were included in the study by using purposive sampling technique assuming that they could have better awareness and pertinent information for the research.

2.3.3. Data Gathering Instruments and Pilot Testing

Data Gathering Instruments

It was felt essential to adopt both qualitative and quantitative data collection approaches, which are survey instruments that help to compare men and women styles of leadership in primary school improvement activities. The quantitative data was obtained from two types of questionnaires designed for school leaders and teachers. The qualitative approach took the form of in-depth interviews with educational experts, document analysis to acquire the relevant data. As Patton (1987) cited in Teshome (1998),indicated that employing multiple methods of data collection helps the researcher to combine the strengths and amend some of the inadequacies of any source of data.

Two kinds of questionnaires were prepared originally in English, which were later translated in to Amharic so as to prevent misunderstandings and misinterpretations on the parts of the respondents. Leaders' questionnaire was distributed to the school leaders such as, all male and female principals, vice principals, teacher representatives in PTAs and SICs, unit leaders, department heads. The second type of questionnaire was distributed to the teachers and they filled out too.

School leaders' questionnaire consisted of close-ended questions pertaining to issues at hand and open-ended questions regarding intentions, actions and inclinations. The questionnaire consisted of four parts. Section one was prepared to collect background characteristics of the target groups such as demographic features, educational level, years of service, fields of specializations, the leadership position or managerial participation. Section two contained both multiple choice item and yes or no alternative types of close-ended questions and open-ended questions to give free opinions regarding issues such as the extent of men and women styles of leadership, the different styles of leadership preferred by men and women leaders, factors that affect the specific styles of women and men leadership, the effect of men and women styles of leadership in primary school improvement activities. Section three was prepared in the form of five point scale from every day to never so as to examine the frequency of performing the listed managerial duties and

responsibilities in relation to the styles female and male leaders. Section four entirely contained open-ended questions regarding issues of school leadership and improvement.

Teachers' questionnaire incorporated of close-ended questions pertaining issues at hand and open-ended questions regarding intentions, opinions. The questionnaire consisted of four parts prepared for all male and female teachers. Section one was prepared to collect background characteristics of the target groups such as demographic features, educational level, years of service, fields of specializations,. Section two contained both multiple choice item and yes or no alternative types of close-ended questions and open-ended questions to give free opinions regarding issues like the extent of men and women styles of leadership, the different styles of leadership preferred by men and women school leaders, factors that affect the specific styles of women and men leadership styles, the effect of men and women styles of leadership in primary school improvement activities. Section three was prepared in the form of five point likert scale from strongly agree to strongly disagree so as to check to what extent do teachers agree with leadership styles of men and women leaders in relation with school improvement activities. Section four of the questionnaire, contained open-ended questions regarding men and women styles of leadership in accordance in school improvement activities going on the schools.

In addition to the questionnaire, the study employed in-depth interview as the second instrument for data collection to complement and obtain relevant data that were not handled by the questionnaire .In-depth questions designed and administered for all available male and female education bureau officials and cluster supervisors.

Pilot Testing

In order to validate and undertake some necessary corrections and modifications on the questionnaires as well as to avoid practical problems in advance, pilot testing was conducted prior to the final distribution to the respondents. Out of thirty four governmental primary schools the researcher selected one school out of the already selected sample schools and draft questionnaires were dispatched to 5% of both school leaders and teachers twice. After the questionnaires had been filled and returned, each of the items in the questionnaire was

thoroughly examined .Ambiguous and unclear statements were corrected and the final questionnaire was distributed to each of the entire sample population. The reliability of the instruments was 0.8.

2.3.4. Methods of Data Analysis

The variables

The dependent variables of this study are school improvement activities in the governmental primary schools of Hawassa town, whereas, the independent variables are women and men styles of primary school leadership.

Data Analysis Techniques

After collection of questionnaires and getting back the adequate number of respondents, the raw data was tallied, structured and tabulated under their respective categories so as to make it manageable, readable and most of all ,understandable .The items were classified in to different tables according to similarities of issues raised in the questionnaires. After being classified, each of the issues was analyzed and interpreted .Depending on the rationale of the basic questions and the gathered data, the data was analyzed by using different statistical tools with the aid of computer assisted MS SPSS-17 program and the existing difference was tested for statistical significance at an alpha level of 0.05 to tolerate errors that may occur due to chances.

To analyze the quantitative data, some data analysis techniques such as frequency distributions, percentage, and mean, and chi-square, independent t-test values were used. Percentage was used to explain the characteristics of the respondents.Mean, chi-square independent t-test values were employed to see the significant relationship between the respondents on the different styles of male and female leadership and the factors that influence male and female styles of leadership, the effect of male and female leaders styles of leadership on the school improvement activities going on the schools. Independent t- test was used to test the significance of the difference between two independent means. The chi-square goodness of fit test was utilized for nominal

data so as to see their significant relationship on some of the study variables. The researcher selected alpha 0.05 level of significance so as to reduce sampling error.

The qualitative data drawn from the open-ended questions, interviews and document analysis facts, pictures, school records, expressions and views obtained were categorized and combined to describe besides to the explanations of tallied, structured and tabulated items of the quantitative data. The qualitative data was analyzed using narration mode as expressed by the respondents and as understood by the researcher. Based on both qualitative and quantitative data analysis, interpretations were made to reach certain findings .Finally conclusions were made and possible solutions were recommended.

Ethical consideration

1 The researcher had briefed the participant about the objectives of the study before collecting the information from them.

2 Participation in the study was optional; it was made only if the participants were willing to participate.

3 The researcher never forced participants to answer the question to which they have a reservation.

4 The informants had been asked for permission if it is possible to record their voice and to post their picture on the research paper.

The Research Procedures

1. To develop a thorough understanding and gain insight on the research topic, relevant literature was assessed and reviewed.
2. Statistical data from various documents under sources of the data were secured and analyzed.
3. Appropriate statistical tools were prepared and pilot tested.
4. After pilot testing and approval, the administration of the instruments followed.
5. The data collected timely were analyzed and interpreted.
6. Finally, a report on the research study was prepared.

3. Presentation of Analyzed Data and Discussion of Results

This chapter of the research deals with the presentation, analysis and interpretation of the data collected from the sample respondents. The primary and secondary data were obtained through questionnaires, interviews, document analysis .Then they were presented, analyzed and interpreted in accordance with the basic questions that were formulated and indicated in the first chapter of the research.

A total of 210 questionnaires were prepared and distributed to the school leaders and teachers of the sample twelve governmental primary schools in Hawassa city administration. From the distributed 125 leaders' questionnaires, 121 questionnaires were filled and returned timely and this represented 96.8% of the rate of return. On other side, 81 teacher questionnaires were filled and returned and this comprises of the 95% of the rate of return from the 85 distributed teacher questionnaires. Interviews were conducted with eight educational officials at the Hawassa city administration education bureau and four cluster supervisors at their satellite schools.

The respondents were categorized in to three groups depending on their roles and responsibilities. The educational experts were categorized in the same group as they are found at the top level of the educational structure in the city administration and are responsible for the management and supervision of the schools .Accordingly, their role is inseparable; therefore, they are categorized under a group referred as experts. The school principals, teacher representatives in education and training boards, parent teacher associations and school improvement committees, unit leaders, department heads were grouped as one because they are school level leaders and are concerned with school level decisions. Thus, they were named by the researcher as school leaders or leaders. The third groups of respondents were teachers who together render their academic responsibilities with the above ones and were close observers and part and parcels of the effects of their school leadership situation.

The Extent of Female and Male styles of School Leadership in the Sample Primary Schools

The aim of this sub-section is to make thorough discussions and interpretations on the proportion of gender representation in the primary school leadership. In addition, it gives focus to the extent of female and male styles of leadership in the strategic leadership of the schools.

Table 3: Male and Female Representation in Each Category of School Leadership Positions in the Sample Schools

No	Leadership Position	Male		Female	
		No	%	No	%
1	Principal	5	62.5	3	37.5
2	Vice principal	8	57.14	6	42.86
3	Parent teacher association teacher representatives	10	66.7	5	33.3
4	School improvement committee teacher representatives	21	55.26	17	44.74
5	Unit leader	15	45.5	18	54.5
6	Department head	6	46.2	7	53.8
	Total	**65**	**53.7**	**56**	**46.3**

Source, own survey 2009

As table above indicates, 5(62.5%) of the males and 3(37.5%) of the females were the school principals. Regarding the vice principalship 8(57.14%) and 6(42.86%) of the males and females respectively were the vice principals. Concerning teacher representatives in parent teacher associations, 10(66.7%) of the males and 5(33.7%) of females were represented in the PTA s of the sample schools. As the data indicates 21(55.26%) of the males and 17(44.74%) of the females were represented in the school improvement committees as teacher representatives. Regarding the unit leadership, 18(54.5%) of them were females and the remaining 15(45.5%) of them were males. Concerning the department headship female constituted the largest share 7(53.8%) of them were females and 6(46.2%) of them were males. In one of the interviews with education training official narrated about male and female representation in the leadership positions of the schools as follows;

In Hawassa city administration, our schools were entirely led by males and there was absence of women school leaders before 1996 E.c. But in the present time there are 9 female principals and vice principals. In addition there are lots of female teacher representatives in parent teacher associations and other committees and the education and training boards of each and every school. Thus, now it is believed that women can lead the primary schools.

These findings indicate that there is almost an increasing attempt to represent both genders in the different levels of the school leadership structures. In one of the interviews with cluster Supervisor regarding school leaders attempt so as to create safe and healthy teaching and learning environment , one of the cluster supervisors narrated the following;

The female school leaders are visible in their attempts to make safe and healthy school environments. For instance in the school called Nigist Furra the female principal decorated the school gardens and built pipe line drinking water and constructed school library, male and female students solid and liquid waste discharge toilets separately. She did this with her proposal grant secured from UNDP and our financial supports.

The School Administrative Communication Strategies Used by Male and Female Leaders

In this part discussions and interpretations are given on the different school communication strategies frequently employed by the male and female school leaders. According to the questionnaire results, 18(23.4%) of the male teachers and majority 47(61%) of the female teachers indicated there is a difference in the method of school administrative communication styles used by their male and female leaders. But 3(3.9%) of the male teachers and 9(11.7%) of the female teachers didn't accept as there is difference in the method of school communication used by male and female school leaders. Thus, it is possible to conclude that there is a difference in the method of school administrative communication styles being used by the male and female leaders in the schools.

Table 4 Male and Female leaders' View on their School Communication Strategies

	variable		Leaders			
			No	%	Chi(X^2)	df
	Method of School Communication Frequently Used Face –to- face contact	M	15	12.6	7.9	3
		F	22	18.4		
	A. Office memos	M	2	1.6		
		F	0	0		
	B. Letters	M	0	0		
		F	2	1.68		
	D. Meetings	M	47	39.5		
		F	31	26		
	Total		119	100		

Source, own survey 2009

As table 4 indicates that 22(18.49%) of the female leaders replied that they frequently employed face-to- face contact method of school communication in their leadership practice. In other side, 47(39.5%) of the male leaders and 31(26.05) of the female leaders used school meetings in their leadership activities to communicate with the school community and 2(1.68%) of the remaining female leaders and 2(1.82%) of the male leaders showed they employed office memos and letters respectively as their frequently preferable styles of school communication. The chi square (X^2) test value (7.97) at an alpha level 0.05 and degree of freedom 3 showed that there was statistically significant difference in the opinions of the male and female leaders in their styles of school communication. This implied that the male leaders preferred meetings and the female leaders indicated as they mostly used face-to-face contacts and letters as their usual methods of school communication.

Similarly, regarding the female leaders method of school communication, majority of the female teachers 35 (53.8%) and 10 (15.4%) of the male teachers indicated that their female leaders often prefer- face –to –face contacts in their usually school leadership duties and the remaining 8 (12.3%) of the male teacher and 12(18.5) of the female teachers suggested that their female leaders employed meetings so as to exchange, ideas, directions, instructions for school based decisions with in the school community. The data stipulated so far signified that the female leaders mainly relied on face- to -face communication. In addition the interview with an educational official strengthened the above idea as follows;

The female principal in Edget Be Andinet school is known in building collaborative and collegial school work environment. In this school there is a unique habit that was initiated by the principal .It is that all of the teachers gather in the school cafeteria beautifully arranged in cultural house of the ' Sidama hat'. Here it is not a place only meant to drink soft drinks, tea and coffee and make laughter and simple talks but it serves as a good ground for all the teachers together with the school principals and other leaders of the schools to discuss on teaching and learning process, achievements and challenges facing in the school every day and if there are work related conflicts they often solve here without arranging additional meetings and wasting the time of their teaching activity.

School Conflict Resolution Mechanisms used by Male and Female Leaders

In this part discussions and interpretations are given on the different school conflict resolution mechanisms frequently employed by the male and female school leaders. Regarding the occurrence of conflicts in the school ,53(44.6%) of the male leaders and 45(37.8%) of the female leaders 8(10.1%) and 25(31.7%) of the male and female teachers respectively explained that there were times where conflicts occurred between individuals or among different work groups or units in their schools. However, 11(9.2%) and 10(8.4%) of the male and female leaders, 15(19%) and 31(39.2%) of the male and female teachers respectively indicated that there was no any conflict in the school. As the majority of the respondents of the two groups showed there were conflicts as works are being performed at their schools. This is undeniable fact connected with change oriented organizations as there are divergent ideas and collaborative planning and decision making for the improvement of the schools.

On the distinctive conflict resolution approaches followed by male and female leaders while resolving school based conflicts, Sixteen (20.5%) of the female and 10 (12.8%) of the male teachers stated as they didn't observe any difference in the approaches of conflict resolution between their male and female leaders. But, 12(15.4%) of the male teachers and 40(51.3%) of the female leaders indicated that there were distinctive conflict resolution mechanisms followed by the male and female school leaders in solving school based conflicts. The interviews with cluster supervisor strengthen the issue as follows;

In the schools, there are sometimes conflicts among teachers and the leaders. The most commonly reported school conflicts to us indicated that the sources of the conflicts are linked with opportunities of involving in trainings, invigilating national exams. In addition, the other common conflicts that often arise with getting the interest on the mentioned and others are strongly linked to ethnic conflicts. These types of conflicts become so hot and exacerbate in the case of the male leaders and are often expressed with aggressive and emotional discourse. In contrary, when these types' conflicts happen in female led schools they cool down soon and peaceful work environment prevails with in short time.

This data clearly implied that there are distinctive approaches of conflict resolution followed by male and female leaders in the sample schools.

On the method of conflict resolution used by the male and female leaders, 29 (28.7%) and 3(2.97%) of the male and female leaders respectively stated as they followed win-loss approach of conflict resolution mechanism . 2 (1.98%) and 1(1.01%) of the male and female leaders indicated that they followed loss-loss and approach of conflict resolution mechanism. 25(24.75%) of the male leaders and 41(40.59%) of the female leaders often adopted win-win approach of conflict resolution mechanism. In order to observe the significant difference between male and female school leader mechanisms of conflict resolution, chi-square value 24.4 at an alpha level 0.05 indicated that there is statistical significance difference between male and female leaders' approaches of conflict resolution. Thus, it is possible to conclude that the male and female school leaders mostly followed different approaches in resolving conflicts.

Regarding the type of language that the school leaders frequently utilize to resolve conflicts. the male leaders 28(28%) indicated that they employed rational and strong verbal written language and 26(26%) of the female leaders stated that they used a hesitant and tentative verbal and written language and 12(12%) of the male leaders and 11(11%) of the female leaders utilized less dominating verbal and body language. In order to observe the significant difference between male and female leaders in their language usage while resolving conflicts, chi square value 30. 53 at alpha level 0.05 showed that there is statistical significant difference in the language usage of male and female leaders in resolving conflicts. This means male leaders preferred mostly rational and strong verbal and written language .But; the female leaders mostly followed hesitant and tentative verbal and written language.

In addition pertaining female leaders language in resolving conflict, 16 (28.5 %) of the female teachers and 10 (17.9%) of the male teachers indicated that their female leaders mostly followed hesitant and tentative written language. In addition 5(8.9%) of the male teachers and 15(26.8%) of the female teachers indicated that their female school leader frequently used less dominating verbal and body language. This is possible to conclude that the female school leaders used hesitant, tentative and less dominating verbal and body language. As Leithwood, Jantzi and Steinbach (1999) languages of women leaders in resolving conflicts were more hesitant and

tentative, their agendas found more informal and flexible, and women managers have less distance from subordinates.

On criticism providing approaches often used by the male and female leaders in the sample schools, 40(34.78%) of the male and 44(38.26%) of the female leaders stated that they magnified positive efforts and follow with the negative (weakness) as their trend of giving criticisms to their staff. In contrary to the above statement 23(20%) of the male leaders and 8(6.96%) of the female leaders indicated as they followed magnifying and starting with negative sides and proceed to the positive one. The researcher again tasted to know whether the significance difference exist between the male and female leaders in giving criticism to their subordinates. The chi- square (X^2) test value 6.455 at alpha level 0.05 and degree of freedom 1 showed that there was statistically significant difference in between male and female leaders in their preferable ways of criticism providing approaches. This is possible to conclude that the female leaders mostly focused on providing positive efforts and followed with negative weakness. However, the male leaders magnified negative criticisms and followed by positive ones.

The interview with cluster supervisor on work related criticisms provided by male and female leaders strengthen this idea as follows;

There is observable difference in giving work related criticisms by male and female leaders. The male leaders are not wise and are too careless and fast when they give work related criticisms. This results a negative image in the moral and efforts of the teachers. Consequently such workers mostly are often absent from the school and this most of the time affects the students lesson quality and coverage of the lesson. However, the female leaders are wise and soft and forward their suggestions in consultative and empathetic manner. This mostly creates sense of ownership in the minds of the teachers and increases their self-efficacy and level of morale for improved and quality work.

This is possible to conclude that the female leaders' styles of giving work related criticisms serves as good opportunity for the teachers recheck their works and make improvements.

In distributing leadership the majority of teachers 35(52.2%) female and 9(13.4%) males teachers suggested that their female leaders were the one who frequent promoting and actively involve teachers to participate in school decision making process. The remaining 12(17.9%) and

11(16.5%) of the male and female teacher respectively suggested that their male leaders were the one who often promoted, participated teachers in the leadership and decision making process of the school. This is possible to conclude that the female school leaders are more participatory than the male leaders in decision making and leadership activities. This is quite compatible to women leaders empowering attitude and consultative decision making and more collegial work places (Helgeen, 1990).

In one of the interviews with the educational official narrated as follows;

There is a difference between male and female leaders regarding school financial management decision making procedures. The males most of the time are bold and independent financial decision makers and are often exposed to corruptions .However, the female leaders are known in following the legal procedures of purchasing and thorough consulting and collective financial decision making .For instance in one of the primary schools, there a budget granted from the bureau for the construction of one additional block of class rooms. But the budget was corrupted by the male principal spending the money with out government purchasing procedures and consulting the school PTA members appropriately .Due to this the construction has been interrupted at its initial phase. This greatly affected the class size and enrollment of additional students in the schools. But the female vice principals replaced in the place of the male leader have maintained a consultative decisions and are known in following the appropriate procedures financial procedures and are praised and recognized for their effort in changing the image of the school in collaborative decision making.

This implied that most of the female leaders believed that involving teachers in decision making as an opportunity so as create mutually coordinated atmosphere for attainment of the schools visions and goals.

Efforts of Men and Women Leaders in School Professional Development Activities

Regarding professional development activities in the schools, 64(52.9%) of the male leaders and 54(44.6%) of the female leaders stated that they encouraged teachers in the school to involve in in-service trainings and workshops so as to capacitate their knowledge, skills with intended teaching methodology and body of knowledge. However, 1(0.8%) the male leader and 2(2%) of the female leaders suggested that they did not encourage the teachers for staff to participate in in-service trainings, workshops. From this data it can be conclude that the majority of the male and

female leaders were concerned with the issue of staff development as a means to build the teachers with the necessary body of knowledge and teaching methodology so as to continuously escalate the academic achievement of their students more than ever.

Regarding the realization of the school as a professional learning community, 61(51.3%) an 52(43.7%) of the male and female leaders respectively indicated that they attempted to make their school professional learning communities. However, very few that is 3(2.5%) of the male leaders and 3(2.5%) of the female leaders suggested as they were not as such concerned about the issue. It is possible to generalize from the gathered data that most of the male and female leaders gave attention so as to realize their schools professional learning communities

One of the interviews with cluster supervisor regarding staff narrated as follows;

Most of the times the male school leaders are bold enough to provide trainings or workshops in front of the teachers. But the female leaders do not have the confidence and often affected with stage fright and shyness. In other regard diplomatic searching of the necessary individuals or experts and funds from higher institution or other organizations and preparing timely staff professional development sessions they are so active diplomatic and good facilitators are more active than the males.

Regarding building a sense of vision in the schools, as it can also be observed in the table, the calculated mean value 4.39 for female leaders and 4.03 for male leaders implied that the female leaders rated the item higher than the male leaders. Thus it can be generalized that female leaders are more concerned to implement the sense of vision in their leadership of the schools than the male leaders.Regarding ensuring that the staff is competent, challenged, supported in seeking higher standard. The calculated mean scores 4.06 for the male and 4.19 for female leaders indicated that male leaders were less concerned on encouraging and supporting teaching staff who was competent, challenged and seek higher standards. But female are more concerned to encourage and support a competent, challenged and higher seeking teachers. This is possible to generalize that the female school leaders were more concerned in ensuring the teaching staff to be competent, challenged and supported in seeking higher standards than the male leaders.

Concerning support and encouragement of school teaching staff to implement change. The calculated mean 4.23 for male leaders and 4.48 for female leaders both scores are above the average point 3.0 stipulates that female leaders were more concerned than male leaders while encouraging and supporting the school teachers and school community in general to make change and school based improvements regarding their teaching learning content, methodology and academic achievement of their students with mutual and participation and ownership of the school community.They visit more classrooms keep up to date on curricular issues, spent more time with their peers. In this regard, Leithwood, Jantzi and Steinbach (1999)argued that women school leaders are strongly identified with educational or instructional leadership.

Pertaining valuing school management hierarchy and encouraging the teachers to follow strictly too, the calculated mean value 4.18 for male leaders and 4.11 for female leaders shows that mostly male leaders kept hierarchical management style than the female leaders. This is quite compatible with male leaders are mostly rationalistic, hierarchical, control; and developing personal rapport through strict role and relationships (Hanson, 2003).

On searching the best path of teachers expertise, ideas and efforts as an input to school. The calculated mean score 4.08 for male leaders and 4.30 for female leaders showed that the female leaders were the one who were more concerned to search the knowledge, skill and experience of different teachers in making school based decisions .This in turn greatly helps so as to bring and tangible change mutually benefiting improvement in the schools.

The calculated mean score about taking risk is 3.75 for male leaders and 3.60 for female leaders showed that the male school leaders had good skills in taking risks in their leadership than the female leaders.

Personal and Organizational Factors that Affect the Leadership Styles of Men and Women Leaders

Table 5: Personal and Organizational Factors that Affect the Leadership Styles of Men and Women Leaders

No	Variables	Sex	Leaders			
	Personal factors		No	%	Chi(X^2)	df
	A. Leaders' personal background	M	7	6.5	2.72	4
		F	11	10.3		
	B. Leaders' educational level and management experience	M	15	14		
1		F	13	12.15		
	C. Employees' personalities	M	20	18.7		
		F	16	14.95		
	D. work conditions	M	16	14.95		
		F	9	8.45		
	Total		107	100		

Source, own survey 2009

Concerning the personal factors behind the practice of leadership, 7(6.5%) and 11(10.3%) of the male and female leaders respectively indicated that their personal backgrounds such as personal values, philosophy and societal and family value systems the nature of their husbands as a factor that influenced their leadership styles. This confirmswith Blackmore (1999) that stated Women's styles of leadership and collegiality are discursively produced practices arising from being located in a particular array of communities work, home, and community practices. In one of the interviews with an educational official strengthened the issue as follows;

In Edget Beandinet school one of the highest performing model schools, the female principal as well as other school leaders have brought a visible school improvements and out standing students achievements and good relationship between the school and parents. Behind this efforts their female leaders' families especially their husbands have provided supports and collaborated them in reducing the work burden at home in managing children and house hold routines. Thus the education bureau and the school management gave awards for their contributions during this year half semester student's day.

Thus, the women leaders were affected with their home and community environments.

4. Conclusions and Recommendations

4.1. Conclusions

Based on the findings of the study, the researcher has come up with the following conclusions;

1. There is a growing involvement of female leaders in the different leadership positions of the schools like as school principals, vice principals, members of PTAs and school improvement committees, unit and department headships.

2. The results implied that the previously male leadership styles are being replaced with the female leadership styles. In addition, the female leaders were supported and trusted to involve in the strategic leadership of the primary schools at different levels of the school.

3. The different methods of school communication used by male and female have differ implications on the improvement of the school. The female leaders mostly used face to face contacts, meetings. This indicates that the communication styles of the female leaders are mostly dependent upon individualized and collegial work environment in the schools. This has particular value on school improvement .In contrary the male leaders' styles of communication mostly focused on office memos and meetings. This implied that the male leadership style of communication promote hierarchical and power distance in their relationship with their subordinates.

4. The presence of work related conflicts in the primary schools is one manifestation that the schools are becoming the grounds of sharing divergent expertise ideas in the accomplishment of the school visions and goals. Thus, it is possible to conclude that these schools are improving or making changes.

5. Regarding the method of conflict resolution, the female leaders' win-win approach is the one that is termed as good way of conflict resolving conflicts in leading schools. It promotes a peaceful work ground .This trend helps to satisfy conflicting work groups, individuals, committees. This again has a paramount contribution to create healthy and collaborative work environment in the schools. However, the m ale leaders were often

observed in applying win-loss approach of conflict resolution. This trend favors one conflicting group in the expense of the other. This greatly hampers the work environment and paves the way to emergence of antagonistic rivalry work groups that compete instead of collaborate and so as to make healthy and safe work environment and to bring school improvement real.

6. From the research out put on providing work related criticisms to the teachers and other workers in the school, the male leaders style emphasized on magnifying and starting with negative side s or weakness and follow with positive ones. This greatly affected the teachers work moral and efforts .This indirectly has negative effects on the students' achievements and school improvement activities in general. However the female leaders focused on magnifying and starting with positive sides and followed with negative one. This trend can bring positive contributions on the efforts rendered by the teachers to enhance the students' results and quality of teaching and learning process.

7. The findings indicated that there were attempts by male and female leaders to participate the teachers in staff professional development activities so as to realize the school as professional learning community. This is one of the green lights observed in the schools undergoing improvement and changes.

8. As the findings stipulated interdepartmental meetings and partnership teachings and coaching between young and senior teaching staff were used as staff development trends employed in the schools in addition to teachers' participation in in-service trainings. These are one opportunities so as the teachers exchange constructive academic ideas and students attitudes, active teaching and learning procedures with their peers in their schools and improve or update their knowledge. Moreover, instructional and experience sharing tours have paramount contribution for the teachers to have a wider intellectual sharing and comprehensive instructional experience sharing alternatives among different teachers of different schools.

9. Regarding distributing leadership findings indicated that the male leaders had good skills. This can help reduce work burden from the leaders and it can increase the

opportunity of the teacher to exercise authority and responsibility on the activities of the school. However the male leaders lack the ability to involve the teachers in school decisions but the female highly depend on team works. This has a great contribution so as to entertain divergent constructive expertise inputs of the teachers to come up to better decision and to realize school improvement through mutual trust and collaborative decision making.

10. The research out puts implied that the female leaders highly emphasized on building the sense of vision, ensuring that the staff as competent challenged and seeking higher standard, support and encourage the teachers to make change, , searching the best path of teachers expertise ideas and efforts as inputs to the school leadership, express their emotions softly, appreciate subordinates even for routine tasks, Spending longer hours, share and encourage to get information, good listeners and empathetic in front of their workers. The above listed findings implied that female style of leadership have elements that can promote collegial, collaborative and sense of ownership in the minds of the leaders, teachers and other community. This in turn paves good opportunity so as to realize school improvement.

11. The results of the findings indicated that male leaders focused on , maintaining and holding power so as to secure the risk and question of accountability, value and encourage their workers to follow the school management hierarchy strictly, take risks to disperse different authorities and responsibilities to be performed at different levels, express their emotions rigidly, stand management stress, prioritize office responsibilities than house hold responsibilities, bold enough in taking corrective actions on their subordinates. The above elements of males' leadership signified that they are compatible with static schools, and hierarchical, independent decision making trend. However, it contradicts with the nature of school leaderships style needed to realize increasing students' performance and school improvement in general.

12. Regarding the factors that influence male and female styles of leadership, one of the issues was that both the male and female leaders lacked the necessary educational level and appropriate educational management specialization. In this regard most of the

principals and vice principals except two had college diplomas and were non-educational management graduates. Thus, they lack the necessary knowledge, skills in school leadership and management. Particularly the female school principals as they have emerged recently they lack management experience. In addition, the long aged rigid top-down school organizational structure and absence of incentives and alternative remunerating mechanisms so as to encourage teachers when they render additional strategic leadership roles and responsibilities hampered male and female styles of leadership.

4.2. Recommendations

Based on the findings of the study, the researcher has forwarded the following suggestions to the concerned bodies;

Hawassa City Administration Education Bureau

1. The bureau should make attempts to increase the number of female leaders, principals and vice principals at all levels of the schools under the bureau. But special focus must be given to increasing female led primary schools.
2. The bureau should arrange different trainings. workshops, seminars on school leadership and school improvement for the school principals and other concerned bodies of the school management.
3. The bureau should arrange different and continuous trainings on school financial management procedures, documentation skills for school leaders.
4. The bureau should provide additional financial supports for the schools to design and implement different staff professional development activities so as to realize the schools as professional learning communities.
5. The bureau in connection with universities and colleges of teacher education is striving to provide in-service trainings to the school principals leading Grade1-8 schools to get their bachelor degrees in Educational Leadership and Management. The same is true to

principals and vice principals leading Grade1-4 to get their diplomas in School Leadership and Management. But the prevailing scale of training is not enough as compared to the available need of trained personnel. Hence, the bureau should scale up the opportunities to train all principals as soon as possible.

The school Management

1. The school principals with PTAs and education and training board members should reorganize the structure of school management to follow down –top approach and build the culture of collective ownership of the school so as to entertain teachers as inputs of school leadership decisions and a glue of common goal achievement.
2. The school principals should increase the number of female leaders in positions such as in department headships, committee, unit memberships and headship. In addition the school should capacitate leadership skills for different leaders of the schools through continuous awareness raising trainings or workshops, seminars.
3. The school principals and other concerned bodies of school management should empower the departments, committees, units with the necessary material and financial supports so as to discharge their leadership responsibilities independently in the schools to realize school improvement.
4. The school principals should make a critical search for appropriate teachers in appointing for membership and headship of departments, committees, units not merely focusing on gender representations but by making thorough search of feminine and masculine qualities of leadership from the male and female teachers.

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The application of interacting schematic knowledge with text variables in a reading lesson: The case of debre markos university first year students of 2010/ 2011 academic year

Haile Shibabaw

Debre Markos University College of social science and humanities Department of English

Abstract

Reading constitutes much of the work of university students. For example, they read to study different courses, to do assignments and to write project works. To do all these, efficient reading is an instrument without which success in university studies is not possible. As Hedge (2000) states, the level of reader comprehension of a text is determined by how well the schematic knowledge interact with the text variables. Hence, the main objective of this study is to examine the application of interacting schematic knowledge with text variables in a reading lesson. Accordingly, the specific research questions were designed to see the extent to which EFL instructors used reading activities to activate students' prior knowledge to create new knowledge; to examine the extent to which EFL instructors got students to have purposes of reading that helped them to construct meaning, and to investigate the major problems that students faced when interacting with reading texts. Moreover, the other research questions addressed in this research were related to examining whether the reading texts had clear organizational structure, and whether the level of difficulty of contents of the reading texts was appropriate to the students' level of University. The subjects of the study were ten EFL instructors and 100 students at Debre Markos University. The ten instructors were selected using purposive sampling technique as all were participating in the first round course provision .The 100 students were selected using simple random sampling technique; that is, using lot. To gather data for the study, questionnaire, group mode interview, and classroom observation were used. Percentage was employed to analyze the data obtained through close-ended questionnaire whereas qualitative data analysis was used with the data obtained through open-ended questionnaire, interview and classroom observation. The results from both the quantitative and the qualitative study showed that EFL instructors did not help students to do pre-reading questions and share ideas with a partner about the pre-reading questions. They were asked to read the passage silently to answer the comprehension questions. They were not asked to read part (s) of the passage to adjust their prediction to link the old knowledge with the new one. The types of purposes of reading used were reading to identify specific and general information. Though these purposes are crucial to reproduce the exact text, they do not enable students to maintain coherence. The coherent meaning constructed by the reading will be somehow related to the reader's prior experience (world knowledge) and the structures already formed in the reader's mind (textual knowledge).Moreover, inability in English language; shortage of vocabulary knowledge; lack of reading habit; negative belief on the use of doing comprehension questions, and lack of exposure to do comprehension questions in the lower grades were the main problems for the students not to be interested in doing comprehension questions. Regarding text variables, the results showed that most of the reading texts that students read were related to the students' socio-cultural context; had clear organizational structure; introduced abstract concepts by using concrete examples; explicitly stated complex relationships, and included the three levels of comprehension questions. Nevertheless, they seemed to have problems in containing appropriate vocabulary load, and they did not have activities that acknowledge students' schematic knowledge. Finally, it is recommended that reading should be taught based on predict-sample text- re-predict –resample process. Setting continual individual and group purposes for reading is also crucial to help students to construct meaning from reading texts.

Definition of Terms and Acronyms

Bottom-up processing: Decoding of a text, step by step, from the smallest elements, for example, sounds or letters, gradually building up to larger units of meaning such as sentences (Hedge, 2000).

Content schemata: The background knowledge of a topic, which a learner holds in his or her mind, and which assists a learner in the interpretation of a text (Hedge, 2000).

Formal schemata: Prior knowledge of the formal structure of different types of texts, which assist readers and listeners in understanding and integrating them (Hedge, 2000).

Meta-cognitive strategies: Strategies used by language learners to plan, regulate, and monitor their learning (Hedge, 2000).

Schematic knowledge: Another term for prior knowledge, gained from experience, knowledge of the way the world is organized, which is held as mental representations in the mind (Hedge, 2000).

Top-down processing: This involves making sense of spoken or written language, primarily by referring to schematic knowledge.

DR-TA _ Directed Reading- Thinking Activity (Ruddell, 2001)

DRA _ Directed Reading Activity (Ruddell, 2001)

DMU–Debre Markos University

1. Introduction

1.1 Background of the study

English is spoken as a foreign language in Ethiopia and is a medium of instruction in the education system from grade seven to tertiary level. The bulk of the teaching and learning materials used in different levels are written in English. Since reading constitutes much of the work at universities, a high degree of demand is placed on students to read academic texts. They, for example, read to do assignments, to pass tests and examinations, and to write term papers. Efficient reading is, therefore, an instrument, without which success in university studies is not possible. As Hedge (2000) states, the level of reader comprehension of the text is determined by how well the schematic knowledge (purpose for reading the text, knowledge of the topic, knowledge of the genre, foreign language abilities, awareness of socio-cultural context, and prior knowledge) interact with the text variables (text type, structure, syntax, and vocabulary). Schematic knowledge that an effective reader should bring to a text refers to a reader's existing

language proficiency in vocabulary, grammar and idioms; knowledge of different text types and genres; andthe background knowledge of the content area of a text, or the topic a text talks about (Carrel, 1984). Text variables are textual features which are provided by the author to help a reader make connections within the text, and influence the way text is interpreted. These features include structure, content, and cohesion of the text, and how the letters and words are placed on the page.

To resolve problems related to lack of schematic knowledge, Harmer (2001) recommends that practitioners need to think about how they choose and use topics and how they approach different reading genres. Moreover, to activate the learners' prior knowledge and to bring their schemata to the text, practitioners can give predictive tasks and interesting activities (Cook, 1989).

Concerning difficulties in relation to topic and genre, Harmer (2001:205) notes, "Many reading activities prove less successful than anticipated because the topic is not appropriate or because students are not familiar with the genre they are dealing with." This means if learners are not interested in a topic or if they are unfamiliar with the text genre they are asked to work on, they develop resistance to engage themselves fully with the activity. This shows that the learners' lack of schematic knowledge, which is the combination of knowledge of the topic, of the genre, and of socio-cultural context, may be a major hindrance to successful reading.

To resolve problems related to systemic or language difficulty, Harmer (2001) recommends that we need to think about pre-teaching, using alternatives to authentic language. Regarding text variables, Paran (1996) and Wallace (1992) state that sentence length, word length, and percentage of unknown words play their part in a text's comprehensibility; that is, texts with longer sentences and words, and with more percentage of unknown words will be more difficult to understand than those with shorter sentences and words and less percentage of unknown words.

If the language, topic, genre, and socio-cultural context of a text are familiar with learners, and if learners are given tasks, which raise their expectations, help them tease out meanings, and

provoke an examination of the reading passage, then learners can be in a dynamic relationship with a text (Hedge, 2000). However, the question that always comes to the researcher's mind is "How well do the students in universities interact with reading texts?"

1.2 Statement of the Problem

My experience as English language teacher in three high schools, one College of Teacher Education and Debre Markos University has been that most students in these institutions have trouble in reading texts in their reading lessons. My information about this comes partly from my observations of students in my classrooms and partly from the students' low scores on the reading part of tests and examinations. Furthermore, from the discussions I have had with colleagues, I have learned that their students, too, have difficulty in reading. It is difficult for me to specify accurately what the nature of these difficulties is .However, when I read literature on reading; I understand that interacting schematic knowledge with text variables is crucial for successful reading.

In this research, therefore, the researcher tried to answer the questions that follow:

1. To what extent do EFL instructors use reading activities to activate students' schematic knowledge to create new knowledge?
2. To what extent do EFL instructors give students purposes for reading that help them to construct meaning?
3. What major problems do students face when interacting with reading texts?
4. Is the level of difficulty of contents of the reading texts (sentence complexity, vocabulary) appropriate to the students' level of understanding?

1.3 Purpose of the Study

Although the importance of reading remains unquestionable, the approach in conducting reading in the teaching learning process has never been an easy task in universities. As mentioned in the statement of the problem part, experience tells us that there are considerable difficulties in the teaching learning of English reading. Therefore, the main objective of this research is to study the application of interacting schematic knowledge with text variables in a reading lesson. Accordingly, the specific objectives for this study are:

1. To study to what extent EFL instructors use reading activities to activate students' prior knowledge to create new knowledge;

2. To investigate to what extent EFL instructors give students purposes for reading that help them to construct meaning;

3. To identify major problems that students face when interacting with reading texts;

4. To identify if the level of difficulty of contents of the reading texts (sentence complexity, vocabulary) are appropriate to the students' level of understanding.

1.4 Significance of the Study

The researcher believes that the result of this study is crucial for course designers to improve the courses specially the reading part of the courses. Moreover, the research is thought to be vital for learners in general and for university students in particular by pinpointing aspects which are very helpful in making meanings from reading texts. The results of the study might also create awareness on the part of English language instructors on how to help students make meaning from reading texts. Furthermore, this research may initiate other researchers to do detailed research on similar issues that are not addressed by this research.

1.5 Scope of the Study

The study is delimited to Debre Markos University which is found in the Amhara region. Although conducting the research on more than one university can strengthen the findings, it is beyond the time and the budget available to the researcher. Twenty English language instructors and four hundred fifty first year students who took communicative English skills course were the population in the study. Debre Markos University was selected a study site for it was the researcher's place of work that would make building rapport with the subjects of the study easier. The first year students were selected since they took communicative English skills course.

2. Review of related literature

This chapter presents related literatures that are crucial to the issue under discussion. Hence, in this chapter, research results together with the information given by different scholars about

reading, schema theories, text variables and other related issues are included.

2.1 What is reading?

Reading is a complicated, actively thinking mental activity, a thinking process to experience, predict, verify and acknowledge information according to readers' previous information, knowledge and experience, and also an interactive language communication between readers and the writer through text. Smith (1985) pointed out that in order to understand language, a reader must utilize direct and implicit information. Direct information refers to words written down, while implicit information includes knowledge of structures and words of a language in a text and knowledge of the discussed topic and certain experience. Different scholars have proposed various models of reading to deal with ways of processing a text. Based on the view scholars give emphasis, the models are generally known as bottom-up, top-down, and interactive (Harmer, 2001).

2.1.1Bottom-up model

Bottom-up Model came into being in 1960s, which emphasizes that readers, taking reading materials as information input, start from letters and words recognition and then combine information continuously to accomplish reading activity. This model highlights that reading must be done in a fixed sequence to get word meaning gradually and readers comprehend the reading materials mainly by language knowledge (Harmer, 2001).

The essential features of the bottom-up approach as indicated above are that the reader tries to decode each individual letter encountered by matching it to the minimal units of meaning in the sound system to arrive at a meaning of the text (McDonough and Shaw 1993). Similarly, Ruddell (1971) considers the reading process as a process in which a reader progresses in sequence from a morphophonemic level through a syntactic and then to a semantic level. Likewise, Gough (1972) regards a reading process, as it is a serial process where the reader recognizes every word

through phonemic decoding; and understands meanings through understanding meaning of individual sentences.

Generally, bottom-up model of reading process holds the view that reading is a process of building symbols into words, words into sentences and sentences into the overall meaning, which reflects traditional attitudes toward reading. In this model, readers begin with the lowest level, from which the symbols are identified. Strings of symbols are then analyzed into morphological clusters, from which words are recognized and then strings of words are analyzed into phrases and sentences. Therefore, from the point of view of bottom-up model, accuracy in understanding linguistic units is very significant and the lower-level processing skills in reading are important.

The bottom-up model has its own shortcomings. Eskey (1988) points out the inadequacies as it fails to recognize the use of background knowledge and other cognitive and meta-cognitive skills such as predicting and anticipating. That is, in this model, readers' implicit information- one's knowledge and life experience- is neglected and one's active processing of information is not taken into consideration (ibid). Following this model, teachers would concentrate mostly on words, sentence patterns and grammatical knowledge related to the reading material but pay little attention to relevant background knowledge when teaching reading.

2.1.2 Top-down model

Goodman (1967) and Smith (1971) proposed a reading model based on psycholinguistics, named as "Top-down Model". The model takes concept theory as basis, and points out that readers predict reading materials according to previous syntax and semantic knowledge and make confirmation and modification during reading process. The model assumes that reading process is based on readers' real world knowledge in memory and is a circulating process of predicting, verifying and confirming. The most influential and comprehensive top-down model is put forward by Kenneth S. Goodman (1967), "The goal of reading is constructing meaning in response to text; it requires interactive use of grapho-phonic, syntactic, and semantic cues to construct meaning." Readers do not read every word, but see through the text in order to be able

to guess the meaning of the words or phrases. During this model reading process, readers take in larger units of meaning of the text at a time, match what they already know with the meaning they derive from the text. Top-down processing occurs as the system makes general predictions based on higher level and general schemata. It searches the input for information to fit into these partially satisfied, higher order schemata.

Under the guidance of this model, teachers would pay too much attention to students' previous knowledge, that is, implicit information in the reading process and overlook basic language knowledge teaching. In top-down model or processing, the reader gets a general view of the reading passage by absorbing the overall picture rather than looking at its elements (Harmer, 2001). Moreover, in top-down model comprehension strategies involve knowledge that a reader brings to a text as opposed to the information that is available within the text itself (Hedge 2000). As she notes, in this model, the reader's background knowledge and his/her knowledge of the language and of the content are more important than the visual display-the text.

Smith (1978:78) describes meaning from a text as:

... is some kind of relation to what is already known. The kind of relation is one of matching or correspondence that relates textual answers to the question posed by the predictions that are themselves motivated by what the reader knows or wants to know.

The top-down model has its own limitations in that it disregards the view that sometimes it is the individual details that help us understand the whole; without a good understanding of a reasonable proportion of the details gained through some bottom-up processing, we will be unable to get any clear general picture of what the text is about (Harmer, 2001).

2.1.3 Interactive model

From the discussion above, it can be concluded that both bottom-up and top-down models have limitations. The recognition of this results in a more comprehensive reading process, namely, interactive model which is an interaction of bottom-up and top-down models claiming that prior

knowledge and prediction facilitate the processing of input from the text. In interactive reading processing, both bottom-up and top-down processing should be occurring at all levels simultaneously (Rumelhart, 1980). Readers may employ bottom-up process as a base for comprehending a text and then turn to top-down process to execute high-level interpretation of the content of the text. Prediction of the content will be confirmed, revised or rejected through further data analysis. Interactive model of reading process is the combination of bottom-up and top-down models, and thus absorbs their merits and avoids the limitations to a great extent

The term 'interaction' refers to the interplay among various kinds of knowledge that a reader employs in moving through a text (Hedge, 2000). Two of these, syntactic and morphological knowledge, are to do with the language itself. These kinds of knowledge, as indicated above, help a reader to decode the language of a text. They can together be called linguistic, or systemic, knowledge. As stated by Hedge (2000), general world knowledge, socio cultural, topic, and genre knowledge together referred to as schematic knowledge. Schematic knowledge enables a reader to work with the language of the text to interpret its meaning. According to the view in the interactive model, the reading process involves the interaction and mutual influence of reader's background knowledge and textual sources. Theorists have attempted to account for the effect of background knowledge using the schema theory of reading.

2.2 The role of schema in the process of Reading

Reading is a major way to learn English. Reading ability is a basic and significant criterion to scale one's English level. Schema plays an important role in the process of reading. A great number of researches on schema theory have been conducted and the achievements have shown that the theory is useful in helping improve students' reading ability. There are various influential ways of defining schema. Bartlett (1932) stated the cognitive definitions of schema as "an active organization of past reactions of past experiences, which must always be supposed to be operation in any well-adapted organic response". Rumelhart (1980) stated about the concept of schema theory basically as a theory of how knowledge is mentally represented in the mind and used. He wrote that "all knowledge is packaged into units. These units are the schemata". Widdowson (1983) also defined schema as "cognitive constructs which allow for the

organization of information in a long-term memory". From the above definitions, we may conclude that schema is the prior knowledge gained through experiences stored in one's mind.

2.2.1 Types of schema

Generally, there are three major types of schemata, namely, linguistic schemata, formal schemata and content schemata, which are closely related to reading comprehension(Carrel, 1984)..

A. Linguistic schemata: Linguistic schemata refer to readers' existing language proficiency in vocabulary, grammar and idioms. They are the foundation of other schemata. As is known, linguistic knowledge plays an essential part in text. Without linguistic schemata, it is impossible for the reader to decode and comprehend a text. Therefore, the more linguistic schemata a reader has in his mind, the faster the reader acquires information and the better understanding the reader may get.

B Formal schemata: Formal schemata refer to the organizational forms and rhetorical structures of written texts, including knowledge of different text types and genres, and the acknowledgement that different types of texts use text organization, language structures, vocabulary, grammar and level of formality differently. Carrel (1984) made an experiment to investigate whether we can facilitate ESL/EFL reading comprehension by teaching text structure based on schematic knowledge. The result of the experiment proved that explicit teaching of the text structure can improve students' reading comprehension. Different reading materials bear different characteristics and pose the correspondent reading requests for readers. A suitable employment of formal schemata plays a significant role in reading.

C. Content schemata: Content schemata refer to the background knowledge of the content area of a text, or the topic a text talks about. They include topic familiarity, cultural knowledge and previous experience with a field. Content schemata deal with the knowledge relative to the content domain of the text, which is the key to the understanding of texts. Since one language is not only the simple combination of vocabulary, sentence structure and grammar but also the bearer of different levels of the language's culture. To some extent, content schemata can make

up for the lack of language schemata, and thus help learners understand texts by predicting, choosing information and removing ambiguities. Many studies show that readers' content schemata influence their reading comprehension more greatly than formal schemata. On the whole, the familiarity of the topic has a direct influence on readers' comprehension. The more the reader knows about the topic, the more easily and quickly he/she gets the information of the text. Therefore, if one wants to be an efficient reader, he/she needs to try to know the knowledge about more fields and topics. Learners with more prior knowledge can better comprehend and remember more the text.

2.3 The Effects of language, formal and Content Schemata during Reading

According to Harmer (2001), language knowledge enables readers to work on the reading text. A fluent reader has a good knowledge of language structure and can recognize a wide range of vocabulary automatically. It is clear that foreign language readers are going to have difficulties in processing texts, which contain unfamiliar aspects of the English language. For example, inability to understand the cohesive devices in a text will impede understanding of the functional relationships of sentences. Cohesive devices include such things as reference items (for example, 'they', 'these matters' 'the latter'); lexical cohesion through a chain of synonyms (for example, 'funding ... financing ... resourcing), or deletion of items such as relative pronouns (for example, 'which' and 'that'). Berman (1984) has suggested that deletion, another cohesive device, can make a text 'opaque' to the reader.

A reader may also use discourse signals of various kinds to get through a text. These may be connectives such as 'moreover', which signals addition, or 'whereas', which signals contrast, 'because' which signal reason, or 'therefore', which signals result (Harmer, 2001). A concern that students should exploit their knowledge of language effectively implies a number of points for the methodology of the reading class (Harmer, 2001). First, encouraging extensive reading may help some students to build knowledge of vocabulary and an awareness of the features of written texts. Second, texts need to be chosen and tasks designed to provide support for what the learner already knows. Third, there might be value in regular use of analytical activities, which

draw students' attention explicitly to some linguistic features of texts. Finally, when students deal with a particular reading text in class, the teacher will need to prepare them for any specific language difficulty they might encounter in it. In seeking to understand the role of background knowledge in reading comprehension, it is often useful to draw a distinction between formal schemata (background knowledge of the formal, rhetorical organizational structures of different types of texts) and content schemata (background knowledge of the content area of a text) (Carrell, 1983).

Carrell (1983) notes the possible causes for a reader's failure to activate an appropriate schema. One possible cause of the failure to activate an appropriate schema may be the writer is not having provided sufficient clues in the text for the reader to utilize effectively a bottom- up processing model to activate schemata the reader may already possess. The other cause can be the fact that the reader does not possess the appropriate schema anticipated by the author and thus fails to comprehend. In both instances, there is a mismatch between what the writer anticipates the reader can do to extract meaning from the text and what the reader is actually able to do.

As Carrell (1983) has stated one of the most obvious reasons, why a particular content schema may fail to exist for a reader, is that the schema is culturally specific and is not part of particular reader's cultural background. Study by Carrell (1981a) has shown that the implicit cultural content knowledge presupposed by a text interacts with the reader's own cultural background knowledge of content to make texts whose content is based on one's own culture easier to read and understand than syntactically and rhetorically equivalent texts based on a less familiar, more distant culture. Other research has shown general effects of content schemata on EFL/ESL reading comprehension. Johnson (1982) has shown that EFL/ESL readers had better recall a text on a familiar topic than a similar text on an unfamiliar topic. Moreover, Hudson (1982) reports a study showing an interaction between overall linguistic proficiency in EFL/ESL and content induced schematic effects in EFL/ESL reading comprehension. Specifically, that study demonstrates the facilitating effects on comprehension of explicitly inducing content schemata through pre- reading activities, especially at the beginning and intermediate proficiency levels, as

compared to two other methods of inducing content schemata (through vocabulary activities and read-reread activities).

Several recent studies have shown the effects of formal, rhetorical schemata in EFL/ESL. In a study by Carrell (1981b), two groups of university bound, intermediate-level ESL subjects each read a different type of simple story-one type well structured according to a simple story schema structure and the other type deliberately violating the story schema structure. Results showed that when second language learners process stories violating the story schema, both the quantity of recall and the temporal sequences of recall are affected. In other words, when the content is kept constant but the rhetorical structure is varied, second language reading comprehension is affected.

2.4 World and Text Knowledge

2.4.1 World knowledge

World knowledge includes information within individual schemata, information involving networks of relationships between and across schemata, and information about embedded characteristics of schemata (Rumelhart, 1981). As exemplified in Rumelhart (1981), the "library" schema has within it a large number of schemata we could enumerate: "desk", "chair", "classification system", and "book", to name a few. These schemata are related to, and in fact embedded in, various other schemata. Think about a library desk, a school desk, an office desk, a computer desk, and so forth and you begin to get the idea. Each of these world knowledge schemata carries with it the scripts, as well as procedural knowledge that makes it possible for the reader to organize information, allocate attention, draw inferences, carry out orderly memory searches, edit and summarize information, and remember information (Anderson, 1994).During reading, world knowledge serves as both the foundation for and the building blocks for constructing meaning- that is, the amount, type, and kind of prior knowledge a reader has about a given topic and the manner in which the reader links known and new knowledge affects the meaning he or she constructs for the immediate text. Hartman (1995) describes this process as "mobilization of potential knowledge fragments" in which the reader engages in "transposing

texts into other texts, absorbing one text into another, and building a variety of intersecting texts" that lead to a reader's construction of meaning (1995:526). World knowledge is thus constantly changing as the result of our ongoing transactions in the world around us and perceptions of incoming information; as a result, no two readings of the same text are ever the same (Weaver, 1994). Generally, the greater the reader's world knowledge, the greater the likelihood that he or she will construct meaning congruent with the author's intended meaning. Rumelhart (1981:22) suggests three explanations to account for lack of concurrence between reader text and author text.

1. The reader may not have the appropriate schemata. In this case, amount of world knowledge is the critical feature in that reader simply has no basis for constructing meaning. The reader could not make meaning of ideas for which he or she had no world knowledge.
2. The reader may have the appropriate schemata, but the information available in text may not suggest them. Here, the reader constructs incomplete or inappropriate meaning but could possibly construct meaning given addition textual information to direct attention to the intended schemata.
3. The reader may construct a consistent interpretation of text, but not the one intended. In this instance, the reader "understands text" but misunderstands the author. This situation can occur when prior knowledge is inaccurate; when stylistic devices signaling author intent, such as irony or exaggeration, are not perceived; or when reader linkages are significantly different from author linkages (Anders and Lloyd, 1989).

Hartman (1995) makes the important point that prior knowledge is not some static "thing" that readers bring to reading events and "unload" before they read; rather, prior knowledge is constantly changing- and creating change-throughout reading, so that it influences and is influenced by all of the elements of the reading event.

2.4.2 Text Knowledge

In addition to using world knowledge, readers also employ prior knowledge about text while reading. Text knowledge is a subject of world knowledge .It contains all that the individual

knows about how text is organized, how one processes text, how the language of text functions, what expectations are reasonable when approaching print, what procedures are useful interaction with text, and countless other conventions of text (Ruddell, 2001).

Ruddell (2001) further notes that knowledge about text information becomes increasingly sophisticated and complex as we have correspondingly wider experience with written text. This information forms a set of assumptions and expectations about text that operates each time we begin to read and continue throughout the reader- text interaction. He also states that the reader's ability to construct meaning congruent with the author's intended meaning depends on the content of his or her prior knowledge and previous experience, on her or his ability to access that prior knowledge base, and on the type and content of the linkages he or she makes between available texts. The reader's ability to construct meaning also depends on her or his ability to use information available in text.

As Ruddell (2001) points out, text and world-knowledge are available in text; whether or not the reader's prior knowledge base makes their meaning accessible, when information in text is already known, that is considered redundant and readily processed. In other words, the things in text that the reader knows before entering that text are redundant and, because of their redundancy, require less mental energy and cognitive processing time. World-knowledge information in text may be redundant as well. For example, the degree to which individuals have experienced reading history books and suspense novels is the degree to which the information is redundant for each person. We create "slots" in our history book and suspense novel schemata for redundant elements that allow us to encounter them in text and process them with very little mental effort; thus, the amount of redundancy present in text determines, to some degree, the amount of mental energy we have to concentrate on new information (Anderson, 1994).

When readers use information both from their own prior knowledge base and from information available in text, they are thus able to enter text with expectations or predictions that assist in constructing the intended meaning. New, or non-redundant, information available in text is understood to the degree that the reader is able to create linkages between the new information

and his or her prior knowledge base. New information is the information for which we literally have no slots; therefore, when text is highly abstract or obscure, creating cognitive links between the new and the known is difficult (Sadosk and Paivo, 1994). As readers working independently, they frequently give up or seek help constructing meaning for text with large amounts of new information. In school, instruction and/or social interactions often assist readers in creating links that allow understanding of new information.

Comprehension is the "use of prior knowledge to create new knowledge" (Adams and Bruce, 1982). The author has initial responsibility for comprehensibility of text, but the major factor related to reading comprehension is the goodness of fit between reader and text. This includes prior knowledge, motivation, cultural background, age, and interest of the reader. Prior knowledge can be gained from informal sources, like family, the home environment, or peers; or more formal sources like school, where subject matter and topic knowledge are learned (Alexander et al, 1994). Aspects of prior knowledge that influence reading comprehension include previous use of reading strategies, life experience, culture, language knowledge or conceptual knowledge. Any of these aspects offer a good fit or a mismatch between reader and text (Gordon, 1992).

Guthrie and Wigfield (2000) defined reading motivation as the interaction of individual goals, values, and beliefs with the topics, processes, and outcomes of reading. Motivated readers do so with purpose, a desire for understanding, a sense of self-efficacy and ownership. Internal desires (intrinsic reasons) or external (extrinsic) forces are factors that motivate readers to read and comprehended text (Ibid).Intrinsic motivation comes from within the reader. Intrinsically motivated readers have a learning-goal orientation: they read for its own sake, to satisfy curiosity, or for challenge or involvement (Alexander and Jettson, 2000). This sense of self-determination encourages readers to engage more deeply, take risks, create their own learning opportunities, and to keep plugging along in the face of reading challenges (Ibid).

Extrinsic motivations for reading include recognition, competition, and work avoidance (the reader uses strategies to reduce the amount of reading) (Guthrie, 1996). Extrinsically motivated

readers do so to accomplish a performance goal rather than a learning goal. The strongest extrinsically motivating factors are grades, approval, incentives, and recognition (Guthrie and Wigfield, 2000). Motivations develop and evolve within individual readers and increase as the reader develops a sense of agency over his/her reading and purposes for reading. Guthrie and Alao (1997) suggest eight principles that increase motivations for reading. They relate to conceptual themes, real-world interactions, self-direction, interesting text, social collaboration, self-expression, cognitive strategy instruction, and curricular coherence.

2.5 Text Variables

Text variables or textual features provided by the author help the reader make connections within the text, and influence the way text is interpreted. These features include structure, content, and cohesion of the text, and how the letters and words are placed on the page. They facilitate reading comprehension by providing clues in the text. In this section, textual variables such as structure, content and physical features (Cohesion) will be described.

2.5.1 Structural Features

Reading comprehension is facilitated if the text is well organized, and the structure is apparent to the reader (Armbruster, 1984). This is especially important if text content is unfamiliar to the reader (Mckeown et al., 1997). Readers use text structure to find key ideas, but depending on content schema and text schema of the reader; some structures are easier to read than others are. Structural features include coherence and rhetorical relationships. According to Armbruster (1984), the most important structural characteristic is textual coherence. The more coherent the text, the more likely the reader is to make the necessary connections between ideas at the sentence level with the overall ideas in the text. Armbruster (1984) classifies coherence as local and global. Global coherence is the term used to describe the integration of ideas across the entire text. Local coherence means that ideas are tied together both within and between sentences. Readers spend more time and expend more cognitive energy trying to make sense of an in-cohesive text (ibid). The premise behind Armbruster's classification of coherence is that

the reader must construct meaning at the sentence level in order to make sense of the overall meaning of the text.

Rhetorical relationships (use of titles, headings, a preview, and repetition of content) play an important role in content structure (Meyer, 1985); they help the reader make associations within the text at a global level (Goldman and Rakestraw, 2000). They inter-relate sentences, and give the text its structure. Rhetorical devices help guide the reader's processing of the text, but a reader must realize their significance in order to use them effectively (Goldman and Rakestraw, 2000). Rhetorical devices include organization or structural clues, linguistic clues, and signaling devices (Alexander and Jettson, 2000).

Comprehension is enhanced with the repeated and consistent use of these devices, but readers need to know what they are and how to use them effectively (Meyer, 1985).Understanding basic organizational and syntactic rules in a text will help the reader find the location of main ideas within the text on both a local and global level. For example, the reader must understand how to generalize global concepts into a single proposition, and to draw conclusions or make inferences about these propositions. Since placement of main ideas within the text and the paragraph will affect reading comprehension, readers should tend to read for important information at the beginning and end of a passage (Kieras, 1985).

Signaling devices are among the elements of the rhetorical relationships. They emphasize content or structure, and help the reader attend to important content. Examples include the use of titles, headings, a preview, or repetition of content (Goldman and Rakestraw, 2000). Signaled information is processed longer and recalled better by making the reader more aware important points at a local and global level (ibid). Major concepts and important key ideas can be highlighted by using number lists; underlining, changing the font, color or size, bolding or italicizing; bullets, arrows or tables.

2.5.2 Cohesion

Linguistic cues are another type of signaling device, and provide a sense of cohesion within the text. Halliday and Hason (1976) describe the interdependent nature of words, sentences, and paragraphs within the text, and define cohesion as a set of semantic resources for linking sentences. Cohesion is "the set of possibilities that exist in the language of making the text hang together" (Halliday and Hason, 1976:18).The integrative cues or connectives that help link ideas together to create a more cohesive text are words such as also, for instance, because, nevertheless, finally, furthermore, and consequently (Goldman and Bakestraw, 2000). These explicit cues help the reader relate one idea to another and add to textual cohesion. Armbruster (1984) refers to these connectives as a form of local coherence; a "linguistic mortar" used to help hold ideas together.

2.5.3 Content

The content of a text is an important variable in reading comprehension, but the most important aspect is that the text be a good match with the reader's prior knowledge, skills, interests, learning goals, and culture (Alexander et al., 1994). Unfortunately, there are texts, which make incorrect assumptions about the reader's prior knowledge, and fail to provide adequate additional information or explicit links to help the reader make meaning of the text (Beck et al., 1998).

2.6 Comprehension Instruction in Content Areas

2.6.1 Instructional Strategies for guiding Comprehension

Pearson, Roehler, Dole, and Duffy (1990) summarized a body of comprehension research about what strategies good readers use to construct full, rich meaning from text. From the many studies reviewed by Pearson and his associates, the following profile of proficient readers has merged. Pearson and his associates call the proficient readers "expert" or "thoughtful" readers. According to Pearson and Colleagues, thoughtful readers:

- Constantly search for connections between what they know and what they encounter as new information in the text.

- Constantly monitor the adequacy of the models of text meaning they build.
- Take steps to repair faulty comprehension once they realize that they have failed to understand something.
- Learn very early to distinguish important from less important ideas in the text they read.
- Are especially adept effectively that synthesizing information within and across texts and reading experiences.
- Make inferences during and after reading to achieve a full, integrated understanding of what they read.
- Sometimes consciously (usually unconsciously) ask questions of themselves, the authors they encounter, and the text they read.

To provide ongoing developments of students' comprehension abilities, teachers need to teach in such a way that the characteristics of thoughtful or strategic readers described above are taught and encouraged as students encounter classroom text. In the next section a strategy, which is renewed in the course of time and recommended as an effective means for facilitating students' comprehension, is described. This strategy is the Directed Reading- Thinking Activity (DR-TA).

2.6.2 The Directed Reading- Thinking Activity (DR-TA)

The Directed Reading- Thinking Activity (DR-TA) was introduced by Russell Staufer in1969 as a means of developing reading comprehension. It has received renewed attention and recommendation as an effective means of facilitating students' comprehension over the years (Gillet and Temple, 2000). Essentially, the DR-TA guides students through text by having the teacher ask students to make and support predictions before reading and then examine their predictions, conclusions, and logic as reading progresses (Ruddell, 2001).

Smith (1994: 19) makes a strong argument for DR-TA and DR-TA like instruction that focuses on students' predictions and subsequent reading of text;

Now at last prediction and comprehension can be tied together. Prediction means asking questions, and comprehension means being able to get some of the questions answered. Comprehension, basically, is the absence of confusion. As we read, as we listen to someone talking, as we go through life, we are constantly asking questions, and then we comprehend. . . In addition, the person who does not comprehend a book or newspaper article is the one who cannot find relevant questions and answers concerning the next part of the text. There is a flow to comprehension, with new questions constantly being generated from the answers that are sought.

According to Ruddell (2001), DR- TA is an important instructional strategy due to several reasons. The first reason is that it replicates the predict-sample text- repredict-resample process as a critical component of comprehension; it encourages the behaviors of thoughtful and strategic readers; and it stimulates full, rich understanding of text with its emphasis on prediction and discussion. The second reason is that it is adaptable to many different text styles. Third, the DR-TA is particularly useful for accommodating the wide cultural, language, and literacy differences students bring to classrooms and for supporting students in constructing new knowledge. Furthermore, it encourages students to construct meaning collaboratively and stimulates a great deal of student talk and verbal interchange, thus bringing into the classroom the real-life interaction and mutual sharing of knowledge and ability that are characteristic of everyday learning. Most importantly, the wide- ranging, rich classroom discussion of a DR- TA exposes speakers with limited English to the very language they are trying to learn. Stauffer (1980) points out five steps in the DR-TA.

The 1st step is identifying purposes for reading. The underlying view in this step is the DR-TA begins with students setting individual and group purposes for reading as they create inter textual links by combining prior knowledge with information in text to predict what the text is going to be about. Purpose setting continues throughout the reading each time students repredict, raising new questions, and then sample increasing amounts of text. In discussion, new links occur and students therefore return to text repeatedly with a purpose for reading; to get answers to questions arising from their predictions or to see whether new information will cause these predictions to be revised.

The 2nd step is adjusting rate to purposes and material. According to Stauffer (1980) rate adjustment occurs along two dimensions in a DR- TA: (1) rate and flow of information (teacher-determined) and (2) reading rate (student-determined). The teacher determines the amount of text to be revealed between stop- points and the length of discussion time at each. The first stop-point should occur immediately following a title or opening line (ibid). Here, students are invited to speculate about all the possible contexts into which the title (line) might fit. Predictions will vary from literal to highly abstract. As they share predictions in class, students examine a variety of experiences- their own and others'- that not only present a range of possibilities but also raise question, "which of these will it be?"

The second stop-point- one paragraph, and sometimes two-usually provides partial answers to this question. Stopping at this point to discuss and make predictions launches students into the cycle of predicting-sampling text-repredicting- resampling that is so important to comprehension.

Decisions, regarding how much text is to be read between stop- points, should be based on text difficulty, concept density within the text, and students' familiarity with the topic (Ruddell, 2001). Generally, stop-points should occur at logical places- at the end of sections, following highly abstract passages, at the end of a page, or at points of high suspense-and should not exceed four or five stops per DR- TA lesson to allow ample opportunity for discussion, refinements of ideas, and guidance during reading without undue interruption (ibid).Critical to the guidance provided is the amount of discussion time at each stop-point. The amount of time allowed determines how long students will have to think and make predictions about what they are reading. It depends, in part, on the amount of information available and the degree of student participation. Of prime importance is the teacher's sensitivity to student needs and willingness to wait for ideas to occur (Ruddell, 2001).

Step 3 is observing the reading. For instruction to be effective, a certain amount of guided silent reading needs to be done in classroom. Teacher observation during that reading yields much

valuable information about students' silent reading abilities and allows the teacher to assist those students who do need help. Whether in small groups or with an entire class, the teacher can quickly learn, which students are faster readers and which are slower, which students are actually reading and which are not, which students exhibit signs of series reading problems (inattention, extreme slowness, stress symptoms, and so on), what strategies students use to get meaning from text or figure out on unknown word, and many other details (Stauffer, 1980).

Step 4 is related to developing comprehension. By now, it should be clear that developing comprehension is an integral part of all phases of the DR-TA (Stauffer, 1980). It occurs as students combine prior knowledge and new information to make predictions, read to confirm or adjust their predictions, and then draw conclusions and speculate during class discussion. It also occurs during the periodic discussions as students compare their knowledge base with others' ideas and viewpoints to their thinking (Ruddeel, 2001). During this process, it is the teacher's responsibility to see that new concepts are developed and reinforced and that students can anchor them within the framework of their prior knowledge base (Ibid).

As Stauffer (1980) states, the questioning strategies that teachers use to initiate and extend discussion are critical to developing comprehension in the DR-TA. The standard DR-TA has essentially two types of questions:

1. Questions that require speculation and prediction:

"With a title like that, what do you think the chapter (or story or article or passage) will be about? "
"Now what do you think?"
"What information do you think we'll find in this chapter (paragraph)?"
"What do you think will happen next?"

2. Questions that require drawing conclusions and/or providing support:

"What makes you say that?"
"Why?"
"How do you know that?"

The final step-**step 5**-pointed out by Stauffer (1980) is developing fundamental skills. When the reading is completed, the teacher directs the class in developing skills that are appropriate to

student needs and instructional goals. Activities should not require students to write answers to literal questions about what they have just read and discussed. The quality of the discussion and the level of understanding students have achieved have gone well beyond literal comprehension already (ibid). Activities should extend student response to text in some important way and may include vocabulary study, various activities to organize and combine information, or any of numerous writing activities (Ibid).

Hartman (1995) states the purpose and outcome of DR-TA. The purpose of DR-TA, as stated by Hartman, is to promote disciplined inquiry in which students use prior knowledge and evidence from text to arrive at new linkages, insights, and understandings, whether these new ideas come from within the immediate text or across multiple texts.One of the greatest values of a DR-TA is the sharing of diverse individual experiences and perceptions. This, however, does not mean that DR-TA lessons compromise the integrity for precision of what is to be learned; they do not. Rather, it acknowledges that students may take very different paths toward that understanding. Understanding of text information is the outcome of a DR-TA lesson (Hartman, 1995).

The teacher's role during a DR-TA lesson is to accept student predictions, making no judgment about how "correct" the perditions are, and to concentrate on follow-up probe questions after reading that assist students in making linkages between what they predicted and what they find and in articulating the reasons, logic, and evidence for the predictions that are made (Ruddell, 2001). Teachers interject information only when student comments indicate misinformation or misunderstanding. Critical to this point is that the teacher's role involves much listening than it does talking (Ibid).Good DR-TA teachers quite often find themselves standing in front of a class calling on students, nodding, and saying, "Why?", "What makes you say that?" "Um-hmm", "Really?" and "Any other ideas?". The teacher encourages students to support predictions and opinions through Methacognitive thought- that is, to examine aloud how they know something or reveal their line of reasoning and to clarify the logic of their thinking (Ruddell, 2001).

3. Research Methods

3.1 The Subjects

As indicated in the first chapter, the research site was Debre Markos University. Therefore, the subjects of the study were EFL instructors and 1st year students of Debre Markos University. In Debre Markos University there were fourteen EFL instructors (thirteen male and 1 female). Ten of them were involved in the study. Table 1 below summarizes the features of EFL instructors in Debre Markos University.

Table 1: General Features of EFL Instructors in Debre Markos University

Sex	Qualification		
	First Degree	Second Degree	Total
Male		19	19
Female		1	1
Total		20	20

Source: Own survey, 2010

Regarding University students, only first year Technology, Psychology, Amharic and accounting students of 2003 were the subjects of the study because only these students the course took in the first round. Second year and above students were already taking communicative English skills course. According to the information obtained from the ten English language instructors who were teaching communicative English skills in the first round, there were 450 first year students who were taken as population of the study. One hundred of them were subjects for the study (43 male and 57 female) as shown in Table 2 below. They were selected using simple random sampling technique.

Table 2: General Features of students who completed the Questionnaire

Sex	Total In number	Total in %
Male	43	43
Female	57	57
Total	100	100

Source: Own survey, 2010

3.2 Instruments of Data Collection

Classroom observation was the main tool used in this study to gather data from both instructors and students. Interview and questionnaire were also used to supplement the data collected

through the observation. Both students' and instructors' questionnaire were provided in English, and group mode interview with the students and instructors was also conducted in English.

3.2.1 Questionnaire

The questionnaire for instructors and students had a covering letter to introduce the purpose of the study to the respondents. Both the instructors and the students' questionnaire had four parts. Part one dealt with the respondents' personal data. Part one of the instructors' questionnaire had 4 questions aimed at eliciting information on the instructors' sex, level of education, number of years in teaching and number of years in teaching in the university. Part one of the students' questionnaire had two questions aimed at getting information about the students' sex, and age. Part two of the questionnaire of both the instructors and the students comprised 14 questions. These questions were adapted from Hedge (2000) and the available literature. They were based on 5 point likert scale. They were used to investigate the extent to which EFL instructors used the stated reading activities to activate students' prior knowledge and create new knowledge, and to which students practice them to activate their prior knowledge and add new information to what they already had. They were also used to examine the extent to which instructors got students to use purposes of reading that helped them to make meaning. The scale ranges from always (5) to never (1) for both instructors and students. Here, "always" means always when necessary. Part three of the questionnaire of both the students and the instructors comprised 9 questions. They were used to investigate whether reading texts that students read had clear organizational structure, and whether the level of difficulty of contents of the reading texts was appropriate to the students' level of understanding. They were also ended with 5-point scale. However, the mode of the questionnaire was "strongly agree", "agree", "uncertain", "disagree" and "strongly disagree".

Moreover, questionnaire with open-ended items were developed for both instructors and students under part four to examine the major problems students faced when interacting with reading texts.

3.2.2 Group mode Interview

A set of follow up group mode interviews was used for confirmation of some replies obtained through the questionnaire and the data obtained through classroom observation. It was implied to seek clarification as to whether the data regarding what readers brought to the text (prior knowledge) interact with the new information they got in the text. Twenty students were selected randomly for the group mode interview. The number of instructors randomly selected for the interview was three. The questions for the interview were related to what students should do before and while reading; causes for not understanding reading texts; types of comprehension questions students did; which types were difficult, and how they did comprehension questions.

3.2.3 Classroom observation

Classroom observation is an effective instrument in that it helps one to gather information that he/she cannot collect through the other instruments. In this study, observation was conducted for the same reason. Among the ten sections selected as a sample, three sections were randomly selected for the classroom observation and in each section; observation took place for 50 minutes during the reading part of the lesson. In the observations, predefined checklists were used (look at appendix 5).

3.3 Procedure of Data Collection

Prior to the actual administration of the instruments, the initial version of the students questionnaire (part 2 and part 3) was first administered as part of a pilot study to 30 first year students, who were not included as sampled subjects, in Debre Markos university. The reliability of the questionnaire (part 2 and part 3) in the pilot study was found using Cronbach's Alpha that helps to see the internal consistency of the items. The reliability of students' questionnaire was found to be .7803. The instructors' questionnaire was found commented on by four instructors from other departments of Debre Markos University for appropriateness and validity. This was done since the number of instructors in the pilot study was very few.

Before administering the questionnaires to instructors and students, a short explanation was given on the purpose of the questionnaire. The questionnaires were collected one day after the

day they were administered by the instructor of each section. That is, the subjects filled in the questionnaire at home so that it would not affect their studies during lesson hours and so that it could be given thorough attention. The questionnaire was administered to 100 subjects from 10 sections. The subjects were thus 21% of the target population. They were selected using simple random sampling technique. Questionnaire was also distributed to 10 instructors who were teaching communicative English skills during the first round.

Then, classroom observation took place in three randomly selected sections. In each section, observation took place for 50 minutes during a reading session. Finally, three instructors and 20 students were selected using simple random sampling technique for the interview. The interview for instructors was conducted in English on individual instructors base whereas panel mode discussion in English for students. The mode of the interview for instructors and students was on note- taking base.

3.4 Methods of Data Analysis

This research work employed both quantitative and qualitative methods of data analysis. The data obtained through close- ended questionnaire were quantified. Percentage was used to examine the extent of the application of the pre-and while- reading activities, which are crucial for students to use their prior knowledge to create new knowledge in a reading lesson and to examine the extent of purposes students had while reading texts.

Percentage was also used to see if topics of the reading texts were interesting for the students, if reading texts had clear organizational structure, if the level of difficulty of contents of the reading texts (sentence complexity and vocabulary) was appropriate to the students, and if reading texts included different levels of comprehension questions. Open-ended questionnaire was used to examine the major problems students faced when interacting with reading texts. In connections with the data gathered through open-ended questionnaire, interview, and classroom observation, qualitative method was employed to both instructors and students' data analysis.

4. Data analysis, Interpretation and Discussion

The objectives of the study, as mentioned in chapter one, were to examine the extent to which EFL instructors of DMU used reading activities to activate students' prior knowledge to create new knowledge; the extent to which EFL instructors got students to use purposes of reading that helped them make meaning; to examine the major problems students faced when interacting with reading texts; to see whether reading texts had clear organizational structure ,and whether the level of difficulty of contents of the reading texts was appropriate to the students' level of understanding. To meet these ends, the instruments mentioned in chapter three were administered and the results of the study are presented as follows.

To examine the extent to which EFL instructors of DMU used reading activities to activate students' prior knowledge to create new knowledge in a reading lesson and the extent to which EFL instructors got students to use purposes of reading that helped them construct meaning ,questionnaire was designed in relation to pre- and while-reading activities. To see the extent of instructors of using those activities, percentage was used and percentage was employed to see the feature of texts in relation to their level of appropriacy, sentence complexity, and vocabulary load. Moreover, to examine the major problems students faced when interacting with reading texts, open-ended questionnaire was used. The data obtained through open-ended questionnaire, interview and classroom observation were analyzed using qualitative description. Each result of the study is followed by brief discussion.

4.1 Instructors' Use of Reading Activities to help Students Activate their Prior Knowledge to create new Knowledge

This sub-section is devoted to presenting the statistical findings that show the extent to which instructors used various reading activities in EFL reading lessons to help students use their prior knowledge to create new knowledge. It is obtained from both instructors and students as shown in Tables 3 and 4 below.

4.1.1 Instructors' use of Reading Activities (as rated by Instructors)

Table 3: Summary of Instructors' Responses Showing the Extent to which they use reading Activities

S/N	Items	Scale									
	Before students read a reading text, I	**always**		**usually**		**Some times**		**rarely**		**never**	
		f	%	f	%	f	%	f	%	f	%
1	encourage them to do pre-reading questions.	6	60	4	40	-	-	-	-	-	-
2	get them to share ideas with a partner about the pre-reading questions.	4	40	5	50	1	10	-	-	-	-
3	get them to exchange ideas with members of their group about what will be included in the passage.	2	20	2	20	6	60	-	-	-	-
4	encourage them to guess what the passage is about using their prior knowledge about topics.	4	40	3	30	2	20	-	-	1	10
5	explain them about the passage.	2	20	6	60	2	20	-	-	-	-
	When students read the reading text (while reading), I										
9	inform them to discuss the questions in-group.	4	40	5	50	1	10	-	-	-	-
10	get them to read silently.	7	70	3	30	-	-	-	-	-	-
11	get them to draw conclusions during class discussion.	3	30	4	40	2	20	1	10	-	-
12	get them to share individual experiences.	3	30	7	70	-	-	-	-	-	-
13	acknowledge their different paths to understand texts.	4	40	4	40	2	20	-	-	-	-

Source: Own survey, 2010

As shown in Table 3, instructors reported that they more frequently encouraged students to do pre-reading questions (60% always and 40% usually), got them to read silently (70% always and 30% usually) and got them to share individual experiences during class discussion (30% always and 70% usually). They also acknowledged students' different paths to understand texts (40% always and 40% usually) , and explained them about the passage (20% always and 60% usually) with little variation among them (20% sometimes), informed them to discuss the questions in group in a significant way and got them to share ideas with a partner about the pre-reading questions (40% always and 50% usually) with little variation among them (10% sometimes).

Moreover, in a significant way but with a relative difference among them, instructors got students to draw conclusions during class discussion (30% always, 40% usually, 20% sometimes and 10% rarely), and encouraged students to guess what the passage is about using their prior knowledge about topics (40% always, 30% usually, 20% sometimes, and 10% rarely) . To some extent instructors also tend to get students to exchange ideas with members of their group about what will be included in the passage (20% always, 20% usually, but 60% sometimes)).

4.1.2 Instructors' Use of Reading Activities (as Rated by students)

Table 4: Summary of students' Responses Showing the Extent to which Instructors use Reading Activities

N/S	Items	Scale									
		Always		Usually		Some times		Rarely		Never	
	Before we read reading texts, the instructor	f	%	f	%	f	%	f	%	f	%
1	Encourages us to do pre-reading questions.	34	34	31	31	12	12	0	0	13	13
2	Gets us to share ideas with a partner about the pre-reading questions.	35	35	26	26	13	13	3	3	23	23
3	Encourages us to guess what the passage is about using our knowledge of the topic.	33	33	22	22	19	19	3	3	23	23
4	Gets us to exchange ideas in-group about what will be included in the passage.	39	39	18	18	18	18	1	1	24	24
5	Explains us about the passage.	37	37	30	30	10	10	21	21	2	2
	When we read a reading passage/while reading/ the instructor										
9	Gets us to discuss different questions of the passage in-group.	51	51	30	30	8	8	9	9	2	2
10	Instructs us to read silently.	33	33	43	43	11	11	10	10	3	3
11	Asks us to draw conclusions during class discussion.	16	16	12	12	14	14	28	28	30	30
12	Gets us to share individual experiences during class discussion.	9	9	15	15	10	10	24	24	42	42
13	Accepts our different ways of understanding texts.	18	18	10	10	15	15	20	20	37	37

Source: Own survey, 2010

As Table 4 depicts, 65 students reported that their instructors frequently encouraged them to do pre-reading questions where as 12 students said "sometimes" and 13 students said "never" encouraged them to do pre-reading questions. 61 students responded that their instructors got

them to share ideas with a partner about the pre- reading questions. The other 13, 3, and 23 students reveled respectively that their instructors "sometimes", "rarely", "never" got them to share ideas with a partner about the pre- reading questions .Regarding the number of students who responded that their instructors encouraged them to guess what the passage is about using their knowledge of the topic, 33 said "always", 22 said "usually", 19 said "sometimes", 3 said "rarely", and 23 said "never". Regarding the extent to which instructors got students to exchange ideas about what would be included in the passage, 39 students responded "always'; 18 students "usually";18 students "sometimes"; 1 student "rarely", and 24 students "never". Most of the students (37 always and 30 usually) said that their instructors explained them about the reading passage where as some of them said (10 sometimes, 21 rarely and 2 never) explained them about the reading passage. During reading, 51 and 30 students respectively responded that their instructors (always and usually) got them to discuss different questions of the passage. On the other hand 8, 9, and 2 students respectively indicated that their instructors got them to discuss (sometimes, rarely and never). Most of the respondents (33 and 43) said "always" and "usually" respectively got their instructors read texts silently. However, 11, 10 and 3 students responded respectively that their instructors got them "sometimes", "rarely' and "never" read texts silently. Some students (16 and 12) responded that their instructors asked them "always" and "usually" respectively to draw their own conclusions during class discussion. On the contrary, most of the respondents were (14 some times, 28 rarely and 30 never) asked to draw their conclusions during class discussion.

Most of the respondents (10 sometimes, 24 rarely and 42 never) also indicated that their instructors less frequently got them to share their individual experiences during class discussion; on the other hand, some of them (9 always and 15 usually) responded that their instructors frequently got them to share their individual experiences. Similarly, regarding the frequency of instructors in accepting students' different ways of understanding texts, 18 respondents said always ,10 said usually, 15 said some times, 20 said rarely and 37 said never. As shown in Tables 3 and 4, instructors in Debre Markos University frequently helped students to do pre-reading questions and share ideas with a partner about the pre-reading questions. On the other hand, in the interview with students conducted in a panel mode and with instructors conducted in individual base, almost all respondents' responded to the question related to what students did

before they read a text was that they did not do pre-reading questions. In the classroom observation, it was also seen that instructors 1, 2 and3 did not let the students do pre- reading questions before they got them to read a passage. The activities for a reading lesson did not include pre-reading questions. All the activities in the reading lesson (activities for critical reading, reading for details, reading for general information) were based on what the writer said in the text. They did not give room for activating students' prior knowledge. As noted in Ruddell (2001), at least two types of prior knowledge are critical to the reading process. The first is world knowledge, which is the total amount of information a person has accumulated through day-to-day living experience about the topic of what he/she reads. The second is text knowledge, which is information accumulated from reader's experiences with text.

The amount and kind of prior knowledge a reader has about a given topic and the manner in which the reader links known and new knowledge affects the meaning he or she constructs for the immediate text. Regarding this process, Hartman (1995:526) describes on "mobilization of potential knowledge fragments" in which the reader engages in transposing texts into other texts, observing one text into another and building a variety of interesting texts that lead to reader's construction of meaning. Our prior knowledge is thus constantly changing as the result of our ongoing transactions in the perceptions of incoming information. For this instructors are expected to activate both the first type of prior knowledge-world knowledge and the second type of prior knowledge- text knowledge- by encouraging students to guess what the passage is about and what will be included in the passage. However, as indicated in Tables 3 and 4, instructors did not tend to do so. It seems that they helped students to get meaning rather than to make meaning from reading texts. Not willing to accept their different ways of understanding texts might also be a sign of teaching reading to get meaning.

In the classroom observations, which took place in the three sections, no effort was made by the three instructors to help students activate their text knowledge by getting them to do pre- reading questions to predict the next part of the text from various clues in the paragraph (s) discussed. Moreover, in the panel mode interview with students all the respondents said that such questions were not presented. . For example, a student in the panel mode interview said:

In grades 9 and 10, we used to do pre-reading questions to predict the next part of the text from clues in the paragraphs discussed. However, here in this university we are asked to read the questions and read the passage. Then, we read the whole passage silently and do comprehension questions, first individually then we discuss the questions either in pair or in small group and finally with our instructor.

What the student said in the above statement is indicated in Tables 3 and 4. In the while reading, instructors frequently instruct them to read silently, let them discuss different questions of the passage in-group, let them share individual experiences and draw their own conclusions during class discussion.

As seen from classroom observations, in all the three sections, instructors asked students to read the passages silently and do the comprehension questions first individually, then compare their answers in small groups. Students were reading texts and attempt to discuss the questions. In the time of discussion with their instructors, many students were pretending as though they were writing answers while a few students were trying to answer questions. Especially, when they were asked to share individual experiences and draw their conclusions during class discussion, few students were attempting to participate in the discussion. Although explaining a passage explicitly for students may cause them to be very dependent, instructors and students in the university mentioned that it was frequently used.

4.2. Students' Purposes for Reading

This sub-section is devoted to presenting the statistical findings that show the extent to which instructors got students to use different purposes of reading in EFL classes to help students make linkages between what they predicted and what they found in texts. Tables 5 and 6 below depict what is obtained from both instructors and students respectively.

As shown in Table 5, instructors frequently got students to scan and skim the passage to identify specific and general ideas (40% always and 60% usually). However, they rarely informed students that their purpose of reading was to adjust their predictions (60% rarely, 30% sometimes, but 10% usually), and got them to predict the next part of the text from various clues (60% rarely, 20% sometimes, but 10% usually).

4.2.1 Students' Purposes for Reading (as Rated by Instructors)

Table 5: Summary of Instructors' Responses Showing the Extent to which they get Students to use Purposes for Reading

S/N	Items	scale									
	While students read the Reading text (while-reading), I	always		usually		Some times		rarely		never	
		f	%	f	%	f	%	f	%	f	%
1	Inform them that their purpose of reading is to adjust their predictions.	-	-	1	10	3	30	6	60	-	-
2	get them to scan the passage to identify specific ideas.	4	40	6	60	-	-	-	-	-	-
3	Get them to skim the passage to identify general ideas.	4	40	6	60	-	-	-	-	-	-
4	Get them to predict the next part of the text from various clues.	-	-	2	20	2	20	6	60	-	-

Source: Own survey, 2010

4.2.2 Students' Purposes for Reading (as Rated by Students)

Table 6: Summary of students' Responses Showing the Extent to which Instructors get them to use Purposes for Reading

S/N	Items	Scale									
		always		usually		Some times		rarely		never	
	When we read a reading passage (while-reading), the instructor	f	%	f	%	f	%	f	%	f	%
1.	informs us that our purpose of reading is to adjust our predictions.	16	16	9	9	16	16	27	27	32	32
2.	gets us to scan the passage to get specific ideas.	32	32	26	26	20	20	19	19	2	2
3.	gets us to skim the passage to identify general ideas.	40	40	25	25	18	18	11	11	6	6
4.	asks us to predict the next part of the text from various clues.	10	10	19	19	21	21	24	24	26	26

Source: Own survey, 2010

As indicated in Table 6, the respondents who said the instructors frequently informed them that their purpose of reading was to adjust their predictions during reading were 16% (always) and 9% (usually). The others responded 16% (sometimes), 27% (rarely) and 32% (never). During reading, the frequency of getting students to scan the passage to get specific ideas was 32% "always", 26% "usually", 20% "sometimes", 19% "(rarely" and 2% "never". Likewise, while reading, the frequency of getting students to skim the passage to identify general ideas was 40%

"always", 25% "usually", *18%* "sometimes", 11% "rarely" and 6% "never". However, the frequency of asking students to predict the next part of the text from various clues was: 10 % "always", 19 % "usually", 21 % "sometimes", 24 % "rarely", and 26 % "never".

In the two tables (Tables 5 and 6), it is indicated that instructors were getting students to scan and to skim passages to identify specific and general information in passages. This was also observed in the three reading lesson classes. In these classes, most of the lessons were covered in getting students to read for the purposes of identifying specific information and general information from the passages of the then periods.

The two tables (Tables 5 and 6) show also that students infrequently read to adjust their predictions. This implies that instructors did not assist students in making linkages between what they predict and what they find in texts, and in articulating the reasons, logic, and evidence for the predictions that are made. After discussing on pre-reading questions, students are expected to read part of a text for getting answers to questions arising from their predictions or to see whether new information will cause those predictions to be revised. Moreover, it is also indicated in the Tables that instructors infrequently got students to predict the next part of the text from various clues. In the classroom observation, it was seen that instructors did not give the students chance to read for adjusting their predictions and to predict the next part of the text. The interview result with students also showed that students did not read for adjusting their prediction and did not predict the next part of the text to examine their predictions, conclusions, and logic as reading progress. This implies that students did not get the access to replicate the predict-sample text- re-predict- resample process, which, as Ruddell (2001) states, stimulates full, rich understanding of text with its emphasis on prediction and discussion. Learning reading in such process helps learners to create meaning. However, as shown in Tables 5 and 6, as seen in the classroom observation and in the interview, students read only for identifying specific and general information from passages. This implies that their purpose of reading is to receive meaning. Such purpose of reading results in passive or inactive readers who will not be able to interact with texts (Ruddell, 2001).

4.3 Summary of students' Problems when Interacting with Reading Activities (Open-ended Questionnaire and Interview)

This sub-section is devoted to examine the problems that students faced when interacting with reading texts. Both students and instructors were asked to write their responses for the open-ended questionnaire and were interviewed.

4.3.1 Summary of Instructors and Students' Responses to the Open-ended Questionnaire

In the open-ended questionnaire, both students and instructors were asked whether most of the students were interested in doing comprehension questions. All the instructors said 'No'. The stated reasons were inability in all the skills of English language, poor in the area of vocabulary knowledge, no habit of reading, and their negative belief on the use of doing comprehension questions. Regarding this question, for example, one instructor said:

> *Most of the students are not interested in doing comprehension questions because of several reasons. One reason is limitations of understanding texts due to inability in the English language. The other reason might be that they believe doing comprehension question does not bring change in their learning of English.*

For the same question, the response of most of the students was also 'no'. The reasons noted were inability in using English language, lack of exposure to do comprehension questions in the lower grades, not getting the necessary help and follow-up from instructors, inability to understand comprehension questions, and limited knowledge of vocabulary.

There were students who said 'yes', for the same question. The reason for most of them was that doing comprehension questions helped them to prepare for the final examination. This implies that many students in the university did comprehension questions may be for grades. That is, they were not intrinsically motivated to do comprehension questions. As Alexander and Jettson (2000) point out, intrinsically motivated readers have a learning goal orientation: they read for its own sake, to satisfy curiosity, or for challenge or involvement.

In the open-ended questionnaire regarding whether students were able to express what they know about pre-reading questions in English without difficulty, the response of a large number of students was "No". Although they did not get chance to do pre-reading questions, their reasons for saying "No" were inability in English language, shortage of knowledge of vocabulary, lack of confidence, expecting everything from the instructors since they believe that their answer was simple guessing, and lack of practice.

For the same open-ended question, all the instructors said "No". The reasons noted were that most of the students were in lack of knowledge of vocabulary, lack of confidence, and inability in using English to express what they know. One instructor, for example, stated his reasons:

> *In the first place, majority of the students are not willing to express what they feel about any type of questions even in the group discussion. The reasons behind this unwillingness might be not understanding the questions and lack of confidence due to shortage of vocabulary in particular and inability in English language in general. Even those students who tried to give response for questions are not free from difficulty. They have had shortage of vocabulary to express what they know. They also have problem of understanding the questions.*

Concerning whether reading texts were related to the students socio-cultural context, almost all the instructors said 'yes'. According to the respondents, examples of texts, which were familiar with students' socio-cultural context, were texts about HIV/AIDS, Culture, and Improving study practices. On the other hand, one instructor said "No" and his example was the reading text entitled with "culture".

For the same question, many students said "yes". They noted that the texts were about HIV/AIDS, Culture, and Improving study practices. On the contrary, some students said "No". They claimed that most of the texts were based on personal opinion of the writers and were difficult to understand. All of them exemplified the text entitled with "culture". They said that the text reflected culture of Gurage, which were not related to their socio-cultural context.

4.3.2. Summary of Instructors and students' Responses to the Interview Question

The interview with students was conducted in a panel mode, and the interview with instructors was conducted in individual base and their response was written in note form. In the interview, both students and instructors were asked regarding the activities done before reading. Almost all students' response for this question was that they did not do pre- reading question. For the same question, instructors' response was similar to that of the students'. For example, one instructor in the interview said, "Before students read a text, I did not get them to do pre-reading questions but I sometimes encourage them to guess meanings in sentences". The other instructors seem to share the view expressed above in different wordings. For example, one respondent said, "Before reading, I sometimes get students to guess meanings of unfamiliar words to help them understand the text". For the question in relation to what students and instructors should do during reading, instructors' response was almost the same but with different wordings. For example, the first interviewee said, "I get them to read quickly to identify specific and general ideas of the passage. I also inform them to read silently. Then, I move round to give them help. I also let them guess the meaning of unfamiliar words from context."

The second interviewee also said, "While students read a text, first I will tell them why they read, that is, to identify specific ideas and to identify the main idea of the passage, to guess the meanings of new words; then I will tell them to read silently". The third interviewee replied to the same question saying, "During while-reading, I will tell students that their purpose of reading is to scan the passage for specific information and to skim the passage for general information. I will also tell them to read silently and guess meanings of unfamiliar words. Then I monitor what they do, and ask them if they face unfamiliar things in the text".

Students' response for the above question in general was that they read silently, identify main ideas of passages, identify specific information, and do vocabulary and comprehension questions. Regarding the interview question in relation to the causes for students not understanding reading texts, students' response focused on shortage of vocabulary, language problem and poor interest, not giving attention to reading skill, and considering reading as a very

difficult skill. For example, one of the interviewees said that she had a problem of understanding reading texts due to her shortage of vocabulary knowledge and inability in English language. Hence, she said she did not have interest in reading. For the same question, from the instructors the first interviewee said, "Causes for students not understanding reading texts may be not having habit of reading and problem of understanding key words, so they believe that they do not understand texts. And I think the main problem can be inability in English language."

The second interviewee said, "Students not understanding reading texts may be caused by the strategy they use- they do not understand how to scan and how to skim. Their poor reading habit and language problem can also be other causes. Not giving much attention for reading and being grammar oriented may be additional causes. "The third interviewee also said, "Causes for students in not understanding passages can be problem in the ability of English language, poor background of reading and poor interest in reading."

Regarding the kinds of comprehension questions students were asked to do and which kind (s) of questions were difficult for them to answer, both students and instructors' answer was the same. That is, questions for critical reading, questions for specific and general information, reference and inference questions, were the types of questions that were included in the text. According to both students and instructors' responses, questions for critical reading and inference questions were difficult for the students to answer. Concerning the ways students do comprehension questions, their answer was that they did individually, in pair, in small groups and with their instructors; that is, in class discussion. For example in the panel mode discussion, one student said that they did comprehension questions according to the instruction from the instructor. That is, according to the instructors' instruction they would do individually, compared their answers in pair, discussed in small groups, and discussed the questions with their instructor. Finally, the interviewee said, their instructor would give them summarized answer.

For the same interview question, the first interviewee from the instructors said, "First I get them to do comprehension questions individually, then I get them to compare their answers in pair or small groups; finally I direct whole-class discussion. "The second interviewee's response was,

"sometimes I get them to do individually, and sometimes I get them to do individually then in pair or in small groups." The response of the third interviewee for the same question was, "I get students to do comprehension questions sometimes individually, sometimes I get them to discuss in pairs or small groups, sometimes I get them to compare their answers with other groups, and sometimes I let them discuss and report."

For the interview question related to students interest in doing comprehension question, instructors response was "no". The first interviewee said, "No, because they felt that it is tiresome or boring." The second interviewee replied, "No, because of lack of background knowledge and due to language problem, they feel that comprehension questions are very difficult." The third interviewee also said, "No, because they feel they may not answer the questions correctly; therefore, they are not interested to do comprehension questions". students interview question for item 7 was whether they did pre-reading questions to predict what the next part of the text would be about based on the various clues they saw in the paragraph (s) discussed. All the students' response was 'no'. They explained what they did in the same way but with different wordings. For example, one interviewee said, "No, we are not asked to do pre-reading questions before we read the passage. We simply read the whole passage and do comprehension question." Another interviewee said the thing with different wordings as follows:

In grades 9, 10, 11 and12, we used to do pre-reading questions to predict the next part of the text from clues in the paragraphs discussed. However, here in this university we read questions before we read the passage: then, we read the whole passage silently and do comprehension questions.

As depicted in the instructors and students' responses from the open-ended questionnaire and interview, the English language ability of students did not seem well enough to interact with reading texts. This is indicated in the response of both instructors and students to the open-ended questionnaire (item 1) and to the interview questions (item 3). In the open-ended questionnaire, all the instructors and a large number of students responded that due to shortage of knowledge of vocabulary and inability in English students do comprehension questions with difficulty. Likewise, in the interview question in relation to the causes for students not understanding texts, almost all the interviewee students and instructors' response was the same. That is, shortage of

vocabulary and language problem or inability in English language, were seen as causes of students' problem of understanding texts.

Moreover, regarding students' interest in doing comprehension questions, the response of many students and instructors was negative. That is, they responded that most of the students were not interested in doing comprehension questions. The reasons listed by the subjects were negative belief about their ability in doing comprehension questions, their negative belief on the use of doing comprehension questions and lack of reading habit in addition to shortage of vocabulary and inability in English language. According to Harmer (2001), language knowledge enables readers to work on the reading text. A fluent reader has good knowledge of language structure and can recognize a wide range of vocabulary. Hence, with poor knowledge of language structure and with shortage of vocabulary it is difficult to work on a reading text.

As indicated in the summary of instructors and students' response to the open-ended questionnaire regarding whether reading texts were related to the students' socio-cultural context, almost all instructors and most of the students answered positively. They also provided examples to show how the texts were related to their socio-cultural context.

However, as depicted in the responses for the open-ended questionnaire and the interview, students were in problem of answering comprehension questions and understanding questions. This case might be related to what Rumelhart (1981) suggests. Rumelhart (1981:22) notes," The reader may have the appropriate schemata (socio-cultural context), but the information available in text may not suggest them." Here, the reader constructs incomplete or inappropriate meaning. Knowledge of socio-cultural context is an element of prior knowledge. Thus, knowledge of socio-cultural context in particular and prior knowledge in general is not some static "thing" that readers bring to reading events and "unload" before they read; rather, it is constantly changing – and creating change-throughout reading so that it influences and is influenced by all the elements of the reading event (Hartman, 1995).

4.3.3 Summary of the classroom observation

In this study, among the ten sections selected as a sample, three sections were randomly selected for the classroom observation, and in each section observation took place for 50 minutes during the reading part of the lesson. In the observations, predefined checklists were used (look at appendix 5).

During the classroom observation, the researcher observed that all the activities in the reading texts were based on answering questions after reading the whole text. The purposes of the activities were to help students improve their ability in critical reading, reading for details and reading for general information. Generally, the purpose of the activities was to help students get meaning from reading texts. Due to this, instructors in the observed sections were not seen when they encouraged their students to do pre-reading questions and predict what will be included in the text. Moreover, they did not get students to stop after reading a certain paragraph in a text and discussed what they understood and predict the next part of the text from various clues. They did not also get students draw their own conclusions and share individual experiences comparing with the information they made in the texts. However, they were observed trying to explain about the passages, and acknowledge the different paths of the students to understand texts.

4.4 Features of Reading Texts/Text Variables

Nine close-ended items were administered to instructors and students to see the features of reading texts (text variables). For the purpose of discussion, the 9 items were grouped under two categories. Table 7 deals with students' responses concerning whether reading texts had clear organizational structure. Table 8 is concerned with instructors' responses to whether reading texts had clear organizational structure. Table 9 is regarding students' response to whether the level of difficulty of contents of the reading texts was appropriate to the students. Table 10 deals with instructors' response to whether the level of difficulty of contents of the reading texts was appropriate to the students.

4.4.1 Summary of students and Instructors' Responses Concerning Whether Reading texts had clear Organizational Structure

Table 7: students' Responses to whether reading texts had clear organizational Structure

SN	Questionnaire item Most texts that we read in a reading lesson:	Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
		f	%	f	%	f	%	f	%	f	%
1.	introduce abstract concepts by accompanying them with many concrete examples.	33	33	50	50	9	9	8	8	0	0
2.	explicitly state important complex relationships (e.g. causality, conditionality, etc) rather than always expecting the reader to infer them from the context.	34	34	37	37	17	17	10	10	2	2
3.	have problems or questions in relation to the intention of the writer.	18	18	35	35	19	19	22	22	6	6
4.	have problems or questions that require us to predict.	9	9	8	8	14	14	20	20	49	49
5.	have problems or questions that require us to draw conclusion.	30	30	45	45	8	8	14	14	3	3
6.	have problems or questions that require us to share individual experiences.	46	46	28	28	8	8	10	10	8	8

Source: Own survey, 2010 f= figure (number)

Table 7 depicts that more than ¾ (83%) of the respondent students agreed that most of the texts they read in a reading lesson introduce abstract concepts by accompanying them with many concrete examples. This item (item 15) is supported by item 18 where 71% of the respondents agreed that most texts explicitly state important complex relationships (e.g. causality, conditionality, etc) rather than always expecting the reader to infer them from the context.

Regarding reading activities included in most texts students read in a reading lesson, more than half of the respondents (53%) replied that texts have questions in relation to the intention of the writer. Nearly half of the students (49%) answered that the texts never have questions that require students to predict. Moreover, those who agreed that most texts have questions that require students to draw conclusion and to share individual experiences are 75% and 74% respectively.

Table 8: Instructors' response to whether students Reading Texts had clear Organizational Structure

S/N	Questionnaire item Most texts that Trainees read in a reading lesson:	Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
		f	%	f	%	f	%	f	%	f	%
1.	Introduce abstract concepts by accompanying them with many concrete examples.	2	20	4	40	1	10	3	30	-	-
2.	Explicitly state important complex relationships (e.g. causality, conditionality, etc) rather than always expecting the reader to infer them from the context.	2	20	3	30	2	20	3	30	-	-
3.	Include questions in relation to the intention of the writer.	5	50	2	20	-	-	1	10	2	20
4.	Include questions that require trainees to predict.	1	10	1	10	-	-	3	30	5	50
5.	Include questions that require trainees to draw conclusion.	2	20	2	20	1	10	5	50	-	-
6.	Include questions that require trainees to share individual experiences.	3	30	2	20	1	10	4	40	-	-

Source: Own survey, 2010

Table 8 shows that six (60%) instructors replied that most texts that students read in a reading lesson introduce abstract concepts with many concrete examples. Half (50%) of the respondents also agreed that the texts explicitly state important complex relationships rather than always expecting the reader to infer them from the context. Concerning reading activities texts included, most of the respondents (70%) agreed that they include questions in relation to the intention of the writer. 50% of the respondent instructors answered that the texts did not include questions that require students to predict. Moreover, the instructors who agreed that texts include questions that require student to draw conclusion and to share individual experiences are 40% and50% respectively.

As can be seen from Tables 7 and 8, the observed findings are that the reading texts have clear organizational structure since abstract concepts in the texts are introduced with many concrete examples. The important complex relationships such as causality and conditionality are also explicitly stated. Moreover, the texts included questions in relation to the intention of the writer (literal comprehension); questions that require students to draw conclusion (Interpretative comprehension), and questions that require students to share individual experiences based on the

passage (Applied comprehension). However, Tables 7 and 8 show that the reading texts did not include questions that require students to predict (pre-reading questions).

4.4.2 Summary of Students and Instructors' Responses to whether the level of Difficulty of Contents of the Reading texts was Appropriate to the students

Table 9: Students' Response to Whether the Level of Content of the Reading Texts was Appropriate to them

S/N	Questionnaire item Most texts that Trainees read in a reading lesson:	Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
		f	%	f	%	f	%	f	%	f	%
1.	have appropriate level of sentence complexity for us.	22	22	44	44	17	17	16	16	1	1
2.	have interesting topics.	48	48	35	35	11	11	5	5	1	1
3.	contain appropriate vocabulary load. For example, usually only one new vocabulary item per paragraph occurs throughout a text.	16	16	19	19	8	8	30	30	27	27

Source: Own survey, 2010

Table 9 shows that (66%) of the students agreed that most texts that they read in a reading lesson have appropriate level of sentence complexity. 83(83%) students answered that most texts have interesting topics. Regarding appropriate vocabulary load, 35% of the respondents agreed, 8% could not decide whereas fifty seven (5,7%) students claimed that most reading texts do not contain appropriate vocabulary load.

Table 10: Instructors' Response to Whether the Level of difficulty of Contents of the Reading Texts was Appropriate to the students

S/N	Questionnaire item Most texts that Trainees read in a reading lesson	Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
		f	%	f	%	f	%	f	%	f	%
1.	have appropriate level of sentence complexity for them.	2	20	6	60	-	-	2	20	-	-
2.	have interesting topics.	2	20	5	50	3	30	2	20	-	-
3.	contain appropriate vocabulary load. For example, usually only one new vocabulary item per paragraph occurs throughout a text	2	20	1	10	1	10	3	30	3	30

Source: Own survey, 2010

Table 10 depicts that eight (80%) instructors replied that most texts have appropriate level of sentence complexity for the students. Nearly three- fourth of the respondents (70%) answered that most of the texts have interesting topics. Concerning the appropriacy of vocabulary load, three (30%) instructors agreed that most texts contained appropriate vocabulary load; one (10%) could not decide and the other six (60%) claimed that most of the texts do not contain appropriate vocabulary load.

As shown in Tables 9 and 10, the level of difficulty of contents of the reading texts in relation to sentence complexity is appropriate to the students. Most of the texts have also interesting topics. However, as indicated in the two tables (Tables 9 and 10), the reading texts that students read do not seem to contain appropriate vocabulary load. This implies that texts contain a number of unknown words. Wallace (1992) states, those texts with more percentage of unknown words will be more difficult to understand than those with less percentage of unknown words.

5. Summary, conclusion and recommendation

5.1 Summary of the Findings

The research carried out was meant to see the extent to which EFL instructors use reading activities to activate students prior knowledge to create new knowledge, to examine the extent to which EFL instructors get students to have purposes of reading that help them to make meaning, to investigate the major problems that students face when interacting with reading texts, to examine whether the reading texts have clear organizational structure, and to see whether the level of difficulty of contents of the reading texts is appropriate to the students level of understanding.

In order to attain the first objective of the study, in addition to the classroom observation two sets of close-ended questionnaire consisting of ten items were prepared for both instructors and students. The answering mode was from always (5) to never (1). The analysis was done using percentage to see to what extent instructors used reading activities to activate students' prior

knowledge to create new knowledge. In order to examine the extent to which instructors got students to have purposes of reading that help them make meaning, along with the classroom observation another two sets of close-ended questionnaire consisting of four items were prepared for both instructors and students. The answering mode was also from always (5) to never (1). The analysis was done using percentage. To see the major problems that students face when interacting with reading texts, open-ended questionnaire consisting of three items was prepared for both instructors and students. The open-ended questionnaire and the interview questions for instructors and students, and the classroom observation were also used to support the data obtained through close-ended questionnaire. To analyze these sources of data, qualitative method was used.

To examine whether the reading texts have clear organizational structure and whether the level of difficulty of contents of the reading texts is appropriate to the students, two sets of close ended questionnaire were prepared for both instructors and students. To examine whether the reading texts have clear organizational structure, six items were prepared. Three items were prepared to examine whether the level of content of the reading texts is appropriate to the students level of understanding. The items in the two issues were analyzed using percentage. The modes of responding the items were ranging from strongly agree to strongly disagree.

After analyzing the data, the following results are obtained. The responses obtained from both instructors and students revealed that instructors' attempt to interact reader variables with text variables in a reading lesson seems not promising. Instructors did not help students to do pre-reading questions and share ideas with a partner about the pre-reading questions. Students were not also asked to read part (s) of the passage to adjust their prediction to link the old knowledge with the new one.

Both instructors and students rated that instructors frequently explain about a passage before students read it. As indicated in chapter four, this might cause students to be dependent. It might also affect students' effort to link known knowledge with new knowledge in the reading process. Students revealed that their instructors infrequently got them to guess what the passage was

about using their prior knowledge about topics, and to exchange ideas in-group about what will be included in the passage. They also rated that their instructors very rarely accept their different ways of understanding texts.

Both instructors and students rated that instructors were getting students to read passages for identifying specific information and general information of passages. This is also observed in the three reading classes. However, as revealed by instructors and students, students were not let to read for adjusting their predictions. Instructors and students also rated that instructors infrequently got students to predict the next part of the text from various clues. In the classroom observation, instructors were not seen to get students to predict the next part of the text based on various clues from the part of the passage already discussed. The interview result with students also indicated that students did not read for adjusting their prediction and did not predict the next part of the text to examine their predictions, conclusions, and logic as reading progress.

Predicting the next part of the text using various clues and reading for the purposes of getting answers to questions arising from predication, are crucial to stimulate full, rich understanding of a text. Learning reading in such process helps students to create meaning (Ruddell, 2001).All instructors revealed that most students were not interested in doing comprehension questions. The problems mentioned for not doing comprehension questions were inability in all the skills of English language; poor in the area of vocabulary knowledge, no habit of reading, and negative belief on the use of doing comprehension questions.

Many students on their part revealed that they were not interested in doing comprehension questions due to: inability in using English language, lack of exposure to do comprehension questions in the lower grades, inability to understand comprehension questions, and limited knowledge of vocabulary. Some students answered that they were interested in doing comprehension questions. The reason for most of the students was that it helped them to prepare for the final examination. This shows that many students in Debre Markos University do comprehension questions in order to gate good grades in the final examination. This implies that

they are not intrinsically motivated to learn reading-they do not read to satisfy curiosity or for challenge.

A large number of students revealed that they are in difficulty to express what they know about questions in English. The major problems depicted are inability in English language, shortage of knowledge of vocabulary, lack of confidence, not getting the exposure to do such questions in the lower grades, expecting everything from the instructors since they believe that their answer was simple guessing, and lack of practice. All the instructors revealed that most of the students were in difficulty to express what they know concerning any type of questions in English. Shortage of knowledge of vocabulary, lack of confidence, inability in using English language to express what they know, and problem of understanding the pre-reading questions were indicated as reasons for the problem mentioned. Almost all the instructors and most students responded that the reading texts that students read were related to the students' socio-cultural context. The examples of the reading texts provided were HIV/AIDS, Culture, and Study skills -The Meaning of Reading and Effective Reading.

Regarding text variables, both instructors and students revealed that most texts that students read in a reading lesson have clear organizational structure. They introduce abstract concepts by using concrete example. They also explicitly state important complex relationship. Moreover, they included questions in relation to the intention of the writer, to draw conclusion, and to share individual experiences (literal comprehension, interpretative comprehension and applied comprehension respectively).However, they did not include questions that require students to predict (pre-reading question). Concerning the level of content of the reading texts, most of the instructors and students responded that, most reading texts that students read in a reading lesson had interesting topics with appropriate level of sentence complexity for the students. Nevertheless, most of them claimed that most of the texts did not contain appropriate vocabulary load.

The text variables such as clear organizational structure, having interesting topics and appropriate level of sentence complexity are included in most of the reading texts. Moreover, in the open-ended questionnaire, both instructors and students revealed that most of the reading

texts were related to the students' socio-cultural context. However, as depicted in the open-ended questionnaire and in the interview, the English language ability of students did not seem well enough to interact with reading texts.

5.2 Conclusion

Based on the findings of the study, the following conclusions are given.

- The types of purposes of reading used were reading to identify specific and general information. Though these purposes are crucial to reproduce the exact text, they do not enable students to maintain coherence. The coherent meaning constructed by the reading will be somehow related to the reader's prior experience (world knowledge) and the structures already formed in the reader's mind (textual knowledge).
- Instructors stated that most of the students were not interested in doing comprehension questions due to inability in their English language, shortage of vocabulary knowledge, no habit of reading, and their negative belief on the use of doing comprehension questions. Both students and instructors also noted that students had difficulty in expressing what they know about pre-reading questions due to shortage of knowledge of vocabulary, inability in using English language, lack of confidence, and problem of understanding the pre-reading questions. From the above statements, we can deduce that the English language ability of most of the students did not seem well enough to interact with reading texts.
- Students did comprehension questions since they felt that it helped them to prepare for final examination. This shows that their drive motive for doing comprehension question was getting good grade. They were not intrinsically motivated; that is, they were not reading to satisfy curiosity or for challenge.
- Instructors and students stated that most reading texts included interesting topics, appropriate level of sentence complexity, clear organizational structure and socio-cultural context related to the students. Nevertheless, they claimed that most of the texts did not contain appropriate vocabulary load.

5.3. Recommendation

Taking the results of instructors and students' responses and the conclusions given as bases, the researcher recommends that the following measures should be considered in a reading lesson to help students make meaning.

1. Students need to learn reading based on prediction and discussion in relation to predict-sample text-re- predict- re-samples process.

- Regarding a reading lesson, both instructors and students explained that students did not get chance to do pre-reading questions and discuss them. So, without getting chance to read for adjusting their prediction, they read to do the comprehension questions in which most of the questions were based on reproducing the exact text.

To make meaning and stimulate full, rich understanding of text, students need to learn reading based on prediction and discussion in relation to predict- sample text-repredict- resample process.

2. Students need to set continual individual and group purposes for reading.

Purpose setting continues throughout the reading; that is from the first prediction up to the last prediction. Generally, students read a text after every prediction for the purposes of getting answers to questions arising from their predictions or to see whether new information will cause these predictions to be revised.

3. Course designers should consider the English language ability of students when preparing reading texts.

As revealed by instructors and students due to inability in English language and shortage of vocabulary, students got difficulty to interact with reading texts. Moreover, as depicted by both instructors and students, most of the texts did not seem to contain appropriate vocabulary load. Since it might be difficult to conduct a reading lesson with students having such problems, I recommend that course designers should consider the English language ability of students when preparing reading texts.

4. Course designers need to design reading activities based on predict-sample text-repridcit-resample process.

In the prediction stage, students have only a title and their prior knowledge. Therefore, in this stage, predictions rely heavily on prior knowledge and various interpretations of title words. In the second stage, first-stage predictions are confirmed or discarded as textual links and information warrants.

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አንብቦየመረዳትንናየመፃፍክሂሎችንአዋህዶመማር/ማስተማርክሂሎቹንበማጐል በትረገድያለውፋይዳ

አበበችተስፋዬ

አህፅሮተ ጥናት

የዚህጥናትአቢይዓላማአንብቦየመረዳትንናየመፃፍክሂሎችንአዋህዶመማር/ማስተማርክሂሎቹንበማጐልበ
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ሚያየአንብቦመረዳትናየመፃፍቅድመትምህርትፈተናተሰጥቷል፡፡በመቀጠልየጥናቱንዓላማከግብለማድ
ረስየተዘጋጀውንአንብቦየመረዳትናየመፃፍቴክስትንለ45
ቀናትበመደበኛፈረቃቸውእንዲማሩተደር¹ል፡፡ከዛምየጥናቱተሳታፊዎችያሳዩትንለውጥለመለካትድህረ-
ትምህርትፈተናተሰጥቷል፡፡ለጥናቱመረጃይሰጣሉተብለውየተዘጋጁትየመረጃመሠብሠቢያመሣሪያዎች
ፈተና፣የአንብቦመረዳትናየመጻፍክሂሎችንበውህዶትለመማርማስተማርየተዘጋጀቴክስት፣ቃለመጠይቅና
ምልከታናቸው፡፡በዚህምመሠረትበቅድመ-
ትምህርትናበድህረትምህርትየተገኙትየፈተናውጤቶችበአማካይ፣በመደበኛልይይት፣በዝምድናማሳያናበ
"ቲ"ቴስትቀመርተሰልተዋል፡፡በመረጃትንተናውመሠረትምየተጠኝቡድኑየድህረ-
ትምህርትፈተናአማካይውጤትቅድመ-ትምህርትፈተናአማካይውጤትበ11.74
ልቆተገኝቷል፡፡በሁለቱክሂሎችመካከልያለውዝምድናም (0.952)
ከፍተኛናአዎንታዊመሆኑንየስታትስቲክስስሌቱአመላክቷል፡፡የአማካይውጤታቸውምአስተማማኝነትወ
ጥመሆንአለመሆኑንለማረጋገጥበተደረገውየዳግምልኬትቲቴስትስለትየቲዋ (20.653)
በሠንጠረዡከተገለጸውየቲ$_{ob}$ዋ (1.671)
እጅግልቆተገኝቷል፡፡የዚህንልኬትአስተማማኝነትምክተማሪዎቹበተገኘውየቃለመጠይቅምልልስናበመ
ማርማስተማሩሂደትበተደረገውየግምገማክትትልናምልከታለማረጋገጥተችሏል፡፡ስለዚህአንብቦየመረዳት
ናየመፃፍክሂሎችንበተናጠልከማቅረብበውህዶትቢቀርቡውጤታማመሆንእንደሚቻልለመገንዘብተችሏል
፡፡በመሆኑምመምህራንምሆኑሌሎችየትምህርትባለሙያዎችትኩረትሰጥተውሁለቱንክሂሎችበውህዶትመ
ማር/ማስተማርየሚያስችሉሥርዓተትምህርቶችን፣መማሪያናማስተማሪያመፃህፍትንቢ.ያዘጋጁ፣ተማሪዎ
ችምእነዚህንክሂሎችበውህዶትበመማርበራስየመማርስልትንቢ.ያዳብሩተመራጭነትያለዉዘዴመሆኑንጥ
ናቱያሳያል፡፡

መግቢያ

አንብቦ የመረዳትንና የመፃፍ ክሂሎችን አዋህዶ መማር/ማስተማር ክሂሎቹን በማጐልበት ረገድ ያለውን ፋይዳ አስመልክቶ ለተደረገው ጥናት በዚህ ምዕራፍ ሥር የጥናቱ መነሻ ችግር፣ የጥናቱ ዓላማ፣ የጥናቱ አስፈላጊነት ፣ የጥናቱ ወሰንና የመሠረታዊ ቃላትና ፅንሰ ሃሳቦች አጠቃቀም ብያኔዎች በቅደም ተከተል ቀርበዋል።

1.1. የጥናቱ መነሻ

የቋንቋ ክሂሎችን ከማሳደግ አኳያ አጥኝዎችና ፀሃፍት ከ16ኛው መቶ ክፍለ ዘመን ጀምሮ የየራሳቸውን አስተዋጽኦ አበርክተዋል። ሩድል (1997) እንደገለፁት እስከ 1930ዎቹ ድረስ ለንባብ ትምህርት ብቻ ትኩረት ይሰጥ ነበር። በነዚህ ጊዜያት የአንደኛ ደረጃ ተማሪዎችን የንባብ ክሂል ለማሳደግ በስፋት የተሰራበት ወቅት ነበር። በዚህ ወቅት 1000 የአሜሪካ ወታደሮች በተለመደው የንባብ ትምህርት ሂደት እንዲማሩ ቢደረግም ማንበብ ሳይችሉ ቀርተዋል። ይህ ሁኔታ ለመስኩ አጥኝዎች ትልቅ ርዕሰ ጉዳይ በመሆኑ የንባብ ትምህርትን ለማሻሻል የሚያስችሉ እንቅስቃሴዎችን በመካከለኛና በሁለተኛ ደረጃ ትምህርት ቤቶች ላይ ተግባራዊ ለማድረግ ተሞከረ።

በ1950ዎቹ መጀመሪያ ላይ የንባብን ትምህርት ተግባራዊ ለማድረግ በአሜሪካ በመለስተኛና በሁለተኛ ደረጃ ትምህርት ቤቶች ተማሪዎችን በሁለት ቡድን በመክፈል "ንባብን ማሳደግ" በሚል መርሃ-ግብር ሰፊ እንቅስቃሴ ተጀመረ። በአንደኛው ቡድን የተካተቱት የንባብ ችግር ያለባቸው (Reading disability) ሲሆኑ በሁለተኛው ደግሞ የንባብ ችግር ያለባቸውንም ሆነ የሌለባቸውን ባንድ ላይ ያጣመረ ነበር። ይህ እንቅስቃሴ እንግሊዝኛን እንደ ሁለተኛ ቋንቋና ሌሎች የትምህርት መስኮችንም የያዘ ሲሆን "ማንኛውም መምህር የንባብ መምህር ነው!" በሚል መፈክር አለማቀፋዊ ይዘት ባለው መልኩ ይካሄድ ጀመር። በዚህ ለንባብ ብቻ በተሰጠው ልዩ ትኩረት የተነሳ በጊዜው የነበሩትን መምህራን አስቆጣ፤ አሳዘነ። ምክንያቱም ለትምህርት ጥራት የተሰጠው ትኩረት አነስተኛ በመሆኑ ነበር። በሁለተኛ ደረጃ የንባብ ትምህርት ላይም አሉታዊ ተፅዕኖ አሳደረ። የሚወጡትም ፈተናዎች ማይምነትን ከማጥፋት ግብ ጋር የተያያዙ በመሆናቸው

መደበኛ ብቃታቸውን ሊጠብቁ አልቻሉም። ይህ ችግር ወደ ዩኒቨርሲቲዎችም ተዛመተ-(ሃርበር 1978)። በሌላ መልኩም ሩደልፍ (1955) ባሳተሙት መፅሃፍ "ፎቢኒ ለምን መፃፍ አይችልም?" የሚልና በሶቪየት (1957) የስፑትኒክ የሳተላይት ውንጨፋ የአሜሪካኖችን የትምህርት ጥራት ጉዳይ ጥያቄ ውስጥ እንዲገባ አደረጉ። ስለዚህ በማንበብና በማንበብ ትዕዛዛት ላይ የተለየ ትኩረት ተሰጠ። በዚህም የተነሳ በ1958 በአሜሪካ ሃገራዊ የትምህርት ጥራት አስጠባቂ ተቋማት ከፍተኛ በጀት በመመደብ በሁሉም የትምህርት ደረጃ ሰፊ እንቅስቃሴ ተጀመረ። በሂደቱም ለጥናትና ምርምር፣ ለመምህራን የሙያ ማሻሻያ፣ ለትምህርት ቤት ፕሮግራሞችና ለሥርዓተ-ትምህርት ቀረፃ ከፍተኛ በጀት ተመደበ።

በሌላ መልኩ ደግሞ የመፃፍ ትምህርትን አስመልክቶ ከ18ኛው ክፍለ ዘመን በፊት የአሪስቶትል ፅንሰሃሳብ አራማጆች *መፃፍ የቀለም ትምህርት ነው* የሚል እሳቤ ነበራቸው። ትኩረት ያደረጉትም በፈጠራ፣ ሃሳቦችን በማደራጀት፣ የተለያዩ ስልቶችን በመጠቀም፣ በማስታወስና በመሞከር ነበር። ይህ ንድፈ ሃሳብ በ18ኛው ክፍለ ዘመን በአሜሪካኖች ዘንድ አሉታዊ ጫና አረፈበት። ለሰዋሰው፣ ለቃል ፅሁፍና ለቃላት መረጣ ልዩ ትኩረት መስጠት ተጀመረ። ይህ ሂደት የዲስኩር አጠቃቀምን በፅሁፍ መግለጽ የሚል አዲስ ትኩረትን ሳበ (ላንገርና ሺይላ፤ 2000)።

በ1980ዎቹ የተደረጉት ጥናትና ምርምሮች ማንበብንም ሆነ መፃፍን ነጣጥሎ በማስተማር የቋንቋን ክሂል ማሳደግ እንዳልተቻለ አመላከቱ። በክፍለዘመኑ መጨረሻም በሁለተኛ ደረጃ ትምህርት ቤቶች የመፃፍና የማንበብ ሥርዓተ-ትምህርቶችን አዋህዶ ማቅረብ አቢይ ግብ ሆነ። ስለዚህ የአሜሪካ ሃገራዊ የመፃፍ ፕሮጀክት ባቀደው መሠረት በመለስተኛ፣ በሁለተኛና በከፍተኛ ደረጃ ላሉ ተማሪዎች በሁሉም የትምህርት ዓይነቶች የማንበብና የመፃፍ ትምህርት ተነድፎ ሁለቱን ክሂሎች ባንድነት የመለማመድ ተግባራት እንዲከናወኑ ተደረገ። መምህራንም ሆኑ ሌሎች ባለሙያዎች ማንበብና መፃፍ የአንድ ሳንቲም ሁለት ገጽታዎች መሆናቸውን አንፀባረቁ። ይህም ሁለቱን ክሂሎች በውህደት መማር/ማስተማር ለግንዛቤ እድገትም መሠረታዊ ጉዳይ መሆኑን አመላከቱ (ሩድል 1997)።

በ20ኛው ክፍለ ዘመን መጨረሻና እስካሁን ባለው ሁኔታ ይህ የለውጥ እንቅስቃሴ ትልቅ እድገት ማሳየቱን የተለያዩ አጥኝዎችና ፀሐፍት ገልፀዋል። በተለይ የማንበብና የመፃፍ ክሂሎችን በውህደት መማር/ማስተማር የተሻለ ውጤት ያስገኛል በማለት ግሪንሎውና ሙር (1982)፣ ፉለድና ላፕ (1987)፣ ሃርፕናጆን (1996)፣ ብሎክ (1997)፣ ኦውልስ (1985)፣ ሩድል (1997)፣ ላንገርና ሺይላ (2000)፣ ኦልሰን (2002)፣ በሃናርሃን (2008)፣ ጆንሰን (2009)፣ ማሪው (1998ዓ.ም.)፣ሞገስ (1999 ዓ.ም.) ገልፀዋል።

ላንገርና ሺይላ (2000) እንደገለፁት ማንበብና መፃፍን በውህደት መማር ቅድመ እውቀት ግንባታን መፍጠር ነው። ቀደም ባሉት ጊዜያት የማንበብና የመፃፍ ንድፈሃሳቦችና ምርምሮች ትኩረት ሁለቱን ክሂሎች በተናጥል ከመተግበር አኳያ ነበር። በ20ኛው ክፍለ ዘመን ግን እነዚህ ንድፈ ሃሳቦችና ምርምሮች ውድቅ ሆነዋል። ከ1980ዎቹ ጀምሮ ክሂሎቹ ጥብቅ ትስስር እንዳላቸው ትኩረት የተደረገበት ሲሆን፣ ትስስርነታቸውም ከቋንቋ ተግባቦትና ከዓላማ /ከምክንያት አንፃር እንደሆነ እየታወቀ መጣ። ባሁኑ የመማር ማስተማር ሂደት ለተግባቦታዊ ትምህርት ትኩረት የተሰጠበት ነው። ተግባቦት ደግሞ የማህበራዊ ህይወትና የትምህርት ቤት አውድን በመጠቀምና በማዋሃድ የሚጐለብት ነው። በዚህም መሠረት ክሂሎቹን አዋህዶ በመማር/ማስተማር ተግባቦትን ማሳደግ እንደሚቻል ማረጋገጥ ተችሏል። ሁለቱ ክሂሎች ተመሳሳይ ሂደታዊ ክንዋኔዎች አሏቸው። እነዚህን ክንዋኔዎች ለመተግበር የቀደመ እውቀትን መጠቀም የግድ ነው።

ተማሪዎች ዳራዊ እውቀታቸውን ለመጠቀም ደግሞ እውነተኛው ህይወትና የመማር ማስተማሩ ዓውድ መተሳሰር አለባቸው። ይህ ትስስር የሚገኘው ደግሞ ሁለቱንም ሊያንፀባርቁ የሚችሉ ልምምዶች ሲኖሩ ነው። ምክንያቱም ፀሐፊዎችና አንባቢዎች አንድ ዓይነት እውቀት አላቸው። ሁለቱም ይተረጎማሉ፣ ስለቋንቋ፣ ስለይዘት፣ ስለሃሳብ ፍሰት፣ ስለመዋቅርና አደረጃጀት፣ ሃሳብን ስለማካፈል ሁሉ አንድ ዓይነት ባህሪያት አሏቸው- (አውልስ 1988፣ ፍሉድና ላፕ 1987)።

በተመሳሳይ ሁኔታ ጆንሰን (2009) እንደሚያስረዱት ***ማንበብ ከመፃፍ ውጭ የሚታሰብ ከሆነ ወደ ውስጥ እንጂ ወደውጭ መተንፈስ አይቻልም እንደማለት ነው:*** ተማሪዎቹ

ለሚያነቡት ነገር ትርጉም ያለው የመፃፍ ተግባር ማከናወን አለባቸው። ዋናው ነገር ሁለቱን ክሂሎች አዋህዶ ለማቅረብ ምን ዓይነት ተግባር መንደፍ ይገባል? የሚለውን ጥያቄ መመለስ መቻል ነው። እየተነበበ የሚፃፍ ከሆነ አስተሳሰብን የማስፋት፣ ቃላትን የመምረጥ፣ ከንባቡ/ከይዘቱ ጋር ጥብቅ ቁርኝት የመፍጠር እንዲሁም የዓረፍተ ነገሩን አወቃቀር፤ የሰዋሰው እዉቀትንም የማሳደግንና ሃሳብንም የመጋራት አቅም ይፈጥራል። በዚህ ሂደት በጥልቀት የመተንፈስ ያህል ይሰማል። ተማሪዎች ሁለቱን ክሂሎች በውህደት ከተማሩ የአስተሳሰብ አድማሳቸውን ያሰፋሉ። ለምሳሌ፡- ደራሲው ለመፃፍ የመረጠው ስልት/ዘዴ ምንድን ነው? ሌላው አካልስ እንዲህ ዓይነት ተመሳሳይ ልምድ አለው? በፅሁፍ ውስጥስ የገለፀው ጥሩ ወይስ መጥፎ ተግባር አለ? ለምን? የሚሉትን ጥያቄዎች ሁለ በመመለስ አርቀው ያስባሉ።

ብሎክ (1997)ም ሲገልፀው የቋንቋ ክሂሎች አንዳቸው ባንዳቸው ላይ የሰለጠኑ ናቸው። በተለይ በአንብቦ መረዳትና በመፃፍ መካከል ያለው ተራክቦ በሂደት የታጠረ፣ አርቆና አዝልቆ ማሰብን የሚጠይቅ ነው። ማንበብና መፃፍ ልክ እንደማንበብና ማዳመጥ/ተቀባይ ክሂሎች/ እና እንደመናገርና መፃፍ/ አቀባይ ክሂሎች/ ትስስር አላቸው። በማንበብም ሆነ በመፃፍ ሂደት ተማሪዎች የሚረዱት ከሚያውቁት፣ ቀድሞ ካላቸው እውቀት በመነሳት ነው። ማንበብ ሃሳብን ከተፃፈ ነገር ለመረዳት ጥረት የማድረግ ሂደት ነው። መፃፍ ደግሞ መልዕክትን በፅሁፍ በማስፈር አንባቢው ሃሳቡን እንዲረዳው የማድረግ ሂደት ነው።

በመማር ማስተማሩ ሂደት ተማሪዎች የፅሁፍን ሃሳብ ለመተንተን፣ ግላዊ አረዳዳቸውን ለማንፀባረቅ፣ እርስ በርሳቸውም ለመረዳዳት ሁለቱን ክሂሎች በውህደት ሊማሩ ይገባቸዋል። ምክንያቱም በትምህርት ቤት ቆይታቸውም ሆነ በቀሪው የህይወት ዘመናቸው እንዲያነቡና እንዲፅፉ በማድረግ የተግባቦት ክሂላቸዉን ያዳብርላቸዋል። ሁለቱን ክሂሎች በውህደት የመማር ብልሃቶችም የባህለብዙዊነትን፣ የብዙሃ ማህበረሰብን ገፅታዎች እንዲዳስሱ፣ እንዲያገናዝቡ ይረዳቸዋል። ቅርሶችን/ታሪኮችን/ና የወደፊት ሁነቶችን ሁለ የመሳል አቅማቸውንም ያጐለብትላቸዋል።

ግሪንሎውና ሙር (1982) ባደረጉት ጥናታዊ አሰሳም በመለስተኛና በከፍተኛ ሁለተኛ ደረጃ ትምህርት ቤቶች 75% የሚሆኑት ዘገባዎች ንጥል የንባብ ትምህርት ኮርሶች መሻሻል እንደሚገባቸው ገልፀዋል። በዘገባውም የንባብ ትምህርት ብቻ የማይሰጥባቸውን ትምህርቶች/ ማህበራዊ ጥናቶች፣ ሂሳብና የሳይንስ ትምህርትን በተመለከተ ሁለቱን ክሂሎች አዋህዶ መስጠት ወሳኝ እንደሆነ ለማየት ተችሏል። ይህን ጥናታዊ አሰሳም መነሻ በማድረግ በሁለተኛ ደረጃ ትምህርት ቤት ያለው ትምህርታዊ መዋቅርና የትምህርት ልምምዶች እመርታዊ ለውጥ ማሳየት እንዳለባቸው ተገልጿል። ምክንያቱም ከዚህ በፊት የነበረው የማንበብና የመፃፍ ልምምድ በተማሪዎች ፍላጐት ላይ የተመሠረተ አልነበረም። በተለይ ይህ የክፍል ደረጃ ተማሪዎቹ ከ10-14 ባለው የዕድሜ ክልል ውስጥ የሚገኙበት ሲሆን ከልጅነት ወደ ጉልምስና የሚሸጋገሩበትም ወቅት ነው። ይህንን ተግባራዊ ለማድረግ ደግሞ ተማሪ-ተኮር ሥርዓተ-ትምህርት መቅረጽ የግድ ነው--(ኢኮርን 1987፣ አ.ርዊይን 1990፣ ሙርና ስቴፋንቺ 1990፣ ሃረስት 1994፣ ትስ 1995፣ ስቴሽንስንፕካር 1993)ን በመጥቀስ ሩድል (1997) ገልፀዋል።

በተጨማሪም ጂዩሚንሳይ (2006) በአሜሪካ ኦሀዮ ዩኒቨርስቲ ባደረጉት ጥናት የደረሱባቸውን ውጤቶች አስመልክተው ሲገልፁ መምህራን ማንበብና መፃፍን ልማዳዊ በሆነ መንገድ ለያይተው ያስተምራሉ። ሁለቱ ክሂሎች ፍፁም የተዋሃዱ ናቸው። ማንኛውም አካል ክሂሎቹን ማሰብ የሚገባው በተናጠል ሳይሆን በውህደት ነው። በሥርዓተ-ትምህርቱም የሚታየው ግድፈት ክሂሎችን ነጣጥሎ መቅረጽ ነው። ይህ ማለት ደግሞ ሁለቱ ክሂሎች የተለያዩ ናቸው ብሎ እንደ መደምደም ይቆጠራል። በሌላ መልኩም ኦልሰን (2002) በሁለተኛ ደረጃ ተማሪዎች ላይ ባደረጉት ጥናት ሁለቱን ክሂሎች በማዋሃድና ተማሪ ተኮር ዘዴን በመጠቀም ተግባራዊ አድርገዋል።

የጥናቱም ሂደት ሁለት ሳምንታትን የፈጀ ሲሆን ተማሪዎቹ ሃሳባቸውን እንዲያንፀባርቁ፣ እርስ በርስ እንዲገማገሙ፣ ግላዊ አረዳዳቸውን እንዲገልፁ ተደርጓል። በተከታታይ ምዘናም ምን ያህል ማንበብና መፃፍ እንደቻሉ ለመገምገም ተችሏል። ሌላው ጥናት ደግሞ በበሃንርሃን (2008) በተማሪ ተኮር ዘዴ በሳይንስ ትምህርቶች ላይ የተደረገ ሲሆን ተማሪዎቹ ከቋንቋ ትምህርት በተጨማሪ በሌሎችም የትምህርት መስኮች የማንበብና

የመፃፍ ትምህርትን በውህደት መስጠት ውጤታማ እንዳደረጋቸዉ ለማየት ተችሏል። በዚህ ጥናት ተማሪዎቹ የቃላት ግንባታን፣ የአንቀጽ አወቃቀርንና አገነባብን፣ አውዳዊ ትርጉም የማግኘትን፣ ትዕዛዛትን ከጽንሰ-ሃሳቡ ጋር የማዛመድን፣ የማስታዎሻ አወሳሰድን፣ በተማሪው መምሪያ ላይ ያሉትን ጥያቄዎች የመመለስን አቅም የፈጠረላቸው መሆኑን ለማረጋገጥ ተችሏል።

ከላይ ከተጠቀሱት ድርሳናት ማንበብና መፃፍ ጥበቅ ቁርኝት እንዳላቸው መረዳት ይቻላል። በኢትዮጵያ ተፈጸሞ ሁኔታ ግን በሁለተኛ ደረጃ ትምህርት ቤቶች ከሥርዓተ ትምህርቱ አወቃቀር ጀምሮ እስከ የክፍል ውስጥ ስነ-ዘዴ ሁለቱ ክሂሎች በተናጠል እንጂ በውህደት ሲቀርቡ አይታዩም። በመርሃ-ትምህርቱም ሆነ በተማሪውና በመምህሩ መፃህፍት የተነደፉ ይዘቶችም ሆኑ መልመጃዎች ክሂሎችን በተናጠል ለመለማመድ ታስበው የቀረቡ ይመስላል። ለምሳሌ፡- የ9ኛ፣ የ10ኛ፣ የ11ኛና የ12ኛ ክፍል የአማርኛ ቋንቋ የመማሪያና የማስተማሪያ መጻሕፍትን ማየት ይቻላል። አጥኝዋ ባደረገችው ምልከታ በዘጠነኛ ክፍል ከቀረቡት 74 መለማመጃዎች መካከል 15 ማንበብን፣ 13 መፃፍን፣ 11 መናገርን፣ 4 ማዳመጥን፣ 12 ሰዋሰውን፣ 9 ሥነ-ዕሁፍን በተናጠል የሚያለማምዱ ናቸው። የዚህ ጥናት አቅራቢም በመንቆረርና በሊሎች ሁለተኛ ደረጃ ትምህርት ቤቶች ከ15 ዓመታት በላይ በመምህርነት ያገለገለች በመሆኗ በራሷም ሆነ በአጋር መምህሮቿ አንብቦ የመረዳትና የመፃፍ ክሂሎችን በተናጥል መማር/ማስተማር ያመጣው ለውጥ እንደሌለ በሂደት፣ በምልከታና በአ-መደበኛ ውይይት ለማረጋገጥ ችላለች።

በተጨማሪም "የማንበብና የመፃፍ ክሂሎችን አዋህዶ ማስተማር ክሂሎቹን በማጉልበት ረገድ ያለው ሚና" በሚል ርዕስ በ1999 ዓ.ም. በባህርዳር ዩኒቨርሲቲ በሞገስ (ለድህረ ምረቃ በቀረበ ጥናታዊ ፅሁፍ) ተጠንቷል። ይህ ጥናት ከተገቢነቱና ከአስተማማኝነቱ አንፃር ከፍተት ታይቶበታል። አንደኛ ከርዕሱ ጀምሮ "ማስተማር" የሚለው ጉዳይ ከዘመኑ የመማር/ማስተማር መስተጋብር ጋር አብሮ አይሄድም። የመምህሩ ተጽዕኖ የጐላበት መሆኑን ያመላክታል። የመሠረታዊ ቃላት ብያኔ ያለመኖሩም፣ የቁልፍ ቃላትን ምንነት፣ እንዴትነት፣ ለምንነት፣ወዘተ...ማወቅ አልተቻለም። ሁለተኛ ዓላማውን ለማስፈፀም የተጠቀመባቸው ዘዴዎች ባንደኛ ደረጃ ተማሪዎች ላይ ብቻ የተፈተሸ መሆናቸውን

ከጠቀሳቸው የጥናት ግኝቶች ለመረዳት ይቻላል። አተገባበራቸውንም በተመለከተ በተደራጀ መልኩ በግልጽ አልተዋቀሩም። ለምሳሌ፡- በድርሳኑ ከተካተቱት ምንባባት መካከል "በትምህርት አንድ" ሥር አራት የፍቅር/የሰላምታ ደብዳቤዎች ተጽፈዋል፤ በመቀጠል ተማሪዎቹ የሥራ ደብዳቤን ቅጽ መሠረት ያደረገ ደብዳቤ እንዲፅፉ ተጠይቀዋል። ከተጠየቃዊነቱ አንፃር እነዚህ አራት ረዣዥም የሰላምታ ደብዳቤዎች ለሥራ ደብዳቤው የሚሰጡት መጋቢ ምላሽ አይኖርም።

የሥነ-ፅሁፍ ሥራዎች አንብቦ መረዳትንና መፃፍን ለመማር/ማስተማር ምቹነታቸውን ሃርፕ (1997)፣ ኦልሰን (2002)፣ ብሎክ (1997) ና ሂተን (1991) ሲገልፁ መምህሩ የተማሪዎችን ደረጃ፣ አቅምና ፍላጐትን ማጥናት እንዳለበት አሳይተዋል። በተጨማሪም የሚመረጡት ቴክስቶች ያልተንዛዙ፣ ተግባቦትን ሊያጠናክሩ የሚገቡ፣ ወቅታዊ የሆኑ፣ የጥንትም ቢሆኑ ባሁኑ ሰዓት ሊደመጡ፣ የተማሪዎችን ፍላጐት ሊያዳብሩ የሚችሉ፣ ክዳራዊ እውቀታቸው ጋር የተገናዘቡ መሆን ይገባቸዋል- (ሂል 1986፣ ላዛር 1993)። በዚህም መሠረት በሞገስ የተመረጡት የማስተማሪያ ቴክስቶች /ምንባባት/ የተወሰዱት ከአንድ የስነ-ፅሁፍ ዘር (ክልቦለድ) ብቻ ሲሆን ባጠቃላይ ምንም ማሻሻያ ሳይደረግባቸው የቀረቡ ናቸው። ይህ ደግሞ ሌሎች የስነ-ፅሁፍ ዘሮች አለመካተታቸውና እንደየአስፈላጊነታቸው ተደራጅተው አለመቅረባቸው ትምህርቱን ምሉዕ እንዳይሆን ያደርገዋል።

የናሙና አወሳሰዱም አይታሰቤ ተላውጠዎችን ለመቆጣጠር ትልቅ ክፍተት የተፈጠረበት በመሆኑ አስተማማኝነቱን አጥብቦታል። ምክንያቱም ባንድ ክፍል ያሉ 60 ተማሪዎችን ለሁለት ክፍሎ ተጠኝና ጥብቅ ቡድን ብማለት ማስተማር አስቸጋሪ ነው። በተጨማሪም ተጠኝ ቡድኖቹ ከጥብቅ ቡድኖቹ ጋር በመደበኛ ፈረቃቸው ልማዳዊውን /መደበኛውን/ መጽሐፍ ይማራሉ፤ ከፈረቃ ውጭ ደግሞ አዲሱን /በአጥኝው የተዘጋጀውን/ ቴክስት ይማራሉ። በዚህ ሂደት የትኛው ተላውጠ ተጽዕኖ እንዳሳደረ ለመገምገም በጣም አስቸጋሪ ነው።

ከዚህም ባሻገር የመረጃ መሰብሰቢያ መሣሪያዎችንም በተመለከተ የቅድመ ትምህርትና የድህረ ትምህርት ፈተናዎች ተመጣጣኝ አይደሉም። ለምሳሌ፡- በቅድመ ትምህርት ፈተና

መመሪያ አራትና መመሪያ ስድስት ድርሰት እንዲፅፉ ተጠይቀዋል። በድህረ ትምህርት ፈተና ግን እንደነዚህ ዓይነት ትዕዛዛት የሉም። ሌላው በድህረትምህርት ፈተና ለአንድ መንግስት መስሪያ ቤት ማመልከቻ እንዲፅፉ ሲጠይቁ በቅድመ ትምህርት ፈተና ላይ ግን አቻ የሚሆን ነገር የለም። ይህ ሁኔታ ደግሞ የፈተናዎቹን አስተማማኝነት ጥያቄ ውስጥ ይከተዋል። ሌላው በአባሪ ገጽ (83) ላይ እንደተገለፀው መመሪያ አምስት በቀጥታ የተወሰደው ከ10ኛ ክፍል የአማርኛ ቋንቋ መማሪያ መጽሃፍ ገጽ (129) መልመጃ (3) ነው። ይህ ደግሞ የፈተናውን አስተማማኝነትና ተገቢነት ይፈታተነዋል። ምክንያቱም የተወሰኑ ተማሪዎች መረጃው ቀድሞ ደርሷቸው ሊሆን ይችላል። በተጨማሪም ለ10ኛ ክፍል የተዘጋጀን መልመጃ ያለምንም ማሻሻያ ለ9ኛ ክፍል መፈተን ተገቢ አይደለም።

ሌላው ለተማሪዎች የቀረበላቸው ቃለ-መጠይቅ ገጽ (88) በአባሪ "ረ" ላይ "የትምህርቱን አቀራረብ እንዴት ታዩታላችሁ?" የሚል አንድና እጅግ ጥቅል የሆነ ጥያቄ ነው። ይህ ደግሞ የተማሪዎችን ዕብረቃ በጣም ይገድበዋል። ምልከታንም በተመለከተ በያንዳንዱ ክፍለ ትምህርት የነበረውን ሁኔታ አይገልጽም ገጽ(89) አባሪ "ሰ" ላይ እንደተገለፀው መምህሩ (አጥኝው) ጥቅል በሆነ መልኩ ያቀረበበት ሁኔታ ይታያል። ለምሳሌ "... በዚህ እለት ከክንዋኔ 3.1 እስከ 3.5 የቀረቡትን መልመጃዎች ሁሉም ተማሪዎች ለመስራት ጥረት ያደርጉ ነበር።" ይህ አገላለጽ እንዴትና በምን ሁኔታ? የሚሉትን ለመለስ አይችልም። ከተገቢነቱም አንፃር በተከታታይ ምዘና ግልጽ ባለመልኩ አለመለካቱ ጥናቱን ምሉዕ ላያደርገው ይችላል ከሚል እሳቤ አጥኝዋ ደግማ ለመፈተሽ ወሰነች።ባጠቃላይ ከዚህ በላይ ባሉት ምክንያቶች ክሂሎቹን በተናጠል ወይስ በውህደት መማር/ማስተማር ክሂሎቹን በማጐልበት ረገድ የትኛው ዘዴ የተሻለ ነው? ከሚለው ማጠቃለያ ለመድረስ ተጨማሪ ጥናት የሚጠይቅ በመሆኑ የዚህ ጥናት መነሻ ሆኗል።

፲.፬. የጥናቱ ዓላማ

የዚህጥናትአቢይዓላማአንብቦየመረዳትናየመፃፍክሂሎችን አዋህዶ መማር/ማስተማር ክሂሎቹን በማጐልበት ረገድ ያለውን ፋይዳ መመርመር ነው። በማንበብና በመፃፍ ክሂሎች መካከል ምን ዓይነት ትስስር ወይም መደጋገፍ እንዳለ መመርመር የጥናቱ አቢይ

ዓላማ ነው። በዚህም መሠረት ጥናቱ የሚከተሉትን ጥያቄዎች የመመለስ ዝርዝር ዓላማዎች አሉት።

- አንብቦ የመረዳትና የመፃፍ ክሂሎች ትስስር እስከምን ድረስ ነው?
- የማንበብና የመፃፍ ክሂሎችን በውህደት መማር/ማስተማር ክሂሎቹን ለማጐልበት ያለው ፋይዳ ምንድን ነው?

1.2. የጥናቱ አስፈላጊነት

ይህ ጥናት የሚከተሉትን ጠቀሜታዎች በማስገኘት ረገድ አስፈላጊ ይሆናል።

- የአማርኛ ቋንቋን ሥርዓተ-ትምህርት እንደገና ለመፈተሽ መነሻ ሊሆን ይችላል።
- የአማርኛ ቋንቋ መምህሮች የመፃፍና የማንበብ ክሂሎችን አቀራረብ አግባብነት እንዲጠይቁ ይረዳል።
- ተማሪ ተኮር የመማር/ማስተማር ሂደትን ለመተግበር ምቹ ሁኔታን ሊፈጥር ይችላል።
- ተማሪዎች ጥሩ አንባቢና ፀሃፊ እንዲሆኑ ያግዛል።
- በመስኩ የወደፊት ተመራማሪዎችን ያነሳሳል።

1.3. የጥናቱ ወሰን

ይህ ጥናት የማንበብና የመፃፍ ክሂሎችን አዋህዶ መማር/ማስተማር ክሂሎቹን በማጐልበት ረገድ ያለውን ፋይዳ በመመርመር ላይ ያተኮረ ነው። ጥናቱ በደብረ ማርቆስ ከተማ በመንቆረር 2ኛ ደረጃ ትምህርት ቤት በ2002 ዓ.ም. ተመዝግበው የዘጠነኛ ክፍል ትምህርታቸውን ከሚተታተሉ 960 ተማሪዎች መካከል በተራ እጣ ናሙና በተመረጡ በ9ኛ"ሀ" ክፍል 50 ተማሪዎች ላይ በቅድመ ፍትነት (Pre-experimental) ተካሂዷል። ጥናቱ በነዚህ ተማሪዎች ላይ እንዲካሄድ የተደረገበትም ዋና ምክንያት ከአንደኛ ደረጃ ወደ ሁለተኛ ደረጃ የተሸጋገሩ ስለሆኑ፣ ዘዴዎችንም በመተግበር አስተማማኝነቱን ለመጠበቅ የሚያስችል የክፍል ደረጃ በመሆኑ ነው። በተጨማሪም ክሂሎቹን በስፋትና በጥልቀት የሚለማመዱበት፣ አጥኝዋም ተማሪዎችን የምታስተምራቸው ስለሆነ ነው። በዚህ ጥናት ውስጥ በትምህርት ይዘትንት የተካተቱ ዳራዊ እውቀትን መጠቀም፣ ጥያቄ መጠየቅና መተንበይ፣ መገመት፣ መከለስና ፅብረቃ ናቸው። በነዚህ ይዘቶች አማካይነትም ጥናቱ

አንብቦ የመረዳትና የመፃፍ ክሂሎች ዝምድና እስከምን ድረስ እንደሆነ በመፈተሽ ለመሪ ጥያቄዎች መልስ ያፈላልጋል።

1.4. የመሠረታዊ ቃላትና ሐረጋት አጠቃቀም ብያኔ

የዚህጥናት፣ቁልፍቃላትአንብቦ መረዳት፣ የመፃፍ ክሂል፣ የመፃፍና የማንበብ ክሂሎች ውህደት ሲሆኑ አጠቃቀማቸውም እንደሚከተለው በቀረበው ብያኔ መሠረት ነው።

1. **አንብቦ መረዳት፡-**ተማሪዎቹ በጥናቱ ሂደት በአንድ ቴክስት ያለውን ሃሳብ ከቀደመ እውቀታቸው ጋር በማገናዘብና በመጠቀም ይዘቱን ይገምታሉ፤ እያነበቡም ወደፊት ያለውን ሁነት ይተነብያሉ። ገፀባህሪያትን/መቼቶችን በማወዳደርና በማነፃፀር ልዩነታቸውንና አንድነታቸውን ይለያሉ። ምንነታቸውን? እንዴትነታቸውን? ለምንነታቸውን? ሁሉ ይገመግማሉ፤ ይጠይቃሉ፤ ከራሳቸው ማህበራዊ ህይወትም ጋር በማነፃፀር የሚስማሙባቸውንና የማይስማሙባቸውን ያንፀባርቃሉ። የሚፅፏቸውንም አንቀፆችና አጫጭር ድርሰቶች ደጋግመው በማንበብና በመከለስ ሃሳባቸውን በቅደም ተከተል የማደራጀት ሂደትን ይፈፅማሉ።

2. **የመፃፍ ክሂል፡-** ተማሪዎቹ የቀረበላቸውን ቴክስት ዋና ዋና ሃሳቦችን በመንቀስ አሳጥረው ይፅፋሉ፤ ከቴክስቱ ለውጡ አዳዲስ ቃላትና ሃረጋት ፍቻቸውን በፅሁፍ ይፈልጋሉ። በፅሁፍ ውስጥ የቀረቡትን ገፀ-ባህሪያት/መቼቶች/ አንድነትና ልዩነትን በፅሁፍ ይገልፃሉ። የአንድን ምንባብ ይዘት ርዕሱን በማየት ግምታቸውን በፅሁፍ ይገልፃሉ፤ ጅምር ሃሳብን በመፈጠረስ የሰዋሰው ሥርዓቱን የጠበቀና ትርጉም ያለው /የሃሳብ ፍሰቱን የጠበቀ/ የመፃፍ ሂደት ያከናውናሉ።

3. **የአንብቦ መረዳትና የመፃፍ ክሂሎች ውህደት፡-** ሁለቱን ክሂሎች ያለምንም ክፍተት አዋህዶ የማቅረብ ሂደት ነው። ተማሪዎቹ ቴክስትን በማንበብ ለአዳዲስ ቃላት ፍች ይሰጣሉ፤ የተገለፁትን ገፀባህሪያት/መቼቶች/ ምንነት፣ እንዴትነት፣ ለምንነት፣ ወዘተ... በጥልቀት በማንበብ አንድነትና ልዩነታቸውን በመፃፍ ይገልፃሉ። የቀደመ እውቀታቸውንም በመጠቀም የራሳቸውን አረዳድ በመፃፍ ያንፀባርቃሉ። የፃፉትንም

በክፍል ውስጥ በማንበብ እርስ በርሳቸው ይገማገማሉ። በአጠቃላይ ዙርመጥ በሆነ መልኩ እያነበቡ ይፅፋሉ፤ እየፃፉ ያነባሉ።

2. ክለሳ ድርሳናት

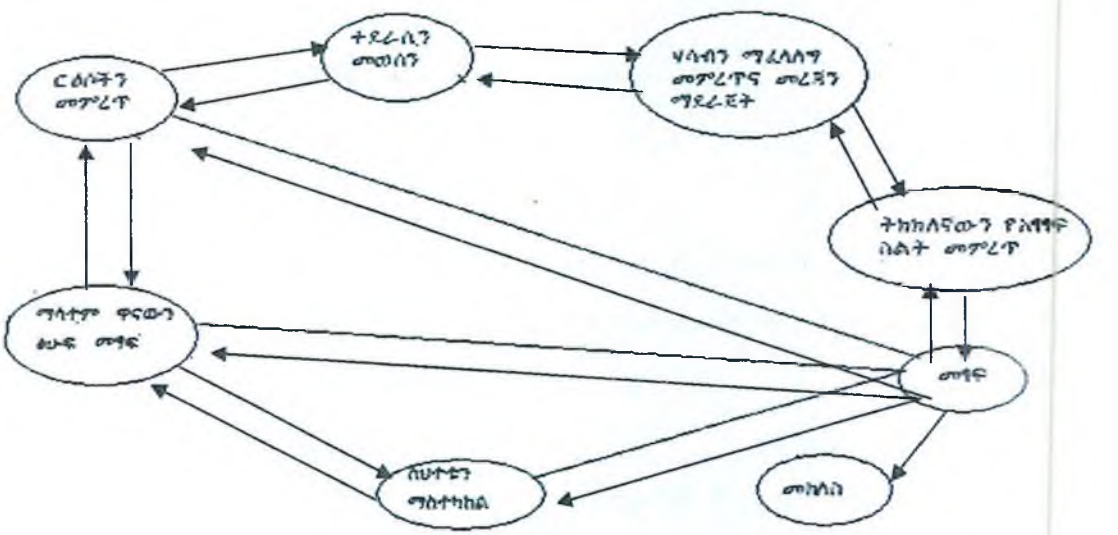
በዚህ ክፍል ከጥናቱ ጋር በቀጥታና በተዘዋዋሪ ተዛምዶ ያላቸው ተገቢ ድርሳናት ተከልሰውና ተገምግመው ቀርበዋል።

2.1 አንብቦ የመረዳትና የመፃፍ ክሂሎች ትስስር

አንብቦመረዳትናመፃፍትስስርእንዳላቸውየተለያዩጥናቶችአመላክተዋል። ያሁሺን (2005) በታይዋን ከተማ በዩኒቨርሲቲ ተማሪዎች ላይ ባደረጉት ጥናት ተማሪዎቹ ተጨባጭ አስተሳሰቦችን ማመንጨት ችለዋል። መረጃዎችን ለመሰብሰብም በቅንጅት በመስራት ከቴክሰቱ ጋር የተገናኘ የቀደመ እውቀታቸውንና ልምዳቸውን ተካፍለዋል። በሁሉም ቡድኖች ንቁ ተሳትፎ ታይቷል። በመማር ሂደቱም ግላዊ እድገታቸውንና የእሴቶቻቸውን ዋጋ ለመገምገም አስችሏቸዋል። የቴክስቱን ገፀባህሪያትም በማነፃፀር የተሰማቸውን ስሜት ገልፀዋል። በተጨማሪም ከተሰጣቸው ሶስት አማራጭ ርዕሶች በመረጡት ታሪክ ዙሪያ በቡድን በማንበብ የራሳቸውን የፈጠራ ታሪክ በመፃፍ ፈጣንና ውጤታማ አንባቢና ፀሐፊ መሆናቸውን አሳይተዋል። በተለይ የቡድን ሰምንት አባላት ከሌሎቹ ቡድኖች በተለየ መልኩ ሙሉ ጊዜያቸውን በመሰዋት 10 ገጽ በመፃፍ የበለጠ መስራታቸውን አስመስክረዋል። እነዚህ የቡድን አባላት በታሪኩ ውስጥ ብዙ ተውሳክ ግሶችንና ቅጽሎችን በመጠቀም ሴራውን ለማጉላት ችለዋል። አያይዘውም ያሁሺን እንደገለፁት የማንበብና የመፃፍ ትስስር በቀደመ እውቀት ግንባታ ሂደት ይንፀባረቃል። ሁለቱም ክሂሎች ተማሪዎች ንቁ ተሳታፊ በመሆን ትርጉምን እንዲገነቡ ያስችሏቸዋል። አንባቢዎችም ሆኑ ፀሐፊዎች ቴክስትን በመተርጎምና በግንባታ ሂደት ያልፋሉ። አንባቢ ሃሳብን ከፅሁፍ በመውሰድ ከቀደመ ዕውቀቱና ከነበረው ልምድ ጋር ያገናዝባል፤ ይተረጉማል። በተመሳሳይም ፀሐፊ ካለው የዕውቀት ዳራ በመነሳት ሃሳብን በማፍለቅ ትርጉምን ይገነባል፤ ያዋቅራል። ቋንቋውን በመምረጥና በማደራጀት ይዘቱንም በማስተሳሰር ይለያል፤ ይወስናል። በተጨማሪም የቴክሰቱ መዋቅሮች እንዴት መገለጽ እንዳለባቸው እቅድ ያወጣል። በዚህ ሁኔታ ቅድመ እውቀትን ለመገንባት ከማንበብ ይልቅ መፃፍ የበለጠ

ግልጽ ይመስላል። ሆኖም ግን ሂደቱ ዙር መጥ ነው።/ቴርኒይና ፒርሰንን (1983) ጠቅሰው ያሁሺን (2005) እንደገለፁት ማንበብና መፃፍ ትይዩ ድርሰታዊ ሂደቶች ናቸው። ሁለቱም ትርጉምን በመገንባት አንድ አይነት ሂደትን ይጋራሉ። የማቀድ፣ የመወሰን፣ የማሰስ፣ የመገምገም፣ የመከለስና የማንፀባረቅ ተግባራት ይከናወኑባቸዋል።

እነዚህ አላባዎች በሁለቱም ሂደቶች ቀጣይና ዙርመጥ ናቸው። ስለዚህ ሁለቱን ክሂሎች ለማሳደግ በተከታታይነት /በቅደም ተከተል/ ሳይሆን ባንድ ጊዜ መለማመድ ያስፈልጋል። ምክንያቱም ማንበብ ለመፃፍ ግፊት ነው። ማንበብ ተማሪዎቹ የተለያዩ የመፃፍ ሞዴሎችን እንዲጠቀሙ የሚጋለጥ ሂደት ነው (ጆይሰና ክርስት 1989)። በዲስኩር ተራክቦ ሂደት ተማሪዎቹ ውስን በሆነው የታሪክ መቼት፣ ገፀባህሪያት፣ ሴራና የአፃፃፍ ቴክኒክ ይመሰጣሉ። በዚህም ቴክስቱ እንዴት እንደተዋቀረ እውቃታቸውን ይጋራሉ፤ ለሚፅፉትም ፅሁፍ መረዳትን ይፈጥርላቸዋል። እንደ ሃርፕናጆን (1996) አቀራረብም መፃፍ ለአንብቦ የመረዳት ክሂል አንዱ አካል ነው። መፃፍ ውጤት ሳይሆን ሂደት ነው፤ ከሂደትም ዙር መጥ ሂደት። ተማሪዎቹ ምን እንደሚፅፉ ይመርጣሉ፤ የፃፉትንም ያስተካክላሉ። ይህንን ዙር መጥ ትስስር በሚከተለው ዲያግራም ሊገለጽ እንደሚችል ሃርፕና ጆን ያስረዳሉ።



ምንጭ ፡-ሃርፕና ጆን (1996፡100)

ዲያግራም 1.1 መፃፍ ዙርመጥ ሂደት ነው።

በዲያግራሙ እንደተገለፀው ተማሪዎች ለመፃፍ ርዕስ ይመርጣሉ፤ ርዕሳቸውንም ለመወሰን ተደራሲያቸውን ይለያሉ፡፡ እነዚህን ለማከናወን ትክክለኛውን የአፃፃፍ ስልት ይመርጣሉ፤ ይፅፋሉ፤ ይከልሳሉ፡፡ በሌላ መልኩ ሲታይ ደግሞ ለመፃፍ የተፃፉ ቴክስቶችን ያነባሉ፤ ይከልሳሉ፡፡ የሚፈልጓቸውን ሃሳቦች ለመምረጥ፣ መረጃ ለማሰባሰብና ለማደራጀት ደጋግመው ያነባሉ፡፡ ስለዚህ ይሄ የማንበብ ሂደት ነው፤ ይሄ ደግሞ የመፃፍ ሂደት ነው ብሎ ገደብ ማበጀት የሚቻል አይመስልም፡፡

በኦልሰን (2002) ጥናትም አንብቦ የመረዳትና የመፃፍ ውህደታዊ የመማር-ማስተማር ሂደት የተሟላ ሂደት መሆኑ ተረጋግጧል፡፡ በጥናቱ ሂደት የአንድ ክፍል ተማሪዎችን ለ15 ተከታታይ ቀናት በተከታታይ ምዘና የፈተሸበት ሲሆን ባህለብዟዊነትን የሚያንፀባርቁ ሥነ-ፅሁፎችን ተጠቅመዋል፡፡ የጥንድ ምላሽ ክንዋኔዎችም ተግባራዊ ተደርገዋል፡፡ ስምንት ብልሃቶችንም በመተግበር ተማሪዎቹ እርስ በርሳቸው በመናበብ ግምገማ አካሂደዋል፡፡ ግላዊ አረዳዳቸውንም ከሌላው ጋር በማስተያየት ራሳቸውን መገምገም ችለዋል፡፡ የተሰጣቸውን ታሪክ በማንበብ የተስማቸውን ስሜት አንፀባርቀዋል፡፡ ለዚህም ለውጥ ተከታታይ ምዘና ወሳኝ ሚና እንደሚጫወትም ገልፀዋል፡፡

ኬኒዲ (1990) ባጠኑት ጥናት ደግሞ "ርዕሶች" አንብቦ የመረዳትንና የመፃፍን ውህደት ለማጉላት ወሳኝ ሚና እንደሚጫወቱ አረጋግጠዋል፡፡ ጥናቱ ፍትነታዊ (Experimental) ሲሆን ተጠኝ ቡድን (A) እና ጥብቅ ቡድን (B) በማድረግ ለተጠኝ ቡድኑ የተለያዩ የማንበብና የመፃፍ ትስስርን የሚያጐለብቱ ዘዴዎችን በመንደፍ ቀርቦለታል፡፡ ለምሳሌ፡- ገላጭ፣ ታሪካዊ፣ ምክንያትና ውጤት፣ ማወዳደርና ማነፃፀር፣ ማሳመን፣ ሂደትን መተንተንን ከታወቁ ፀሐፊዎችና ተማሪዎች ፅሁፍ በማቀናጀት የተለማመዱበት ነበር፡፡ ጥብቅ ቡድኑ (B) ግን ከላይ የተጠቀሱት ሁኔታዎች ሳይሟሉላቸው እንዲያነቡና እንዲጽፉ ተደረገ፡፡ የተገኘውም አማካይ ውጤት የቡድን "A" 84.125 ሲሆን የቡድን "B" 75.364 ሆኗል፡፡ ከዚህ ውጤት በመነሳት ለተማሪዎች የሚዘጋጁ/የሚቀርቡ ርዕሰ-ጉዳዮች ማንበብና መፃፍን አዋህደው ሊለማመዱ የሚያስችሉ መሆን አለባቸው ከሚል ድምዳሜ ላይ ለመድረስ ተችሏል፡፡

ሌላው ጥናት ደግሞ ጁዩሚንሳይ (2006) በታይዋን ከሊጅ ያደረጉት ነው። ጥናቱ 50 ተማሪዎችን ያቀፈ ሲሆን ሁለቱን ክሂሎች በውህደት ለ15 ሳምንታት እንዲማሩ በማድረግ ሙከራ የተደረገበት ሂደት ነበር። ተማሪዎቹ የማንበብና የመፃፍ ችሎታቸውን ሊያሳድጉ የሚችሉ ቴክስቶችን ከድረ-ገጽ፣ ከአርቲክል፣ ከጋዜጣ፣ ከመጽሔት በመምረጥ እንደየፍላጐታቸውና እንደየጠቀሜታቸው እንዲማሩ ተደርጓል። በሂደቱም ተማሪዎቹ የቋንቋ ብቃታቸውን እንዳሳደጉ ለማየት ተችሏል። ከጥናቱም በመነሳት ሁለቱን ክሂሎች በመነጣጠል የሚሰጡ ትዕዛዛት ማንበብን እንደተቀባይ ክሂል የመቁጠር ነገር ሲሆን የመፃፍ ሂደት ደግሞ ሰዋሰዋዊ ትክክለኛነትን ብቻ የጠበቁ ተግባራትን የማዋቀር ሂደት ይሆናል። ይህ ደግሞ በማንበብም ሆነ በመፃፍ ሂደት የተማሪዎችን ፅብረቃ ማግኘት አያስችልም ከሚል ድምዳሜ ላይ ተደርሷል።

2.2 የማንበብና የመፃፍ ክሂሎችን አዋህዶ የመማር/ማስተማር ፋይዳ

ብሎክ (1997) እንደገለፁትሁለቱንክሂሎችአዋህዶመማር/ማስተማርተማሪዎችበትምህርቱላይትኩረትእንዲኖራቸውሰለሚያደርግንቁ ተሳታፊዎች ይሆናሉ። በሚያነቡትና ላነበቡትም በመፃፍ ምላሽ ይሰጣሉ። በተግባራዊ ክንዋኔያቸውም እርስ በርስ በሃሳብ የመደጋገፍና የራስን አረዳድ ከሌላው ጓደኛቸው ጋር የማመሳከርን ሁነት ሁሉ ይፈጥርላቸዋል። ይህንንም ማረው (1998፡170፡190) እንደሚከተለው አጠናክረውታል።

ክሂሎች የተለያዩ ስለሆኑ ለትምህርት ሲቀርቡ ራሳቸውን ችለው ነው ብሎ ማሰብ ይቻላል። አንድ ቀን ተማሪዎች በማንበብ ላይ አትኩረው ሰርተው ከሆነ በሚቀጥለው በመናገር ላይ ብቻ በሌላም ቀን እንዲው በሌላው ክሂል ላይ ብቻ እያሉ ማሰብ ይቻላል። ይህ መሰሻ ሃሳብ ግን በሁለት ምክንያቶች ውድቅ ይሆናል። አንደኛ ነገር አንድ ክሂል ካለ ሌላ ክሂል ብቻውን አይከወንም፤ ሊከወንም አይችልም... ባንድ ክሂል ላይ ብቻ ከሆነ ትኩረታችን በእርግጥ ለምሳሌ፡- ተማሪዎቻችን በንባብ ችሎታ ብቻ አትኩረው እንዲሠሩ ማድረግ ይቻላል፤ ሆኖም ይህ ክንዋኔ ቆይቶ ወደ አንድ ወይም ወደ ብዙ ክሂሎች ይቀየራል።በቋንቋ አጠቃቀም ሂደት አንድ ሰው በሚያደርገው ተግባቦት ባንድ ክሂል ብቻ

መሥራት አለመቻሉ የክሂሎችን አዋህዶ ማቅረብ ምክንያታዊ ያደርገዋል፡፡ ... በዚህም መሠረት ክሂሎችን አዋህዶ ማቅረብ ትምህርቱን ትርጉማዊና ሙሉ በሙሉ ህይወታዊ ስለሚያደርገው ይኸው ጉዳይ የተለየ ትኩረት ያስፈልገዋል፡፡

በሃንርሃን (2008) ባደረጉት ጥናት ተማሪዎች ክቋንቋ ትምህርት ባሻገሪም በሳይንስ ትምህርቶች የማንበብና የመፃፍ ክሂሎችን አዋህደው በመማራቸው ውጤታማ መሆናቸውን አረጋግጠዋል፡፡ የተጠኝዎቹ ብዛት በቁጥር ስምንት ወንዶችና አንድ ሴት ሲሆኑ ክሂሎችን በውህደት ያለመማራቸው የሳይንስ ትምህርቶች ላይ ችግር እንደፈጠረባቸው በምልከታ አረጋግጠዋል፡፡ ይህንንም ችግር ለመቅረፍ ጥምር ክፍለ ጊዜ በመቅረጽና 16 ብልሃቶችን በመንደፍ ተግባራዊ አድርገዋል፡፡ በሂደቱም ተማሪዎቹ፣ ሃሳብን ከዓውድ ለመረዳት ችለዋል፡፡ ቃላትን በተገቢው ቦታ በመጠቀም ዓረፍተ ነገርን አዋቅረዋል፡፡ ጀንሰንም (2009) እንደገለፁት ማንበበ የመፃፍ ምላሽ ነው፣ መፃፍም የማንበብ፡፡ ወደ ውስጥ መተንፈስ እንዳለ ሁሉ ወደውጭ መተንፈስም የግድ ነው፡፡ የማንበብና የመፃፍ ትዕዛዛት በውህደት መቅረብ ተማሪዎች ጠንካራ ፀሐፊዎች፣ ጥልቅና ስልታዊ አንባቢዎች እንዲሆኑ ያግዛቸዋል፡፡ ለምሳሌ፡- አንድ መምህር ተማሪዎቹ ስለአንድ ግለሰብ ታሪክ እንዲፅፉ ቢፈልግ ሞዴል የሆነ ፅሁፍ እንዲያነቡ የመረጃ ምንጮችንም እንዲሰበስቡ ያዝዛቸዋል፡፡ ሲፅፉም ሃሳባቸውን በቅደም ተከተል ለማዋቀርና ለማደራጀት ደጋግመው በማንበብ ፅሁፋቸውን ፈር ማስያዝ ይጠበቅባቸዋል፡፡

2.3 የአንብቦመረዳትናየመፃፍክሂሎችንበውህደትየመማር/ማስተማርብልሃቶችናአተገባበራቸዉ

አንብቦየመረዳትና የመፃፍ ክሂሎችን አዋህዶ መማር/ማስተማር ክሂሎቹን በማጐልበት ረገድ ከፍተኛ ፋይዳ እንዳለው የወቅቱ የቋንቋ ትምህርት አቀራረብ አቢይ ጥያቄ ነው፡፡ ኦልሰን (2002)፣ያሁሺን (2005)፣ በሃናርሃን (2008)፣ ጃዩሚንሳይ (2006)፣ ጆንሰን (2009) በጥናቶቻቸው ላይ በተለይ በሁለተኛ ደረጃ ተማሪዎች ክሂሎቹን ለማጐልበት የሚያስችሉ ብልሃቶችንና አተገባበራቸውን አሳይተዋል፡፡ ብልሃቶቹም ዳራዊ እውቀትን መጠቀም፣ ጥያቄዎችን መጠየቅና መተንበይ፣ ማጠቃለል መገመትና ፅብረቃ ናቸው፡፡

አንባቢዎችና ፀሐፊዎች የቀደመ እውቀታቸውን በመጠቀም ተግባራትን ለማከናወን እቅድ ያዘጋጃሉ። በሂደቱም ሁለት ዓይነት እቅዶችን ያሳድጋሉ፤ ሂደታዊና ቋሚ (ቴይኒይና ፒርሰን 1983)። ሂደታዊ እቅዶች ተግባራቱን እንዴት ማከናወን እንደሚገባቸው ከይዘት ነፃ በሆነ መልኩ የሚነደፉ ናቸው። ለምሳሌ፦ በያሁሺን (2005) ጥናት እንደታየው ሃሳብን ማፍለቅና ይህንን ለማድረግ የሚያስችሉ ንዑሳን ምድቦችን ማከናወን ናቸው። ቋሚ እቅድ ደግሞ በበሃርንሃን (2008) ተግባራዊ እንደተደረገው ይዘት ተኮር ነው። ትኩረት የሚደረግበትም በቀጥታ ልዩ በሆነው ርዕሰ ጉዳይ ላይ ነው። ሁለቱም እቅዶች ተማሪዎች የማንበብና የመፃፍ ግባቸውን እንዲያሳኩ ረድተዋቸዋል። በተጨማሪም በሂደቱ የረዥም ጊዜ የማስታወስ ብቃታቸውን በመጠቀም ዳራዊ መረጃዎችን ለመስጠት ችለዋል። ምክንያቱም እውቀት ባብዛኛው ምንጭ ነው።የሚገደበው ግን በሚገኘው አነስተኛ መረጃ መጠን ነው። አንባቢዎችም ሆኑ ፀሐፊዎች ምናባዊ እይታቸውን የሚያሳድጉት ከቴክስት ወይም ለቴክስት መረጃዎችን ሲያስሱ ነው። በዚህ ሂደት ግላዊ ልምዶችና ባህላዊ ሁነቶችን፣ የእለት ተዕለት ገጠመኞችን ሁሉ በመዳሰስ ዕውቀትን የማግኘት፣ የአስተሳሰብ አድማሳቸውን የማስፋት እድል ያገኛሉ በማለት ጅዩሚንሳይ (2006)፣ ኦልሰን (2002)፣ ጀንሰን (2009) በጥናታቸው አሳይተዋል።

የማንበብናየመፃፍክሂሎችን አዋህዶ መማር/ማስተማር ተማሪዎች የተለያዩ ጥያቄዎችን እንዲጠይቁና እንዲተነብዩ ያስችላቸዋል። ከማንበብ/ከመፃፍ በፊት፣ ጊዜና በኋላ ጥያቄዎችን እንዲጠይቁና እንዲተነብዩ በማድረግ ተማሪዎቹ ከሚያከናውኗቸው ተግባራት ጋር ጥብቅ ትስስር እንዲፈጥሩ አስችሏቸዋል (ኦልሰን፣2002)። የተሰጣቸውን/ የመረጡትን ተግባራት ከግብ ለማድረስ ሲያነቡና ሲጽፉ የታሪኩን ሴራ ለመከታተል ለማወቅ ተንብየዋል፤ የግል አረዳዳቸውንም ከሌሎች ጋር ለማነፃፀር የሴራውን አወቃቀር፣ የገፀባህሪያቱን አሳሳል ሁሉ የመተንተን፣የመተንበይ ሁኔታን መፍጠር ችለዋል። ማረው (1998፡181-184) ብሎክ (1997)ን ዋቢ በማድረግ እንደገለፁት ጥያቄ የማመንጨት ሥራ በራሱ እውቀትን የመገንባት ክንዋኔ በመሆኑ የእንደገና ግንባታን ሥራ ይጠይቃል። ይህም በራስ መማርን ያበረታታል፤ እውቀትንም ያጠናክራል። አንባቢ ተኮር በሆነ መንገድ የቆየ ልምድና እውቀታቸውን መሠረት አድርገው አዳዲስ ጥያቄዎችን በማመንጨት ምላሽ የሚሰጡ ተማሪዎች በከፍተኛ ደረጃ እውቀት የማግኘትና እውቀታቸውንም የማቆየት እድል

አላቸው። አተገባበሩንም በተመለከተ ተማሪዎቹ ከመፃፋቸው ወይም ከማንበባቸው በፊት፣ እያነበቡ ወይም እየፃፉ የማደራጀት፣ወይም ካነበቡ/ከፃፉ በኋላ የማደራጀት ይሆናል። በሂደቱም ተማሪዎቹ ምንድን ነው የማውቀው? ለማወቅ የምፈልገው ምንድን ነው? ያወቅኩትስ ምንድን ነው? የሚሉትን ጥያቄዎች እንዲመልሱ ማድረግ ይቻላል። ላላው ጥያቄ የመጠየቅ ችሎታን የማጐልበቻ መንገድ ደግሞ የድምጽ ማሰማት ማሪብ (think-aloud) ነው። በዚህ ሂደት መምህሩ፣ ተማሪዎቹ ምን እንደሚያስቡ እርስ በርሳቸው በመጠያየቅ መረጃ ለማግኘት የመጣር ሂደት ነው።

ከዚህም ባሻገር ነፃ ተዛምዶና አሰሳ (free association and skim) መጠቀም ሌላው አማራጭ ነው። ይህንን ተግባራዊ ለማድረግ ተማሪዎች እያነበቡ/ እየፃፉ እያሉ አዲስ ጉዳይ ሲያጋጥማቸው በአዕምሯቸው የሚታሰባቸውን እንዲገልፁ ማድረግ ነው። ለምሳሌ፡- ይህንን ስዕል ስትመለከቱ ምን ታሳባችሁ? ብሎ መጠየቅ ይቻላል።

በሌላ በኩል ደግሞ አንብቦ መረዳትንና መፃፍን በውህደት ለማስተማር ከሚያገለግሉት ብልሃቶች መካከል ማጠቃለል ተጠቃሽ እንደሆነ ጁይሚንሳይ (2006)፣ ብሎክ (1997) ያስረዳሉ። ይህ ብልሃት ተማሪዎቹ ያነበቡትን ወይም የፃፉትን ነገር እንዲያብራሩ፣ ማስረጃዎችን እንዲያጣቅሱ የማድረግ ሂደት ነው። አተገባበሩም ከሚያነቡት ቴክስት ነገሮችን በማለባለብና በማዋቀር ቁልፍ ሃሳቦችን እንዲለዩ ማድረግ ይቻላል። እንደ ኦልሰን (2002)፣ ያሁሺን (2005) ጥናትም ተማሪዎቹ ስለሚያነቡት ወይም ስለሚፅፉት ነገር ማጠቃለልን መለማመድ፣ ምናባዊ እይታን መፍጠር፣ ከሌሎች ፅንሰ ሃሳቦች ጋር ያለውን ተራክቦም በማጣመር ሰፊ የሆነ አዕምሯዊ ምስል መፍጠር ችለዋል። በዚህም መሠረት ተማሪዎች ከመረጡት ቴክስት በቡድን ወይም በግል በማንበብ ዋና ዋና ሃሳቦችን ማውጣት፣ ጭብጡን በሥዕላዊ መረጃ መግለጽ፣ ከራሳቸው የህይወት ተሞክሮ/ከነባራዊው እውነታ ጋር /ማዛመድ ይችላሉ። የአረፍተ ነገር አሰካኩን ሁሉ ያስተካክላሉ፤ የራሳቸውንም አመለካከት ያንፀባርቃሉ፤ ይፈጥራሉ፤ እንዲሁም ስለጭብጡቹ ወይም ትርጉሞችም አጠቃላይ የሆነ ግንዛቤን እንዲገልፁ/እንዲጨብጡ ያስችላቸዋል። ተማሪዎች ትርጉምን በሚገነቡበትም ሂደት ራሳቸውን በክንዋኔው ውስጥ በመዝፈቅ የተለያዩ ሚናዎችን ይጫወታሉ። የሃሳብ ፍሰትን የመጠበቅ ችሎታንም ያዳብራሉ። በኦልሰን

(2002) ጥናት ውስጥ "ቴክስቱን ሳነብ ራሴን በገፀባህሪው ላይ ያየሁ መሰለኝ። አንዳንድ ጊዜ ስሜታዊ በመሆን በገፀባህሪው ላይ እፈሃለሁ፤ አለቅሳለሁ" በማለት ስታነብ የገጠማትን ሁኔት አንዲት ተማሪ በፅሁፍ ገልፃለች።

ተማሪዎቹ ማንበብና መፃፍን አዋህደው በሚማሩበት ጊዜ ከቴክስቱ ያገኙትን ጠቃሚ ሃሳብና ልምድ በመፃፍ ያንፀባርቃሉ። በዚህ ሂደት የተለያዩ ጥያቄዎችን በማንሳት ምላሽ እንዲሰጡ ማድረግ ይቻላል። ለምሳሌ፦ ከቴክስቱ ምን ተረዳሁ? ምንስ እማራለሁ? የነበረኝ ልምድና ይህንን ቴክስት ካነበብኩ በኋላ የማገኘው/ያገኘሁት ለውጥ ምንድን'ነው? የሚሉትን በመመለስ አርቀው እንዲያስተውሉ ያግዛቸዋል። በኦልሰን (2002) ጥናት የ9ኛ ክፍል ተማሪዎች "የጨረቃዋ ኮረዳ" በሚል ርዕስ የቀረበውን አጭር ልቦለድ በማንበብ የተሰማቸውን ስሜት ገልፀዋል፤ ምን መልዕክት እንዳለውም ለመረዳት ችለዋል። በራሳቸው ህይወትም ተግባራዊ ለማድረግ መነሳሳትን ፈጥሮላቸዋል። የራሳቸውን አስተሳሰብ በሚያንፀባርቁበት ሂደትም እርስ በርሳቸው ተገማገመዋል። በተለይ በመፃፍ ክንዋኔያቸው የቴክስቶችን የሃሳብ አደራጃጀት፣ የቃላት አጠቃቀምና የሃሳብ ፍሰታቸውን ሁሉ ዳሰሰዋል። ሥነ-ልቦናዊና ማህበራዊ ተራክቧቸውን ቃኝተዋል። የሌላውን ባህልና ማህበራዊ ህይወት ከራሳቸው ጋር በማነፃፀርና በማወዳደር ተችተዋል። የጋራ ግንዛቤንም ፈጥረዋል። ግላዊ አመለካከታቸውንም ለማንፀባረቅ አስችሏቸዋል።

ልምድ ያላቸው አንባቢዎችና ፀሐፊዎች ምቹ የግንዛቤ ስልቶችን በመምረጥና በመተግበር ብቻ ሳይሆን አጠቃቀማቸውንም መቆጣጠርና መወሰን ይኖርባቸዋል። መቆጣጠር "ሶስተኛ ዓይን" ነው። ይህ ሂደት ፀሐፊዎችንም ሆነ አንባቢዎችን ይመራቸዋል። የሚፅፉትን ርዕሰ ጉዳይ ከመግቢያ እስከ መደምደሚያ ድረስ ያለውን ተሰናስሎ ሁሉ መቆጣጠር አስፈላጊ ነው። በሂደቱም ተማሪዎች የሚፅፉትን ተግባር እርስ በርስ በመናበብ የማስተካከያ ሃሳብ ይለዋወጣሉ። የጋራ ግንዛቤንም እንዲፈጥሩ ያስችላቸዋል። ንቁ ተሳታፊነታቸውንም ያፋጥናል። ጀማሪ አንባቢዎችና ፀሐፊዎች ክንዋኔያቸውን ለመቆጣጠር በጣም ይቸገራሉ፤ ምክንያቱም እንዴት መቆጣጠር እንዳለባቸው ግንዛቤው የላቸውም። ስለዚህ ተማሪዎች ሲያነቡም ሆነ ሲፅፉ ብዙ ልምምድ ማድረግ ይጠበቅባቸዋል። በልምምዱም ወቅት ትርጉሞችን/ፅንሰ-ሃሳቦችን ይከልሳሉ። ተማሪዎቹን በቡድን /በጥንድ/ በማሳተፍ የርስ በርስ

መስተጋብር እንዲፈጥሩ ማስቻል ከመምህሩ/ርቷ/ ይጠበቃል። ልምድ ያላቸው አንባቢዎችና ፀሐፊዎች የተረዱትን ነገር ዙር መጥ በሆነ መልኩ ይፈትሹታል። ተማሪዎች ከቴክስቱ የያዙት ትርጉም ምን የህል ትክክል እንደሆነ ለማረጋገጥ እንደገና ይከልሱታል። ባጠቃላይ ከቅድመ ተግበራት እስከ ድህረ-ተግባራት ድረስ ያሉት ሥነቶች መሰናሰላቸውን ለማረጋገጥ እንደገና ማደራጀት፣ ማዋቀር/መከለስ/ እጅግ ጠቃሚ ጉዳይ ነው። ጀማሪ አንባቢዎች ሽምጥ ወደፊት በመገስገስ ያነባሉ፤ ልምድ ያላቸው አንባቢዎች ግን እንደሁኔታው የቆይታ ጊዜ በመውሰድ ያሰላስላሉ። ወደኋላ ተመልሰውም ያገናዝባሉ። ስለዚህ የማንበብና የመፃፍ ስልቶችን በመጠቀም ክንዋኔዎችን የመከለስ ልምምድ ማድረግ ይጠበቃል (ኦልሰን 2002)።

ባጠቃላይ በክለሳ ድርሳናቱ የቀረቡት ጥናታዊ ግኝቶች አንብቦ የመረዳትናንና የመጻፍን ክሂሎች በውህደት መማር/ማስተማር የተማሪዎችን ችሎታ የሚያዳብር መሆኑን፣ ሁለቱ ክሂሎች ፍፁም የማይነጣጠሉ፣ አንዳቸው ባንዳቸው ላይ የሰለጠኑ መሆናቸውን አመላክተዋል። በተለይ በሁለተኛ ደረጃ ትምህርት ቤቶች ክሂሎችን ዙር መጥ በሆነ መልኩ ማቅረብ የተማሪዎችን የግንዛቤ አድማስ እንደሚያሰፋና በራስ የመማር ስልትንም እንደሚያዳብር ገልጸዋል። ከዚያም በሻገር ተማሪዎቹ ንቁ ተሳታፊ እንዲሆኑ፣ስሜታቸውን እንዲያንጸባርቁ ያስቻላቸው መሆኑን ጥናቶቹ ጠቁመዋል።

3. የአጠናን ዘዴ

ጥናቱ ዓላማውን ከግብ ለማድረስ የተከተለው የአጠናን ስልት ቅድመ ፍትነታዊ (Pre-experimental) ሲሆን፣ በፈተና፣በምልከታና በቃለመጠይቅ የተገኙትን መረጃዎች በመተንተን ይገልፃል፣ የተደረሰበትንም ማጠቃለያ ያቀርባል።

3.1 ተጠኝዎች

ጥናቱ ያተኮረው በደብረ ማርቆስ ከተማ በሚገኘው በመንቆረር ሁለተኛ ደረጃ ትምህርት ቤት ነው። በጥናቱ የተካተቱት የ2002 ዓ.ም የ9ኛ ክፍል ተማሪዎች ናቸው። በዚህ የክፍል ደረጃ 960 ተማሪዎች በመማር ላይ ይገኛሉ። ባንድ የመማሪያ ክፍል ደግሞ በአማካይ 50 ተማሪዎች ይማራሉ። ጥናቱ በሙከራ ላይ የተመሠረተ በመሆኑ ሁሉንም ተማሪዎች ተጠኝ ማድረግ አይቻልም። የጥናቱን አስተማማኝነትና ተገቢነትን ለመጠበቅም የተጠኝዎችን ቁጥር መወሰን የግድ ነው። በዚህም መሠረት የአንድን ክፍል ተማሪዎች ተጠኝ ለማድረግ በቅድሚያ የሁሉም ክፍል ተማሪዎች የችሎታ ስብጥር ተመሳሳይ መሆኑን ማረጋገጥ በማስፈለጉ አጥኝዋ ከትምህርት ቤቱ የክፍል ምደባና ድልደላ ኮሚቴ ሰብሳቢ ጋር ባደረገችው ውይይት ተማሪዎች በዓመቱ መጀመሪያ ላይ በየክፍሉ ሲመደቡ የውጤት ስብጥርን ታሳቢ ያደረገ መሆኑን ገልፀውላታል። በተጨማሪም የ2002 ዓ.ም የ9ኛ ክፍል የአማርኛ ቋንቋ የአንደኛው ወሰነ ትምህርት አማካይ ውጤት በየክፍሉ ከ65.8 በመቶ እስከ 66.5 በመቶ መሆኑን ከውጤት ትንተናው መገንዘብ ለማረጋገጥ ችላለች።

የተማሪዎቹ የችሎታ ቅርርብ በዚህ መልኩ ከተረጋገጠ በኋላ ሁሉንም የመማሪያ ክፍሎች እጣ ውስጥ በማስገባት 9ኛ"ፈ" ክፍል ተጠኝ ቡድን በመሆን ተመርጧል። በዚህ የመማሪያ ክፍል የሚማሩ ተማሪዎች 50 በመሆናቸውና ጥናቱም በአንድ ቡድን ላይ ብቻ ያተኮረ በመሆኑ ሁሉም የክፍሉ ተማሪዎች በተጠኝነት ተካተዋል።

3.2 የመረጃ መሰብሰቢያ መሣሪያዎች

የጥናቱን ዓላማ መሠረት በማድረግ መረጃ እንዲያስገኙ የተመረጡት የመረጃ መሰብሰቢያ መሣሪያዎች ፈተና፣ የመማር ማስተማሪያ ቴክስት እንዲሁም ቃለመጠይቅና ምልከታ ናቸው።

3.2.1 ፈተና

የተጠኝ ቡድኑን ተማሪዎች የአንብቦ መረዳትና የመፃፍ ችሎታቸውን ዳራ ለማወቅና የቅድመና የድህረ ትምህርት ፈተናዎችን የተዛምዶ መጠን ለመለየት የቅድመ ትምህርት ፈተና በአጥኝዋ ተዘጋጅቷል። ጥያቄዎቹ አራት ክፍሎች አሉት። የመጀመሪያው ከኃይለመለኮት (1978፡22-23) መጠነኛ መሻሻል ተደርጐ ከተወሰደ ምንባብ የወጡ ቁልፍ ቃላትን በማዛመድ የሚመለሱ አምስት ጥያቄዎችን የያዘ ነው። ክፍል ሁለተም ይህንን ምንባብ መሠረት ያደረጉ አስር ምርጫ ሰጪ ጥያቄዎች አሉት። ክፍል ሶስተ ከበዓሉ (1966፡82-83) አንድ አንቀጽ በመውሰድ ማረው (1996) የተጠቀመበት ሲሆን ከአንቀፁ ስምንት ቁልፍ ቃላትን በመግደፍ ክፍት ቦታዎቹን እንዲሞሉ ማድረግ ነው። ክፍል አራት ደግሞ ማረው (1996) ዊንትሮውድን (1981) በመጥቀስ በገለፁት መሠረት ከሲሳይ (1978) የተወሰደ አንቀጽን በማፋለስ የቀረበ ሲሆን ተማሪዎቹ ዓረፍተ ነገሮቹን እንደገና በማደራጀት በትክክለኛው የሃሳብ ቅደም ተከተል አንቀፁን አስተካክለው እንዲፅፉ ማድረግ ነው። በነዚህ መንገዶች የቀረቡት አንብቦ የመረዳት ጥያቄዎች ሂተን (1991)፣ ቄር (1993)፣ ሩድል (1997)፣ ሃርኘናጆን (1996) ባወጡት መርህ መሠረት ተማሪዎቹ የቃላትን ትርጉም ከአውድ መረዳታቸውን፣ የምንባብን መልእክት መገንዘባቸውንና የጽንሰ ሃሳብን ትርጉም መገንባታቸውን ለመለካት የቀረቡ ናቸው።

በሌላ መልኩ የመፃፍ ችሎታን እንዲለኩ የተዘጋጁት ። ጥያቄዎቹ በአራት የተከፈሉ ናቸው። የመጀመሪያው ከሀዲስ ዓለማየሁ (1965፡49-21) መሻሻል ተደርጐበት የተወሰደን አንድ ምንባብ መሠረት ያደረገ ነው። ተማሪዎቹ ከምንባቡ ለወጡ ቁልፍ ቃላት ዓውዳዊ ፍቻቸውን አብራርተው ይጽፋሉ። ሁለተኛው ክፍል ከዚሁ ምንባብ ለወጡ ሁለት ገፀባህሪያት የባህሪይ ልዩነታቸውን በተሰጣቸው ሠንጠረዥ መሠረት በራሳቸው አገላለጽ ይመልሳሉ። በሶስተኛው ክፍል አንቀጽ ይመሰርታሉ፣ አራተኛው ክፍል ደግሞ ከበውቀቱ ስዩም (1995፡9) የግጥም መድብል የተወሰደ ግጥም ከነሥዕላዊ መግለጫው የቀረበ ሲሆን የግጥሙን መልዕክት አብራርተው ይገልፃሉ። ጽንሰ ሃሳቡንም ከሥዕሉ ጋር በማገናዘብ አንድ አንቀጽ ይመሠርታሉ። እነዚህ የመፃፍ ችሎታን የሚለኩ ጥያቄዎች ብሎክ (1997)፣ ሩድል (1997)፣ ሃርኘናጆን (1996) ባወጡት መርህ መሠረት የተዘጋጁ ናቸው። በዚህም መሠረት ተማሪዎቹ ምን ያህል አርቀው ያስባሉ? ሃሳብን አደራጅተው የመፃፍ ብቃታቸውስ እስከምንድረስ ነው?ትርጉምንስ እንዴት ይገነባሉ? ከጽሁፍ ውስጥስ ዋና ዋና

ሃሳቦችን በመለየት የመፃፍ ችሎታቸው ምን ይመስላል? የሚሉትን ለመለካት ያስችላል።ይህ ፈተና ለተማሪዎች ከመቅረቡ በፊት በተራ የእጣ ናሙና በተመረጡ በተከለ ሃይማኖት ሁለተኛ ደረጃ ትምህርት ቤት በ9"F" ክፍል 25 ተማሪዎች ላይ ሙከራ በማድረግ በአራሚ ዘለል በተሰላው የአስተማማኝነት ውጤት መሠረት ተሻሽሎ ተዘጋጅቷል።

በዚህ መልኩ የተዘጋጀውን ፈተና አስተማማኝነቱን ለመጠበቅ ተጠኝ ተማሪዎቹ በመረጡት ሰዓት በሰፊ ክፍል በአንድ ጠረጴዛ አንድ ተማሪ ብቻ በማስቀመጥ በአጥኝዋ አማካይነት ተፈትነዋል። ለፈተናው የተሰጠ ጊዜ 2፡30 ሲሆን ተማሪዎቹ ፈተናውን ሠርተው እንደጨረሱ የፈተናው ወረቀት በአጥኝዋ ተሰብስቧል።

እርማቱም በሦስት የአማርኛ ቋንቋ መምህሮች አማካይነት እንደየጥያቄዎቹ ባህሪያት የጋራ መስፈርቶችን በማውጣት ታርሟል። መስፈርቶቹም፣ የሀሳብ አደረጃጀት፣ የስርዓተ ነጥብ አጠቃቀም፣ ምክንያታዊ ተዛምዶን የማሳየት፣ ፅሁፍን ባንድ አንቀፅ አሳጥሮ የመፃፍ ብቃት ናቸው። በእርማቱ ሂደት በመጀመሪያ የእያንዳንዱ ተማሪ የመልስ መስጫ ወረቀት በሶስት ኮፒ ተራብቶና ስማቸው ተሸፈኖ ኮድ በመሰጠት ለሶስቱም መምህሮች ታድሏል። በመጨረሻም በሦስቱ አራሚዎች መካከል ያለው የፈተና አስተማማኝ ውጤት 0.92 በመሆኑ ከፍተኛ ስምምነት መኖሩን ስላመለከተ አራሚዎች ለእያንዳንዱ ተማሪ የሰጡት ውጤት ተመዝግቦና ለሶስት ተካፈሎ የተገኘው አማካይ ነጥብ የተማሪው ውጤት ተደርጎ ተወስዷል።

3.2.2 የመማር ማስተማሪያ ቴክስት

ለተጠኝ ቡድኑ የማንበብና የመፃፍ ክሂሎችን በውህደት ለመማር/ማስተማር የሚያገለግል ቴክስት በአጥኝዋ ተዘጋጅቷል(ገፅ43፣ አባሪ"ሀ"ን ይመለከቷል)። መማሪያ/ ማስተማሪያውም ላዛር (1993)፣ ሂል(1986)፣ ሀርኘና ጆን (1996)፣ ሩድል (1997)፣ ብሎክ(1997) ባስገነዘቡት መሠረት የሥነ ጽሁፍ ሥራዎችን /የልቦለድ ቅንጫቢዎችን፣ ግጥሞችን፣ሥነቃሎችን/ በመምረጥና የተማሪዎቹን የክፍል ደረጃ፣ ፍላጐት፣ የቀደመ እውቀታቸውን፣ ባህላዊ ዳራቸውን ታሳቢ ባደረገ መልኩ በማደራጀትና በማሻሻል ተዘጋጅቷል። ቴክስቱ ስድስት

ክፍለ ትምህርቶች ሲኖሩት ሁለቱን ከሂሎች በማዋሃድ የተዘጋጁ መልመጃዎችና ከንዋኔዎች ቀርበዋል። እነዚህ ተግባራት አንብቦ የመረዳትንና የመፃፍን ክሂሎች ዙርመጥ በሆነ መልኩ ለማዳበር የሚያገለግሉ ብልሃቶችን/መገመት፣ መተንበይ፣ መጠየቅ፣ ማጠቃለል፣ ማንፀባረቅና ዳራዊ እውቀትን መጠቀም/ ተግባራዊ ለማድረግ የማ ስችሉ ናቸው። ቴክስቱ በአማካሪውና በሁለት የአማርኛ ቋንቋ መምህሮች ተገምግሞ በተሰጠው አስተያየት መሠረት እንደገና ተሻሽሎ ተዘጋጅቷል። በመጨረሻም 50 ኮፒ በማራባት ለእያንዳንዱ ተማሪ በነፈስ ወከፍ እንዲዳረስ ተደርጓል። ጥናቱን ከግብ ለማድረስም የተጠኝ ቡድን ተማሪዎች ከዚህ በፊት ይማሩበት የነበረውን ልማዳዊውን/መደበኛውን ቴክስት በመተው የተዘጋጀውን ቴክስት በመደበኛ ፈረቃቸው ለ45 ቀናት በሳምንት ሶስት ቀናት በቀን ለ42 ደቂቃዎች በአጥኚዋ እንዲማሩ ተደርጓል።

3.2.3 የክፍል ውስጥ ምልከታ

ሌላው የመረጃ መሰብሰቢያ መሣሪያ ምልከታ ነው። እነደ ሩድል (1997) አገላለጽ የተማሪዎችን የማንበብና የመፃፍ ችሎታን መረጃ ለማግኘት ምልከታ የላቀ ጠቃሚ መንገድ ነው። በዚህም መሠረት ለ45 ቀናት የተደረገው የመማር ማስተማር ሂደት ምን ይመስል እንደነበር አጥኝዋ ምልከታ አድርጋለች። መምህርቷ/አጥኝዋ ከተማሪዎቹ ጋር፣ ተማሪዎቹ ከተማሪዎቹ ጋር ያላቸውን የዕለት ተዕለት መስተጋብር፣ እንዲሁም ተማሪዎቹ በልምምዳቸው ወቅት ምን እንዳጋጠማቸው፣ ተግባራቱን እንዴትና ለምን እንደፈፀሙት፣ ያመጡት ለውጥ ምን ያህል እንደሆነ ያለው (1998) እንዳስገነዘቡት በተከታታይ ምልከታ ዘዴ በመጠቀም፣ በመቃኘት መዝግባና አደራጅታ ይዛለች-(አባሪ "ሰ"ን ከገፅ 80-87 ይመለከቷል)።

3.2.3 ቃለ መጠይቅ

የመጨረሻው የመረጃ መሰብሰቢያ መሣሪያ ደግሞ ቃለመጠይቅ ነው። አጥኝዋ ዓላማ ተኮር በሆነ ዘዴ የመረጠቻቸውን ስድስት/ጐበዝ፣ መካከለኛና ደካማ/ ተማሪዎችን በትምህርቱ ሂደት፣ በየክፍለ ትምህርቱ መጨረሻና ከጥናቱ በኋላ ነፃ ቃለ መጠይቅ አድርጋላቸዋለች። የጥያቄዎቹን ይዘት (በአባሪ "ረ" በገፅ 80 ይመለከቷል)።

የመማር ማስተማሩ ሂደት ከተጠናቀቀ በኋላ ተጠኝዎቹ ያመጡትን ለውጥ ለመገምገም ድህረ ትምህርት ፈተና ተሰጥቷቸዋል። ይህ ፈተና ከቅድመ ትምህርት ፈተና ጋር በተመሳሰለ መልኩ የተዘጋጀ ነው። አንብቦ መረዳትን የሚለካው (50%)፣ ጥያቄ አራት ክፍሎችን የያዘ ሲሆን የመጀመሪያው ከበዓለ (1962፡53-56) መሻሻል ተደርጐበት ከተወሰደ ምንባብ የወጡ አምስት ጥያቄዎችን ያዛምዳሉ። ሁለተኛው ክፍል ከተሰመረባቸው ቃላት ዓውዳዊ ፍቻቸውን በመምረጥ ይመልሳሉ። ሶስተኛው ክፍል ደግሞ ምንባቡን መሠረት በማድረግ የሚመለሱ የምርጫ ጥያቄዎች ናቸው። ክፍል አራት ከበዓለ (1962፡30) የተወሰደ አንድ አንቀጽ ሲሆን፣ ክፍት ቦታዎችን በተሰማሚ ቃላትና ሃረጋት ይሞላሉ። ይህም በቅድመ ትምህርት ፈተና የተገለፁትን መለኪያዎች ተግባራዊ ለማድረግ አስችሏል።

በሊላ መልኩ የመፃፍ ችሎታን እንዲለካ የተዘጋጀው የድህረ ትምህርት ፈተና አራት ክፍሎች አሉት። የመጀመሪያው ከማሪው (1996፡73) የተወሰደ ሲሆን፣ ተማሪዎች ዓረፍተ ነገሮቹን በማዋቀር፣ በማደራጀት ተጠየቃዊነቱን የጠበቀ አንድ አንቀጽ ይመሰርታሉ። ሁለተኛው ክፍል ከሲሳይ ንጉሱ (1978፡62) መጠነኛ መሻሻል ተደርጐበት የተወሰደ ምንባብ ሲሆን የአራት ገፀባህሪያትን የባህሪይ ልዩነት በራሳቸው አገላለጽ በሰንጠረዥ ይፅፋሉ። በመቀጠል ተማሪዎቹ በፈተና ሰሞን ስለሚያሳዩዋቸው ባህሪያት ተጠየቃዊ በሆነ መልኩ አንድ አንቀጽ ይመሠርታሉ። አራተኛው ክፍል ከአረጋሽ ሰይፉ (1989፡24) የተወሰደ ግጥም ሲሆን የግጥሙን መልዕክት አብራርተው ይፅፋሉ፤ አንቀጽም ይመሰርታሉ። በዚህ መሠረት ተማሪዎች እንደቅድመ ትምህርት ፈተናው ሁሉ ምን ያህል አርቀው ያሰባሉ? ሃሳብንስ አደራጅተው የመፃፍ ብቃታቸው እስከምን ድረስ ነው? ትርጉምንስ እንዴት ይገነባሉ? የሚሉትን ለመለካት ያስችላል።

ይህን ድህረ ትምህርት ፈተና እንደቅድመ ትምህርት ፈተናው አስተማማኝነቱን ለመጠበቅ ተማሪዎቹ በመረጡት ሰዓት በሰፊ ክፍል በአንድ ጠረጴዛ አንድ ተማሪ ብቻ በማስቀመጥ ተፈትነዋል። ለፈተናው የተሰጠ ጊዜ 2፡30 ሲሆን ተማሪዎቹ ፈተናውን ሠርተው እንደጨረሱ የፈተናው ወረቀት በአጥኝዋ ተሰብስቧል።

አስተራረሙም በትምህርት ቤቱ ባሉ ሶስት የአማርኛ ቋንቋ መምህራን አማካኝነት እንደየጥያቄዎቹ ባህሪያት የጋራ መስፈርቶችን በማውጣት ታርሟል። በእርማቱ ሂደት በመጀመሪያ የእያንዳንዱ ተማሪ የመልስ መስጫ ወረቀት በሦስት ኮፒ ተራብቶና ስማቸው ተሸፍኖ ኮድ በመስጠት ለሶስቱም መምህራን ታድሏል። በመጨረሻም ባራሚዎች መካከል ያለው የውጤት አስተማማኝነት 0.95 ስለሆነ የያንዳንዱ ተማሪ ውጤት ተመዝግቦና ለሶስት ተካፍሎ የተገኘው አማካይ ነጥብ የተማሪው ውጤት ተደርጎ ተወስዷል።

3.3 የመረጃ አተናተን ዘዴ

የቅድመ ትምህርትም ሆነ የድህረ ትምህርት የጽሁፍ ፈተናዎች በሶስት የትምህርት ቤቱ የአማርኛ መምህራን ታርመዋል። የሶስቱም አራሚዎች ውጤት በአራሚ ዘለል በኩደር ሪቻርድሰን (KR20) ቀመር መሠረት ተሰልቷል። በስሌቱም መሠረት በሶስቱ አራሚዎች መካከል የሁለቱ ፈተናዎች የአስተማማኝነት ውጤት 0.92 እና 0.95 ሆኗል። ይህም ያለው(1998) እንደገለፁት የመለኪያው አስተማማኝነት ከ0.90 በላይ ስለሆነ በአራሚዎች መካከል በጣም ከፍተኛ የሆነ ስምምነት መኖሩን በማመልከቱ መረጃው እንዳለ ተወስዷል።

ከዚህ በኋላ በቅድመ ትምህርትም ሆነ በድህረ ትምህርት የተገኙ ውጤቶች ያለው (1998) እንደገለፁት አንብቦ የመረዳትንና የመፃፍን የተዛምዶ መጠን ለማወቅ በፒርሰን የተዛምዶ መወሰኛ ዘዴ (Pearson correlation coefficient) አማካይነት ተሰልቶ የተዘምዷቸውን ልክና አቅጣጫ ለማወቅ ተችሏል። ስሌቱም ተተንትኗል። በመቀጠል በቅድመ ትምህርት ፈተና የተገኘው የአንብቦ መረዳትና የመፃፍ (100%) ድምር ውጤት ከድህረ ትምህርት ፈተና የአንብቦ መረዳትና የመፃፍ (100%) ድምር ውጤት ጋር በማነፃፀር የተገኘውን ለውጥ በዳግም ልኬት ቲ ቴስት ቀመር (Repeated Measures sample t-test) ተሰልቶ ተተንትኗል። እንዲሁም የጥናቱን ተገቢነትና አስተማማኝነት በማሳየት በኩል ለስድስቱ ተማሪዎች የተደረገላቸውን የቃለ መጠይቅ ምላሾችና ከጥናቱ መጀመሪያ እስከ መጨረሻ

ድረስ በምልከታ የተመዘገቡትንና የተደራጁትን መረጃ ዎች በማነፃፀር በሀተታ ተገልፀዋል፡፡

4. የጥናቱ ውጤት ትንተናና ማብራሪያ

4.1 የጥናቱ ውጤት ትንተና

በፈተና፣ በቃለ መጠይቅና በምልከታ የተሰበሰቡ መረጃዎች በሚከተለው መልኩ ሲተነተኑ በቅድሚያ የተጠኝ ቡድኑ የአንብቦ መረዳት ክሂል የቅድመና የድህረ ትምህርት ውጤት የተዛምዶ መጠን ወጥ መሆኑን ወይም አለመሆኑን ለመወሰን፣ እንዲሁም ልዩነቱን ለማነፃፀር በአማካይ፣ በመደበኛ ልይይት፣ በዝምድና ማሳያና በ"ቲ" ቴስት ቀመር ተሰልቷል፡፡

ሠንጠረዥ1፡- የአንብቦ መረዳት የቅድመና የድህረትምህርት ውጤት ንፅፅር በአማካይ፣ በመደበኛ ልይይት፣ በዝምድና ማሳያና፣ በ "ቲ" ቴስት ቀመር

የአንብቦ መረዳት ውጤት	$\bar{x}$	Sd	r_{xy}	df	t_{ob}	t-cri
ቅድመ-ትምህርት	29.82	6.56	0.933	49	* 15.664	1.671
ድህረ ትምህርት	35.12	6.53				

*P<0.05

በሠንጠረዥ 1 እንደተመለከተው በፒርሰን የተዛምዶ ማሳያ (r_{xy}) በተሰላው ስሌት መሠረት የተጠኝ ቡድኑ የአንብቦ መረዳት ችሎታ በቅድመና በድህረትምህርት መካከል ያለው ተዛምዶ (0.933) በጣም ከፍተኛ ሲሆን ግንኙነታቸውም አዎንታዊ ነው፡፡ ከውጤቱ መረዳት እንደሚቻለው በአንብቦ መረዳት ክሂል በቅድመ ትምህርት ፈተና ከፍተኛ ውጤት ያስመዘገቡ የጥናቱ ተሳታፊዎች በድህረ ትምህርት ፈተናም ከፍተኛ ውጤት አስመዝግበዋል፡፡ ወይም በሌላ መልኩ ሲታይ በቅድመ-ትምህርት ዝቅተኛ ውጤት ያስመዘገቡ ተማሪዎች በድህረ-ትምህርትም ዝቅተኛ ውጤት አስመዝግበዋል ወደሚል መደምደሚያ የሚያደርስ ይመስላል፡፡

መደበኛ ልይይትም በኩል የአንብቦ መረዳት የድህረ ትምህርት መደበኛ ልይይት ከቅድመ-ትምህርቱ ያነሰ መሆኑን የስታትስቲክስ ቀመሩ ያመለክታል። ይህም የተማሪዎችን የአንብቦ መረዳት ችሎታ ወጥነት /ዘላቂነት/ ሊያመላክት ይችላል። ውጤቱም በኩረጃ ወይም በሌላ ተለውጠ ተጽእኖ የተገኘ ሳይሆን በችሎታ መሆኑን ያመላክተ ይመስላል። አማካይ ውጤታቸውንም በተመለከተ የድህረ ትምህርት የአንብቦ መረዳት ፈተና አማካይ ውጤት ከቅድመ ትምህርት አማካይ ውጤት የበለጠ ይመስላል። ሆኖም ልዩነቱ አስተማማኝ መሆን አለመሆኑ በስታትስቲክሰ መረጋገጥ ስላለበት በ"ቲ" ቴስት ቀመር ተሰልቷል። በዚህም መሠረት ለምናልባት ሰህተት 5% (P<0.5) በሙተው በተሠራው ስሌት የt_{ob} ዋ.ጋ (15.664) በሰንጠረዥ ላይ ከተመዘገበው t-cri(1.671) እጅግ ልቆ በመገኘቱ የተማሪዎቹ የአንብቦ መረዳት ችሎታ በቅድመና በድህረ ትምህርት መካከል ጉልህ ልዩነት መኖሩን ያሳያል።

በቃለ መጠይቅ የተሰበሰበው መረጃም ከዚህ በላይ ያሉትን ውጤቶች የሚደግፍ ይመስላል። ከተጠኝ ቡድኑ መካከል ዓላማ ተኮር በሆነ ዘዴ የተመረጡት ስድስቱም ተማሪዎች አንብቦ መረዳትንና መፃፍን በውህደት መማራቸው ለአንብቦ መረዳት ችሎታቸው መሻሻል ለውጥ እንዳሰገኘላቸው ገልፀዋል። የመማሪያ መጽሃፉ አዘገጃጀትና የምንባባት አመራረጥ ከመደበኛው የተለየ በመሆኑ ስሜታቸውን ገዝተው እንዲያነቡ፣ ዳራዊ እውቀታቸውንም በመጠቀም አርቀው እንዲያስቡና ሃሳብን እንዲያደራጁ የረዳቸው መሆኑን ገልፀዋል። በመማር ማስተማሩ ሂደት በምልከታ የተገኘውም መረጃ ከመጣኝና ከቃለመጠይቁ መረጃዎች ጋር ተደጋጋፊነት አለው። ተማሪዎቹ በየክፍለ ትምህርቱ በቅድመ ንባብ፣ በንባብ ላይና በድህረንባብ የቀረቡትን ክንዋኔዎችና ተግባራት በንቃትና በፍላጐት ሲሰሩ ተስተውሏል። በተደረገው ግምገማም የምንባባትን ይዘት ሲገምቱ፣ አርቀው ሲያስቡ፣ ሃሳብን ሲያፈልቁ፣ ዳራዊ እውቀታቸውንም ሲጠቀሙ እንዲሁም ሃሳባቸውንም ሲጋሩ ለማስተዋል ተችሏል።

በተመሳሳይ መልኩ የተጠኝ ቡድኑ የቅድመና የድህረ ትምህርት የመፃፍ ክሂል ውጤት ተነፃፅሯል። ይህም ቀጥሎ ባለው ሰንጠረዥ 2 ቀርቧል።

ሠንጠረዥ2፡- የመፃፍ ክሂል የቅድመና የድህረ ትምህርት ውጤት ንፅፅር በአማካይ፣ በመደበኛ ልይይት፣ በዝምድና ማሳያና በ"ቲ" ቴስት ቀመር

የመፃፍ ክሂል ውጤት	$\bar{x}$	Sd	r_{xy}	df	tob	t-cri.
ቅድመ-ትምህርት	23.10	7.76	0.912	49	* 14.251	1.671
ድህረ-ትምህርት	29.64	6.90				

*P<0.05

በሠንጠረዥ2 እንደሚታየው የተጠኝ ቡድኑ የቅድመና የድህረ ትምህርት ውጤት በፒርሰን የተዛምዶ ማሳያ (r_{xy}) በተሳለው ስሌት መሠረት በሁለቱ ፈተናዎች መካከል ያለው ተዛምዶ በጣም ከፍተኛ ሲሆን ግንኙነታቸውም አዎንታዊ ነው። ከውጤቱ መረዳት እንደሚቻለው በመፃፍ ክሂል በቅድመ-ትምህርት ከፍተኛ ውጤት ያስመዘገቡ ተማሪዎች በድህረ ትምህርትም ከፍተኛ ውጤት አስመዝግበዋል። ወይም በሌላ መልኩ ሲታይ በቅድመ-ትምህርት ዝቅተኛ ውጤት ያስመዘገቡ ተማሪዎች በድህረ ትምህርትም ዝቅተኛ ውጤት አስመዝግበዋል ለማለት የሚያስችል ይመስላል።

በመደበኛ ልይይትም በኩል የመፃፍ ክሂል የድህረ ትምህርት መደበኛ ልይይት ከቅድመ-ትምህርት መደበኛ ልይይት ያነሰ መሆኑን የስታትስቲክስ ቀመሩ ያሳያል። ይህም የተማሪዎቹ ውጤት ያልዋዠቀ መሆኑንና የመፃፍ ችሎታቸው ቅርርብም በድህረ ትምህርት የጠበበ መሆኑን ያሳያል።

አማካይ ውጤታቸውንም በተመለከተ የድህረ ትምህርት የመፃፍ ክሂል ፈተና አማካይ ውጤት ከቅድመ-ትምህርት አማካይ ውጤት የሚበልጥ ይመስላል። ሆኖም ልዩነቱ አስተማማኝ መሆን አለመሆኑ በስታትስቲክስ መረጋገጥ ስላለበት በ"ቲ" ቴስት ቀመር ተሰልቷል። በዚህም መሠረት ለምናልባት ስህተት 5% (P<0.05) በመተው በተሠራው ስሌት የt_{ob} ዋጋ (14.251) በሰንጠረዥ ላይ ከተመዘገበው t-cri ዋጋ(1.671) እጅግ በልጦ በመገኘቱ በቅድመና በድህረ ትምህርት የመፃፍ ችሎታ ውጤት መካከል ጉልህ ልዩነት መኖሩን አመላክቷል።

በቃለ መጠይቅ የተሰበሰበውም መረጃ ይህንን ውጤት የሚደግፍ ይመሰላል። የመፃፍን ክሂል በተመለከተ ተማሪዎቹ የአዲሱንና የመደበኛውን የመማሪያ መጽሃፍት ልዩነት እንዲገልፁ በተጠየቁት መሠረት በመደበኛው/በልማዳዊው የመማሪያ መጽሃፍ ውስጥ የተካተቱት የመፃፍ ትዕዛዛት ዳራዊ እውቀታቸውን፣ ፍላጐታቸውንና አቅማቸውን ያላገናዘበ፣ አንድ ርዕስ በመስጠት እንዲፅፉ የሚታዘዙበት ሁኔት በመሆኑ እንደሚሰለቹና የሃሳብ እጠረትም እንደሚያጋጥማቸው ገልፀዋል። አዲሱ መፅሃፍ ግን እነዚህን ቅድመ ሁኔታዎች ያሟላ በመሆኑ ለመፃፍ ያለመቸገራቸውን ጠቅሰዋል። በመማር ማስተማሩ ሂደት የተደረገው ምልከታም ከዚህ በላይ ካሉት መረጃዎች ጋር ተደጋጋፊነት አለው። ተማሪዎቹ በግልም ሆነ በቡድን የመፃፍ ተግባራትን በፍጥነትና በፍላጐት ሲያከናውኑ ተስተውሏል። እንዲሁም በሠሩት የክፍልና የቤት ሥራ አማካኝነት የመፃፍ ችሎታቸው እያደገ መምጣቱን ለመገንዘብ ተችሏል።

በተጨማሪም የተጠኝ ቡድኑ የቅድመና የድህረ-ትምህርት አንብቦ የመረዳትና የመፃፍ ችሎታዎች ተነፃፅረዋል። ውጤታቸውም በሚከተለው ሠንጠረዥ 3 ቀርቧል።

ሠንጠረዥ 3፡- የቅድመና የድህረ ትምህርት የአንብቦ መረዳትና የመፃፍ ክሂሎች ንፅፅር በአማካይ፣ በመደበኛ ልይይት ፣ በዝምድና ማሳያና በ"ቲ" ቴስት ቀመር

የአንብቦ መረዳትና የመፃፍ ክሂሎች ውጤት	$\bar{x}$	Sd	r_{xy}	df	Tob	t-cri.
ቅድመ-ትምህርት	53.02	13.05	0.952	49	20.653*	1.671
ድህረ-ትምህርት	64.76	11.80				

*P<0.05

በሠንጠረዥ 3 እንደሚታየው የተማሪዎቹ የአንብቦ መረዳትና የመፃፍ ውጤት በፒርሰን የተዛምዶ ማሳያ (r_{xy}) በተሰላው ስሌት መሠረት በሁለቱም ፈተናዎች መካከል ያለው ተዛምዶ በጣም ከፍተኛ ሲሆን ግንኙነታቸውም አዎንታዊ ነው። ከውጤቱ መረዳት እንደሚቻለው በቅድመ ትምህርት በአንብቦ መረዳትና በመፃፍ ከፍተኛ ውጤት ያስመዘገቡ ተማሪዎች በድህረ-ትምህርትም ከፍተኛ ውጤት አስመዝግበዋል። ወይም በሌላ መልኩ ሲታይ በቅድመ-ትምህርት ዝቅተኛ ውጤት ያስመዘገቡ ተማሪዎች በድህረ-ትምህርትም ዝቅተኛ ውጤት አስመዝግበዋል ወደሚል መደምደሚያ ያደርሳል።

በመደበኛ ልይይትም በኩል የድህረ-ትምህርት የአንብቦ መረዳትና የመፃፍ ውጤት መደበኛ ልይይት ያነሰ መሆኑን የስታትስቲክስ ቀመሩ ያሳያል። ከዚህ አንፃር ተማሪዎቹ ከቅድመ-ትምህርት ይልቅ በድህረ ትምህርት የውጤት ቅርርባቸው የጐላ መሆኑን ያሳያል። በተጨማሪም በሁለቱም ክሂሎች የተማሪዎቹ ውጤት ያልዋገቀ መሆኑን አመላክቷል። በዚህም ቀጥተኛ ግንኙነት ያላቸው ይመስላል።

አማካይ ውጤታቸውንም በተመለከተ የአንብቦ መረዳትና የመፃፍ ክሂል የድህረ-ትምህርት አማካይ ውጤት ከቅድመ-ትምህርት አማካይ ውጤት የሚበልጥ ይመስላል። ነገር ግን ልዩነቱ አስተማማኝ መሆን አለመሆኑን በስታትስቲክስ መረጋገጥ ስላለበት በ"ቲ" ቴስት ቀመር ተሰልቷል። በዚህም መሠረት ለምናልባት ስህተት 5% (P<0.05) በመተው በተሰራው ስሌት የt_{ob} ዋጋ (20.653) በሰንጠረዡ ላይ ከተመዘገበው t-cri ዋጋ(1.671) እጅግ በልጠ በመገኘቱ በቅድመና በድህረ ትምህርት በአንብቦ መረዳትና በመፃፍ ችሎታ መካከል ጉልህ ልዩነት መኖሩን ያመላክታል።

ከቃለ መጠይቅ የተገኘውም መረጃ ከመጣኝ መረጃው ጋር ተደጋጋፊነት ያለው ይመስላል። ተማሪዎቹ አንብቦ የመረዳትና የመፃፍ ትምህርትን በውህደት በመማራቸው ያገኙት አዲስ ነገርና ያጋጠማቸው ችግር ምን እንደሆነ ሲገልፁ በተለይ የመፃፍ ክሂልን ለመለማመድ የመደበኛው የመማሪያ መጽሃፍ አቀራረብ/አዘገጃጀት ትልቅ ችግር እንደነበረበት፣ ከምን ተነስተው ምን እንደሚፅፉ የሚያስጨንቃቸው መሆኑን ተማሪዎቹ ገልፀዋል። በአሁኑ የትምህርት አቀራረብ ግን እያነበቡ መፃፍ ወይም እየፃፉ ማንበብ ትልቅ መነቃቃትን እንደፈጠረላቸው ገልፀዋል። የንባብ ላይ ጥያቄ መኖርና መልመጃዎች ከስዕላዊ መግለጫ ጋር ተሳስረው መቅረባቸው አዲስ ነገር እንደሆነባቸውና ለጊዜው ግርምታን የፈጠረባቸው መሆኑን ጠቁመዋል። ነገር ግን ለትምህርቱ ትኩረት እንዲሰጡ፣ ፍላጐት እንዲያድርባቸውና አርቀው እንዲያስቡ እንደረዳቸው ስድስቱም ተማሪዎች ገልፀዋል። የቡድን ሥራዎችም ሃሳብ ለመጋራት፣ እርስ በርስ ለመገማገምና የራስን ሃሳብ ለማንፀባረቅ ትልቅ እገዛ እንዳደረገላቸው በትምህርታቸው ደከም ያሉት ሁለት ተማሪዎች አፅንኦት በመስጠት ስሜታቸውን አንፀባርቀዋል።

በምልከታ እንደታየው በየክፍለ-ትምህርቱ በተማሪዎች መካከል ያለው ተራክቦ በንቁ ተሳታፊነት የተከናወነ ነበር ለማለት ያስችላል፡፡ ተማሪዎቹ የሠሯቸውን ተግባራት በክፍል ውስጥ ሲያቀርቡ የየቡድኑ አባላት ጥያቄዎችን በመጠየቅና በመመለስ ሲሳተፉ ነበር፡፡ ሁሉም ተማሪዎች በመማሪያ ቴክሰቱ ላይ ያሉትን ክንዋኔዎችና መልመጃዎች በመስራትም አሳርመዋል፡፡ በተለይ በትምህርታቸው ደከም ያሉ ተማሪዎች ከአቻ ጓደኞቻቸውና ከመምህርቷ የሚሰጣቸውን መጋቢ ምላሾች በመጥርጐም በየጊዜው መሻሻል እንዳሳዩ ለመረዳት ተችሏል፡፡

ባጠቃላይ በውጤት ትንተናው እንደታየው ተጠኝዎቹ አንብቦ መረዳትንና መፃፍን በውህደት መማራቸው በሁለቱም ክሂሎች መሻሻል እንዳሳዩ በፈተና፡ በቃለ መጠይቅና በምልከታ የተሰበሰቡት መረጃዎች አመላክተዋል፡፡ በሌላ መልኩ ደግሞ ከመፃፍ ክሂል ይልቅ የአንብቦ መረዳት ክሂል አማካይ ውጤት ልቆ መገኘቱ የተማሪዎቹ የትምህርት ዳራ ተፅዕኖ ያሳደረ ይመስላል፡፡ በመደበኛ ልይይት ግን ምንም እንኳን የአንብቦ መረዳት ክሂል ልቆ ተገኝቷል ቢያስብልም ትልቅ መሻሻል የታየበት የመፃፍ ክሂል ነው፡፡ የመፃፍ የድህረ-ትምህርት መደበኛ ልይይት ከቅድመ ትምህርት መደበኛ ልይይት በ0.86 አንሶ ተገኝቷል፡፡ በአንብቦ መረዳት ግን የድህረ-ትምህርቱ ከቅድመ ትምህርቱ በ0.03 ብቻ ያነሰ መሆኑን ስሌቱ ያሳያል፡፡ ከዚህ አንፃር ተማሪዎቹ ከዚህ በፊት በነበረው የመማር ሂደት ለመፃፍ ይቸገሩበት የነበረውን የሃሳብ እጥረትና አደረጃጀት ችግር አዲሱ ቴክስት አቃሎላቸዋል ወደሚል መደምደሚያ የሚያደርስ ይመስላል፡፡

4.2 የጥናቱ ውጤት ማብራሪያ

በውጤት ትንተናው መጀመሪያ ላይ የታየው የአንብቦ መረዳት የቅድመና የድህረ-ትምህርት ውጤቶች ንፅፅር ነው፡፡ በሁለቱ የፈተና ውጤቶች መካከል ያለው የተዛምዶ መጠን በፒርሰን የተዛምዶማሳያ (r_{xy}) በተሰላው መሠረት በጣም ከፍተኛ (0.933) እና አዎንታዊ መሆኑ ተረጋግጧል፡፡ ይህም የተማሪዎች የአንብቦ መረዳት ችሎታ ወጥነት እንዳለው ያሳያል፡፡ የቅድመ ትምህርት የአንብቦ መረዳት አማካይ ውጤትም ከድህረ ትምህርቱ አማካይ ውጤት በ5.20 አንሶ ተገኝቷል፡፡ይህንንም የልዩነት አስተማማኝነት ለማረጋገጥ በዳግም ልኬት "ቲ" ቴስት ቀመር በተሰላው መሠረት የt_{ob} ዋጋ (15.664)

በሰንጠረዡ ላይ ከተመዘገበው t_{cri} ዋጋ (1.671) እጅግ ልቆ ተገኝቷል። ስለዚህ አንብቦ መረዳትን በተናጥል ከመማር ይልቅ በውህደት መማር ለተማሪዎች ውጤት መሻሻል የላቀ አስተዋፅኦ እንዳደረገ ያሳያል።

የመደበኛ ልይይትንም በተመለከተ ከቅድመ-ትምህርት አንብቦ የመረዳት ውጤት ይልቅ የድህረ ትምህርት የመደበኛ ልይይት ውጤት አንሶ ተገኝቷል። ከዚህ አንፃር ተማሪዎቹ አንብቦ መረዳትንና መፃፍን በውህደት መማራቸው የአንብቦ መረዳት ችሎታቸውን እንዳሻሻለላቸውና በተማሪዎች መካከልም የችሎታ መቀራረብን እንደፈጠረላቸው ያመለክታል። ይህም ጆንሰን (2009) *ማንበብ ከመፃፍ ውጪ የሚታሰብ ከሆነ ወደ ውስጥ እንጂ ወደ ውጪ መተንፈስ አይቻልም እንደማለት ይቆጠራል*፤ በማለት እንደገለጸዉ ሁለቱን ክሂሎች በውህደት መማር በጥልቀት የመተንፈስ ያህል ነው። እየተነበበ የሚፃፍ ከሆነ አስተሳሰብን የማስፋት፣ ቃላትን የመምረጥ ከቴክስቱ ጋር ጥብቅ ቁርኝት የመፍጠር አቅም ይፈጥራል። ጁዩሚንሳይ (2006) ማንበብና መፃፍ ፍፁም የተዋሃዱ ናቸው።ማንኛውም አካል ክሂሎቹን ማሰብ የሚገባው በተናጠል ሳይሆን በውህደት ነው። አንደኛው ላንደኛው ክሂል መጋቢ ነው ከሚሏቸው ሃሳቦች ጋር ተደጋጋፊነት ሲኖረው ከሞገስ (1999) ጥናታዊ ግኝት ጋር ግን ተደጋጋፊነት የለውም። በሞገስ ጥናት የተጠኝ ቡድኑ የአንብቦ መረዳት ውጤት ልዩነት የዋዠቀ መሆኑን ለመረዳት ተችሏል። ለዚህም በምክንያትነት የተገለፀው ተማሪዎች አንድም በመማር ማስተማሩ ሂደት በትኩረት የተከታተሉትና ያዳበሩት የመፃፍ ችሎታቸውን ነው፤ ሁለትም በማንበባቸው ነው መፃፍ የቻሉት የሚል ነው።

በመቀጠል የመፃፍ የቅድመና የድህረ-ትምህርት ፈተና ውጤቶች ተነፃፅረዋል። በሁለቱ ፈተናዎች መካከል ያለው የተዛምዶ መጠን ለክና አቅጣጫ በፒርሰን የተዛምዶ ማሳያ (r_{xy}) በተሰላው ስሌት መሠረት በጣም ከፍተኛ (0.912) እና አዎንታዊ መሆኑ ተረጋግጧል። ይህም የተማሪዎቹ የመፃፍ ችሎታ ወጥ መሆኑን ያሳያል። የመፃፍ የመደበኛ ልይይቱ ከቅድመ ትምህርት ይልቅ በድህረ-ትምህርት አንሶ መገኘቱ ተማሪዎች አንብቦ መረዳትንና መፃፍን በውህደት ከመማራቸው በፊት በተለይ በትምህርታቸው ደከም ያለ ተማሪዎች መፃፍን ለመለማመድ የሚያስችሉ ቅድመ ሁኔታዎች

አንዳልተመቻቸላቸው ያሳያል። በአዲሱ ቴክስት ግን በቡድን የመስራት፣ ከምንባባት መረጃዎችን የማግኘት፣ ከማህበራዊ ህይወታቸው ጋር የተያያዙ ተግባራት የ[illegible]ኖር ለዚህ ውጤት አብቅቷቸዋል የሚል መደምደሚያ ላይ ሊያደርስ ይችላል። አማካይ ውጤታቸውም ከቅድመ ትምህርቱ የድህረ ትምህርቱ በ6.54 በልጦ ተገኝቷል። የዚህን ልዩነት አስተማማኝነት ለማረጋገጥ በ "ቲ" ቴስት ቀመር ተሰልቷል። የt ዋጋ (14.251) በሰንጠረዡ ላይ ከተመዘገበው t-cri ዋጋ (1.671) እጅግ በልጦ ተገኝቷል። ይህ ውጤት ከሞገስ (1999) ጥናት ጋር ተደጋጋፊነት አለው።

ሌላው ንፅፀር የቅድመና የድህረ-ትምህርት የአንብቦ የመረዳትና የመፃፍ ክሂሎች ድምር ውጤት ሲሆን የተዛምዶ መጠናቸው (0.953) በጣም ከፍተኛና እምንታዊ ነው። ይህም ያሁሺን (2005) አንባቢዎችም ሆኑ ፀሃፊዎች ቴክስትን በመተርጐምና በግንባታ ሂደት ያልፋሉ። ሁለቱም ትይዩ ድርሰታዊ ሂደቶች ናቸው። ሃርፐና ጆን (1996) መፃፍ ለአንብቦ የመረዳት ክሂል አንዱ አካል ነው። ኦልሰን (2002) አንብቦ የመረዳትና የመፃፍ ውህደታዊ የመማር/ማስተማር ሂደት የተሟላ ሂደት ነው ካሏቸው ሃሳቦች ጋር ተደጋጋፊነትን ሲያሳይ ከሞገስ (1999) ጥናት ግን ፍፁም ልዩነት የፈጠረ ሆኗል። በሞገስ ጥናት የተጠኝ ቡድኑ የሁለቱ ክሂሎች ዝምድና(-0.168) በመሆኑ ዝቅተኛና አሉታዊ መሆኑን አመላክቷል።

አማካይ ውጤታቸውንም በተመለከተ ከቅድመ-ትምህርት አማካይ ውጤት የድህረ ትምህርት አማካይ ውጤት በ11.74 ብልጫ አሳይቷል። ይህንንም አስተማማኝነት ለማረጋገጥ በዳግም ልኬት "ቲ" ቴስት ቀመር ተሰልቷል። የt_{ob} ዋጋ (20.653) በሰንጠረዡ ላይ ከተመዘገበው t_{cri} ዋጋ (1.671) እጅግ ልቆ መገኘቱን የስታትስቲክሱ ቀመር አረጋግጧል። ከዚህ በላይ የተገለፁት ውጤቶችም ከቃለመጠይቅና ከምልከታ መረጃዎች ጋር ተደጋጋፊነት እንዳላቸው ለማረጋገጥ ተችሏል።

ተማሪዎቹ አንብቦ መረዳትንና መፃፍን በውህደት ለመማር ማስተማር የተዘጋጀውን ቴክስት ለ45 ቀናት መማራቸው ያስገኘላቸውን የውጤት መሻሻል ከመጣኝ፣ ከቃለመጠይቅና ከምልከታ መረጃዎች ለመረዳት ተችሏል። በዚህ የመማር ማስተማር

ሂደት ሁለቱን ክሂሎች በውህደት ለመማር የሚያስችሉ ብልሃቶች ተግባራዊ ተደርገዋል። ተማሪዎቹ የርስበርስ ተራክቧቸውን አጐልብተዋል። ንቁ ተሳታፊነታቸውን ጥያቄዎችን በመጠየቅና ተግባራትን በፍጥነትና በፍላጐት በመሥራት አሳይተዋል። ይህም ብሎክ (1997)፣ ሩድል (1997) ተማሪዎች አንብቦ መረዳትንና መፃፍን በውህደት ለመማር መገመት፣ ጥያቄ መጠየቅና መተንበይ፣ ዳራዊ እውቀታቸውን መጠቀምና የተሰማቸውን ስሜት ማንፀባረቅ የሚያስችሉ ቴክስቶችንና ተግባራትን ማዘጋጀት ትምህርቱን ውጤታማ ያደርገዋል ካሏቸው ሃሳቦች ጋር ይደጋገፋል።

በተጨማሪም በሁለቱም ክሂሎች ከቅድመ ትምህርት ውጤት የድህረ-ትምህርት ውጤት በልጠ መገኘቱ የተማሪዎችን የችሎታ መሻሻል ይገልፃል። ከዚህ አንፃር አንብቦ መረዳትንና መፃፍን በውህደት መማር ውጤታማ ያደርጋል፣ ተማሪዎች ሃሳባቸውን በነፃነት እንዲገልፁ፣ አርቀው እንዲያስቡ፣ ትርጉምን እንዲገነቡ፣ የሃሳብ ግጥምጥምነት ያለው ፅሁፍ እንዲፅፉ ባጠቃላይ ጥሩ አንባቢዎችና ፀሐፊዎች እንዲሆኑ ያግዛቸዋል በማለት በ9ኛ ክፍልና በከፍተኛ ትምህርት ተቋማት ጥናታቸውን ካደረጉት አልሰን (2002)፣ ያሁሺን (2005)፣ ጁዩሚንሳይ (2006) እና በሃርንሃን (2008) ሃሳብ ጋር ተደጋጋፊነት አለው። ስለዚህ አንብቦ መረዳትንና መፃፍን በተናጥል ከመማር/ከማስተማር ይልቅ በውህደት ማቅረብ ሁለቱንም ክሂሎች በአቻነት ማጐልበት ብቻ ሳይሆን አንዱ ክሂል ለመጐልበት የሌላው ክሂል መኖር የግድ ነው ቢባል ተጠየቃዊነቱን ያጐላዋል። ክሂሎቹም ቀጥተኛ ግንኙነት እንዳላቸው ለመረዳት ያስችላል።

በቃለ መጠይቅና በምልከታ እንዲሁም በቅድመ-ትምህርት የፊተና ውጤት መረጃ እንደታየው ተማሪዎቹ አንብቦ መረዳትንና መፃፍን በተናጥል ሲማሩ በተለይ በመፃፍ ሂደት ሃሳብን የማፍለቅ፣ የማደራጀት ችግር እንደነበረባቸው ተስተውሏል።ሁለቱን ክሂሎች በውህደት ሲማሩ ግን የቴክስቱ አመራረጥና አደረጃጀት የተማሪዎችን ፍላጐትና የቀደመ እውቀት መሠረት ያደረገ በመሆኑ ከላይ የተገለፁት ችግሮች አላጋጠሟቸውም። ይህ ሁኔታ ብሎክ (1997)፣ ሩድል (1997)፣ በሃንርሃን (2009) እንደገለፁት የተማሪዎችን አዕምሮ በማነቃቃት ሂደት፣ አማራጭ ስልትን በመጠቀም የፅንሰ ሃሳቡን ገፅታዎች፣ ባህሪያትን በመዘርዘር እንደገና አደራጅተው እንዲፅፉ ማድረግ፣ እንዲሁም ቁልፍ ሃሳቦችን መለየት፣

ማስፋፋት፣ ሃሳብን መምረጥ፣ የመጀመሪያ ረቂቅ መፃፍና እንደገና መፃፍ በማከናወን ሃሳብን ለማመንጨት ብቻ ሳይሆን በሃሳቦች መካከል ያለውንም ዝምድና ለማሳየት ምቹ ሁኔታ መፍጠሩን ለማረጋገጥ ተችሏል ከሚለው ሃሳብ ጋር ይደጋገፋል። አንብቦ በመረዳትም በኩል በቅድመ ንባብ፣ በንባብ ላይና በድህረ ንባብ ጥያቄዎች መካተታቸው ተማሪዎቹ እንዲገምቱ፣ ሃሳባቸውን ሰብስበው እንዲያነቡ፣ እንዲተነብዩና ጥያቄዎችን እንዲጠይቁ እንዲሁም ሃሳብን እንዲያደራጁ፣ በራስ የመማርን ስልትም እንዲያዳብሩ፣ እውቀታቸውንም እንዲያጠናክሩ የረዳቸው መሆኑን ለማየት ተችሏል። ይህም ማረው (1998፡181-184) ብሎክ (1997)ን ዋቢ አድርገው ከገለፁት ሃሳብ ጋር ተደጋጋፊነት አለው።

በአጠቃላይ በዚህ ጥናት ለማየት እንደተሞከረው ተጠኝ ቡድኑ አንብቦ መረዳትንና መፃፍን በውህደት ከመማሩ በፊት የነበረው ችሎታ በሁለቱም ክሂሎች ዝቅተኛ ነበር። ይህ እንደተጠበቀ ሆኖ ግን ሁለቱ ክሂሎች ሲነፃፀሩ አንብቦ የመረዳት አማካይ ውጤት ከመፃፍ አማካይ ውጤት በመጠኑ ብልጫ አሳይቷል፤ የመደበኛ ልይይቱም እንዲሁ። ይህ ውጤት ከሞገስ (1999፡36) ከተገለፀው የጥናት ውጤት ልዩነትን ፈጥሯል። በሞገስ ጥናት የተጠኝ ቡድኑ የአንብቦ መረዳት ውጤት ከመፃፍ ውጤት ያነሰ መሆኑ ተገልጿል። ለዚህም በምክንያትነት የቀረበው የትምህርት አቀራረቡ ከአንብቦ መረዳት ይልቅ የመፃፍን ክሂል አጓልብቷል የሚል ነው። እንዲሁም በተጠኝዎቹ የመፃፍ ችሎታ መካከል ያለው ልዩነት የተረጋጋ ሲሆን በአንብቦ መረዳት በኩል ግን የዋገፀ መሆኑን ይገልፃል። ከዚህም አንፃር በርድገው (2003) እና ሜይ (1990)፣ ዲዮንሲዮን (1983)ን ዋቢ በማድረግ ከተጠቀሰው /የማንበብና የመፃፍ ክሂሎች በውህደት ከቀረቡ ሁለቱም ክሂሎች በእኅነት/በአንድ ጊዜ /ይገሰብታሉ/ ከሚለው የጥናት ግኝት ጋር ጥናታቸው እንደሚቃረን ሞገስ አመላክተዋል።ይህ ጥናት ግን ሞገስ ከጠቀሷቸው አጥኝዎችም ሆነ ከሌሎች ማንበብና መፃፍን በውህደት መማር ሁለቱን ክሂሎች ዙርመጥ በሆነ መልኩ ያገሰብታል ከሚለው ሃሳብ ጋር ተደጋጋፊነቱን አሳይቷል።

5. ማጠቃለያ፣ መደምደሚያና መፍትሔ

የጥናቱ ዳራ፣ ከጥናቱ ጋር ተያያዥነት ያላቸው ክለሳ ድርሳናት፣ የአጠናን ዘዴና የጥናቱ ውጤት ትንተናና ማብራሪያ እንደቅደምተከተላቸው ያለፉት ምዕራፎች ትኩረት ነበሩ። በዚህ ምዕራፍ ደግሞ ማጠቃለያ መደምደሚያና ከጥናቱ ጋር የተዛመዱና አግባብ የሆኑ የአጥኝዋ አስተያየቶች በቅደም ተከተል ቀርበዋል።

5.1. ማጠቃለያ

የጥናቱ ዓቢይ ዓላማ አንብቦ የመረዳትንና የመፃፍን ክሂሎች አዋህዶ መማር/ማስተማር ክሂሎቹን በማጐልበት ረገድ ያለውን ፋይዳ መመርመር ነው። በዚህም መሠረት ጥናቱ ምላሽ ሊሰጥባቸው፣ መሪ አድርጐ ያነሳቸው መሠረታዊ ጥያቄዎች የሚከተሉት ነበሩ።

- አንብቦ የመረዳትና የመፃፍ ክሂሎች ትስስር እስከምን ድረስ ነው?
- የማንበብና የመፃፍ ክሂሎችን በውህደት መማር/ማስተማር ክሂሎቹን ለማጐልበት ያለው ፋይዳ ምንድን ነው?

በዚህም መሠረት በመጀመሪያ ተጠኝዎችና የመረጃ መሰብሰቢያ መሣሪያዎች ተመርጠዋል፣ ተዘጋጅተዋል። ተጠኝዎቹ በደብረ ማርቆስ ከተማ በመንቆረር 2ኛ ደረጃ ትምህርት ቤት በ2002 ዓ/ም ተመዝግበው የ9ኛ ክፍል ትምህርታቸውን ከሚከታተሉ 960 ተማሪዎች መካከል በተራ እጣ ናሙና የተመረጡት የ9"ሀ" ክፍል ተማሪዎች ናቸው። እነዚህ ተማሪዎች በተጠኝነት ሲመረጡ በቅድሚያ በትምህርት ቤቱ የ9ኛ ክፍል ተማሪዎች መካከል ያለውን የችሎታ ስብጥር አጥኝዋ በምልከታ፣ ከክፍል ድልደላ ኮሚቴ ጋር ባደረገችው ውይይትና በ2002 ዓ/ም በአንደኛው ወሰነ ትምህርት ከተመዘገበው የተማሪዎቹ የውጤት ትንተናን መዝገብ በመመርመር የየክፍሉ አማካይ ውጤት ተመጣጣኝ መሆኑን በማረጋገጥ ቅድመ ሁኔታዎችን በማጥናት ነበር።

ቅድመ ትምህርት ፈተናውን ከተፈተኑ በኋላ በአጥኝዋ የተዘጋጀውን፣ /የሁለቱ ክሂሎች በውህደት መማር/ማስተማር ቴክሰት/ ለአርባ አምስት ቀናት ሲማሩ ቆይተዋል። በዚህ ሂደት መደበኛውን /ልማዳዊውን/ የመማሪያ መጽሃፍ አልተማሩም። በመጨረሻም ከቅድመ ትምህርት ፈተናው ጋር አቻ የሆነ የድህረ ትምህርት ፈተና ተፈትነው ውጤቱም በመረጃነት በመመዝገብ በአማካይ፣ በመደበኛ ልይይት፣ በዝምድና ማሳያና በ"ቲ" ቴስት

ቀመር ተሰልቷል። ከዚህም ባሻገር በቃለ መጠይቅና በምልከታ የተሰበሰቡት መረጃዎች ከመጣኝ መረጃው ጋር በማገናዘብ ከተተነተኑ በኋላ የሚከተሉት ውጤቶች ተገኝተዋል።

- አንብቦ የመረዳትና የመፃፍ ክሂሎች ውህደት እስከምን ድረስ እንደሆነ ለማረጋገጥ በቅድመና በድህረ ትምህርት የፈተና ውጤት በተደረገው የዝምድና ማሳያ ስሌት ከፍተኛ አዎንታዊ ተዛምዶ እንዳላቸው ለማረጋገጥ ተችሏል። ይህንንም ጉልህና አስተማማኝ እንደሆነ ለማረጋገጥ በ"ቲ" ቴስት ቀመር ተሰልቶ ተረጋግጧል።
- የማንበብና የመፃፍ ክሂሎችን በውህደት መማር/ማስተማር ክሂሎችን ለማጐልበት ያለውን ፋይዳ ለመመርመር በተደረገው ሂደት ተጠኝዎቹ በቅድመ ትምህረት የነበራቸውን ችሎታ ከድህረ ትምህርት ችሎታቸው ጋር በማነፃፀር በአማካይ፣ በመደበኛ ልይይት፣ በዳግም ልኬት "ቲ" ቴስት ቀመር ተሰልቷል። በዚህም መሠረት ከፍተኛ ለውጥ እንዳመጡ ለማየት ተችሏል። እንዲሁም ተጠኝዎቹ በሠሯቸው የክፍልና የቤት ሥራዎች መሻሻል እንዳሳዩ በምልከታ ለማረጋገጥ ተችሏል። በቃለመጠይቅም ተማሪዎቹ ያሳዩትን ለውጥ ገልፀዋል።

- የማንበብና የመፃፍ ክሂሎችን በውህደት መማር/ማስተማር ተማሪዎች በጋራ የመስራትን፣ ሃሳብ ለሃሳብ የመለዋወጥን፣ የራስን ሃሳብ የማንፀባረቅን ሁኔታ የፈጠረላቸው መሆኑን በክፍል ውስጥ በሚያደርጉት የርስበርስ ተራክቦ በምልከታና በቃለመጠይቅ ሂደት ለማረጋገጥ ተችሏል። ይህንንም የቅድመ ትምህርትና የድህረ ትምህርት ፈተናዎችን የውጤት ልዩነት ማሰረጃ በማድረግ ለማረጋገጥ ተችሏል።

5.2 መደምደሚያ

የጥናቱን ውጤትና ማብራሪያ መሠረት በማድረግ ጥናቱ ከሚከተሉት መደምደሚያዎች ላይ ደርሷል።

- የሂሳብ ቀመሩ እንደሚያሳየው በአንብቦ መረዳትና በመፃፍ መካከል ያለው ዝምድና በጣም ከፍተኛና አዎንታዊ መሆኑን ነው። በዚህም መሠረት በአንብቦ መረዳት ከፍተኛ ውጤት ያስመዘገቡ ተማሪዎች በመፃፍም ከፍተኛ ውጤት አስመዝግበዋል።

ወይም በአንብቦ መረዳት ዝቅተኛ ውጤት ያስመዘገቡ በመፃፍም ዝቅተኛ ውጤት አስመዝግበዋል። ይህም የሁለቱ ክሂሎች ትስስር የጠበቀ መሆኑን መረዳት ይቻላል። በዚህም ምክንያት የተገኘው ውጤት የማንበብና የመፃፍ ክሂሎችን በውህደት በመማርና በክሂሎቹ መካከል ቀጥተኛ ግንኙነት አለ።

- በቅድመ ትምህርትና በድህረ ትምህርት ፈተናዎች መካከል ያለውን ልዩነት ለማወቅ በተደረገው የዳግም ልኬት "ቲ" ቴስት ቀመር የt_{ob} ዋጋ ከሠንጠረዡ ከt-cri ዋጋ አጅግ ልቆ ተገኝቷል። ይህም ሁለቱን ክሂሎች በውህደት መማራቸው ከፍተኛ የውጤት መሻሻልን እንዳስገኘላቸው ያረጋግጣል። ከዚህ አንፃር ክሂሎቹ በውህደት መቅረባቸው የግድ ነው።

- የአንብቦ መረዳትና መፃፍን በውህደት ለማስተማር የተዘጋጀውን ቴክስት በሚማሩበት ሂደት ተማሪዎቹ መጀመሪያ ከነበራቸው የመማር ማስተማር ሂደት ይልቅ ንቁ ተሣታፊነተቸውን በምልከታና በክፍል ውስጥ ግምገማ ለማረጋገጥ ተችሏል። ስለሆነም በክሂሎቹ መካከል ቀጥተኛ ግንኙት አለ ማለት ነዉ።

- በቅድመ ትምህረትም ሆነ በድህረ ትምህረት ፈተና ውጤቶች ከመፃፍ ይልቅ አንብቦ የመረዳት ውጤት በመጠኑ ልቆ ተገኝቷል፤ ይህ ደግሞ ከጥናቱ በፊት የመማር ማስተማሩ ሂደት ከመፃፍ ይልቅ አንብቦ መረዳት ላይ ያተኮረ እንደነበረ ለመረዳት ያስችላል፡

- የጥናቱ ውጤት እንዳሳየው ተማሪዎቹ በተደረገላቸው እገዛ መሠረት በሁለቱም ክሂሎች መሻሻልን አሳይተዋል። ስለዚህ አንብቦ መረዳትንና መፃፍን በውህደት በመማርና በአንብቦ መረዳትና በመፃፍ ክሂሎች መካከል ቀጥተኛ ግንኙነት አለ።

5.3 አስተያየት

ከጥናቱ ውጤት በመነሳት አጥኝዋ የሚከተሉትን የመፍትሄ ሃሳቦች ሠንዝራለች።

- አንብቦ የመረዳትና የመፃፍ ክሂሎች በውህደት ከቀረቡ ተማሪዎችን ንቁ ተሣታፊዎች ያደርጓቸዋል። በአንድ ጊዜ ከአንድ በላይ ክሂል ዙር መጥ በሆነ መልኩ በመለማመድ ጥሩ አንባቢዎችና ፀሐፊዎች መሆናቸውን ጥናቱ አረጋግጧል። በዚህም መሠረት በቋንቋ ትምህርቱ የተሻለ ውጤት ለማምጣትና ስኬታማ ለመሆን ክሂሎች በውህደት ቢቀርቡ ተጠየቃዊነት ይኖረዋል።

- አንብቦ መረዳትንና መፃፍን በውህደት ለመማር/ማስተማር የቀረበው ቴክስት የተማሪዎችን እርስበርስ የመደጋገፍ፣ዳራዊ እውቀታቸውን የመጠቀም፣ ሃሳባቸውን የማንፀባረቅ፣ የመጠየቅና የመተንበይ፣ እንዲሁም የመገመት ብልሃቶችን ተግባራዊ ለማድረግ ተማሪ ተኮር ዘዴን መጠቀም የግድ ሆኖ ተገኝቷል። ስለዚህ ይህንን ዘዴ ተግባራዊ ለማድረግ ተማሪዎቹ ክሂሎችን በተናጥል ሳይሆን በውህደት ቢማሩ ውጤታማ ያደርጋል።
- አንብቦ የመረዳትና የመፃፍ ክሂሎች በውህደት ከቀረቡ ፋይዳው የጐላ መሆኑ በጥናቱ ተረጋግጧል። በዚህም መሠረት የሁለተኛ ደረጃ ትምህርት የአማርኛ ቋንቋ መማሪያና ማስተማሪያ መፃህፍት አዘጋጆች ሁለቱን ክሂሎች በውህደት ለማቅረብ በሚያስችል ሁኔታ ቢሠሩ ተማራጭነት ይኖረዋል።
- የአማርኛ ቋንቋ መምህራንም የማንበብና የመፃፍ ክሂሎችን ጥብቅ ትስስርነት በውል ተገንዝበው የመማር ማስተማር ስልታቸው ክሂሎቹን በውህደት በማቅረብ ላይ ያተኮረ ቢሆን ውጤታማ የደርጋቸዋል።
- ተማሪዎችም አንብቦ የመረዳትና የመፃፍ ክሂሎችን በውህደት በመማር በራስ የመማር ስልትን ቢፈጥሩ በትምህርት ቤት ቆይታቸውም ብቻ ሳይሆን ከዛ ባሻገርም ጥሩ አንባቢዎችና ፀሃፊዎች የመሆን አቅም ይፈጥርላቸዋል።
- መምህራንም ሆኑ ሌሎች ተመራማሪዎች በዚህ የጥናት ውጤት ላይ ተመስርተው ተማሪ ተኮር የትምህርት አቀራረብና ሁሉንም ክሂሎችን በውህደት የመማር/ማስተማር ሂደት ምን ያህል ጥብቅ ትስስር እንዳላቸው፣ ወይም የዘመኑ የትምህርት አቀራረብ/ዘዴን ተግባራዊ ለማድረግ ሁሉንም ክሂሎች በውህደት መማር/ማስተማር ፋይዳው ምን ያህል እንደሆነ በስፋት ቢያጠኑ ለአማርኛ ቋንቋ ሥርዓተ ትምህርት አዘጋጆች፣ ለአማርኛ ቋንቋ መምህራን፣ እንዲሁም ለቋንቋው እድገት የጐላ አስተዋጽኦ ሊያበረክቱ ይችላሉ።

6. ዋቢዎች

ሀዲስ ዓለማየሁ።(1965)። *ፍቅር እስከመቃብር*። አዲስ አበባ ሜጋ አሳታሚ ድርጅት።

ማረው ዓለሙ። (1996)። *በሳል ድርሰት ማስተማሪያ*። አዲስ አበባ፣ ብርሃንና ሰላም ማተሚያ ድርጅት።

ማረው ዓለሙ። (1998)። *የአማርኛ ቋንቋ ማስተማሪያ ዘዴ*። አዲስ አበባ፣ ብርሃንና ሰላም ማተሚያ ድርጅት

ሞገስ አመራ። (1999)። *የማንበብና የመፃፍ ክሂሎችን አዋህዶ ማስተማር ክሂሎቹን*

በማጮለበት ረገድ ያለው ሚና፡፡ የልታተመ የድህረ ምረቃ ቴሲስ፡ባህርዳር ዩኒቨርሲቲ፡ ሂደማን ፋኩልቲ፡ ባህር ዳር፡፡
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ሲሳይ ንጉሱ፡፡ (1978)፡፡ *ሰመመን*፡፡ አዲስ አበባ፡ ኩራዝ አሳታሚ ድርጅት፡፡
በዓሉ ግርማ፡፡ (1962)፡፡ *ካድማስ ባሻገር*፡፡ አዲስ አበባ፡ ንግድ ማተሚያ ድርጅት፡፡
በውቀቱ ስዩም፡፡ (1995)፡፡ *ኑዋሪ አለባ ጎጆዎች*፡፡ አዲስ አበባ፡ኩራዝ አሳታሚ ድርጅት፡፡
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አበረ አዳሙ፡፡ (2001)፡፡ *ፍቅር በሲኦል ውስጥ*፡ አዲስ አበባ፡ አስቴር ነጋ አሳታሚ ድርጅት፡፡
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The practice of Continuous Professional Development of General Secondary School Teachers in Eastern Gojjam Zone- Amhara National Regional State

Gebeyehu Shiferaw, Molalign Tamiru and Desalew Abawa

Abstract

The Purpose of this study is to investigate the practice of Continuous Professional Development (CPD) that has been carried out to general secondary schools (9-10) teachers in Eastern Gojjam Administrative Zone of Amhara Region. In addition to explore factors that had been constraining the implementation of CPD. To this effect the descriptive survey method was employed. Document analysis, interview and questionnaire were used as instruments of data collection. Data were collected from randomly selected schools and teachers. In general, educational experts /officers at Woreda and Zonal level, school principals, and teachers were included as subject of the study. The data gathered were analyzed qualitatively and quantitatively. The findings of the study showed that CPD training needs assessment, which is very essential for designing and implementing, had been very low. The study also revealed that there was no organized support and follow-up system to strengthen and know the effect of CPD training outcomes. Continuous Professional Development activities had been hindered by lack of understanding its objectives; budget and time limitation; mainly focused on occasionally assigned programs and absence of motivation for teachers who were participated actively.

CHAPTER ONE

1.1 Background of the study

The success of organizations mainly lies on the competence of their human resources. One has to appreciate the ever growing socio-economic as well as technological changes and try as much as possible to be with them (Brandt and Olson,1981) ; (Peterson,1981) This gives an idea about why most of the organizations pay much attention for continuous training program. Among these, educational institutions are the ones which always keen about effectiveness of their people engaged in different training activities.

Development of education is influenced by the improvement and development of educational personnel in general and teaching staff in particular. Teachers play the key role in the educational system for they are responsible in preparing and building the capacity of their students. This could be possible when teachers update themselves throughout their professional life to keep the

quality and relevance of education. Due to this reason teaching profession requires peculiar attention.

Thus, Continuous Professional Development (CPD) enables teachers to be efficient enough in performing their professional activities and its ultimate worth has an essential role for the improvement of students learning.

In providing CPD program Husien and Positlethwite (1994) state that many countries encouraged and implemented the local school-based training. This is because such training program could satisfy the ever increasing demand of qualified teachers at their context. The quality of education to greater extent depends on the quality of teachers who are influential figures in acquiring effective program in the education system if they are always in continuous learning process. Quality teachers could be obtained through well organized and adequately provided in service education and training (Venkate, 1993).

Teachers can fully improve and refresh themselves for the benefit of their own and the society they serve. It is also believed that the dynamic nature of educational environment cannot be easily managed without continuous learning. This implies that teachers need to continuously update their competence. In this respect, the Ethiopian education and Training policy document (MOE. 1994:2) has entailed the need of professional development for teachers as vital and taken as a minimum requirement for teachers to continue in their profession and improve the quality of education. Consequently, new training approaches that focus on updating and upgrading the professional competence of teachers and enable them to cop up with order of the day were designed.

1.2 Statement of the problem

In Ethiopia a number of studies were conducted about CPD related issues (Mintesnote, MOE, Liyew, 2008). But, not much research has been done about the practical effect of CPD in secondary schools. In fact, evaluative research by Hogenbosch in 2009 was conducted to assess the problems of implementation and the attitude of teachers towards CPD in Amhara Region.

This study revealed that the actual practice of CPD was less significant for secondary school teachers compared to primary school teachers with respect to the willingness of teachers to work together and apply group work as an active learning method. This shows that there is a need to investigate the practice of CPD in secondary schools separately. Due to this reason the researchers of the this study developed an interest to study the practice of CPD in secondary schools of eastern Gojjam Zone.

1.3 The objectives of the study

The general objective of the study is to describe the practice of CPD program of general secondary schools in East Gojjam Zone.

Consequently, the specific objectives are to:

- Assess the effect of CPD on the practice of teaching and learning
- Identify the support system established in the process of 'CPD' program.
- Review practical problems manifested in the process of planning up to monitoring stages of CPD.

In order to achieve the above objectives, an attempt was made to give response to the following basic questions.

1. How do different educational stake holders involved in CPD training program?
2. To what extent CPD training improves teachers' practice
3. What are the support and follow up systems for the effective implementation of CPD?
4. What are the major challenges to the practice of CPD training in secondary schools?

1.4 Significance of the study

The study would be important for the following reasons:

- It could help as a source of information about the current status of the program in the region.
- others may share experiences from the result of the study
- It would initiate others to conduct further research in the area

1.5 Delimitation of the study

The study focuses on the practice of CPD program in some selected general secondary schools of East Gojjam Zone in Amhara Region. The Researchers have been serving as educational official, expert, teacher educator and teachers in the Zone. This gives an opportunity to obtain genuine information about CPD in the area. Moreover, the current work place of the researchers is in this Zone which gives them an opportunity to conduct the research side by side with their regular task (teaching).

CHAPTER TWO: LITERATURE REVIEW

2.1 Concept of Continuous Professional Development (CPD)

The term Continuous Professional Development is now common to many professions as learning 'on the job'. CPD embraces the idea that individuals aim for continuous improvement in their professional skills and knowledge, beyond the basic training initially required to carry out the job (Gray, 2005).

CPD is a way of learning to become more effective by exploiting the learning opportunities that lie just below the surface of everything you do already. It helps people to learn from what they do so they can get better at it (Underhill, 1999). It also refers to skills and knowledge attained for both personal development and career advancement. Therefore, the process of staff development in teaching is a continuous one and that every school has to be expected to regard the continued training of its teachers as an essential part of its task for which all members of staff share responsibility (Ibid). Generally, the concept CPD is a continuous learning by practitioners.

In Ethiopia Continuous professional Development as a strategy has been given higher emphasis to improve the quality of education. During the years 2002 and 2003 Ministry of Education (MOE) has been reviewing all aspects of its Teachers Education System Overhaul (TESO). In this endeavor the main Considerable training opportunity for teachers was CPD.

All teachers in Ethiopia are expected to develop and improve their practice of participation in CPD activities each semester. A new strategy for CPD in schools has been developed and presented after 2004. It demonstrates how all teachers will engage actively in their own development as professionals. Teachers are likely expected to renew heir teaching licenses periodically and promote through their career ladder. It is CPD which favor teachers to renew licensing and promotion.

A team was formed within the Ministry of Education (MOE) to develop the overall strategy for CPD and a number of specific activities were identified. A CPD guide line has been produced which details the new strategy and courses developed for the induction of newly deployed teachers and for CPD priority programs.

The components visualized by the new CPD strategy were: A two year induction course for newly deployed teachers, centrally developed courses on identified priority issues to be taken by all teachers and individually approved professional development for all teachers.

Some of the acceptable CPD opportunities for teachers in Ethiopia are: English language improvement program, courses developed by cluster trainings, courses organized by educators, conducting action research, taking distance learning courses, serving as mentors for newly deployed teachers, organizing or facilitating workshops and presenting research findings in cluster centers and training institution(MOE,2003)

2.2 Training Need Assessment of CPD

CPD programs are carried out to address the learning or development needs of an individual, group individuals or an identified need of a particular institution (MOE, 2005).These needs could be identified by a process of needs analysis or review.

Continuous Professional Development training need analysis is the process of identifying areas where teachers lack skills, knowledge and ability in effectively promoting their job. Training need assessment is therefore, a tool which formally tries to narrow the gaps between the current

practices and the desired results. It places the gaps (needs) in priority order and selects those gaps (needs) of the highest priority for action (Hammond, 1999).

The process of need assessment would include collecting the data, analyzing them & providing feed back as components of planning CPD (Morczely, 1996). Such data serve for making decisions for the selection of courses or topics of training.

2. 3 Involvement and Awareness of teachers in the CPD

According to Hugenbosch (2009),the main target group to implement CPD is the teacher Moreover, research results have shown that the more professional development opportunities available to teachers, the more effective teachers working in schools. Consequently the students learning will be improved. (Hammond, 1999).

Teachers must be encouraged to design their practice and evaluate their performance as professionals. The professional ability of teachers is improved by empowering and increasing the participation of teachers in planning, intervention and monitoring activities . (Full an 1991 ;Conley 1991).

2.4 Delivery modes of CPD

Continuous professional development (CPD) can be delivered through different ways depends on the context. For instance, in America workshop and seminar have been used to carry out CPD courses during 1990s and later the mode of delivery has shifted to the other types such as research, collaborative learning, participation and experience sharing among colleagues from the same subject, grade and school (Porter etal, 2000). In addition ways Sparks and Horsley (1998) explain that there are five modes of delivery such as individual guided development, being observed and observing colleagues in classroom, involvement in the improvement of curriculum, training and research which focuses on actual professional practice. The above writers notice that teachers' reflective activity is the key point for successful completion of CPD training. The most common modes of delivery of CPD as mentioned by Barens and Andrew(2002) are seminars, workshops, conferences, inter and intra school activities, Peer observation , Visiting schools and teachers, consultations, mentoring, group discussions, case studies and action research.

2.5 Contribution of CPD in developing teachers' capacity

Continuous professional development is concerned with staff collaboration, broadening of pedagogical skill, and subject matter knowledge, strengthening of relationship between schools and research institutions, minimizing the gap between professional requirements and limitations in pre-service teacher training and focuses on building the required capacities (http://www.axiaitizencinnect.com).

Thus, according to **Underhill (1999)** CPD is important because:

i. It helps teachers remain fresh, alert, up-to-date, and confident in their methodology and the subject area they teach

ii. It enables teachers to participate in, use innovative skills of teaching and contribute to the development of their schools as learning organizations and their profession as learning profession

CPD is useful in sustaining and developing teachers' ability in:

- Providing concrete, realistic and challenging goals
- Designing activities that include both technical and conceptual aspects of instruction
- Developing individual reflection and group enquiry.
- Getting support from colleagues
- Assessing their effects on students' learning
- Managing classrooms effectively (Baker and Smith ,1999) ;(Riding ,2001)

Therefore, the professional development of teachers is Key factor in ensuring effective students' performance and learning.

2.6 Support system in CPD

The way Continuous Professional Development is resourced appears to vary according to the type of institutions, its geographical situation, and the priority the school management places on professional development (Gray,2005).There are a wide variety of resources such as in terms of material, finance ,time and human which can be used to support continuous Professional Development activities. The potential and availability of resource are basic implementation strategies for successful training of Continuous Professional Development (MOE, 2003).

Teachers themselves are the most powerful and most accessible human resources for continuous Professional Development. Teacher development activities are most effective when carried out collaboratively in an atmosphere of mutual support and encouragement. Schools have professional colleagues who have better knowledge and experiences to share their expertise. So, school principals should always take the responsibility in identifying and encouraging these colleagues to run the Continuous Professional Development program effectively.

Time must be available to carry out this essential professional training. Teachers are very busy people and this should be taken into account during the planning stage of Continuous Professional Development.In addition to school, Woreda Education Office, Zone Education Department, Regional Education Bureau and other educational stakeholders are expected to provide support for CPD training program..These could be in the form of:

- Identification of needs and providing feedback
- Help an institution conducting self- assessment
- Demonstrate good practice
- Material and financial support
- Train those who will be facilitating the actual training of CPD
- Carry out and assist in monitoring and evaluating the CPD program(Bernstine,2000)

2.7 Monitoring and Evaluation

Monitoring is a continuous function that uses the systematic collection of data to provide an ongoing development intervention with indication of the extent of progress and achievement of objectives. .The definition shows that monitoring is a continuous process of assessing progress of CPD program or intervention in order to understand the degree to which desired results are being met. It is the activity of collecting, recording, communicating, analyzing and using information for the purpose to identify and promote the action necessary to improve implementation. It also measures the quality and effect of process and procedures.

Evaluation is the systematic and objective assessment of an ongoing or completed program or policy including its design, implementation and results. The aim is to determine the relevance and fulfillment of objectives, effectiveness, impact and sustainability of the training (Millins, 1994).

Therefore, evaluation is a complement to monitoring in that when monitoring system sends signals that the efforts are going off track , then good evaluative information can help clarity the realities and trends noted with the monitoring system Monitoring and evaluating the effectiveness of Continuous Professional Development is an essential part and ultimately help students to become better learners.

CHAPTER THREE

3.1. Research Methodology

A descriptive survey method was employed to conduct the study. This is because the method is appropriate to assess the status of the current (existing) practice of CPD program by collecting data from relatively large sample size (Best and Kahn, 1999)

3.2. Sources of data and instruments used to collect Data

Data were collected from teachers, school principals, and educational officials, from Woreda, & Zonal offices. Interview, questionnaire & document analysis were used to collect the data. School principals and educational experts from woreda education offices and Zone Education Department have served as source of information through interview. Besides, questionnaire was used to collect data from teachers. Moreover, documents in Schools, Woredas, & zonal education office were used to supplement the data collected.

3.3 Sampling Techniques

East Gojjam Zone has 25 general secondary schools. The schools were grouped in to two; seventeen schools which are along the main road of Addis Ababa to Bahir Dar and eight schools which are far from the main road. More than 25 percent of general secondary schools from each

group were taken as samples. Thus, 5 general secondary schools from along the main road (Amanuel, Debre marks, Genbotehaya, Dejen, Bechena) & 2 general secondary schools from areas far from the main road(Yejubie and Rebugebeya) were selected. Totally 7 schools were taken as samples using the convenience sampling technique. In these seven schools there are four hundred twenty eight teachers among which (25%) one hundred seven teachers were taken as respondents randomly. Woreda educational officers to which the seven schools are affiliated were taken as members of the sample by purposive sampling technique. Moreover, seven school principals (one from each school) and one educational officer at zone level were included in the sample.

3.4 Procedures of Data collection

Questionnaires & interview guide lines were distributed to one of the secondary schools and one woreda educational office in Debre Markos town for pilot study. Where these sample places were not included as source of the main data of the research. It was done to check the reliability of instruments. The instruments of data collection were revised according to the information obtained from the pilot survey. Then, one hundred seven questionnaires were distributed and ninety one which is (85%) of the distributed questionnaires were returned.

3.5 Data Analysis Techniques

Both Qualitative and Quantitative data analysis were employed. Regarding quantitative data percentile was used to analyze data.

CHAPTER FOUR: DATA PRESENTATION AND ANALYSIS

1.1. Characteristics of respondents

Seven principals from the seven schools (one from each school), seven woreda and one zone educational officer were interviewed. All principals and officers are males and they are above thirty eight years old. Among four hundred twenty eight teachers, one hundred seven teachers were taken as members of the sample and 91gave responses through questionnaire. Teachers' detail personal information is described by the following table:

Table 1 – Information about teachers

No	Item	Frequency	%
1	Sex		
	Male	69	75.8
	Female	22	24.2
	Total	91	100
2	Age in years		
	18 – 27	29	31.9
	28 – 37	38	41.8
	38 and above	24	26.3
	Total	91	100
3	Educational Qualification		
	Diploma	17	18.7
	BA/BED/BSC	72	79.1
	MA/MED/MSC	2	2.2
	Total	91	100
4	Work experience at the current position		
	0-5 years	26	28.6
	6-11 years	49	53.8
	More than 11 years	16	17.6
	Total	91	100

Source: Own survey (2010)

Table 1 Shows that among 91 teachers 69(75.8 %) were males and 22 (24.2%) were females. The proportion of females as compared to males is very low. What is clear from the above information is that less participation of females at secondary education still calls for an effort to increase women teachers' involvement in the teaching profession. In the case of age distribution, considerable number of respondents i.e 38(41.8%) were in the age groups of 28-37 years. To the other side 29(31.9%) and 24(26.3%) of respondents are with the age group of 18-27 years and above 38 respectively.

Teachers' educational qualifications were also reported in table 1 of item 3. As indicated in the table 72(79.1%) of respondents were degree holders and only some teachers i.e 17(18.7%) were diploma holders. These diploma graduates were also attending their degree program through in-service education like summer and distance. Regarding work experience, more than average number of respondents served for 6-11 years. The remaining respondents 26(28.6%) and 16(17.6%) are below 5 years above 11 years of experience respectively.

4.2 Practices and Problems of CPD in General Secondary Schools

Table-2 Training Needs Assessment of CPD

No	Items	Agree		Disagree		Do not know	
		Freq.	%	Freq.	%	Freq.	%
1	Teachers have been given the opportunity to identify their CPD training needs	3	3.3	76	83.5	12	13.2
2	CPD training needs were identified by						
	a. Schools	1	1.1	77	84.6	13	14.3
	b. Woreda education office			66	72.5	25	17.5
	c. Zone education department			63	69.2	28	30.8

Source: Own survey (2010)

As per the data in table 1 the majority that is 76(83.5%) of teachers said CPD training needs were not identified by the teachers. In addition, the table shows that 28(30.8%), 25(17.5%) and 13(14.3%) of teachers do not know whether zone educational department, woreda education office and schools were involved or not in identifying CPD training needs respectively. Besides, 77(84.6%), 66(72.5%) and 63(69.2%) of teachers do not agree about the involvement of schools, woreda officers and zone educational department in the process of identifying needs of CPD respectively.The interview made for school principals, woreda education and zone department officers depects as they were not involved in identifying CPD training needs. But, these principals and officers said that the courses of CPD were sent by MOE into schools.

Table -3 Awareness about CPD

No	Items	Adequate		Inadequate		Not at all	
		No.	%	F	%	F	%
1	Teachers awareness about CPD objectives & activities	2	2.2	83	91.2	6	6.6
2	Secondary school principals awareness about objectives & activities of CPD	10	11	78	85.7	3	3.3
3	Woreda education officers awareness about the objectives & activities of CPD	8	8.8	80	87.9	3	3.3
4	Awareness of woreda education officers about CPD objectives & activities	6	6.6	77	84.6	8	8.8
5	Awareness of Zone education department about the objectives of CPD	4	4.4	84	92.3	3	3.3

Source: Own survey (2010)

In table 3 teachers were asked to rate their perceptions about the awareness level of teachers, school principals, woreda and zone educational officers on the CPD training of teachers. The response of teachers' shows that, the great majority 83(91.2%) teachers rated the awareness of teachers regarding the objectives of CPD is inadequate. Similarly most teachers which are 78(85.7%) , 77(84.6%) and 84(92.3%) said the awareness of principals, woreda and zone officers were not adequate respectively. The interview data from the secondary schools Principals and woreda education & Zone education officials showed 6(85.7%) of Principals, 7(100%) of education officers at woreda level, and the education office at the zonal level said as they lack knowledge about the objectives & activities of CPD.

Table-4 Degree of Participation of teachers in the CPD training

No	Items	High		Medium		Law		Do not Know	
		Freq.	%	Freq.	%	Freq.	%	Freq.	%
1	Teachers opportunities to involve in Planning of CPD	2	2.2	8	8.7	72	79.1	9	9.9
2	Active engagement of teachers in carrying out CPD activities	4	4.4	3	34.06	48	52.8	8	8.8
3	Mentors experience to lead training and facilitate CPD	9	9.9	20	21.7	59	64.8	3	3.3

Source: Own survey (2010)

In table '3' teachers were asked to rate their participation in different activities of CPD. Accordingly, 72(79.1%) of teachers rated the involvement of teachers in planning CPD activities was low. Only 2(2.2%), and 8(8.8%) of the respondents were in favor of high & medium participation respectively. The table shows 48(52.8%) of teachers rated the participation of teachers in carrying out CPD activities was low. Whereas, only 3(3.3%) and 4(4.4%) rated the participation high and medium respectively. Surprisingly 8.8% said, they do not know the level of participation of teachers. Furthermore, 59(64.8%) of teachers rated the experiences of mentors in facilitating CPD training was low and 20(21.7%) rated it medium. Only 9(9.9%) of teachers said mentors experience of facilitation is high.

Table-5 Support for CPD Program

No	Items	Highly Satisfying		Satisfying		Not Satisfying		Note at all	
		Freq.	%	Freq.	%	Freq.	%	Freq.	%
1	Availability of experienced and trained mentors	5	5.5	16	17.6	51	56	10	20.9
2	Availability of time	-	-	8	8.8	68	74.7	15	16.5
3	Budget allocation from the school	3	3.3	7	7.7	33	36.3	48	52.7
4	Material finance and expert support from different sources like:								
	a. Woreda Education Office	13	14.3	28	30.8	41	45	9	9.9
	b. Zone Education Department	10	11	15	16.5	47	51.6	19	20.9
	c. Regional education Bureau	11	12.1	18	19.8	50	54.9	12	13.2
	d. Non-Government organization	2	2.2	5	5.5	14	15.4	70	76.9
	e. private Institutions	-	-	4	4.4	5	5.5	82	90.1
	f. Parents	.	.	1	1.1	3	3.3	87	95.6

Source: Own survey (2010)

The above table shows that 51 (56%) and 10(20.9%) of teachers indicated that the presence of well trained and experienced teachers on CPD in Schools were not satisfying and not at all respectively. The other insignificant number of respondents which are 6 (17%) and 5(5.5%) of teachers responded as satisfying and highly satisfying. In relation to time availability for CPD training, most of the teachers which are 68(74.7%) replied as not satisfying and 15(16.5%) as not at all existing. Teachers were also asked when the CPD program usually carry out. Most of the respondents responded that CPD program usually conducted after the school day. Average number of respondents answered at weekends. Others few number of teachers on working days.

With regard to the allocation of budget from the school, more than half of the respondents that is 48 (52.7%) said that as no budget was considered to run CPD program In addition the significant number of teachers 33(36.3%) replied not satisfying. Responses obtained from school principals through interview showed that schools were not allocated budget for CPD training in their plan due to the scarcity of money. Teachers were also asked to provide information about resource support in terms of material, finance and human. The responses gathered reflected that only 13(14.3%) of teachers, which is the highest of all, said that woreda education offices were

providing resources at highly satisfying level. Interview was also conducted for principals, woreda educational experts and zone department. According to the principals' response, only stationary materials were provided for teachers who were taking CPD courses. Interviewees from woreda and zone indicated that schools were responsible to run the CPD program.

Table-6 Training modes used during CPD training

Teachers were asked the extent to which components of modes of training are used in CPD program. Here under are the answers in terms of frequency and percentage.

Item	N	High		Medium		Low		Not at all	
		Freq.	%	Freq.	%	Freq.	%	Freq.	%
Consultation	87	-	-	2	2.3	4	4.6	81	93.1
Coaching	87	-	-	5	3.4	5	5.8	79	90.8
Group discussion	91	75	82.4	5	5.5	4	4.4	7	7.7
Experience sharing through supervision	86	15	17.4	8	9.3	4	4.7	59	68.6
Action Research	91	70	76.9	7	7.7	5	5.5	9	9.9
Case study	89	-	-	3	3.4	2	2.2	84	94.4
Seminar	90	-	-	4	4.5	3	3.3	83	92.2
Conference	88	-	-	1	1.1	2	2.3	85	96.6
Workshop	84	-	-	4	4.8	2	2.4	78	92.8

Source: Own survey (2010)

The above table shows that 75(82.4 %) and 70 (76.9 %) of the respondents rated group discussion and active learning as high respectively. That means these modes are used highly in CPD training compared to the other types. To the contrary, almost all of teachers that are 78(92.8%), 85(96.6%), 83(92.2%), 84(94.4%), 79(90.8%) and 81(93.1%) said that workshop, conference, seminar, case study, coaching and consulting respectively are not totally used as modes of training in schools. Even though, it is not that much abandoned, 59(68.6%) of respondents suggested that the model 'experience sharing through supervision' is also not so much used in the actual CPD training in practice. The responses gathered through interview from principals of schools, woreda and zone education officials are consistent with the data gathered by questionnaires from teachers.

All 7(100%) of school principals said a large amount of work is done through group work and action research while other modes are used rarely. Similarly, most which is 5(71.4%) of woreda education officials replied that there are more activities of CPD performed through group

discussion and action research. The remaining of 2(28.6%) of woreda interviewees forwarded that in the actual practice of CPD 'seminar' and 'workshop' are more importantly given attention than other types of models. Likewise, the response of the zone education officer goes with the idea of school principals.

Regarding document analysis, documents like portfolio and minute records on CPD issues were found. Most of the records entail about CPD activities to be completed, the strong sides and points to be improved and these all are recorded through discussion. There are also evidences which show 'as there were practices of action research in the CPD training. Whereas, others such as 'workshop' , 'conference', 'seminar', 'consultation' and 'coaching' were not reflected in the documents as frequent as 'group discussion' and 'action research'. Nothing was observed about the model 'case study' in document analysis.Even though, documents show the presence of action research, information from interviewees indicated that there was lack of implementing the findings of researches to improve teaching learning process.

Table-7 Extent of practical contribution of CPD for teachers

Teachers were also asked to give response on the extent to which continuous professional development contribute to their profession. The information gathered is presented in the following table.

Item	N	High		Medium		Low	
		Freq.	%	Freq.	%	Freq.	%
Introduction of innovative professional skills for effective teaching	89	-	-	15	16.9	74	83.1
Implementation of continuous assessment	91	9	6.6	55	62.6	28	30.8
Implementation of active learning methods	91	15	16.5	41	45.1	35	38.4
Improvement of classroom management techniques	91	17	18.7	44	48.4	30	32.9
Solving professional problems using action research	91	13	14.3	50	57.1	26	28.6
Improvement of skills of experience sharing with colleagues	91	10	11.1	48	53.3	32	35.6
Improvement of participation in group discussion with colleagues	91	14	15.4	43	54.9	27	29.7
Enhancement of teachers' capacity in solving problems cooperatively	91	-	-	21	23.1	70	76.9

Source: Own survey (2010)

The table illustrates that 17(18.7%) of teachers are benefited from CPD in developing their skill of classroom management technique, which is relatively rated as high compared to the other possible contributions of CPD. On the other hand, contributions of CPD on ability of teachers' 'capacity in solving problems cooperatively' and 'usage of innovative professional skills for effective teaching' are rated as low by 70(76.9%) and 74(83.1%) of the respondents respectively. In the open ended question all most all of the respondent teachers reflected that CPD helped them to develop their capacity to use active learning methods in instruction such as group work, question and answer, and drama. Some of the respondents suggested that group discussion with colleagues, classroom management technique; experience sharing with colleague, using action research and implementation of continuous assessment are some of the professional benefits that they gain from CPD training. Besides, the information gathered through open ended questions reveals that teachers in the CPD training have developed ability of producing individual portfolio of evidences. Besides, teachers' portfolios show that as most teachers are trying to carry out continuous assessment, active learning methods, action research and experience sharing with colleagues.

The information gathered through interview with school principals, woreda and zone education officials asserts that there is an observable progress on the ability of teachers in implementing different active learning methods and technique of classroom management including action research. Moreover, they suggested that the skill of teachers in applying continuous assessment and intention to share ideas with colleagues have shown remarkable progress after CPD training. But, all principals and education officials at woreda as well as zone level agree on teachers' insufficient effort on solving problems cooperatively and introducing innovative professional skills of teaching.Hence, from the aforementioned data it is possible to conclude that CPD has played important role in the advancement of teachers' ability of sharing ideas and participation in group discussion with colleagues. Furthermore, CPD enables teachers to show better performance in their skill of action research, active learning, continuous assessment and classroom management. However, the data shows CPD in practice lacked in bringing change on

teachers' capacity to solve problems cooperatively and their usage of innovative professional skills for effective teaching.

Teachers were further asked to indicate who were involved in the evaluation process. Acording to table 8. majority of respondents 62(68.1%) and average number of teachers 49(53.8%) replied that teachers themselves and principals were the main actors in the process of assessment respectively. Other, which are 40(44%), 38(41.8%), 23 (25.3%), and 11(12.1%) said that woreda education office department heads at school level zone education department and regional education bureau engaged in a limited manner to evaluate and monitor the training program respectively.

Table-8 Monitoring and Evaluation of CPD

No	Item	Frequency	%
1	Following – up system have been conducted by:-		
	a. Teachers themselves	62	68.1
	b. Department heads	38	41.8
	c. School Principles	49	53.8
	d. Woreda education Office	40	44
	e. Zone Education Department	23	25.3
	f. Regional education Bureau	11	12.1
2	Frequency of monitoring and evaluation		
	a. Weekly	3	3.3
	b. Monthly	7	7.7
	c. Once in a semester	18	19.8
	d. Once in a year	21	23.1
	e. Occasionally	59	64.8
	f. At the completion of each CPD Course	24	26.4
3	Data collection instruments for monitoring and evaluation		
	a. Questionnaire	27	29.7
	b. Observation check list	10	10.9
	c. Interviews	8	8.8
	d. Collegial and staff meeting	36	39.6
	e. Document analysis from training records and reports	57	61.6

Source: Own survey (2010)

Teachers were asked to rate on the frequency of monitoring and evaluating the practice of CPD. Respondents 59(64.8%) replied that most of the time assessment was taken place occasionally. Considerable number of respondents 24 (26.4%), 21(23.1%) and18 (19.8%) said that follow-up

was carried out at the completion of each CPD course, once in a year and once in a semester respectively.

The question was forwarded to teachers about data collection instruments for monitoring and evaluation. Majority of respondents 57(61.6%) said that documents of training records and reports from different sources used as tools. In addition to this considerable number of teachers which are 36(39.6%) and 27(29.7%) reported that meetings within the school and questionnaire were employed to collect the data respectively.

The summarized reasons found from open ended question is that lack of awareness about the role of evolution to improve training, Lack of commitment and kept quite until to be requested and the information was commonly collected only through written and oral reports.

Principals of schools educational experts and officers at woreda and Zonal level were interviewed on the practice of monitoring and evaluation of the CPD program. During the interview principals replied that they were not involved in the CPD training with teachers and their usual responsibility was to check whether teachers have been attending CPD training and giving approval for their performance at the end of each course.

Almost all educational officials and principals answered that the CPD program was evaluated using reports and occasional visits of some schools. The interviewees at each level believed that the CPD program was not adequately monitored and evaluated. Regarding problems and challenges of CPD in secondary schools, response of teachers, principals and educational experts/officers is summarized as follows:

Teachers:

- Not based on teachers need
- Teachers were simply forced to participate in the training but not in the planning stage.
- Lack of well trained and experienced mentors
- Lack of follow – up system
- No responsible person to run CPD training at each educational level
- Teachers perception that CPD will not continue (Consistent)
- Absence of motivation that teachers who performed best are equally treated with those who performed least.
- No continuous support

- ❖ Limitation of awareness
- ❖ Unaccredited of training participation

Principals:

- ❖ Teachers believed that CPD is designed as to add work loads on them
- ❖ Teachers are participating for the purpose of participation but they are not working as the expected once to improve learning.
- ❖ Experts and authorities from WEO, ZED, and REB were tried to check whether teachers are working the activities found in the module without providing technical support and feedback on the issue of CPD training.

Educational Experts /officers

- ❖ Teachers associate on the training opportunities with personal benefit ahead of professional benefit
- ❖ Shortage of modules to be distributed to schools according to the number of teachers.
- ❖ Less attention given by teachers about the role of CPD for their promotion.
- ❖ Teachers negative perception for CPD as an additional load of task
- ❖ No practice is made to motive teachers who performed best and support others who are involved least.
- ❖ Lack of attention and awareness on the side of principals and supervisors
- ❖ Absence of developed standards(tests) for appropriate implementation of CPD
- ❖ Priority was given to which occasionally arranged programs to be implemented instead performing the planned ones.

CHAPTER FIVE: SUMMARY, CONCLUSION AND ITS IMPLICATION

5.1 Summary

The main objective of the research is to describe the practice of continuous professional development of secondary school teachers in Eastern Gojjam zone of Amhara Regional state.

More than 25% of secondary schools of the zone were selected as sample randomly. From these schools one hundred seven teachers were taken to give response through questionnaire. More over seven woreda educational officers, seven principals and one officer at zone level were purposefully chosen to give their opinions through interview about the on going CPD practice in secondary schools.

From the sample teachers taken, eighty five percent of them returned the questionnaires. From these 75.8% are males and 24.2% are females. Among these more than 70% of the teachers are above the age of 28 years old and 97.8% are first degree and diploma holders. Most, which are

82.4% of the teachers have at most eleven years teaching experience; from these teachers 53.8% of them have six up to eleven years experience. It discloses there were matured and energetic teachers in schools as compared to others.

The data were gathered, organized and analyzed using percentage. Based on the results of the data analysis the major findings of the study are presented as follows:

1. In relation to the training need assessment more than 69 % of teachers said that teachers, woreda & Zone education officers did not take part in identifying the training needs of CPD general secondary schools.
2. Besides that the great majority which is 91.2% of teachers rated their awareness about the objectives & activities of CPD was inadequate.
3. Regarding the involvement of teachers in the planning of CPD; 79.1% teachers rated their involvement was low.
4. In the case support system, significant number of respondents replied that experienced and well trained mentors in schools were few in number. Even in some schools such type of teachers were not completely available.
5. Regarding time availability, almost all respondents asserted that teachers were usually involved in CPD training when they were free from their regular duty.
6. Resource support was not significantly provided for teachers who were taking CPD courses. Only schools supported teachers with stationary materials. Occasional technical support in a form of supervision and monitoring was given by Woreda Education Office and Zone Education Department. According to the responses collected from school principals and educational experts, Regional Education Bureau has been contributed in training mentors about CPD. The remaining stake holders (NGO, private institutions and parents) had not taken their share.
7. Concerning CPD training modes of delivery, 76.9% and 82.4% of teachers said that action research and discussion are highly used as modes of delivery respectively. Others such as conference, case study, consultation, work shop and experience sharing through supervision, seminar, and coaching were not exercised in the training.
8. In the case of practical contributions of CPD for teachers, 83.1% and 769% of teachers leveled that innovative professional skills and solving problems cooperatively were at the lower level respectively. The rest, such as continuous assessment, active learning methods, class room management techniques, solving professional problems using action research, skills of experience sharing with colleagues, and participation in group discussion are leveled as above average by more than 61.6% of teachers.
9. The responses of sample respondents indicated those teachers themselves 68.1% and principals 53.8 % have contributed a lot in monitoring and evaluating the practice of CPD training. Next to these, Woreda Education office 44 % and department heads at school level 41.8 % were participated significantly. Monitoring and evaluation was carried out

during occasional visits and written reports which mostly conducted at the end of the CPD training courses. The common instruments used for collecting information was through document analysis 61.6% which was already recorded in the CPD trainees portfolio ,staff meeting and reports submitted.

10. The main problems observed in implementing CPD training program include; Absence of training needs assessment; non- participatory of the key educational stake holders including teachers; lack of monitoring and evaluation system; lack of awareness and commitment.

5.2 Conclusion

CPD courses were developed without adequate communication and participation of the major stake-holders, especially teachers and other educational personnel. This could result negative effect on the implementation and sustainability of CPD. Even though, there had been an effort to train small number of school mentors and educational experts, the trained mentors and experienced teachers on CPD had not been systematically identified and motivated. Most of the time the CPD training programs were arranged when teachers were free of their regular teaching program and was not formally scheduled. This resulted inconsistency of training activities. Furthermore, except stationary materials from schools and occasional supervision by Woreda Education Office and Zone Education Department, support from different educational stake holders for CPD training was almost none.

It is also possible to conclude that relatively action research and collegial discussion were the dominant modes of CPD used. However, action research results were not effectively used for improvement teaching –learning process. Modes such as conference, case study, consultation, work shop and experience sharing through supervision, seminar, and coaching were the most forgotten and neglected once. This has brought negative influence on effectiveness of CPD training.

Most teachers have developed their ability of sharing ideas and participation in group discussion with colleagues. In addition, teachers are relatively in a better position to exercise active learning, continuous assessment and classroom management. But the on going CPD didn't bring

significant improvement on teachers ability to solve problems cooperatively and their usage of innovative professional skills for effective teaching.

In sum, continuous Professional Development Program has been hampered by the absence of systematized training needs assessment; inadequacy of resources and lack of attention; motivation, monitoring and evaluation mechanisms.

5.3 Implication of the Findings

The above evidences indicate the following implications which are expected on the practice of Continuous Professional Development:The need to analyze the training needs of CPD. It is very important to provide an opportunity for teachers to be involved directly in professional training needs assessment. This is because teachers may give an information about the contents to be included, the structure of teachers who are engaged in CPD training and others. So, it is possible to invite teachers to design the course individually and collaboratively. This has a greater positive impact in increasing the commitment of participants and the achievement of course objectives.

The need to strengthen the network between ministry of education , university, Regional Education Bureau, Zone Education Department ,Woreda Education Offices and Schools. In the TESO document the role of each stake holders has been already stated but in practice it is observed that each educational stakeholder push the responsibility to others and lack feeling of ownership. Therefore, multi directional communication is essential to maintain the consistency of the training program and improve leadership support.

The need to take Continuous Professional Development as teachers major task. The key responsible person for the training is the teacher. Other stake holders may participate mainly in facilitating in a form of supervising and providing resources. So, empowering teachers by giving chance to plan their activities, and evaluate their performance and finally developing close follow-up system is very important. Teachers should be also motivated.

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Impact of the EHEECEE on CLT: An Exploration into Evidence of Washback on Teachers' Practices at Two Preparatory Schools in East Gojjam

Simachew Gashaye

Department of English Language, Debre Markos University; Email: simenen2009@gmail.com

Abstract

The recurrent use of tests in educational system influences its processes and products as tests do have strong power of determining the 'what' and 'how' aspects of the teaching and learning practices (Madous, 1988; Alderson and Wall, 1993). This study was intended to examine the impact of the Ethiopian Higher Education Entrance Certificate English Examination (EHEECEE) on implementation of Communicative Language Teaching (CLT) appoach in six aspects of teaching: time budgeting, teaching methodology, contents of teaching, lesson preparation, material choice, and classroom assessment. Participants of the study were English language teachers of two preparatory schools. Classroom observation, field notes and interview were employed to collect data. For the classroom observation, the validated Communicative Orientation Language Teaching (COLT) observation scheme was utilized. The COLT data were analyzed with mean percentage while the responses of the field notes and the interview were analyzed with a systematic note-based content summary (Krueger, 2002). The findings of the classroom observation revealed that the teaching methodology, the contents of teaching, the lesson preparation, and time budgeting were affected as they were geared to test preparation. Similarly, the findings of the interview disclosed that teachers' material choice and their classroom assessment were influenced by the EHEECE. Therefore, the exam was found to affect the implementation of the CLT in that teachers' practice was deviated from practicing CLT to preparing students for the exam. Hence, the EHEECEE yielded negative wash back on the implementation of CLT.

1. Introduction

1.1. Background of Study

Evaluating the processes and outcomes of education at different levels of the system has long been employed as education by its very nature is a complex, sensitive, and core sector for a country. The evaluation is made to obtain dependable and quantifiable data about the suitability of the designed curriculum, the suitability of the instructional materials, and the effectiveness of the employed teaching method. Along with this, the performance and achievement of students and the efficiency of teachers are assessed. Unlike the personal guessing, the results of assessments are used to make different decisions by the concerned bodies (Mehrense, 1984; Taiwo, 1998).

In order to make the assessments on the educational processes and outcomes, tests are the most commonly used tools in the educational settings. In this regard, Cheng and Curtis (2004:6) state the perpetuating role of tests in the educational settings in a way that "... it is clear that tests and assessments are continuing to play a crucial and critical role in education into the new millennium." Even though tests have an indispensable role in the education sector, they are persistently criticized for their impact on the teaching and learning processes.

The effect of tests on the teaching and learning process is commonly referred to as washback (Alderson and Wall, 1993; Cheng et al, 2004; Ghorbani, 2008; Shih, 2009). The washback of the tests influences the different aspects of language teaching and learning practices. Researchers have identified some domains of teaching that are influenced by the washback of the tests. They are lesson preparation/syllabus design, time arrangement, the contents of teaching, teaching method, material choice, and classroom assessment (Shih, 2009; Spratt, 2005). Washback, as literature indicates, is a complex educational phenomenon, and it has got different dimensions. Writers over times have identified different dimensions of washback. Some of the dimensions that different writers use to describe washback are: value or direction, scope or level, visibility, and degree or strength. In terms of value, washback has got negative and positive features; in terms of scope, there is micro and macro-level washback; regarding strength, washback constitutes weak and strong washback, and on the basis of visibility, washback is described as overt and covert (Andrews, 1994a; Watanabe, 1996b; Manjarres, 2005).

However, previously, the impact of tests was not noticed as a distinct phenomenon in language education though the impact of tests has been continued in the teaching and learning processes for a long time with the existence of tests. It is lately that Alderson (1986) has identified test impact as a predominant phenomenon in the realm of language testing which demands researchers to turn their attention to the area.

The phenomenon, washback of tests, originates from the power that tests possess on the stakeholders, mainly on the teachers and students, as researchers in applied linguistics have pinpointed (Shohamy, 1992). Researchers in applied linguistics have described the great power

of tests in affecting the implementation of the designed curriculum and obtaining the desired learning outcome. Spolsky (1981: V), for instance, in his memorable quote describes the power of tests: "Tests should be labeled just like dangerous drugs. Use with care!" This implies the need to wisely use tests; otherwise, they could have dangerous effects on the teaching and learning process. Madaus (1988:83) , in his part , argues about the power of tests saying:"It is testing, not the 'official' stated curriculum, that is increasingly determining what is taught, how it is taught, what is learned, and how it is learned." This still emphasizes the overriding power of tests in the implementation of a certain curriculum.

Apparently, researchers in language testing are extending their focus from investigating validity and reliability of tests to examining the impact that tests have on the teaching learning process. In this regard, Ghorbani (2008:61) discusses the current tendency in language testing research that "Traditionally, language testing researchers have focused their attention on inherent issues in tests. But recently some researchers have turned to the empirical investigation of the washback phenomenon which is not limited to the test itself." As a result, studying the impact of tests has become a global concern for researchers in applied linguistics. Alderson (2004: ix) substantiates the idea in a way, "Washback and the impact of tests more generally has become a major area of study within educational research, and language testing in particular..."

Regardless of the global demand of investigating the impact of tests, researchers invariably argue that there is lack of empirical studies in the area. There is clear demand to examine the impact of tests on the curriculum under implementation. Wall (1997) in light of this, contends that even though interest and awareness to washback effect is increasing among researchers in the field, there is still lack of studies in the area. Hence, the presentstudy examines the impact of tests on the implementation of CLT, particularly the practices of teachers at preparatory schools.

1.2. Statement of the Problem

English language has been taught in Ethiopia since the advent of modern education to the country (Dejene, 1990). It has been used as a medium of instruction and a language for diplomatic relations after 1935. Currently, in addition to its function as a medium of instruction

in secondary and tertiary levels, the language is used as a working language in some governmental and in most non-governmental organizations in the country (Mekasha, 2005; Alemu, 2004; Teshome, 1995). Considering this indispensability of English language, greater emphasis has been given to the teaching and learning of the English language.

Regarding the methodology of English language teaching in Ethiopia, formerly the focus was mainly teaching the form of the language in an explicit manner (Surafel, 2002). In the early 1970s, after CLT has been introduced globally, the Ethiopian Ministry of Education has changed the English language curriculum, from structural syllabus to communicative one. Along with this shift to this language teaching approach, textbook preparations and teacher training programmes have also been made to be communicative (Tylor, 1998).

Regardless of the different efforts that have been undertaken to develop the communicative ability of the learners through CLT, the poor English language proficiency of the learners is getting regularly complained. Teshome (2003) contends that their English language ability is getting poorer and poorer. Besides, Alemu (2004: VI), reporting his study of evaluating the ELT practice in the Ethiopian secondary schools, points out that "The students' language has shown no improvement after the exposure to the new textbook."

Different factors could be attributed to the less success of CLT to take root and to the poor English language proficiency of the students. However, I feel that the impact of the English language tests could be one of the major causes that lead to the poor English language communicative skills of the students and to the less success of the CLT implementation. The impact of the tests on the English language education seems to receive less attention as far as my knowledge is concerned. In this regard, Prodromou (1995:13) comments that "Professional neglect of the washback effect is one of the main reasons why new methods often fail to take root in language classes."

Two local studies, conducted by Dereje (2000) and Melkamu (2007), on the washback the national examinations in the English language practices, are worth mentioning. However, the researchers were likely to focus on evaluating the inherent nature of the tests, mainly on the

content validity, instead of their impact on the teaching and learning practices. These days, as Ghorbani (2008) has noted, researchers have tended to examine the impact that tests produce on the classroom practices instead of sticking to the validity of tests. In these local studies, the influences of the washback of the exams on the different aspects of the classroom practices seem to be addressed very slightly.

Thus, the present study focuses on the impact of the tests, not on their inherent nature, on the practices of teachers in their EFL classrooms. It also examines how the tests affect the practices of teachers, and the areas of the English language teaching aspects that are influenced by the wash back of the tests. To explore the nature of wash back of the EFL tests on the English language education in Ethiopia, the Ethiopian Higher Education Entrance Certificate (EHEEC) English Language Examination was felt to be more appropriate to be examined as this public examination is a high-stakes test.

This study, thus, sought to answer the following basic research questions.

- How does the EHEECEE affect the practices of teachers?
- What aspects of English language teaching are affected? Why?
- What feature does the wash back constitute?

1.3. Objectives of the Study

The purpose of this study is to examine the impact of the EHEECEE on the implementation of CLT with regard to teachers practice. It specifically tried to investigate:

- What the classroom practices of teachers looked like;
- The aspects of teaching that were affected by the exam, and how they were affected; and
- The form of washback that was observed in the EFL practices of teachers, if any.

1.4. Significance of the Study

Investigating the impact of English language tests on curricular implementation is crucial which otherwise leads to extra wastage of time, energy, and money for the unsuccessful teaching practices, as Alemu (2004) has argued. Hence, the results of this research may have valuable

contributions in the EFL education. Thus, it could provide feedback to the Ministry of Education about the implementation of CLT. Moreover, it may lead to further research on the area test impact as it is under researched.

1.5. Scope of the Study

This study was delimited to examining the impact of the EHEECEE on the implementation of the syllabi specifically from the perspectives of teachers' practice.

2. Methodology

Regarding the research site, it was conducted at two government preparatory schools in East Gojjam Zone, Amhara Regional State. Namely, the schools were Ginbot 20 (located at Lumame Town) and Gojjam Ber (situated at Dejen Town) preparatory schools. These schools were selected for three reasons. One, they are geographically closer to each other. Second, they were accessibility to the researcher, and thirdly, these preparatory schools were established lately so that they are similar in many respects. The participants of the study were English language teachers as they are the main stake-holders that centrally involve in the English language teaching. Hence, Grades 11 and 12 English language teachers from these preparatory schools were subjects of the study. The number of teachers in both preparatory schools was eight, four in each school.

This study followed the mixed methods research procedure (Dornyei, 2007 and Creswell, 2009). Both quantitative and qualitative data were used. To investigate the impact of the national examination on the curriculum implementation, learning what the EFL practices of teachers in the actual teaching environment and assessing their beliefs why they were practicing in the way they were observed were the basic data collecting means. Classroom observation was employed to examine the areas of the English language teaching aspects that were influenced by the exam and to understand the prevailing features of the test impact (Wall and Alderson, 1993; Bailey, 1999). Besides, interview was employed to elicit data about the

types of activities they give more emphasis in their preparing lessons, teaching and testing, and the types of materials they used.

While conducting the classroom observation, structured coding sheet or observational schedule was used. The structured coding observational scheme pertinent to this study was the Communication Oriented Language Teaching (COLT), mainly Part A, as Hayes (2003), Burrows (1998) and Watanabe (1996b) recommend. In addition, field note was used to record different activities of teachers that were not recorded through the COLT.

For the observation, three teachers (one from Grade 11 and two from Grade 12) were selected from Ginbot 20 preparatory school with their consent. Each teacher was observed six times. Totally, 18 classroom observations were made. The data collection was done in December 2010G.C/2003 E.C.

After the observation was completed, interview with teachers was conducted with six teachers (three from each school). Four were from Grade 12 and two of the teachers were from Grade 11. All of them had a BA degree and their teaching experience in preparatory schools ranged from two to six years. To help the participants communicate their opinions freely and comfortably and to obtain the required data, the interview was conducted through Amharic Language. All the interviews were audio-recorded.

The data were organized and analysed both qualitatively and quantitatively.The classroom observation data that were obtained using the COLT coding scheme were analysed with mean percentage. The responses of teachers to the interview were transcribed into note-based content summaries. Similarly, the field notes were put in note-based content summaries. The note-based content summaries were analysed qualitatively (Dornei, 2007; Krueger, 2002).

3. Results and Discussions

A. Findings of Classroom Observation

The analysis of the classroom observation with COLT Part A was discussed as follows. For the sake of discussion, the classrooms where Teacher A, Teacher B, and Teacher C were observed were labeled as Class A, Class B and Class C, respectively. The discussion was made in line with the categories of COLT Part A: participant organization, content and topic control, student modality, and type and purposes of materials. The findings of observations in the three sections were presented consecutively. Classes A and B were Grade 12 and Class C was Grade 11.

Participant Organization: The form of interactions among the participants constitutes different features in the observed classes.

Table 4.1: Comparison of participant organizations in the three Classes

Participant Organization	Teacher A	Teacher B	Teacher C
T⊂⊃S/C	65%	78.33%	75.83
S ⊂⊃ S/C	9.67%	9.67%	2.5
Choral	1.67%	2.58%	8.83
Group	22.5%	5%	2.5
Individual	1.25%	4.17%	10.5
Total	100%	100%	100%

Source: own survey 2010

Note: T stands for teacher; S stands for students, and C stands for class

Across the observed classes, the dominant form of participant organization was teacher to student/class (T⊂⊃S/C) interaction. As the data in Table 4.1 above displays, of the total class times in the three classes observed, teacher to student/class interaction constituted a mean percentage of 65%, 78.33% and 75.83%, respectively. A considerable amount of time was taken by teachers during the classroom instructions. This contradicts with the principles of CLT where the majority of the class time is devoted to students' practices (Richards, 2006).

Content: In this category of COLT, the subject matters of the classroom activities were described. The time spent for management procedures, explicit language foci, and other topics (including limited and broad topics) were determined with this parameter.

Table 4.2: Summary comparison of contents observed in sections A, B & C

Content	Teacher A	Teacher B	Teacher C
Procedure %	12.66	6.25	7.08
Form-vocabulary only %	27.5	2.08	23.33
Pronunciation	0	0	0
Form-grammar only %	26	37.91	43.75
Form-spelling only %	0	0	0
Function only %	13.75	17.91	9.16
Discourse only %	10.83	27.08	8.33
Sociolinguistics only%	8.33	8.75	4.16
Form-vocabulary and Discourse %	0	0	0
Form-vocabulary and form-grammar %	0	0	4.16
Narrow %	0	0	0
Broad %	2.91	0	0
Total %	100 %	100 %	100 %

Source: own survey2010

As the mean percentage of the total observed time for the different categories and subcategories of the parameter content is indicated in Table 4.2, more time was allotted to teaching forms of the language. Top priority was given to form- grammar. Following grammar, form-vocabulary received more attention. These two forms were considered to be the primary concerns of teaching. In contrast to this, contents such as pronunciation, form-spelling, form-vocabulary and discourse and others were observed neglected in the classroom instructions. In CLT, the focus of teaching is on developing the communicative competence of the learners' where all the linguistics, sociolinguistics, discourse and strategic competences are developed (Richards, 2006). However, in these classes the focuses were mainly on linguistics competence (teaching grammar, mechanics and vocabulary). During grammar lessons, teachers were giving detailed notes taken from other books in an explicit manner. Regarding topic control, in all observations, it was the teacher who was controlling the choice of the topics.

Student Modality: The length of time the students spent in listening, reading, speaking, writing or the combinations of these skills was calculated to determine the dominant feature of student modality.

Table4.3: Summary comparison of student modality

Student modality	Teacher A	Teacher B	Teacher C
Listening only %	54.16	73.75	60.83
Speaking only %	2.91	0	4.16
Reading only %	0.41	0	10
Writing only %	0	2.91	0
L+S %	27.08	5.41	13.75
L+R %	5.41	0	0
R+W %	7.5	17.91	8.75
S+R %	2.5	0	2.5
L+S+W %	0	0	0
L+S+W %	0	0	0
Total %	99.97	99.98	100

Source: own survey2010

L stands for speaking.; S stands for speaking.; R stands for reading; W stands for writing, and others are combination of the skills

As indicated in Table 4.3, the dominant form of student modality was listening. In more than half percent of the class times, the students were listening to the explanations given by the teachers, and they were giving answers to the questions being practiced in the classroom. As opposed to this, the other categories of student modalities, including mean percentages of writing only, and the combinations of the skills in most cases indicated a null or negligible proportion. This contradicts with the essences of CLT in which students are expected to develop both the productive and receptive skills (Richards, 2006).Teachers were observed practising students with exam-related activities such as grammar, dialogue completion, guessing meanings of underlined words, arranging jumbled words into sentences and ordering jumbled sentences into paragraph with exam fashion.

Types and Purposes Materials: All the time, the types of materials used in the classroom instruction were in text form. No lesson was delivered with audio and audio-visual materials. Even, the text forms of materials were not presented in an extended manner such as stories, dialogues, and connected paragraphs; mostly, the minimal forms of texts were used. The purposes of the materials used for teaching and learning were pedagogical, textbooks and exam-related commercially - published books.

The finding of the COLT data analysis revealed that classroom practices were not designed to promote students communicative skills. The classes were teacher-dominated as the analysis of participant organization indicates; the focus area of teaching was mainly on form related aspects of the language as the content analysis indicates, and the students were listening most of the time as the student modality analysis reveal.

B. **Findings of Interviews**

The interview with teachers had six main questions and extended sub-questions under each question (See Appendix 3).The responses to these questions were analysed under five main areas: time arrangement, methodology, material use, focus of classroom activities, and external pressure.

Regarding the time budgeting to treat the different skills, it was reported that teachers gave more time to the language areas that mostly appear in the EHEECEE. All of the respondents invariably reported that they were devoting more time on teaching grammar. They stated that many questions were included in the exam from grammar. Next to grammar, speaking received more attention, as three of the respondents noted. However, as the data obtained from classroom observation reveals, what teachers claimed about their teaching of speaking was not actual speaking practice. What the teachers practised while teaching students speaking was completing dialogues and conversations in written form. The other skills received much less attention, specially listening was not taught, as all of the respondents noted. For the excluding of listening skills in their teaching, they attributed to the lack of instructional materials to teach the skill, and its exclusion from the entrance exam. The main reason for giving less emphasis, and even excluding of the skills from the teaching seemed their under-representations in the entrance exam. This finding agrees with what Alderson and Hamp-Lyons (1996) and Shohamy et al. (1996) found out that teachers devote more time for exam preparation classes.

With regard to the implementation of the communicative language teaching (CLT), almost all of the participants responded that they were not satisfactorily employing CLT in the teaching. They complained that their students were not interested to practice communicative activities. They

complained that the students' background experience affected them to implement CLT. As they claimed, at lower grades, the students used to learn and practice grammar and other form related activities instead of practicing skills like speaking and writing. This is accordance with what Alderson and Wall (1993) state that tests affect how teachers teach.

Regarding material choice, all the respondents consistently reported that they were using materials other than the textbook. All of them complained that their textbooks were not satisfactory in giving notes and exercises that prepare the students for the EHEECEE. This tends to agree what Watanabe (1996) states that exam affects material choice as teachers prefer to use exam related materials instead of the prescribed textbooks.

As the interviewees, except one teacher, noted that they were arranging tutorial classes. In the tutorial classes, they were presenting notes and exercises from the commercially published books. As they noted, they had freedom of time to give notes and exercises from such books in the tutorial classes. The students, as the teachers reported, were attending those classes anxiously due to the fact that exam related activities were practiced.

As most of the respondents mentioned, their classroom assessments were similar with their teaching. They were focusing on examining skills that could mostly appear in the EHEECEE. They reported that they were interested more in familiarizing the students with the entrance exam. Grammar was highly emphasized in their assessments. Next to grammar, reading received more attention in the tests. Though not in the actual practice form, speaking was included in the tests in the form of dialogue completion through writing. The other skills were less emphasized in their classroom assessments. As they reported, like in the teaching, listening skills was ignored in the tests. In light of this, Shohamy ea al. (1996) found out that teacher were assessing students in away external tests were prepared so as to familiarize the students with those tests.

All of the interviewees agreed that their students exerted pressure on their teaching to gear their instructions to the exam. Moreover, they feel pressure from colleagues and supervisors to gear their instruction to exam. The strongest pressure as the respondents reflected emanated from the students. This pressure seemed to urge the teachers to gear their teaching

to the test instead of achieving what the curriculum required them to do. In this regard, Shih (2007) and Ghorbani (2008) note that different parties put pressure indirectly on teachers to make their practice exam oriented.

Summary

This study was conducted to examine the impact of the EHEECEE on the implementation of CLT curriculum. The study was conducted on preparatory school teachers. Qualitative and quantitative data were collected with classroom observation and interview. The data collected through both classroom observations and interview with teachers revealed that the EHEECEE affected the practices of teachers. The classroom instructions were teacher-dominated as opposed to learner centered in CLT; the contents of teaching were mainly form- related activities such as grammar, vocabulary, and dialogue and conversation completion; students were mainly kept to be passive as they spent most of the instruction time on listening and reading activities; teachers used supplementary materials that were used to prepare students for the exam, EHEECEE instead of using the prescribed textbooks that were prepared communicatively; classroom tests were geared to the contents and formats of the EHEECEE instead of assessing the communicative skills of the learners to promote CLT, and the time arrangement was mainly devoted to practicing exam-related activities (sub-skills and knowledge aspects of the language) instead of promoting main skills.

Conclusion

The EHEECEE affected the implementation of CLT in that the focus of teachers' practice was mainly developing the students' language knowledge aspect for exam preparation instead of developing their communicative ability. Therefore, negative washback of the EHEECEE was observed in the practices of teachers.

Recommendations

In order to develop the communicative ability of the learners in language teaching, CLT has been employed globally. However, in this study it was learnt that the EHEECEE has deterred the implementation of CLT. So, it is desirable that:

- the Examination Agency should reform the EHEECEE in line with the principles of CLT in order to promote the development of students' communicative competence;
- researchers should further study the washback of the EHEECEE on the practices of teachers, students and other concerned stakeholders through including survey and document analysis techniques that were not used in this study, and
- the Ministry of Education should harmonize the practices of curriculum designers, textbook writers, exam producers and teachers so that there could be shared assumptions among them.

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Major issues and determinants of roommate conflict among Debre Markos University students: The case of 2010/2011 entries

Wohabie Birhan and Tesera Bitew

Debre Markos University College of social sciences and humanities Department of psychology

Abstract

The issue of roommate conflict is so sensitive that it could have a catastrophic effect and may go beyond the social relationship of students. Conflict is inevitable for roommates especially if there are heterogeneities among roommates in culture, ethnicity, personalities and religious beliefs. In order to resolve conflict among roommates, it is important to be aware of the issues and determinants that cause the conflict. This research was aimed at identifying the major issues and determinants of conflict, identify the strategies employed by roommates to resolve conflict and to check whether significant differences exist in the frequency and intensity of conflict as a function of age, sex, and educational level of roommates. The total regular students' population of the 2010/11 academic year in Debre Markos University was 5204. Out of this, data was collected from 206 students among which 165(80.1%) were males and 41(20%) were females randomly selected from all colleges and academic levels. The researchers reemployed mean, standard deviation, percentage and MANOVA to compare frequency and intensity of roommate conflict as a function of age, sex and level of education of roommates. The alpha level for the analysis was .05. The result of the analysis revealed that the major issues of roommate conflict among Debre Markos University students were refusal to discharge common responsibility, dispute over common resources, and disciplinary issues and there were significant differences ($F(1,204) = 6.663, p = .011$.) between males and females in respect to the intensity of conflict on discipline issue. A significant difference in the frequency of conflict was found among roommates as a function of age on using common resources ($F(3,220) = 4.611, p = .004$, eta=.25). Data analysis also revealed that frequency of conflict differed significantly among freshmen, junior and senior roommates on usage of common resources ($F(2,203) = 11.815$, $p = .000$); on the issue of discharging common responsibility $F(2,203) = 3.078, p = 048$ and on the use of roommates property without permission $F(2,203) = 3.868, p = .022$

ACRONYMS AND REFERENCES

- ANOVA: Analysis of Variance
- MANOVA: Multiple analysis of Variance
- M: Mean score of either frequency or intensity of roommate conflict
- Refusal: Refusal to Discharge common Responsibility, which is one of the issues of conflict

- Common: Usage of common resources of the university or dormitory, which is considered the second issue of conflict.
- Private: Usage of the private resources among the students, which is again the other issue of conflict
- Discipline: Disciplinary issues which are the causes of conflict
- Assault: Personal Attacks and backbites which are the fifth categories of issues of roommate conflict.
- Private Resource (Intensity): the intensity of conflict in relation to usage of private resources
- Common Resource (Intensity): the intensity of conflict in relation to usage of common resources
- Discipline (Intensity): the intensity of conflict in relation to disciplinary issues
- Refusal for Responsibility (Intensity): the intensity of conflict in relation to refusal to discharge common responsibility Assaults (Intensity): the intensity of conflict in relation to assaults (Personal attacks and back bi

1. Introduction

1.1 General Background of the Study

Most college students live with roommates. In fact, for many, it is their first time living with a roommate. The problem is that students may not know how to communicate problems to their roommates in an effective way or how to come up with a solution. According to Duran and Zakahi (1988), cited in Halpin(2009) poor relationships with roommates are responsible not only for dissatisfaction with school and lower GPA but also it is life threatening. If there is a problem between roommates and neither can work it out, they may start to feel desperate, trapped, and turn the matter into a life or death situation. For example, one student killed her roommate before committing suicide in Harvard (Halpin, 2009).

There are several issues that lead roommates into conflict. Research indicates that shortage of space is one of the causes of conflict among roommates in universities. For example, in Nigeria Okebukola (2004) cited in Egwunyenga (2009) found that in some rooms in the Federal and State Universities, 15 students share space meant for five. In some Universities, 24 students

stayed in one big room originally meant for 10 students. Thus rooms are often choked up with wears, buys and beguiles, resulting in less space for chairs and desks, making the rooms inadequate for personal study.

One important relationship, especially for freshmen, is the roommate relationship. Without a satisfying roommate relationship, students may experience loneliness and may try to alleviate that loneliness by leaving college (MCcorkle and Mason, 2009). Similarly, Duran and Zakahi (1988), cited in Halpin (2009) state that poor relationships with roommates are responsible for dissatisfaction with school and lower GPA. By studying conflicts that roommates have, we can start to provide solutions. That way, students will know how to express their displeasures and keep their grades from falling.

According to Egwunyenga (209), roommate conflict results in serious academic difficulties and failures at least for three reasons. The first reason is that today's learning focuses on inter-student cooperation where one can learn from another and can act in groups to attain educational objectives. It is a social product that could not be necessarily attained solely through individual activity. Thus, when students lack such cooperation among themselves and when they become in conflict, they may face academic failures. Secondly, roommate conflict may cause serious academic failure because conflict leads to fierce competition where one may destroy the others' utilization of potential and academic resources such as reference materials. Thirdly, conflict could cause serious academic problems since it affects the psychological stability of the students. As the roommate conflict increases, students' anxiety may increase beyond and may reduce utilization of their academic potential.

1.2. Issues, Determinants and Strategies of resolving Roommate conflict

The issues causing conflict on roommates are numerous. Conflicts between roommates are typically issues of specifics, such as how often to clean or how loud the radio should be (Little, 2004). Similarly, Michael (2003),mentions about six issues of conflict among roommates: possession of rooms by one of the roommates for his/her exclusive programs; the problem of

separating campus and private property, the neatness problem, having frequent parties in common dormitory and the problem of different tastes in shows, movies, and music.

Meanwhile, Clark (2006) found that the usual issues of conflict that roommates faced were cleanliness, disrespect, illegal activities and vandalism. Each conflict has its own issues and concerns, which makes each situation unique as well as challenging. Besides, others focus on visitation and guest, sleeping times such as lighting on, listening music, use of one's belongings, social time in room, room design and use of space as main issues of conflict among roommates. Egwunyenga(2009) has assessed the causes and various strategies for managing roommate conflicts in Universities in Nigeria taking a total of 1520 from private and governmental universities through structured questionnaire. The results showed that smoking cigarettes in the room, use of roommate's property, gossiping a fellow roommate, noise-making, cooking inside the room, unacceptable prayers, members of different cults with differing interests, are some of the likely causes of conflict among roommates. This writer has stated additional issues of conflict such as: squatting (occupying properties without legal rights) friends, having an affair with a roommate's lovers, refusal to clean the room, competition in the use of electrical appliances, and refusal to settle common bills.

Different scholars on the area indicate that some socio-demographic variables such as age, gender, and ethnicity are attributed to be determinants for roommate conflict. For example, Abramovitch (1997) cited in Halpin (2009) states that race (ethnicity) is a frequent cause of friction between roommates. Living with a person from another culture could be one of the hardest parts of sharing a living space with him/her and the main cause of conflict between roommates. Young college students may not be exposed to a lot of diversity until they get their first roommate in college.

Mean while, Benenson and his colleagues cited in Munger (2009) conducted a set of three studies to know if roommate conflict shows variations between males and females. Accordingly, they identified 30 male and 30 female undergraduates at a small, Northeastern U.S. college. The results indicated that the male students were significantly more likely to be satisfied with their roommates than female students, whether or not they had a conflict with their roommate. The

students also rated their roommates on social interaction, interests, values, and hygiene, and male students gave significantly higher ratings for their roommates than females for every category except hygiene.

In a second study, the researchers surveyed three separate institutions to see how frequently male and female students requested to change roommates. The results also indicated that whether the students were at a small, medium, or large college or university, females asked for significantly more roommate changes than males. Similarly, MCcorkle & Mason (2009) found that females reported more conflicts than males. In their study, they found that 32 % of females reported conflicts compared to 13% of males. In general, previous research findings indicate that females have more conflict than males with their roommates.Because the nature of the relationships and conflict issues are different, conflict resolution strategies are also likely to be different, but few researchers have examined these variables (Little, 2004). In relation to this, Brenner suggests that many residents make the mistake of assuming that their roommate should think, feel, or act the way they do. But a better idea recommended for roommates is to build an open communication process right from the beginning of the year and to perceive roommates as having their own thought, feeling and action. Therefore, he pointed out the following guidelines that could help roommates have a more comfortable coexistence.

- Individuals should not consider their roommate as a best friend beyond respecting each other,
- Roommates should take some time to get to know each other without passing judgments,
- Roommates should have a written agreement concerning about interest , visitation and guests, bathroom schedule, cleaning of the room, Study times in room, Sleep time(s), Use of Personal things ,Social time in room, Room design and use of space, etc

Similarly Egwunyenga recommended the following strategies for healthy roommate relationship: encouraging communication among conflicting roommates, bringing together roommates to solve problems and using diplomacy to suppress conflicts.

Gojko(2009), states that having roommates is not all that different from living with family, or even being married. He has listed five basic strategies for conflict resolution: accommodation, avoidance, compromise, competition, or collaboration. Accommodation is a great way to resolve roommate conflict if preserving a relationship is more important than the issue at hand. This is a good strategy in a situation where perhaps an issue has been blown out of hand. Perhaps the issue causing conflict has no one correct answer. It is good to sit down and discuss the issue. Maybe roommates can come up with a solution that takes into account what the partners want. This is often difficult to achieve, but if it works, then that is great.

Of all the methods of conflict resolution, the one most fitting in most situations is to compromise with roommates. Usually the bigger picture is more important than the smaller issue of the argument, and roommates will find that if they work together, they not only preserve their relationship, but they resolve the issue. The best way to deal with a messy roommate is to avoid getting one in the first place (Aaptsherpa, 2006).

Another last option to resolve roommate conflict is removing a bad roommate. This is a serious problem. But, many authors recommend that universities should encourage regular meetings, perhaps monthly, to bring up mutual issues with open communication to prevent conflict. Each roommate should take a turn describing his or her perception of the situation, how he/she feels about it and what he/she would like.

Training also determines the type of strategies used in resolving conflict. For example, studies by Johnson and Johnson (1996) cited in Little, (2004) as part of their research about the "Teaching Students to be Peacemakers" conflict resolution program, showed that inner-city students who were untrained in any type of peer mediation or conflict resolution skills invariably utilized a competitive approach that was often physical.

1.3. Statement of the Problem

The transition to college and the university roommate- matching process is a situation potentially rife with difficulty and stressors. The student roommate relationship is a unique one in that a high level of contact with a relatively unfamiliar person occurs in small, closed quarters. College

students are often away from home and established support systems such as family and friends for the first time. They are learning to manage increased academic demands, time pressures, and newly experienced personal independence in unfamiliar environs, creating an atmosphere of stress and instability (Degirmencioglu, Urberg, Tolson, & Richard, (1998) cited in Little,(2004). They found that less stability in a relationship is more likely to result in conflict, thus suggesting that roommate relationships are likely to be challenging for many late adolescents.

Roommate conflict has been found to be linked with increased psychological distresses like anxiety and demoralization among university students (Lepore, 1992). Little research has been conducted to examine gender differences in roommate conflict and the previous research findings report controversies. For example, Lepore's (1992) study of roommate conflict revealed females to have lower levels of conflict with roommates than males. To the contrary, MCcorkle &.Mason (2009) found that females reported more conflicts than males.

In addition to the controversies, previous studies conducted on the area were not comprehensive in the sense that they did not include all the demographic variables associated with conflict. For example, Halpin(2009) conducted a research on roommate conflict, but did not include all demographic variables in his research.Being one of the Federal Universities, Debre Markos University admits students having different backgrounds, religious beliefs, culture, values, language, etc. and these variations roommate conflict is inevitable. When such conflict remains unresolved, it will gradually escalate to other major challenges in the life of students and in the security system of the university.

Another reason for the inevitability of conflict is that, being one of the new universities, Debre Markos University has shortage of resources and hence there is a high competition to utilize scarce resources such as computers, cafeteria, bathrooms, shelves, reference materials, and so on. The third reason is that students often come from differing home environments and bring with them varying expectations regarding what their living environment should be like.

Furthermore, the unavailability of local studies conducted on the roommate conflict has made the problem difficult to search sound solutions. The studies conducted on this area in Africa and

America were scarce (Halpin, 2009) and controversial in their findings. Besides the insufficiency, these research works were limited to revealing the prevalence only, and did not indicate the incidences and intensities, and particular issues over which roommates disagree at. Another reason for conducting this research is that because previous studies were not comprehensive in the sense that they did not include all the demographic variables associated with conflict. In order to have a logical flow of ideas in the research, the whole research process was guided by the following basic questions raised at the beginning of the research.

1. What are the major issues of conflict among roommates of DMU students?
2. What are the Determinants of conflict among roommates?
3. What strategies are employed by roommates to resolve these conflicts?
4. Are there significant mean differences of frequency and intensity of conflict as a function of age, sex, and level of education?

1.4. Research Objectives

Generally, this research is our attempt to find the issues of roommate conflict and its causes as well as the strategies to resolve conflict. Specifically, the research was aimed to:

1. Find out the major issues of conflict among roommates of DMU students.
2. Find out the determinants of conflict among the university roommates
3. Explore the strategies being employed by roommates to resolve these conflicts.
4. To verity whether there is significant difference in frequency and intensity of conflict as a function of age, sex and level of education.

1.5. Significance of the Study

Conflict resolution between roommates is a significant concern for university housing officials, as satisfaction with roommate relationships in college residence is associated with perceived quality of the college experience, student academic performance, and better psychological adjustment (Lovejoy, Perkins, & Collins, (1995) cited in Little (2004). As a result, the output of this study can help a lot to administer the student population in the university and to reduce the

resulting revolts. By reducing students' complains it promotes service satisfaction of the students in the university stay and maintains positive relationship among roommates. Furthermore, the results of the study could serve as a good source of information to aware the university administration about conflict issues and determinants among roommates. Finally, it could also be a source of information for further researchers who want to explore more on the area.

1.6. Scope of the Study

The research includes all regular Debre Markos University students of 2003E.C (2010/2011) academic year. The topical focus of the research was on conflict issues of roommates and strategies of resolving them. The study is delimited only to regular students who live in the campus.

1.7. Limitation of the Study

One limitation of this study is that data regarding roommate conflict were collected only from students due to shortage of time by researchers. The study would have been better if additional data had been collected from student affairs and dormitory administrators too. Another limitation of this study is that Participants were characterized by a limited range of ethnic and religious diversities due to the fact that almost all of the participants belong to one ethnic group and one religion and hence ethnicity and religion were left out in the analysis.

1.8. Operational Definition of Terms

Roommate Conflict: in this context is defined as disagreement between students living in the same dormitory.

Issues of Conflict: It refers to using roommate's property without permission; common resources; discharging common responsibilities; discipline, and personal attack and backbites.

Determinants of conflict: in this context, refers to the demographic factors such as age, sex, and level of education.

Strategies of resolving conflict: It refers to negotiation, mediation, compromising, collaboration, and other strategies used by roommates.

2. Research Methods

2.1. Overview of Research Design

This survey research was designed to identify the major issues and determinants of conflict among roommates. The study is primarily a non-experimental quantitative design focusing on identifying if there are significant difference in the frequency and intensity of conflict among student roommates as a function of variations in certain demographic variables.

2.2. Participants

Participants for the study were taken from Debre Markos University regular students. The population size of students was 5204 and includes freshmen, junior and senior regular students of the 2010/2011 academic year in all colleges/faculties. Out of the total population, 206 students (165 male and 41 female) were taken from all colleges and academic levels as a sample for the study. The samples were randomly selected from each of the colleges and academic levels using proportionate stratified random sampling.

2.3. Procedures of Data Collection

Once the total population was known, the samples were selected based on their sitting arrangements in their respective classrooms for the study. Then the questionnaire was administered to these samples by instructors from the Department of Psychology in Debre Markos University. Orientation was also given to these instructors about how it is to be completed by the participants.

2.4. Instruments

A questionnaire with 34 items including the socio-demographic variables (23 of which were 5 point Likert scales ranging from 5=most of the time to 1=Never to measure frequency and "5"="Extremely angry" to "1"="Feel nothing at all" for intensity of conflict) were used. Accordingly, higher scales indicated high frequency and intensity of conflict and vice-versa. Items for the questionnaire were developed by researchers based on literature review. Particularly the issues or contents of conflict that were relevant to Ethiopian context were taken from a research conducted on Nigerian Universities by Egunyenga(2009).

In addition to the close ended items, some open ended ones were added by the researchers to enable participants mention issues of conflict other than the ones mentioned in the close ended items. The questionnaire consisted of four parts. The first part was about background information of the participants such as sex, age, field of study, academic level, ethnic group religion, and family income.

The second part consisted of different strategies of resolving conflict used by the students when conflict arises. The third part of the questionnaire contained five broad categories of issues (Making use of roommate properties without permission., Room Discipline, sharing common properties discharging common responsibility, and Personal attacks and backbites) , each of which having several specific items related to the heading issues.

Regarding how participants responded to the items, this was how it was done. First, participants were provided with different issues of conflict and if they had conflict, they would rate how frequently they had conflict and how they felt during that moment by rating their response on the five point scale. Hence a participant was supposed to respond twice for the frequency and intensity of conflict for each issue on the five point scale. With regard to the return rate of the questionnaire, initially, the questionnaire was distributed to 220 participants but 14 questionnaires were discarded for they were incomplete. Hence questionnaires for 206 participants were entered in the data analysis.

To assess whether the five items that were grouped to measure the frequency and intensity of conflict, reliability test using Cronbach's alpha was conducted. The alpha for the five items that

measure frequency of conflict was .73, which indicates that the items form a scale that has reasonable internal consistency reliability. Similarly, the alpha for the intensity scale was .65 and this means that it has minimally adequate reliability.

2.5. Techniques of Data Analysis

Data obtained through questionnaire was coded and analyzed using both descriptive statistics such as mean, percentage, standard deviation and Multi Analysis of Variance (MANOVA). MANOVA was employed to see whether the mean differences were statistically significant or not as a function of the three demographic variables; that is, age, sex, and level of education.

The mean report and the MANOVA tables are presented for each of the significant comparisons. The mean report tables were intended to show the mean frequency and intensity of conflict on the major issues. The interpretation of the mean frequency of conflict is as follows: "1" for "conflict never occurs", "2"for "conflict occurs rarely", "3" for "conflict occurs once a month", "4" for "conflict occurs once a week" and "5" for "conflict occurs most of the time."

Similarly, the intensity of conflict was measured by the degree of feeling of anger students felt during conflict. It was rated "1" for "feel nothing at all"; "2" for "Slightly Angry"; "3" for "Angry"; "4" for "Very Angry" and "5" for "Extremely Angry".

3. Results

In this chapter the mean, percentage, standard deviations and MANOVA results of the frequency and intensity of conflict as a function of age, sex and level of education of roommates have been presented. This research was planned with the aim of answering the following basic questions:

1. What are the major issues of conflict among roommates of DMU students?
2. What are the Determinants of conflict among roommates?
3. What strategies are employed by roommates to resolve these conflicts?
4. Are there significant mean differences of frequency and intensity of conflict as a function of age, sex, and level of education?

Table 3.1 Demographic characteristics of participants

Demographic variable	Value label	N	%
Sex	Male	165	80.09
	Female	41	19.9
	Total	206	100
Age	19-21	32	15.53
	22-24(late adolescents)	82	40.3
	25-28(early adults)	69	33.5
	29 and above(middle adults)	23	11.2
	Total	206	100
Educational level	1st year	54	25.7
	2nd year	93	45.6
	3rd year	59	28.6
	4th year and above	-	-
	Total	206	100
Ethnicity	Amhara	182	90.3
	Oromo	6	1.9
	Tigre	9	4.4
	Others	9	3.4
	Total	206	100
College/faculty	Social Science and Humanities	45	21.29
	Natural and computational science	38	18.8
	Business and Economics	32	14.9
	School of Law	22	10.89
	Technology	26	12.9
	Agriculture	24	11.9
	Health Science	23	9.2
	Total	206	100
Religion	Orthodox	186	90.3
	Protestant	8	3.9
	Catholic	1	.5
	Muslim	9	4.4
	Others	1	.5
	Total	206	100

Source own survey, 2010

From the above table, one can understand that the majority of the participants (80.09%) were males and more than 90% of them were from Amhara ethnic group. Similarly, the majority of the participants (40.3%) were in the age range of 22-24. With regard to religious belief, most (90.3%) of the participants belong to Orthodox Christianity and in terms of family income, the majority of the participants (54.4%) come from low income families.

3.1. Analysis of Major Issues of Roommate Conflict

Analysis was made to identify the major issues of conflict among roommates. To do so, a mixed frequency table was prepared for five main categories of issues of conflict (Use of Private

Resources, Use of common Resources, Room Discipline, Refusal to Discharge Common Responsibility and Personal assaults as presented in below:

Table 3. 2. The Mean comparison of frequency and intensity of major issues of conflict

	Use of Private Resource	Conflict over Common property	Discipline Issues	Refusal to Discharge Common	Assault or Backbites
Mean frequency Standard	2.64 1.12	3.11 1.28	3.02 1.19	3.62 1.32	2.89 1.40
Mean Intensity Standard	2.25 .93	2.37 1.16	2.78 1.18	2.87 1.40	2.48 1.23
Average	2.445	2.74	2.90	3.245	2.685

Source own survey, 2010

As it is shown in table 3.2, out of the issues described in the questionnaire, the major issues of conflict were identified based on their mean scores of frequency and intensity of conflict. Hence the major issues of conflict among roommates were refusal to discharge common responsibility, conflict over common resources and disciplinary issues. Refusal to discharge common responsibility was found to be an issue that has the highest mean score of frequency and intensity of conflict (M=3.62 SD=1.32 and M= 2.87.SD=1.40 respectively). This implies that roommates disagreed more on carrying out common responsibilities such as cleaning the room. The Second major issue of conflict was 'Use of Common Properties' such as on who shall use a computer or shower first etc and its mean score of frequency of conflict is 3.11 and intensity of conflict is 2.37 .The third major issue of conflict was disciplinary issues and the mean frequency and intensity of conflict are (M=3.02, SD=1.19) and (M=2.78, SD=1.18) respectively. But, the mean score of frequency of conflict due to Personal Attacks and Backbites were relatively lower (M=2.89 for frequency and 2.48 for intensity of conflict).

3.2. Analysis of Determinants of Roommate Conflict

The demographic variables age, sex and level of education were taken as determinants (independent variables) for the frequency and intensity of conflict. Therefore analysis was made for each these variables as follows:

Table 3.3: Descriptive mean Frequency of conflict in relation to age of roommates

Dependent variable	Age	Mean	Std. Deviation	N
Frequency of conflict on common resources	19-21	3.0000	1.39044	31
	22-24	3.3855	1.19788	83
	25-28	3.0870	1.32553	69
	29 and above	2.3043	.97397	23
	Total	3.1068	1.28338	206
Frequency of conflict on discipline	19-21	3.1613	1.15749	31
	22-24	3.1807	1.23115	83
	25-28	2.9130	1.17247	69
	29 and above	2.5652	1.03687	23
	Total	3.0194	1.18922	206
Frequency of conflict on common responsibility	19-21	3.8065	1.32714	31
	22-24	3.6867	1.26807	83
	25-28	3.6232	1.34056	69
	29 and above	3.0870	1.41142	23
	Total	3.6165	1.32279	206

Source own survey, 2010

Descriptive mean frequency table indicates that mean frequency of conflict among roommates was greater for the first and second age groups (age groups of 19-21 and 22-24 years) for conflict issues such as room discipline,(M=3.163,SD=1.16 and M=3.18,SD=1.23) respectively. Meanwhile all four age groups scored high mean for the frequency of conflict on discharging common responsibilities (Mean ranging from=3.0887-3.8065). This implies that discharging common responsibility such as cleaning the room was a widespread problem among roommates of all age groups.

Table 3.4:MANOVA result for mean frequency and intensity of conflict among different age groups

Dependent variable *Frequency of conflict on:*	Type III sum of squares	df	Mean square	F	Sig.	eta
Using roommates property without permission	6.798	3	2.266	1.841	.141	.027
Discipline	8.309	3	2.770	1.987	.117	.029
Assault and backbite	13.003	3	4.334	2.272	.081	.033
Common resources	21.640	3	7.213*	4.611	.004	.25
Intensity of conflict on						
Using roommates property without permission	3.820	3	1.273	1.469	.224	.021
Discipline	1.867	3	.6222	.443	.723	.007
Assault and backbite	5.295	3	1.765	1.157	.327	.017
Common resources	4.917	3	1.639	1.220	.303	.018

Source own survey, 2010 *the mean difference is significant at .05 level.

The MANOVA result revealed that the four age groups differ significantly on the mean frequency of conflict on sharing common resources (F (3,220) =4.611,p=.004, eta=.25). But there was no significant mean difference on the intensity of conflict across different issues. Meanwhile, Post hoc test indicated that the mean difference existed between those who were within the age range of 22-24 and those roommates who were in the age range of 36 and above.

Table.3.5.Descriptive Mean frequency of conflict on different issues in relation to sex

Frequency of conflict on:	Sex	Mean	Std. Deviation	N
Using roommate's property without Permission	Male	2.6265	1.14639	166
	Female	2.7000	.99228	40
	Total	2.6408	1.11622	206
Using common resources	Male	3.1024	1.28218	166
	Female	3.1250	1.30458	40
	Total	3.1068	1.28338	206
Discipline	Male	3.0723	1.16809	166
	Female	2.8000	1.26491	40
	Total	3.0194	1.18922	206
Discharging common responsibility	Male	3.6024	1.32519	166
	Female	3.6750	1.32795	40
	Total	3.6165	1.32279	206
Assault(personal attack and backbite)	Male	2.8795	1.36091	166
	Female	2.9250	1.54235	40
	Total	2.8883	1.39412	206

Source own survey, 2010

Analysis was also made on the frequency and intensity of conflict by taking sex as a determinant. Descriptive mean intensity of conflict over disciplinary issues for males and females were found to be M=3.6, SD=1.3 and M=2.8, SD=1.3 respectively. This difference was also found to be statistically significant F (1,204) =6.663,p=.011.

Table: 3.6 ANOVA test for intensity of conflict as a function of sex difference

Source	Dependent variable	Type III sum of squares	df	Mean square	F	Sig	Partial eta squared
Sex	Using roommates property	.806	1	.806	.923	.338	.005
	Common resources	.028	1	.028	.021	.886	.000
	Discipline	9.038	1	9.038*	6.663	.011	.032
	Common responsibility	3.721	1	3.721	1.912	.168	.009
	Assault and backbite	1.533	1	1.533	1.003	.318	.005

Source own survey, 2010 *The mean difference is significant at .05 levels.

However, though the mean differences were not significant, females scored greater mean than males in many of the issues compared to their male counterparts. For example, they scored higher on the issues of common responsibility (M=3.675, SD=1.33), common resources (M=3.125,SD=1.3), personal attacks and backbite (M=2.925,SD=1.54) and use of roommates property without permission (M=2.700,SD=.99). This implies that females have more frequent conflict on several issues than males.

Table 3.7 Mean Report for the frequency of conflict across Fresh, Junior and Senior students

		Using roommate's property		Common		Discipline		Refusal to discharge common res.		Assault	
Source		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Level	Freshmen	3.00	.98	3.66	1.22	2.87	1.04	3.94	1.17	3.08	1.45
	Junior	2.54	1.25	3.15	1.28	3.09	1.38	3.39	1.35	2.81	1.40
	senior	2.47	.94	2.54	1.12	3.05	.97	3.68	1.37	2.85	1.33

Source own survey, 2010

With regard to levels of education, mean scores of frequencies of conflict is high for usage of private properties (M=3.00, SD=.98), sharing common properties (M=3.66,SD=1.22), and refusal to discharge common responsibility (M=3.94,SD=1.17) among first year students than Junior and Senior students. But, the mean score of frequency of conflict among first year students is the least in relation to Disciplinary issues.

Table: 3.8.ANOVA table for mean frequency of conflict among the three levels of education

Independent variable	Frequency of conflict on:	Type III sum of squares	df	Mean square	F	Sig.
Level of education	Common resources	35.205	2	17.602*	11.815	.000
	Discipline	1.680	2	.840	.592	.554
	Common responsibility	10.556	2	5.278*	3.078	.048
	Personal attack and backbite	2.554	2	1.277	.655	.521
	Use of roommates property Without permission	9.376	2	4.688*	3.868	.022

Source own survey, 2010 *The mean difference is significant at .05 level.

The MANOVA test at 95% confidence level indicates that there was significant mean difference among fresh, junior and senior students on usage of common resources F(2,203) =11.815,p=.000 ; on the issue of discharging common responsibility F(2,203)=3.078,p=048 and on the use of roommates property without permission F(2,203) =3.868,p=.022.

Table 3.9: Mean Report of intensity of conflict across different education levels

source	Year		Private (intensity)	Common (intensity)	Discipline (intensity)	Refusal intensity	Assault (intensity)
Education level	1st year	Mean	2.32	2.51	3.06	2.89	2.68
		SD	.70	1.3	1.1	1.4	1.2
	2nd Year	Mean	2.26	2.52	2.70	2.65	2.37
		SD	1.1	1.1	1.3	1.4	1.2
	3rd Year	Mean	2.19	2.02	2.64	3.22	2.46
		SD	.82	.82	.96	1.4	1.4

Source own survey, 2010

Descriptive mean report indicates that mean intensity of roommate conflict was highest for freshmen roommates on disciplinary issues (M=3.06, SD=1.1) while senior students have the least (M=2.64, SD=.96).This implies that first year students had more intense conflict than the junior and senior students on the issues mentioned above.

Table: 3.10. MANOVA test for Intensity of conflict across the three levels of education

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Eta
Level ofducation	Intensity of conflict on:						
	Refusal in discharging common responsibility	11.847	2	5.924*	3.092	.048	.2
	Common resources	10.533	2	5.266*	4.024	.019	.2

Source own survey, 2010 *The mean difference is significant at .05 level.

N.B: Only significant mean differences were selected presented in the above table.

As one can understand from the above table, mean intensity of conflict was significant on refusal in discharging common responsibilities F (2,203) =3.092,p=.048) and on sharing of common resources F(2,203),=4.024, p=.019) among freshmen, junior and senior roommates. But, intensity of conflict on other issues of conflict did not show significant difference among the three groups.

Table 3.11: summary table of main and interaction effects of determinants of frequency and intensity of conflict on different issues

Indepen dent variable	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Eta
Age	Frequency of conflict on common resources	21.640	3	7.213	4.611*	.000	0.25
Sex	Intensity of conflict on disciplinary issues	9.038	1	9.038	6.663*	.011	0.2
level/ year of study	Frequency of conflict on private resources	9.376	2	4.688	3.868*	.022	0.2
	Frequency of conflict on common resources	35.205	2	17.602	11.815*	.000	0.3
	Intensity of conflict on common resources	10.533	2	5.266	4.024*	.019	0.2
	Frequency of conflict on common responsibility	10.556	2	5.278	3.078*	.048	0.2
	Intensity of conflict on common responsibility	11.847	2	5.924	3.092*	.048	0.2
Age*sex	Frequency of conflict on discharging common responsibility	15.593	3	5.198	3.071*	.029	0.3

Source own survey, 2010 *The mean difference is significant at .05 levels

As shown in table 3.11, the three independent variables (age, sex, and level of education) and the issues on which these variables have significant mean difference on the frequency and intensity of conflict. Accordingly, the interaction between the independent variables age*sex were found to have significant mean difference on the frequency of conflict on discharging common responsibility ($F(3,198)=3.071, p=.029$).

Moreover, the interaction effects of those variables with statistically significant mean difference on the dependent variable and the effect size (magnitude of the difference between levels of the independent variable with respect to the dependent variable) were computed. Accordingly, effect sizes ranging from medium to large were found. This implies these variables contributed to the variation. For example, the interaction between age and sex contributed to 30 percent of the variation.

3.3. Additional Issues of Conflict Stated by Participants

In addition to what has been provided by researchers, Participants were also requested to state other issues of conflict in the open ended part of the questionnaire. Hence, racism, misbehaving, issues related political party membership, and Personal hygiene were among the major issues of conflict indicated by some of the participants.

3.4. Analysis of the Strategies of Conflict Resolution

Participants were asked to rank four basic types of conflict resolution strategies (Compromising Accommodation, Avoiding and Collaboration) on the questionnaire. The frequency responses indicated that the rank of strategies of conflict from top to bottom were collaboration, compromising, avoiding, and accommodation as indicated in the table below.

Table 3.12. Frequency and percentage of conflict resolving strategies rated by participants

	strategy	Frequency	Percent	Valid Percent	Cum. Percent
	Collaboration	80	39	39.35	55.4
	Compromising	58	28	29	28.5
	Avoiding	31	15	15.1	20.83
	Accommodation	23	11	11.1	39.7
	Missing System	16	8	8	60.65
Total		206	100.0		100.0

Source own survey, 2010

4. Discussion

The three major issues in which roommates scored higher frequency and intensity of conflict were 'Refusal to Discharge Common Responsibility'; Disciplinary Issues and dispute or competition on use of Common Properties. This result is similar to the findings of Egwunyenga (2009) and Michael, (2003) on similar issues. The fact that there was high frequency and intensity of conflict may be because the university in which the current research was conducted is one in which under construction. Hence it is obvious that there would be scarce. That is the resources available might not be proportional to the large number of students. Besides these, participants also indicated on the open ended item that they disagreed on issues related to prejudice, racism, and Personal Hygiene with their roommates. This implies that there several other issues in addition to the major categories indicated in the questionnaire that lead roommates to conflict.

The demographic variables, age, sex, and education level were taken as determinants of roommate conflict. The purpose of taking these demographic variables was to see if these variables could bring significant differences on the frequency and intensity of roommate conflict. Accordingly, mean frequency and intensity of conflict were found to be different between roommates of the two sexes; among different age group and freshmen, junior, and senior roommates. These determinants of roommate conflict are discussed in detail below. One of the demographic variables considered in the analysis in relation frequency and intensity of roommate conflict was age of participants. Accordingly, mean frequency of conflict among

roommates was greater for the first and second age groups (i.e age group 19-21 and 22-24) on room discipline issues. This implies younger roommates have more disciplinary problems than older ones. One reason for this might be because the younger age groups are less tolerant and have less emotional intelligence in managing conflicts. In relation to this issue, Urberg, Tolson, Richard, (1998) cited in Little (2004), state that roommate conflicts are more likely to be challenging for adolescents than matured adults.

Meanwhile, all the four age groups had high mean for the frequency of conflict on discharging common responsibilities. This is an indication that discharging common responsibility such as cleaning the room was a pervasive problem among roommates of all age groups. On the other hand, significant mean frequency of conflict was found among the age groups on the issue of using common resources. From the descriptive mean score, one can learn that the first age group (19-21) had more frequent conflict on sharing common resources such as computers, reference books, and dormitory space. Meanwhile, the fact there was more frequent conflict on this issue could be attributed shortage of resources in the university.

Sex was the second variable considered as a determinant of frequency and intensity of conflict. Accordingly, male and female roommates were compared to see if there was a difference in the mean frequency and intensity of conflict across different issues. Hence, females scored greater mean frequency of conflict on the issues of private resources; on usage of common resources, and on discharging common responsibility compared to their male counter parts though these differences were not statistically significant. This implies that the incidence of conflict on these four issues was more prevalent among female roommates than male ones. The present result is supported by previous research findings conducted on the same issue on male and female college roommates. For example, MCcorkle & Mason (2009) found that females reported more conflicts than males. To the contrary, the present finding contradicts the findings of Lepore (1992). Lepore's (1992) study of roommate conflict revealed that females have lower levels of conflict with roommates than males.

This difference in the results might be due to some other factors such as cultural variations and sampling errors. Hence, to fill the existing gaps and avoid controversial findings, the

investigator recommends that further research has to be conducted. But with regard to intensity of conflict, males had a significant mean difference over females on disciplinary issues. This implies that male roommates disagreed over room discipline specifically on drinking and intoxication, noise making, smoking, chatting/talking and listening music while their roommates were studying or sleeping.

Frequency and intensity of conflict were also found to significantly differ among freshmen, junior and senior students (year of study levels).Hence, descriptive mean scores of frequencies of conflict were high on usage of private properties, sharing common properties and refusal to discharge common responsibility among first year students than Junior and Senior students. But overall, refusal to discharge common responsibilities was found to be an issue that freshmen, Junior and senior participants disagreed with their roommates, since the mean scores of frequency of conflict on this issue were closer for the three groups. Meanwhile, the Multiple Analysis of Variance showed that significant mean differences were found among fresh, Junior and Senior participants on common resources and on use of private resources .This difference might be because first year students were not well-adjusted to the living arrangements in dormitories with other people whom they had never met before and the competition might be higher to survive. What is more is that they may have less awareness about campus life compared to their junior and senior counterparts. This idea is supported by Halpin (2009).The writer further suggests that living with a roommate for the first time and how to communicate problems and coming up with solutions is a challenge for beginner roommates. Similarly, McCorkle and Mason (2009) suggest that typical first year students are not often developmentally prepared to effectively negotiate interpersonal conflicts with roommates on their own. These writers further remind that satisfying roommate relationship is especially important for freshmen students.

Using an open ended item, participants were also asked to indicate a strategy of resolving conflict other than the ones mentioned by reseaarchers. Hence, the majority (47.5%) them reported that they use negotiation as an alternative way of conflict resolution and the rest (22.5%) of them replied that they reported to the concerned bodies so as to solve the resulting

conflict. The remaining ones used tolerance as a way of resolving conflict. This finding is similar to the strategies indicated by Gojiko (2009).

5. Summary, Conclusions and Recommendations

5.1. Summary and conclusion

Conflict is inevitable among roommates is inevitable because students with different ethnic groups, cultural backgrounds, personal interests and religious beliefs are assigned in the same dormitory. Conflict arises among roommates over several issues but the ordinary and little frictions among roommates could cause serious effects on the psychological, academic and social well-being of the students unless they are resolved soon.

Therefore, to resolve the conflict among students before escalation, universities need to be aware about the issues and determinants of conflict so that it will be manageable to resolve. This research paper was therefore an attempt to find out the major issues and determinants of conflict among Debre Markos University Students. In doing so, the following basic questions were raised:

1. What are the major issues of conflict among roommates of DMU students?
2. What are the Determinants of conflict among roommates?
3. Which issues cause more frequent and intense conflict among roommates?
4. What strategies are employed by roommates to resolve these conflicts?

To answer such basic questions, researchers used descriptive survey research. The data was collected from 206 DMU students of 2010/2011 academic year. The participants were randomly selected from all colleges and academic levels. Researchers employed mean, percentage standard deviation and multiple analyses of variance (MANOVA) to compare the frequency and intensity of roommate conflict across the independent variables. The result of the analysis revealed the following major findings:

Descriptive mean frequencies indicated that the three major issues that caused the highest frequency and intensity of conflict across all colleges and academic levels were Refusal to Discharge Common Responsibility, Disciplinary issues and Use of Common Properties. The result of MANOVA also has revealed that the mean frequencies of conflict were significantly different across variables such as age, sex, and level of education of roommates on certain issues.

Similarly, data analysis revealed that freshmen students had the highest mean scores of frequency of conflict on usage of roommate's resources without permission, disciplinary issues and refusal to discharge common responsibility than Junior and Senior students. The mean score of intensity of conflict due to refusal to discharge common responsibility was the highest for first year students than the junior and senior students.

5.3. Recommendations

Based on the findings the study, researchers has forwarded the following recommendations to the roommates and respective authorities of the University.

- Since roommates are mainly coming into conflict because of refusal to discharge common responsibility and on how to use common resources, they should have a formal written agreement that helps them know their duties and responsibilities while living with others.
- The University should orient roommates on the utilization of common resources and training should be provided for roommates on basic life skills of managing conflict.
- Students especially, the freshmen should be given trainings on the issues of assertiveness, coping strategies and multi-culturalism so that they can manage conflicts that arise among them and develop tolerance towards each other.
- The student affairs' office should assign roommates based on their choice and matching characteristics of students than assigning them randomly so that roommates to reduce conflict.
- The University should encourage regular meetings with students to discuss on the issues that might be causes for conflict among roommates.
- Roommates need to develop mutual respect and should be committed to do their best in discharging common responsibilities.

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