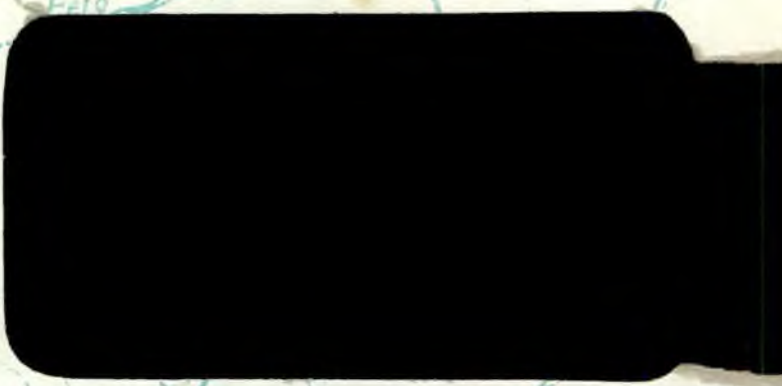
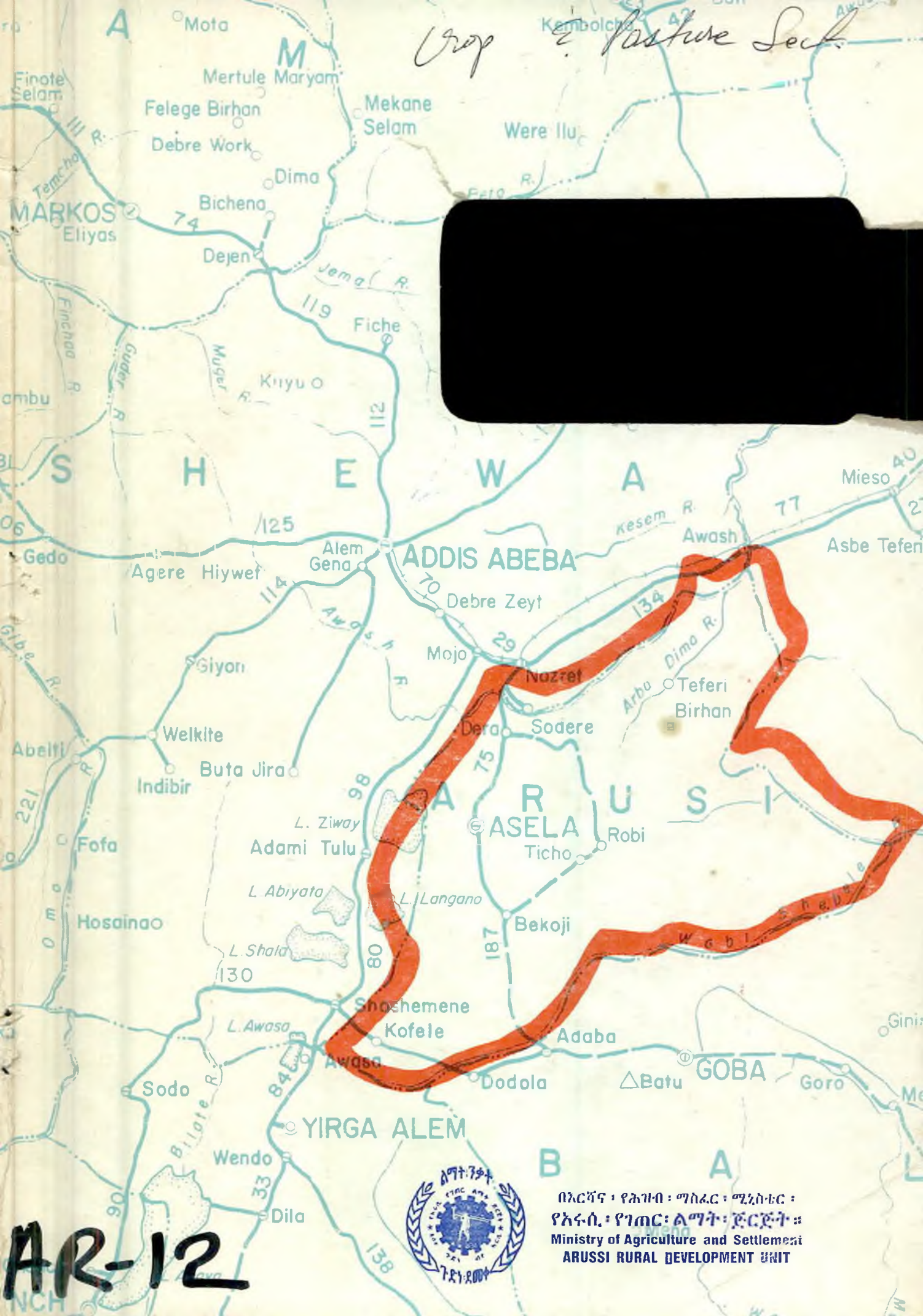


Crop & Pasture Sect.



AR-12



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ARUSSI RURAL DEVELOPMENT UNIT

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T A B L E O F C O N T E N T

	<u>PAGE</u>
Introduction	1- 3
1. <u>Project Direction</u>	
1.1 Planning, Evaluation and Budget Section	4- 5
1.2 Industry Promotion Section	5- 7
2. <u>Extension, Education & Co-op. Promotion Department</u>	
2.1 District Development Offices	7-10
3. <u>Agro. Engineering & Plant Husbandry Department</u>	
3.1 Crop & Pasture Section	10-20
3.2 Seed Multiplication Section	20-22
3.3 Forestry Section	23-25
3.4 Agricultural Engineering Section	26-27
4. <u>Infrastructure Department</u>	
4.1 Road Section	27-29
4.2 Water Development Section	29-31
4.3 Building & Maintenance Section	31-32
5. <u>Animal Health & Breeding Department</u>	
5.1 Cattle Breeding Section	32-35
5.2 Animal Research Section	36-38
5.3 Veterinary Section	38-44
6. <u>Common Services Department</u>	
6.1 Personnel Section	44-45
6.2 Purchase & Stores Section	45-48
6.3 Transport and Garage Section	48-49
6.4 Staff Clinic	49-50
7. <u>Finance Department</u>	
7.1 Accounts Section	50-51

1. Introduction

This report is one in a series of the Annual Reports that appear at the end of every budget year. It summarizes the activities of all Departments, Sections and Units that were performed during the budget year 1977/78.

The first part summarizes the major developments that took place during the budget year and the second part gives detailed accounts of activities of all Department/Sections and Units.

2. Major Developments:

The Planning, Evaluation and Budget Section under took important evaluation studies including Rural population, Land utilization practices & Livestock survey and Annual Report for the year 1976/77. In collaboration with other sections, the Section also prepared a new livestock development programme that increases the efficiency of distribution of cross heifers to peasant associations at a reasonable price. Moreover, the Section carried out budgetary activities and also started an independent budget control.

The Development Implements Industry Produced 2238 different kinds of agricultural implements, household furniture & equipment and installed two oil mills to encourage industrial cooperatives in the region. It has also established two skill centers that provide the respective peasant Associations with basic agricultural implements and household furniture. Six local artisans were trained in metal and wood work for the two skill centres. Regarding beekeeping the section has started the distribution of improved beehives to peasant associations and the production of honey was found very encouraging.

The Extension, Education & Co-op. promotion Department has rendered extension services in various fields. During the budget year 1977/78 there were 1116 peasant associations with a total member of 294,746, 360 women associations, 162 Youth groups and 133 service coops in the project area. A total amount of 72,305 qts. of fertilizer and 17,026qts. of improved seed, 65 improved agricultural implements, 36 crossheifers about 4,000,000 seedlings and vegetable seeds worth of 1,783 Birr. were distributed to farmers. Furthermore, stores, schools & feeder roads were constructed through self-help schemes and literacy campaign was carried out at Arboye, Angada and Tibila.

Demonstration activities & Extension education on the proper application of improved seed, fertilizer, cultural practices, livestock management, forestry, and basic principles of socialist cooperatives have been given to farmers through fifty rural development centres.

The crop and pasture Section has conducted metrological and crop & soil surveys to gather and document weather data and to categorize soil by type and nutrient status. Trials and Observations were carried out on cereals, pulses, oil crops, vegetables and fruits to identify high yielding varieties and establish their cultural practices. Regarding crop protection trial, 19 weed control trials on different crops, soil and seed testing, surface and subsurface drainage trials have also been conducted. The forestry section established five new permanent sample plots and performed statistical analyses of sample plots regarding height, age and volume of every species. The section also produced a total of 4,000,000 seedlings at different nursery centres. The Agricultural Engineering section carried out a continous drainage and erosion trials at different trial centers and conducted research on different agricultural implements. The Seed Multiplication Section cultivated a total of 988.8 has for seed production purpose at Kulumsa and Assassa farms. Of the total acreage at Kulumsa and Assassa 50.1% was under wheat, 18.5% under barley, 10.4% under maize, 9.1% under teff and 5.3% under rape.

The Animal Research Section carried out breeding programme, feeding trials on cows and sheep to investigate the effect of feeding levels on the yield of milk, fat content, growth rate, lambing percentage etc. The cattle Breeding Section had 986 local cattle and 2088 cross-breed cattle. During the budget year a total of 888 cows received A.I. service, 5099 heads of cattle were vaccinated against various diseases, 1404 heads of cattle received curative veterinary service and 101 cross-breed cattle were sold. The Veterinary Section gave A.I. service for 211 local cows, produced 6,575 doses of semen and 4,625 lts of liquid nitrogen, vaccinated 861,765 heads of animals, treated 24,184 head of animals against parasites and other diseases, survyed 567 animals & birds on various diseases and collected 2555 samples on different animal diseases.

In the area of Infrastructure, 50 Kms. of road, were surveyed 109 Kms of road were maintained, 23 kms on the Huruta-Robe road were completed, about 10 Kms. on the Dhera-Sire Road were also cleaned, graded and ditched. The water Development section Drilled 14 boreholes in Arssi, Shoa, Sidamo and Ganugofa with an average depth of 77.2 metres and an average yield of 7,040 litres per hour. Moreover, survey and design have been made for 6 water supplies and motor pumps of 5H.P. were installed.

To sum up, the target performance of every Department/Section has been very promising although some deviations were observed.

1. Project Direction

1.1 Planning, Evaluation & Budget Section

A. Goals

- Undertake various evaluation studies for efficiency and effectiveness control of ARDU's activities.
- Collection of base-line data in the Project Area.
- Recommend for improved goal attainment.
- Accumulate, analyse & document experience in rural development.
- Assist and advise in the design implementation of social economic studies.
- Prepare annual work programme and budget.
- Advise Departments/Sections/DDO's on the efficient utilization of their budgets.
- Prepare budget deviation and budget comparison statements.

B. Activities

B.1 Evaluation:-

During the budget year the section has undertaken two major evaluation studies namely, annual report for the year 1976/77 and Rural Population, Land Utilization Practices & Livestock Survey. The latter has important data on rural population, land utilization practice and livestock and will appear in a different publication. Four quarterly work progress reports were also prepared and submitted by the Section.

B.2 Planning & Economic Analyses:-

The Planning & Evaluation Section in collaboration with other sections, has prepared a new livestock development programme and carried out a cost-benefit analyses of dairy, sheep & poultry associations to compare the benefit that can be obtained from exotic and indigenous heifers, sheep and birds. The new livestock development programme emphasises group approach than individual and reduces the price of cross heifers from about 600.00Br. to 275.00 Br. for associations and about 300.00 Br. for individual farmers. Besides this, minor cost calculations regarding seed and cooking oil have also been done.

B.3 Budgetary Activities:-

The Planning, Evaluation & Budget Section has prepared and submitted work programme and budget for the years 1978/79 and 1979/80. Two quarterly financial statements for the period 1976/77, regular quarterly budget requests and other control activities were carried out.

B.4 Other Activities:

The section has attended a number of seminars inside and outside ARDU, participated in various temporary and permanent committees of the project, assisted and advised other sections in the design and analyses of surveys and trials.

C. Deviations:

- C.1 Due to shortage of staff, the section was not able to undertake costbenefit analyses of the project, infrastructure study and technoeconomic survey of Ticho and Arbagugu.
- C.2 Since the Accounts Section couldn't provide budget data, due to the fact that most of its staff participated in Kebele activities, the Planning, Evaluation & Budget Section was unable to prepare budget deviation and budget comparison statements. However, the Section started an independent budget control activities during the period 78/79.

D. Problems:

- D.1 As the demand of the Section's high level staff for other purpose was high, the section couldn't carry out its normal activities smoothly.
- D.2 Due to the inadequate and incomplete information provided by other sections and delay in reporting, the section couldn't prepare and submit reports in time.

E. Inputs:

During the budget year the staff consisted of four Ethiopian high level staff (one sociologist, one statistician, one agricultural economist and one budget officer) . two Ethiopian middle level staff and four other category staff.

1.2 Industry Promotion Section:

A. Goals

- Produce agricultural implements.
- Training of rural artisans.
- Encourage the establishment of rural skill centres.
- Explore the possibility of establishing industrial cooperatives.

B. Activities:

B.1 Production of Implement

During the reporting period the Section has produced 981 pieces of modern agricultural implements worth of 85,391.40 Birr and 1,257 pieces of household furniture and equipment worth of 82,445.45 Birr.

The type and quantity produced is given below:

<u>Item</u>	<u>Quantity(Pcs.)</u>	<u>Unit Price(Br.)</u>
Implements		
Ox-cart	251	203.50
Donkey cart	58	197.00
Donkey cart with tanker	7	262.50
Wheel-barrows	497	26.20
Plough	5	40.40
Harrow	58	45.40
Bee-hives	105	49.40

<u>Item</u>	<u>Quantity</u> (Pcs.)	<u>Unit Price</u> (Birr.)
Household Furniture & Equipment		
Chairs	513	14.80
Tables	301	160.30
Beds	90	65.00
Boxes	119	12.70
Table Tennis	3	96.50
Bed side cabinet	12	35.00
Waste basket	4	4.50
Paper trays	9	5.10
Doors	99	101.85
Windows	104	74.85
Hospital exa. beds	2	269.25
Child bed	1	62.00

B.2 Oil Mill

Two oil extracting machines have been installed and production of Noug Oil will start by the end of August 1978. The objective of establishing the mill is to encourage industrial cooperatives in the region.

B.3 Skill Centres

With the establishment of two more skill centres at Kersa and Lemu the number of skill centres established by the Section has increased to four. The contributions made by farmers for the construction of the skill centres at Kersa and Lemu were 5,520 Birr. and 5,000 Br. respectively. Six local artisans selected by the people have been given training on wood and metal works. These two skill centres started functioning since April 1978 and are managed by 'Skill Centre Development Committee' composed of farmers. At present the skill centres at Assassa, Ogolcho, Kersa and Lemu produce carts, wooden boxes, beds, wheel-barrows, Chairs, sickles, local ploughs, accessories for local ploughs, spades, shovels, knives, hoes etc..... and also render maintenance services.

The table below shows the type and quantity of major items produced by the skill centers at Ogolcho and Assassa during the budget year 77/78.

No.	Item	Assassa			Ogolcho		
		Quantity	Unit Price	Total Value	Quantity	Unit Price	Total Value
1.	Ploughs	612	7.00	4,284.00	405	7.00	2,835.00
2.	Boxes	70	30.00	2,100.00	67	30.00	2,010.00
3.	ox-cart	3	203.00	609.00	59	203.00	11,977.00
4.	Chairs	35	8.00	280.00	33	8.00	264.00
5.	Tables	35	17.80	623.00	50	23.00	1,150.00
6.	Spades	3	4.50	13.50	6	5.00	30.00
7.	Wegel	500	3.50	1,750.00	300	4.00	1,200.00
8.	Beds	35	45.00	1,575.00	64	55.00	3,520.00
	Total	1,293	-	11,234.50	984	-	22,986.00

Besides contributing 50% of the total expenditure for the construction of skill centres ARDU also provides them with raw and semi-finished materials on credit.

B.4 Bee-Keeping

To encourage modern bee-keeping in the region ARDU has established demonstration stations at Degaga, Metti, and Aselia with a total number of 58 modern beehives. A modern beehives yields 15-20 kgs. of honey per harvest whereas a traditional bee-hive gives only 7-10 kg. per harvest.

C. Deviation

No major deviation has been reported.

D. Problems

D.1 Shortage of skilled labour

D.2 Shortage of raw materials for the implements industry and oil mill.

E. Inputs

E.1 Staff

The Section had 4 Ethiopian high level, 7 Ethiopian middle level and 104 other category staff.

E.2 Investment in Construction

Expansion works on machine & assembly shops and construction of new offices and exhibition room for sample products of the industry have been carried out. A metal work shop has also been constructed during the year.

A 50% contribution of 10,520 Br. was made for the establishment of skill centres at Kersa and Lemu.

2. Extension, Education & Co-operatives Promotion Department

2.1 District Development Offices

A. Goals

- Help the development and consolidation of various peasants' institutions including specialized production groups.
- Carry out villigazation/settlement schemes.
- Embark upon non-formal education with social, political and economic content.
- 4 Promote self-help schemes.
- Manage trials and demonstration plots.
- Advise peasants on crop production, livestock and forestry management and improved farm implements.
- Assist in the provision of adequate veterinary and artificial insemination services.
- Assist departments/sections in their socio-economic research undertakings.

B. Activities

The following extension & education activities have been accomplished through five district development offices and fifty rural development centres. Assela District Development Office (Assela D.D.O.) had 19, Bekoji D.D.O. 8, Koffele D.D.O. 7, Abomsa D.D.O. 6 and Robe D.D.O. 10 rural development centres (RDCs). Assela, Bekoji and Koffele D.D.Os form the old project area, while Abomsa and Robe were covered during Phase III.

B.1 Organizing and Consolidation of Peasants' Institutions

The number of peasants' associations and other institutions in each of the D.D.O. during the budget year 1977/78 was as shown below:-

D.D.O. Peasant Institution	Assela D.D.O.	Bekoji D.D.O.	Koffele D.D.O.	Abomsa D.D.O.	Robe D.D.O.	Total
Peasants' associations	352	171	173	186	234	1,116
P.A. Members	98,776	43,326	47,277	44,102	61,265	294,746
Women Ass.	260	188	173	68	171	860
Youth groups	75	9	73	5	-	162
Service Co-ops	44	18	24	21	26	133

A seminar was held at each district development office to teach peasants about the basic principles of Co-operatives, Co-operative Management, Book-Keeping and Accounting.

Democratic elections have been held in many areas to replace old peasants' associations leaders by new and competent ones. In general all rural development centres have been engaged in consolidating peasants' institutions so that they can play an important role in rural development activities. Although much remains to be done, encouraging results have been observed in this line. For example, all fertilizer and seed were distributed through service co-operatives during the 1977/78 crop season.

B.2 Distribution of Inputs

During the budget year 72,305 qts. of fertilizer, 17,826 qts. of seed worth of 4,600,000 Br. were distributed to about 65,000 farmers. The quantity of fertilizer sold in cash was only 8,243 qts. In addition to this 74 oxen carts, 1 donkey cart, 10 harrows vegetable seeds worth of 1,783 Br., about 4,000,000 seedlings and 36 cross-heifers were given to farmers.

B.3 Promotion of Self-help Schemes

A store, school and an office for a peasant association have been constructed through self-help in Bekoji. Similarly, a school which can accommodate about 50 students was completed at Arboye, and a similar school is also near completion at Angada. Moreover, a small grain mill has been installed in Tibila by a service co-operative and a water reservoir was constructed at Arboye to overcome water supply problem in the area. In Assela Development District, one big store was constructed by a service co-operative at Kersa. Regarding road construction, maintenance work was carried out on the Chafe Jilla - Adami Tulu road which is about 34 Kms. 63 kilometers of road was also constructed through self-help scheme at Chafe-Jilla - Habura (17 Kms.), Sire (27 Kms.), Ligaba (2 Kms.) and Arata (17 Kms.).

B.4 Provision of Basic Education

Rural development agents at Arboye, Angada and Tibila have been teaching peasants in collaboration with the Literacy Campaign Unit at Abomsa.

B.5 Demonstration and Trials

Demonstration of improved seeds, fertilizer, farm implements and cultural practices was conducted in Ticho and Arbagugu. Extension demonstration trials have also been managed.

B.6 Extension Education

Extension education on crop production and projection, livestock management, basic principles of socialist co-operatives and forestry has been given to farmers through fifty rural development centres.

B.7 Provision of Services

Veterinary products and herbicides were sold to farmers.

C. Deviation

The performance of the development district offices especially with regard to So-operatives, Women and Youth Groups and Villagization was not satisfactory. This was due to lack of guidelines and trained manpower like co-operative accountants and promoters.

D. Problems

D.1 Due to the situation that prevailed in the country, there was shortage of agricultural inputs and in some areas distribution started late.

- D.2 Ordered goods were either inavailable in the market or received late.
- D.3 Vehicles assigned to the new district development offices required frequent maintenance due to bad road conditions.
- D.4 As the demand for vehicles by mass and government agencies was high certain difficulties have been encountered with respect to field operations.
- D.5 Lack of co-operation on the farmers part with regard to vaccination programme forced some district development offices to visit the same area more than necessary.

E. Inputs

During the year the staff situation in the District Development Offices was as follows:-

<u>Category</u> D.D.O.	Ethiopian High Level	Ethiopian Middle Level	Other Category Staff
Robe	1	5	64
Abomssa	1	4	67
Koffele	1	4	60
Bekoji	1	4	60
Assela	1	10	131
Total	5	27	302

3. Agro. Engineering & Plant Husbandry Department

3.1 Crop & Pasture Section

A. Goals

- Undertake surveys to increase knowledge about agricultural conditions and limitations.
- Findings new crops and varieties
- Determine optional growing techniques for different crop varieties.
- Establishment and improvement of pasture.
- Study methods of controlling weeds, insects and diseases.
- Improve knowledge of soil conditions in the area.

- Control of seed with regard to trueness to variety, cleanliness, germination and quality.
- Plant nutrient analyses.
- Planning, analyses and interpretation of trials from main station sub-stations and extension demonstration fields.
- Preparation of annual report of crop research and extension trials.

B. Activities

B.1 Surveys

B.1.1 Metrological Surveys

Metrological surveys in different stations have been carried out. Monthly summary of weather data from main stations, Kulumsa, Bekoji and Assassa have been sent to the office of the National Climatology Department in Addis Ababa. Reports of weather data from other sub-stations were also sent to the above mentioned office as often as the data from these stations were received.

B.1.2 Weed and Pest Surveys

There has not been any weed survey during the year. Incidences of Grasshoppers, Army Worms and Chafer grubs were observed.

B.1.3 Crop and Soil Surveys

Different surveys on food & forage crops and soil have been conducted by the Section.

B.2 Trials and Observations

B.2.1 Metrological Observations

The annual rain fall recorded in Chilalo 'Awraja' during the year 1977 has been above average. All stations in the 'Awraja' received higher rain fall during the month of October which was one of the dry months in the past years.

This high rainfall in October has caused crop damage before harvest in most parts of the 'Awraja'.

The highlands of Chilalo 'Awraja' received a temperature below average, while the medium altitude and lowland areas received higher temperature. The minimum temperature recorded in the awraja was normal except in Assassa, which has received higher temperature than the previous years.

B.2.2 Testing of food Crops

65 trials on cereals, 74 on pulses, 6 on oil crops, 4 on vegetables and 4 on fruits have been conducted during the year.

B.2.3 Fertilizer Trials & Cultural Practices

During the year variety trials and cultural practices were conducted on various cereal crops at different trial sites of ARDU. Generally the rainfall was high and unfavourable distribution, as there was low rainfall at the early vegetative development and unusual heavy rain at harvest. This generally affected the yield and grain quality of small grain cereals to some extent.

All in all, 13 trials (4 on cereals, 7 on pulses and 2 on oil crops) were carried out and the results obtained indicated the following:

Barley:-

Food and malting barley varieties were tested at the high and medium altitude areas while drought resistant food barleys and fertilizer trials were conducted at Dhera and Tibila, respectively. A new malt barley variety BH8B/F4.E.L.7.L was under increase at Bekoji.

Wheat:-

Different variety trials of bread wheat, Durum and Triticales were conducted. Of this there were a number of international and national materials planted and screened for disease, frost and drought resistance and for general adaptability at different ecological zones. Existing commercial varieties are K. Kanga, K.Mamba, Romany BC and Enkoy. A new drought tolerant variety K62go-Bulk is under a large scale production.

Maize:-

Different variety trials and inter-cropping maize with beans were conducted. Weather conditions were very favourable for maize during the cycle of the test. Thus yield as high as 196 qts./ha. was obtained in a variety trial. This is the highest yield ever recorded for maize in ARDU region are H611 and Alemaya Composite for medium highlands, Katamani for lowland areas with short rain.

Teff:-

Among the varieties tested DZ-01-354 has been top yielder. The cultural practice trials are not conclusive.

Sorghum:-

Sorghum variety trials were conducted at Dhera, Tibila and some extension demonstration areas in Arbagugu 'Awraja' for the first time. The performance of the crop was very encouraging at Tibila, a typically lowland area, where different cereal crops do not adapt well under natural conditions. The best variety Kobo Mash 76 has been increased and distributed to some farmers in the area during the 1978 crop season.

Horsebeans:-

Among the tested varieties on national programme,

F305 Morocco was promising with a yield of 43 qts./ha., whereas the standard check variety CS 20 DK gave a yield of 31 qts./ha., Although this has been the case, careful evaluation is required for release until reliable varieties are established.

Field peas:-

Different varieties were tested at various locations both inside and outside the project area. Results have shown that Mahandarfer, CS 436, Nunham Zaden 30 and newera gave yields of 10.5 qts/ha, 10.8 qts./ha, 10.4 qts./ha. and 20.1 qts./ha. at Kulumsa, Bekoji, ANDU and Debrezeit, respectively.

Haricotbeans:-

Among the tested varieties Negro mecentra 11 gave a higher yield of 34.2 qts/ha. while only 23.7 qts/ha. was obtained from Mex. 142 R.

Soyabeans:-

The top yielder from the Soyabean varieties tested was Williams with a yield of 19 qts/ha.

Due to mishandling of trials on oil crops during the growing period, all trials regarding oil crops were discarded.

B.3 Pasture and Forage CropsB.3.1 Natural Grassland

One trial on the improvement of native pasture has been conducted at Koffele. Split application (400 kg./ha. of Urea, 1/3 in March and 2/3 in June) gave the highest herbage yield.

B.3.2 Plant Introduction

Thirty-eight observation trials on annual and perennial pasture were tried at different extension demonstration sites and almost all species show good adaptation and establishment.

B.3.3 Cultivated grasses

B.3.3.1 Fertilizer application at different rates were applied on Cookfoot and Rhodes grasses and it was found out that a rate of 400 kg./ha. of urea (applied 1/3 in March and 2/3 in June) gave the highest herbage yield.

In line with the different rates of urea applied on Rhodes grass, harvest at different conservation stages (i.e grazing, silage and hay) show significant differences. Another trial on the effect of delaying cleaning out and time of urea application on Rhodes grass has been conducted at Kulumsa. Results have shown that early cut during the month of March and April; and application of urea in late June and early July gave the highest forage yields 12 and 15 tons dry matter/ha, respectively.

Study on whole and split application of urea, applied at different rates on columbus grass show that split application (applied at planting and knee-height) out-yielded whole application (applied only at planting) by about 40%.

B.3.3.2 Seeding Rate Trial

Study of seeding trials on temperate grasses, phalaris, Cookfoot and Lolium gave higher herbage yields at a seeding rate of 20kg./ha

B.3.3.3 Planting Methods

Elephant grass mixed with tropical legume, out yielded Desmodium Uncinatum by 25% when fertilized with only 200 kg/ha of urea.

B.3.3.4 Management of Grassleys

Study on Rhodes grass, clipped at different stages (before, start and full heading), has been carried out at Kulumsa. It has been observed that Rhodes gave the highest herbage yield when clipped at full heading. However protein yield (Kg/ha) has been found to be the best at early stage i.e. before heading.

B.3.4 Cultivated Legumes

B.3.4.1 Fertilizer Trial

Triple super phosphate applied at the rate of 46 kg/ha. on Alfalfa gave the best economical and botanical yield.

B.3.4.2 Seeding Rate

Seeding rate trials on Vetch and Melilotus have been conducted at Kulumsa. Both species, seeded at the rate of 20 kg/ha gave seed yields of 13 and 35 qt./ha; and herbage of 13 and 17 tons dry matter/ha, respectively.

B.3.4.2 Management of Legumes

Clipping stage trial on Alfalfa has shown that highest yield was obtained at 100% flowering stage. However, the quality was best at 10% flowering stage.

B.3.5 Cultivated Grass/Legume Mixtures

B.3.5.1 Fertilizer Trial

A comparison trial on grass/legume mixture and pure grass, fertilized with different rates of urea, has shown that grass/legume mixture (Rhodes and Alfalfa) out yielded by 35%.

B.3.5.2 Seeding Trial

Mixture of Columbus and Dolichos at different seeding rates were compared and higher yields recorded were 30 and 20 kg/ha for Columbus and Dolichos, respectively.

B.3.6 Root Crops

B.3.6.1 Fertilizer Trial

Different rates of NaCl and P_2O_5 have been applied on fodder beet. 160 kg/ha of NaCl without P_2O_5 gave the highest root and leaf yield.

B.3.6.2 Seeding Trial

In a seeding rate trial on fodder beet, a rate of 10 kg/ha gave the highest root and leaf yield.

B.3.6.3 Variety Trials

Among the tested sugar beet varieties, Zwaan Poly was found to be the best yielder.

B.3.7 Annual Forage Crops

B.3.7.1 Seeding Trial

Seeding rate trials (Oat/Vetch and Oat/Pea Mixtures) at three different ecological areas have been tried. Results of the experiment have shown that a combination of 100 liter Vicia or Pea gave the highest forage yield. Moreover, botanical analysis has also shown the highest percentage of legumes at the above mentioned rate.

B.3.8 Seed production Scheme

Multiplication of Rhodes grass, Colored guinea, Columbus, Cockfoot, Phalaris tuberosa, Phalaris aurindnacea, Lolium perenne, forage Vetch, Melilotus, Dolichus, Oats, fodder beet and forage Kale is still on progress. A total of 10 has is already planted with the above mentioned herbage species.

B.4 Crop Protection

B.4.1 Weed Control

During the growing season of 1977, 19 weed control trials (10 in cereals, 2 in pulse crops, 4 in oil crops and 2 in forage crops) have been performed. In wheat and barley Hoe 23408 produced a 100% control of Snowdenia Polysta chya and the resultant yield increase was 26% for wheat.

In 'teff' CGA 24705 alone and with atrazine has significantly decreased the yield. In a field where Gesten 500 FW was sprayed, harrowing prior to sowing gave higher yield compared with no harrowing.

On the persistence of atrazine and the effect on subsequent crops (wheat and rape) a trial was performed for the third time and no significant yield depression, due to the herbicide, was recorded.

In horsebeans, A3623 has produced the highest mean yield increase (18%) followed by atrazine plus flourodifen (11%).

From the method of weeding trial in flax, no appreciable yield increase was obtained at Kulumsa. The amytryne and amytryne plus promytryne plots have caused a severe crop damage at Kulumsa and Bekoji.

Among the herbicides tested on rape at Kulumsa, propachlor and teridox gave the highest and significant yield when compared with TCA. At Bekoji however, no significant yield increase was obtained with all the treatments.

In Vetch high yield increases of 49% and 44% were attained with fluorodifen and A3623, respectively. Regarding seed yield, atrazine plus fluorodifen and A3623 gave high yield increases 50% and 40% respectively. Higher forage (Columbus) yield increases of 7% and 6% were obtained from atrazine plus terbutryne and atrazine alone treated plots, respectively.

The most critical period of competition and yield losses, due to weeds in different crops was studied. Accordingly, the first 30 days seemed critical in wheat and barley and no significant yield increase was observed for the weeding made during subsequent days upto the 75th day from emergence.

In field peas and horsebeans, no significant yield increase was obtained, eventhough weeding was continued, beyond 15 days from emergence; while in haricot beans the yield kept on increasing significantly upto the 45th day of emergence.

B.4.2 Seed Dressing of Wheat

Regarding seed dressing, three trials were conducted. At Bekoji and Kulumsa aldrin, although not significant, gave a relatively higher yield. However, at Dhera aldrin plus thiram gave significantly higher yield increases.

B.4.3 Chafer Grups

Aldrin gave the highest yield at Asela and Carbofuran at Kore. None of the insecticides and levels of seed dressing, however, gave significant yield increase. The highest mean yield increase 42%, was obtained with 300 g.a.i aldrin/100kg seed of barley.

B.4.4 Stalk Borers

At Kulumsa, no significant difference in yield was observed from all the treatments whereas; carbofuran applied on the soil around the plant and diazinon applied on the plant whorle have produced a significant yield increase when compared with the control plot.

B.6.3 Seed Certification

All seeds harvested at Kulumsa and Assasa were checked and certified by the seed sub-unit before delivery to farmers and/or organizations.

B.6.4 Maize Programme

Necessary supervision was done for the production of H611 on 15 has. Parental lines planted for maintenance were Kital synthetic II, Equador 573, Line A,D,F,G, Esby 11 High altitude composite, Katumani synthetic VI and Casst composite.

B.6.5 Crosses

Alemaya Composite x BC 573
(G x D) X (A x f)
2F different local varieties of maize from Ticho and Arbagugu were planted for observation.

B.7 Services

B.7.1 Extension Demonstration Trials

Variety fertilizer trials, cultural practices and rotation trials from different areas were threshed and weighed for yield information.

B.8 Reports

B.8.1 Crop & Pasture Section

The Section's annual report for the period 1975/76 was already prepared and submitted whereas reports for the years 1976/77 and 1977/78 are under preparation.

C. Deviation

- C.1 Due to the breakage of electrical generator and discontinuation of water supply plant and soil analyses were not conducted.
- C.2 The number of research trials increased as a result of the unexpected inclusion of pulses programme.
- C.3 The number of crop samples tested for quality increased from the original plan due to the increase in Beka seed obtained from farmers.

D. Problems

- D.1 There was negligence on the part of rural development agents in submitting correct metrological data in time. Besides, there was frequent breakage of metrological instruments.
- D.2 Delay of decisions from Project Direction & Personnel Section and failure of the Purchase & Stores Section in providing ordered materials was felt by the Section.

E. Inputs

E.1 Staff

The Section had three Ethiopian high level, nine Ethiopian Middle level and thirty-two other category staff.

E.2 Investment in Equipment

The Section purchased one diesel motor during the year.

E.3 Investment in Construcion

One big hall for discussion club was constructed and the cost was shared with the Seed Multiplication Section

3.2 Seed Multiplication Section

A. Goals

- Produce cleaned seed of improved varieties.
- Produce other grains for rotation purposes
- Efficient operation of Kulumsa and Assasa farms to enable the Section cover its costs.
- Help, when possible, farmers by providing machinery services.

B. Activities

B.1 1977/78 Crop Season Seed Production

A total of 988.8 has was cultivated for seed production purposes at both Kulumsa and Assasa farms. The acreage & yield for various crops is given below:-

No	Kulumsa Farm						Assasa Farm						
	Crop	Variety	Acreage(ha)		%	Yield Qt/ha	Crop	Variety	Acreage(ha)		%	Yield Qt/ha	
			Planned	Actual					Planned	Actual			
1	Wheat	6410 - 2	2.0	0.8	0.2	24.2	Wheat	Kanga	114.0	114.0	16.9	29.4	
		Mamba	69.0	69.0	19.6	11.9		Rommany B.C	121.0	121.0	18.0	29.8	
		Enkoy	49.5	65.1	18.4	26.4		Mamba	68.0	68.0	10.1	27.9	
		Romany B.C	30.0	30.0	8.5	23.5		Enkoy	36.0	36.0	5.3	41.7	
		K6399-3	-	0.5	0.1	23.3		Bulk6290	10.0	10.0	1.5	22.7	
2	Barley	Beka	55.0	55.0	15.6	15.4	Barley	Beka	114.0	114.0	16.9	15.4	
		Composite 29	13.1	13.1	3.7	16.3		Composite 29	5.0	5.0	0.7	22.4	
3	Maize	Parentinc (M)	6.0	0.4	0.1	21.9	Maize	Arusso II	2.0	2.0	0.3	27.1	
		Crossing H611(f)	5.0	0.5	0.1	24.3		C-63	1.0	1.0	0.2	27.1	
		H611	39.0	39.0	11.1	67.5		Katumani	37.0	37.0	5.5	30.0	
		Katumani	11.0	11.0	3.1	26.5		Rape	Target	44.0	44.0	6.5	15.0
		Alenaya Comp.	15.0	15.0	4.3	66.6		Teff	DZ-01-354	83.0	83.0	12.3	18.0
		Other	8.0	3.6	1.0	36.9		Horse B.	20 D	39.0	39.0	5.8	17.0
4	Rape	Target	10.0	10.0	2.8	10.8							
5	Teff	DZ-01-354	10.0	10.0	2.8	13.4							
6		Rhodes	-	-	-	25.8							
		Colombus	30.0	30.0	3.5	10.5							
		Colored GU	-	-	-	39.5							
		Total	352.6	353.0	-	-			674.0	674.0	-	-	

Of the total acreage at Kulumsa and Assasa, 50.1% (514.4ha) was under wheat, 18.5% (190.1 has.) under barley, 10.4% (106.5 has.) under maize, 5.3% (54 has) under rape and 9.1% (93 has) under teff. At Kulumsa and Assasa farms 13,837 qt of wheat, 3,021 qts. of barley, 4,005 qts. of maize and an insignificant quantity of other seeds were produced and only 14,197 qts. of cleaned seed were prepared. Besides this, about 6,000 qts. of malt barley which was purchased from farmers was cleaned and distributed to farmers.

B.2 Machinery pool Activities

During the year the following machine hours were done.

Operation	Kulumsa		Assasa		Others		Actual Total
	Planned	Actual	Planned	Actual	Planned	Actual	
Slashing	50	-	30	33	-	-	33
Ploughing	1200	1580	1500	1694	700	13	3287
Harrowing	600	815	1200	1133	150	23	1971
Fertilizing	100	134	150	319	100	4	457
Planting	200	179	350	48	150	4	231
Spraying	100	62	150	129	-	-	191
Harvesting	700	639	1500	1040	150	148	1827
Transportation	650	397	1300	789	500	188	1374

C. Deviation

A total of 295 has. of land for seed multiplication purposes was obtained from peasants' associations around Etheya and Gonde. This will help the project in the production of additional seed.

D. Problems

- D.1 Although the Section took over the above mentioned farms, budgetary problems were felt.
- D.2 The transfer of the machinery service unit to the seed multiplication section added a work-load.
- D.3 Since the machines of the unit were old and there was shortage of trained & qualified personnel (machine operators and mechanics) there was maintenance problem.
- D.4 Shortage of storing facilities, breakdown of electrical generator demand of cleaned malt barley by St. George Brewery, demand for machinery services outside the project area and breakdown of cleaning machines at Assasa have substantially hampered the smooth operation of the Section.

E. Inputs

E.1 Staff

The staff consisted of 1 Ethiopian high level staff, 6 Ethiopian middle level staff, 2 Farm Managers, 2 Assistant Farm Managers, 1 Chief Mechanic, 1 agro-Mechanic and 75 other category staff.

E.2 Investment in Equipment

A sum of Eth.Br. 10,000 which was intended for the purchase of a corn sheller, was transferred for the purchase of a tractor-model MF 185. Besides, one seed dressing machine and one seed cleaning machine were purchased.

E.3 Investment in Construction

One combine shed, at Assasa was constructed.

3.3 Forestry Section

A. Goals

- Study the silvicultural stand development and productivity of established plantation.
- Conduct trials on species and establishment techniques.
- Assess and analyse statistically all trial plots and prepare yield table.
- Prepare volume tables and farm factor for selected eucalyptus species.
- Silvicultural treatment, pruning and thinning of 80 has. of plantations at the project centre.
- Operation of nurseries for the production of 4,000,000 seedlings.
- Forestry extension activities, distribution of seedlings and survey of farmers' plantations.
- Training of research and nursery foremen.
- Render services to other sections.

B. Activities

B.1 Silvicultural stand development and productivity of established plantations

Five new permanent sample plots were established at the project centre for five species of Eucalyptus and pines.

B.2 Trials of species and establishment techniques

One espacement and species trials were established at Ashoka, a land use planning model area. Besides, five different species were included in the trial; and seven draught resistant species of acacia have been planted at Dhera for elimination trial.

B.3 Statistical Analyses of Sample Plots

In the annual assesment of permanent plots, the annual increment of every species with regard to height, age and volume were entered in the yield table chart.

B.4 Construction of Volume Tables and Farm Factor

The farm factor for five species were calculated and established as follows.

Species	Tree No.	Dbh	NFQ	AFQ	Tree Volume M ³	True Volume M ³	F.F.
Eucalyptus Globulos	1	22.50	0.5330	0.4890	0.8747	0.3525	0.4
	2	38.50	0.6600	0.6490	4.4005	1.8789	0.4
	3	33.50	0.5670	0.5500	2.8646	1.0494	0.4
	4	29.00	0.5820	0.5450	1.8164	0.6789	0.4
	5	31.00	0.7040	0.6670	2.0379	0.7941	0.4
Eucalyptus Saligna	1	17.50	0.6570	0.6290	0.4185	0.1862	0.4
	2	16.50	0.6670	0.6060	0.3507	0.1584	0.5
	3	17.00	0.6470	0.6180	0.4426	0.1947	0.4
	4	16.00	0.6560	0.6250	0.3619	0.1726	0.5
	5	17.00	0.6760	0.6180	0.4835	0.2067	0.4
Pines Patula	1	15.00	0.6330	0.5670	0.2562	0.1504	0.6
	2	14.00	0.7500	0.6790	0.2001	0.0971	0.5
	3	16.00	0.6880	0.6250	0.2513	0.1295	0.5
	4	13.50	0.6670	0.5930	0.1646	0.0854	0.5
Pinus Radiata	1	16.0	0.5625	0.5938	0.3217	0.1624	0.5
	2	21.5	0.6280	0.6050	0.6934	0.2881	0.4
	3	18.0	0.6110	0.6110	0.4886	0.2199	0.5
	4	20.5	0.6830	0.6590	0.6469	0.2733	0.4
	5	20.5	0.6590	0.6340	0.6436	0.3014	0.5
C.Lusitanica	1	18.5	0.5680	0.4320	0.3226	0.1340	0.4
	2	16.0	0.6250	0.5940	0.2513	0.0990	0.4
	3	19.0	0.6320	0.6050	0.4366	0.1831	0.4
	4	20.5	0.5850	0.5370	0.4027	0.1630	0.4
	5	14.0	0.6790	0.6430	0.1678	0.0812	0.5

Dbh = Diameter at breast height NFQ = Normal form quotient

AFQ = Absolute form quotient F.F = Form factor

B.5 Silvicultural Treatments

During the reporting period high pruning on two pine species namely, patula & radiata on 10 has., normal pruning on C. Lusitanica + P. Radiata on 20 has. and thinning of 30 has. of plantation have been done at the project centre.

B.6 Operation of Nurseries

A total of 3,271,000 seedlings were produced. Of this, 306,000 seedlings were produced at Robe nursery, 355,000 at Teferi Berhan, 600,000 at Assassa and 2,000,000 at Asella nurseries. About 40,900 and 214,925 seedlings were sold and given freely, respectively to other government and mass organizations.

B.7 Forestry Extension Activities

Information on the prevailing forest situation in the country and agitation on forestry development was disseminated and carried out through different media including audio-visual material. Survey of farmers' plantations for the 1977 planting season was also carried out.

B.8 Training of Nursery & Research Foremen

Sixteen nursery and research foremen were trained for a period of three months on basic forestry theory and practical courses.

B.9 Other activities

The Section has supplied 150 m³ of firewood to the Catering Section. The firewood was prepared from the 1977 thinning of plantations. The hedges and flower gardens at the project centre were managed and kept clean.

C. Deviation

Minor deviation was observed regarding the production of seedlings at Robe and Teferi Berhan nurseries which was attributed to inconveniences of transporting sand and forest top soil to these areas.

D. Problems

No significant problem was faced during the year.

E. Inputs

During the year the Section had 1 Ethiopian high level staff, 1 research assistant, 1 senior forestry technician, 1 assistant forestry extension co-ordinator, 1 nursery technician, 12 nursery foremen, 1 administrative assistant, 35 nursery workers, 12 gardeners and 1 driver.

3.4 Agricultural Engineering Section

A. Goals

- Identification of needs of agricultural tools, implements through general field surveys.
- Appraisal of available equipment and designs.
- Development of the above to suit local conditions.
- Development and testing of new prototypes which are either imported or manufactured locally.
- Assessment of local storage facilities, crop condition during storage and extent of damage in storage.
- Study means of producing gas from cow-dung.
- Identification of problem areas in soil conservation, drainage, water conserving and irrigation.

B. Activities

B.1 Soil Preparation For Drainage Trials

B.1.1 Sagure Drainage Trial

About 1.8 hectares of land has been cultivated at Sagure during the year in order to compare yields from various widths of cambers and trenches of tiles. Comparison of yields from different drainage systems has also been conducted.

B.1.2 Diksis Drainage Trial

Drainage trial on 2 has. of land has been conducted near the Diksis State Farm.

B.2 Erosion Trials

Two erosion trials have been conducted on areas under active erosion at Etheya & Bilalo.

B.3 Agricultural Implements

B.3.1 Seed Dressing Device

This is a simple device made from available materials and is used to treat seed before sowing in order to protect it against soil and seed born diseases.

B.3.2 Tile Molding Device

This device is made in order to enable the Section produce tiles necessary for its drainage trials. Tests on the device have shown that improvements should be made on the prototypes

B.3.3 Powder Measuring Device

Attempts were made to design a powder measuring device that can pack 'Beso' powder in plastic bags before it is sent to war fronts.

C. Deviations

- C.1 On request of the Farm Management Unit of the Animal Health and Breeding Department, the Section has designed camber beds on the water logged area of the lower side of the barn.
- C.2 The 22 cubic meter bio-gas digester constructed near ARDU's Livestock Farm was modified due to previous design failures.

D. Problems

- D.1 During the year there was a serious shortage of qualified personnel.
- D.2 Since the Section had not a head, it has faced the problem of arranging transportation facilities for its activities.

E. Inputs

During the budget year, the Section had one Ethiopian high level, two Ethiopian middle level and Seven OCS.

It invested one surveying instrument worth of Eth. Br. 6,000 two calculating machines worth of Eth.Br. 340.00 and two sleeping bags worth of Eth.Br. 220.00

4. Infrastructure Department

4.1 Road Construction Section

A. Goals

- Survey of roads.
- Construction and maintenance of roads.
- Advising and supervising in the construction of third class roads.

B. Activities

B.1 Surveying

About 50 kms. of road was surveyed.

B.2 Maintenance

Repair and maintenance of the Etheya-Huruta road, about 14 kms was done. Moreover, 15 kms of maintenance was accomplished on the Dhera-Sire road, about 35 kms. on the Meraro-Gobe road and 45 kms. on the Bilalo-Kersa road.

B.3 Construction

Twenty-three kms, of the Huruta-Robe road was completed while another 10 kms on the same road was basically completed except for dumping and laying of surface course. The Huruta-Robe road which is about 75 kms., was supposed to be completed during the budget year. Due to several problems, however, only 50 kms. was completed up to the budget year 1977/78. The remaining 25 kms. will be completed by the end of the next budget year. On the Dhera-Sire road about 10 kms. was cleared, graded and ditched. Drainage structures were also constructed on the same road.

B.4 Other Constructions

Construction of the Asela Stadium & excavation with D-7 dozer of the oil mill compound of ARDU were done during the year.

C. Deviations

Since the production targets envisaged in the annual work programme and budget were extremely unrealistic, major deviations were observed when comparing the accomplished production against the proposed production targets.

D. Problems

Although the project as a whole has faced a host of problems, it was the road construction programme that was seriously affected. The problems, as indicated below, were cumulative.

- D.1 There was an acute shortage of construction foremen, surveyors, mechanics, electricians and scania drivers.
- D.2 There was delay in the delievery of scania sparte from Sweeden. The Pedla Desta company which used to supply spare parts was practically non-operating.
- D.3 Delay in the delivery of gasoil, gasoline, lubricants and construction materials such as cement and steel.
- D.4 Aging of the scania fleet reduced their performance by about 40%. Unless new trucks are made available to reinforce the fleet, production will soon go down to unacceptable minimum. Use of scania trucks for other purpose has also aggravated the situation.
- D.5 Since there was not a qualified and experienced head for several years, the section seems disorganized and there has been indiscipline in the section.
- D.6 The 1977/78 budget proposal was poorly prepared and has hindered the recruitment of qualified and skilled personnel.

E. Inputs

1 cat, grader 120 for Eth.Br. 184,000.00 and 1 field welding machine for Eth.Br. 7,000.00 were bought. The Section had 1 Ethiopian High Level, 1 Ethiopian Middle Level 30 OCS. and 180 daily workers.

4.2 Water Development Section

A. Goals

- Construction of water supply facilities.
- Organize self-help schemes for community water supply.
- Running of Asella and Kulumsa water supply.

B. Activities

B.1 Survey and Design of Water Supply

Survey and design have been made for the following areas:-

- (i) Huruta water supply
- (ii) Sedika " " (Ticho)
- (iii) Adlle " " "
- (iv) Tibila water supply (Arbagugu)
- (v) Bele-Murkicha " (Chilalo)
- (vi) Siltana " (Ticho)

B.2 Construction of Water Supply

The following boreholes have been drilled during the 1977/78 budget year. The average depth, yield and cost is 77.2 meters, 7,040 litres and 15,000 Birr respectively.

No.	Drilling Site	Depth m.	Yield lt/hr	No.	Drilling Site	Depth m.	Yield lt/hr
1	Arboye (Arbagugu)	150	Dry	8	Billate (Sidamo)	61	6,000
2	Arboye (Arbagugu)	80	"	9	Sille (Gomugofa)	51	6,000
3	Tibila(Arbagugu)	130	3,000	10	Habe (Ticho)	37	3,000
4	Melkasa (Chilalo)	150	4,000	11	Buko (Ticho)	44	4,400
5	Bite (Chilalo)	94	4,000	12	Sedika(Ticho)	80	4,000
6	Mitto 1 (Shoa)	65	18,000	13	Watera(Ticho)	170	Poor
7	Mitto 2 (Shoa)	60	18,000	14	Mitto 3 (Shoa)	58	caved

B.3 Other Water Supply Schemes

At Sultana a spring box and public fountain with six faucets was constructed. It is estimated that about 2,000 people will be benefited from this scheme. At Sedika too, a 5 H.P. motor pump complete with 4,000 litres elevated tank has been installed to serve 2,500 people. Moreover, a 50,000 litres reinforced concrete reservoir was constructed at Bekcji and installation of a 5 HP motor pump has been partially completed at Adele.

Attempts were made to improve a 15,000 m³ pond for farmers around Nunu-Gure, but was not successful due to unexpected flood.

B.4 Household Well

One household well of 18m³ was constructed at Tena. It will be used for research follow up and human consumption.

C. Deviation

Since some of the deep wells dug were outside the Project Area, mobilization and other reasons reduced the efficiency of the section. The number of boreholes anticipated and the actual number drilled is shown below:-

No.	Activities	Target	Actual
1	Drilling of deep wells	18-24	14
2	Long term test pumps	13-19	2
3	Setting up of hand pumps	10-15	1
4	Errection of Wind Mills	1-2	-
5	Errection of Diesel pumps	4-6	2
6	Household wells	5-6	1
7	Dams or ponds	3-4	-
8	Pipeline	10.000m	170m
9	Spring	3-4	-
10	Treatment Plant	2-3	-
11	Reservoir	-	1
12	Manufacture of hand pump	-	1
13	Tanks	-	4
14	Water tower	-	1

D. Problems

D.1 Transport:

Shortage of vehicles, condition of existing vehicles and shortage of fuel were seriously felt.

D.2 Staff

The number of qualified personnel was very limited compared with what the section demands.

D.3 Materials and Spareparts

Shortage of construction materials and in availability of spareparts in the market posed problem.

E. Inputs

E.1 Staff

During the year the section had two Ethiopian high level, four middle level and forty-eight other category staff.

E.2 Equipment and Machinery

During the budget year a 15 HP motor, a 10HP motor and pump, a 3HP generator and a portable welding plant were purchased.

4.3 Building & Maintenance

A. Goals

- Construction of six stores for grain, seed and fertilizer.
- Construction of two district development offices with an area of 200m² each.
- Repair and maintenance of all ARDU facilities at the project centre and elsewhere.
- Minor constructions such as stables, sheds etc. as requested.

B. Activities

- B.1 Construction of a 250m² building for oil mill has been completed and all machinery and installations have been fixed.
- B.2 An old building has been remodelled into wood work and metal-work shops at Kulumsa for the Agricultural Engineering Section. Additional offices and a shed of G.I. sheet wall with a total area of 360m² have also been constructed.

- B.3 The central store has been extended by 50m² of concrete floor and G.I. sheet walls and roofing.
- B.4 The damaged sewer line from Club House to the Biological pond has been replaced by a new one of about 100 meters and diameter of 30 cm. cement pipe.
- B.5 Ten villas at the project centre and offices and residence at Bekoji and Koffle have been maintained and painted.
- B.6 Frequent repair and maintenance work of electrical installations and machines of work shops and seed cleaning machines at Kulumsa and Assasa has been done. Routine maintenance has also been done on electrical and sanitary installations.

C. Deviation

Construction activities mentioned in the 1977/78 work programme and Budget were not done. However, other construction activities which were not envisaged in the work programme such as the construction of metal workshop and Oil mill building were done.

D. Problems

Hiring of temporary workers had been a serious problem, because it ends up with misunderstanding and court cases when the programmed construction site is finished. There were also problems in the supply and transportation of construction materials.

E. Inputs

During the year the staff consisted of one Ethiopian High Level, One Ethiopian Middle Level and Twenty other category staff.

5. Animal Health & Breeding Department

5.1 Cattle Breeding Section

A. Goals

- Production and distribution of up-grade heifers to improve the breed of livestock in the project area with emphasis on milk yield.

B. Activities

B.1 Herd Management

At the beginning of the year the farm had 995 local and 1997 cross cattle. At the end of the period the composition of the herd was as follows:-

Local cows	=	477
Local heifers over one year of age	=	77
Local castrated bulls	=	72
Local 1-9 month old male calves	=	185
Local 1-9 month old female calves	=	<u>175</u>
	Sub-total =	<u>986</u>
50% cross pregnant & non-pregnant heifers	=	70
50% cross lactating cows	=	445
50% cross non-lactating cows	=	208
50% cross debilitated & sick cows	=	88
50% cross settled & non settled heifers	=	<u>907</u>
	Sub-total =	<u>1718</u>
25% cross male calves	=	162
25% cross female calves	=	180
25% cross female calves above 1 year	=	22
Bulls	=	2
Steers	=	<u>4</u>
	Sub-total =	<u>370</u>
	Grand Total =	<u><u>3075</u></u>

During the budget year 642 heads of cattle (of which 101 are 50% cross cows & heifers, 186 are local cows, 72 are local male calves, 50 are local female calves, 150 are 25% cross male calves and 83 are 25% cross female calves) were sold and 980 (325-25% cross female calves, 311 are 25% cross male calves, 154 local female calves and 190 local male calves) were born. Out of the total number of animals distributed to farmers 101 were 50% cross heifers. About 327 cattle were dead during the reporting period. This indicates a 9% mortality rate for the whole herd. Most of the dead animals were calves. The reason for such mortality rate was shortage of grass and other feed stuff.

Since the number of settled and non-settled 50% cross heifers is 907, the farm has enough heifers to distribute about 500 cross heifers annually for the coming two years. However, since the young 50% crosses are only two years of age and since insemination has started lately, distribution would be discontinued for about two years after distributing the 907 cross heifers which the farm has at present. Regarding milk production the farm obtained 178, 167 litres for above the anticipated amount. This was due to unnecessary calving of heifers which were supposed to be in the hands of farmers.

B.2 Pasture Management

Due to the fact that the farm's size has decreased from 3,600 has. to 1,800 has. and since there was an acute shortage of wheat bran, noug cake and other supplementary feedstuff, establishment of grass species which have high nutritive value was felt essential. Thus, the following have been established.

1. Lolium	=	7.0	haectares
2. Cocks-foot	=	2.5	"
3. Fodder-beet	=	10.0	"
4. Kale	=	1.0	"
5. Oats	=	22.0	

In addition to this 300 bales of oat hay, 200 bales of grass hay and 7,000 bales of teff straw were produced. Moreover, the dispute between the surrounding farmers' association and the farm which has hither to hampered the farm's smooth operation was resolved, fences and grazing land was respected and rotational grazing practice was commenced.

B.3 Veterinary & A.I. Services

Artificial insemination service which was discontinued for the past two years has been started. A total of 888 cows have received A.I. service, 5,099 vaccinations (265 against rinderpest, 2,945 against blackleg and 1,889 against foot & mouth disease) have been done and 1,404 heads of cattle have received curative veterinary services.

C. Deviation

C.1 Distribution of Heifers

Out of the planned annual distribution of 500 cross heifers only 101 were distributed to farmers. The target could have been accomplished, had distribution started earlier. The reason for the delay was that the Livestock Development Committee had to prepare a new livestock development programme and revise the price of cross heifers.

C.2 A.I. Service

Out of the planned 6,000 artificial inseminations only 1,000 were done. This was due to the breakage of the project's liquid nitrogen plant.

D. Problems

Pregnant cross heifers which were supposed to be in the hands of farmers calved on the farm leading to increased herd size on a tremendously reduced farm. This necessitated more labour for partial intensification of the farm and for milking activity.

E. Inputs

E.1 Staff

The Section had one Ethiopian high level, two Ethiopian middle level (a farm manager & animal health assistant) and 134 other category staff. Moreover, due to the problem the Section faced during the year, a minimum of 100 daily workers were employed daily to supplement the permanent staff.

E.2 Investment in Construction

Two office rooms for the manager and cashier were constructed. Minor constructions such as night enclosures, farm roads & bridges were also constructed.

5.2 Animal Research Section

A. Goals

- Conduct various trials on local and cross cattle, poultry.
- Produce lambs, cross calves and chicken.
- Record milk production of every cross cow every 21 days.
- Establish new grass land and grow oats & fooder beets.
- Manage both local and cross cows, calves, bulls, ewes, rams, lambs and poultry.
- Manage 200 hactares of farm land.

B. Activities

B.1 Dairy Cattle

To improve the quality of livestock and livestock products ARDU has been undertaking breeding programme between exotic bulls and local cows and the performance of cross cows with regard to milk production has been very satisfactory. It has also been observed that age at first calving of 50% F_1 (Friesian x Arssi) crosses was smaller than F_2 (F_1 x F_1) and 75% Friesian crosses (Friesian (Friesian x Arssi) as shown in the following table.

Cross	Age at first Calving (Months)	First Lactation Milk Production (lts)	Lactation Lengh (days)	Calving Interval (Months)
F_1 : Friesian x Arssi	28.42 ± 0.34	1779.49 ± 68.33	420.53 ± 15.25	14.43 ± 0.37
F_2 : Friesian x Arssi	38.4 ± 1.15	1403.22 ± 195.02	261 ± 36.66	-
Fr(Friesian x Arssi	32.04 ± 0.51	1850.42 ± 58.61	291.68 ± 7.30	-

B.2 Sheep Breeding

Sheep product in the country is very low when compared with the sheep population. To help increase sheep product ARDU started breeding programme a long time ago with the aim of increasing lamb growth rate, better ewe mothering ability and milking capacity and increasing lambing percentage.

During the budget year breeding season lasted 5-6 weeks (from 31/10/77 - 9/12/77) and lambing time was from 25/3/78 - 2/5/78.

The time of breeding was deliberately adjusted so that lambing can take place during the short rainy season. 173 lambs (47: 25% crosses of different breed 15: local Arssi lambs) were born. Birth weight data were taken right a birth time whereas weaning weight was recorded at 120 days of age.

Relatively good rams and ewes were selected on the basis of weight at 120 days and the rest were sold for slaughter.

Following is the performance of lambing and mothering ability of different breeds.

Breed	Lambing Percentage	Mean age of ewes (yrs)	Birth weight (kg)	Weaning weight (kg)	Remark
Arssi	1.02	5.6	3.6	14.1	
BDM x AR	1.40	5.3	4.8	17.9	
BDM x BDM x Ar	1.00	3.6	4.6	17.8	
HM x HM x Ar	1.00	3.2	4.9	19.5	
BDM x HM x Ar	1.00	2.0	3.6	18.9	
Ar x HM x Ar	1.10	4.5	3.9	17.6	
HM x Ar	1.20	5.0	3.5	18.8	
Breeds of the ram	Breed of ewes	Birth weight (kg)	60 days weight (kg)	120 days weight (kg)	Remarks
Hampshire Merion	Arssi	3.50	10.2	15.3	
" "	BDM x Ar	5.30	16.6	23.6	Single
" "	BDM x Ar	4.15	9.1	14.8	Multiple
" "	Ar (HxMxAr)	3.90	12.8	18.3	Single
" "	Ar (HxMxAr)	3.50	6.5	14.5	Multiple
" "	HxM(Corr.xAr)	4.10	14.0	20.7	
Bieu Demaine	Arssi	4.40	10.5	15.3	Single
" "	Arssi	2.00	6.8	11.0	Multiple
" "	H x M x Ar	4.70	14.8	20.7	Single
" "	H x M x Ar	3.60	10.1	14.1	Multiple
" "	HxM(HxMxAr)	5.10	17.0	23.3	
" "	BDM (BDM x Ar)	4.60	14.0	17.7	
Ar(Bonga x Ar)	H x M x Ar	4.60	13.6	19.3	Single
" "	H x M x Ar	3.30	10.3	15.5	Multiple
" "	BDM x Ar	4.70	16.1	22.0	Single
" "	BDM x Ar	3.80	10.6	15.0	Multiple
Local Arssi	Arssi	3.50	10.3	14.2	Single
" "	Arssi	1.50	6.2	9.7	Multiple
" "	HxM(HxMxAr)	4.50	15.1	20.6	Single
" "	HxM(HxMxAr)	2.70	10.0	13.5	Multiple
HxMxHxM(HxMxAr)	Arssi	2.50	7.8	11.7	
	HxM(Corr.xAr)	3.80	12.2	17.3	

BDM = Blue Demaine AXM - Hampshire x Merino Corr. = Corriedale Ar = Arssi

B.3 Milk & Hay Production

During the year 267,286.6 litres of milk and 220 tons of grass was produced.

C. Deviation

Goat raising and beef fattening programme did not materialize due to shortage of staff.

D. Problems

There was delay of ordered goods

E. Inputs

E.1 Staff

The staff consisted of one Ethiopian High Level, three Ethiopian Middle Level and 76 other category staff

E.2 Investment in Equipment

An incubator with a capacity of 750 egg setting was purchased.

E.3 Investment in Livestock

Five pure Friesian bulls were purchased from Sweden.

E.4 Investment in Construction

Hotchery, brooding and growers' house was constructed.

5.3 Veterinary Section

A. Goats

- Investigate animal diseases in the project area and formulate strategy of reducing the rise of diseases.
- Give laboratory services to the Staff Clinic, Livestock Research, Water Development Section and Gobe Farm.
- Undertake preventive & curative measures through which animal health should be maintained to the maximum standard.
- Teach stock-breeders about livestock disease, disposal of dead animals and early reporting system.
- Up-grade local cattle by providing artificial insemination service.
- Produce deep-frozen semen from pure and cross-bred bulls.

B. Activities

B.1 Animal Disease Investigation

Periodic serology tests for the control of brucellosis, milk hygiene control, mastitis test and control of water hygiene have been carried out. Daily parasitological and bacteriological examinations, meat inspection, autopsy and sensitivity tests have also been done. The number of samples examined for this purpose is given here-under

Activity	Human	Camel	Horses Mules & Donkeys	Sheep & Goats	Poultry	Dogs & Cats	Water	Total
Parasitology	13	1186	67	327	58	5	-	1656
Bacteriology	19	164	8	16	26	-	-	233
Mastitis	-	1229	-	-	-	-	-	1229
Postmortem	-	35	2	22	50	2	-	109
Water hygien	-	-	-	-	-	-	141	141
Total								3368

Besides 5,013 parasitological samples were examined and 2,390 samples of meat (1228 antmortem & 1162 postmortem) were inspected.

B.2 Veterinary Field Operation

B.2.1 Rinderpest

The disease has been reported throughout the whole administrative region. In Chilalo alone there were 68 calls for rinderpest outbreaks during the budget year and most of them have shown typical symptoms.

The distribution of outbreaks was as follows.

July	0	November	11	March	3
August	4	December	4	April	6
September	6	January	5	May	5
October	11	February	7	June	6

It can be seen that the highest number of outbreaks occurred in October and November and the lowest in July and March.

B.2.2 Anthrax

Anthrax has been reported in the lowland areas. In Chilalo there were 60 reports as follows:-

July	6	November	4	March	10
August	3	December	9	April	2
September	5	January	4	May	5
October	3	February	2	June	7

B.2.3 Black Leg

The total number of outbreak reports in Chilalo was 77 as shown under:-

July	12	November	3	March	3
August	5	December	9	April	3
September	5	January	7	May	7
October	10	February	7	June	6

B.2.4 Sheep-pox

During the budget year 76/77 the disease occurred mostly in Chilalo Awraja. This year, however, it has been reported in all of the project Area.

B.2.5 African Horse Sickness

During the past years the disease occurred in the lowland areas of Zuway & Dugda. This year it has also been reported in Ticho Awraja. The vaccine was produced at DEBrzeit and the antibodies level of those vaccinated has shown satisfactory results 9 months immunity according to Debre-zeit reports. It is hoped that the disease can be controlled if intensive vaccination programmes are arranged.

B.2.6 Pasturellosis

The number of outbreaks in 1977/78 has increased compared to that of 1976/77. In Arbagugu 'Awraja' there were light outbreak reports in only one 'Wereda'-Merti in January and one in March. There was also an outbreak report in Koffele 'Wereda' near the boarder with Bale in January.

B.2.7 Rabies

Hundreds of stray dogs are seen in certain towns of Arssi and during the reporting period four children have died in Koffele. Although there is no data at hand on the number of victims it is told that death report is high. Thus, the Section has killed a few hundred unvaccinated stray dogs as a measure against rabies. The total number of animals vaccinated against various diseases was 86,762.

B.3 Curative services

The commonest internal parasites in the region are liver fluke, tape worms, lung worms, Haemonchus and ascaris whereas external parasites like ticks are rare except in the lowland areas. The number of animals treated against various animal diseases is shown in the table below.

Treatment Manipulations	Development District			
	Robe	Dhera	Koffele	Bekoji
Infectious diseases	1149	690	557	356
Hekminthes	4417	1047	5018	5076
External parasites	2212	1777	71	214
Non infectious	-	48	-	283
Castration	586	307	145	271
Surgical	19	-	-	18
Protozoa	665	-	-	586
Total	9048	3869	5791	6834

B.4 Artificial Insemination

During the budget year a total of 258 natural matings and artificial inseminations have been done on 178 started cows and heifers at the project's Livestock Research Section. Out of these 121 were found to be pregnant. Actual pregnancy rate was 68% while the N.R. 60-90 days rate was 75%. The difference i.e. 7% indicates that the level of management at the Livestock Farm was good. Detail of monthly activities at the farm is given below.

Month	Number of Inseminations	First Inseminations	Pregnancy Check		Treatment
			No. of animals checked	No. of positive animals	
July	6	2	-	-	-
September	-	-	-	-	-
October	-	-	5	5	-
November	28	24	-	-	-
December	45	31	-	-	20
January	24	12	-	-	-
March	30	15	24	14	-
April	46	17	45	33	-
May	34	6	-	-	-
June	19	2	40	30	-
	26	11	64	39	-
Total	258	120	178	121	-
		63%		68%	

Among 120 animals that were served only once, 108 have been checked for pregnancy test and 68 were found to be pregnant. The 63% conception rate shows a good performance of animals regarding reproduction. In addition to this, regular A.I. run which was interrupted for a longer period was put into operation at the end of February 1978. Since then a total of 187 inseminations were done on 112 farmers' animals. The NR 60-90 days rate was 67%. As farmers benefiting from the service were not cooperative in bringing their inseminated animals for pregnancy check-ups the Section lacks information on the actual conception rate. Among the inseminated animals two were treated for infertility.

During the year, 21 new crushes Koffele Development District and 6 crushes between Asella and Etheya were erected. Since the number of participants in the A.I. programme is very low, campaigns were carried out to encourage farmers to obtain utmost benefit from the programme. In certain areas peasants' associations have established Livestock Development Committees.

The number of inseminations done through regular A.I. run is shown in the following table:

Month	No. of Inseminations	First Inseminations	NR60-90 days rate(%)	Treat-ment	No. of Animals Checked	No. of Positive Animals
February	3	3	50	-	-	-
March	33	30	80	2	12	7
April	50	40	57	-	-	-
May	66	40	72	-	-	-
June	35	16	79	-	-	-
Total	187	129	67%	2	12	58%

B.5 Liquid Nitrogen and Semen Production

B.5.1 Liquid Nitrogen

Production of liquid nitrogen started late January, 1978 and the total production was about 3,935 litres of which 1,295 litres were sold to the following agencies.

<u>Agency</u>	<u>Quantity Sold(lts)</u>
Dairy Development Agency(DDA)	495
Institute of Agricultural Research(IAR)	695
Wolaita Agricultural Dev.Unit (WADU)	105
	<u>1,295</u>

The remaining was consumed by the project as follows:

A.I. run	60 lts
Livestock Research Section	80 "
Gobe Cattle Breeding Section	700 "
Semen Laboratory (freezing & Storage)	750 "
Wastage (Evaporation)	150 "

B.5.2 Semen

Semen collection and processing was put into effect in February 1978 after a long period of interruption. Within a period of five months 6,340 doses of semen were prepared. Nearly 1,500 doses were used for A.I. service, Livestock farm and Gobe Cattle Breeding Section.

C. Deviation

C.1 Surveying of Animal Diseases

Animal disease survey programme was not completed due to shortage of fuel & vehicles and lack of trained laboratory veterinarian.

C.2 Out of the anticipated production of 18,000 doses of semen only 6,340 were produced. However, since the demand was less than what was produced the Section did not encounter any problem due to the failure in goal fulfilment.

C.3 The targets for insemination and pregnancy diagnosis which were 3,000 and 1,500 respectively were not also achieved. The actual work done in this regard was far below the planned. The reasons for such considerable deviations were the interruption of artificial insemination service for a longer time and delay of hydrogen gas supply from abroad.

D. Problems

D.1 There was shortage of laboratory and medical supplies.

D.2 Acute shortage of vehicles for Asella-Kersa daily A.I. run.

D.3 The chiller at the Liquid Nitrogen Plant had problem with regard to heat exchange mechanism.

E. Inputs

E.1 Staff

The Section had three Ethiopian high level, twelve Ethiopian middle level and thirty-nine other category staff.

E.2 Investment in Equipment

Refrigerators, tents, surgical instruments and other equipment of field operation have been purchased.

E.3 Investment in Construction

A sum of about Eth. Birr 11,700 has been spent on the erection of crushes along the Asella-Bekoji, Asella-Etheya roads and Koffele.

6. Common Services Department

6.1 Personnel Section

A. Goals

- Recruitment & selection of staff.
- Maintenance of conducive atmosphere among employees.
- Evaluation of staff for the purpose of salary increment, promotion, proper placement, training, warning, improving Departments'/Sections' efficiency.
- Coordination of training and general welfare of all staff.
- Maintain proper and upto date personnel information.
- Provision of housing facilities based on the Projects' housing regulation.
- Carry out routine personnel matters such as administration, provision of medical services, annual leaves etc.

B. Activities

According to vacancy reports submitted by departments and sections five Ethiopian high level, seven Ethiopian middle level and 179 other category staff were recruited. On the other hand six Ethiopian high level, four Ethiopian middle level and 22 other category staff have resigned during the year. Several staff from the Industry Promotion Section and Transport & Garage Section have been sent to the National Productivity Centre (NPC) for training.

The Section has been engaged in routine administrative works such as transfer, promotion, termination, disciplinary measures, correspondence etc.

C. Deviation

Up-to-date personnel records were not kept and manpower survey and training arrangement were not done.

D. Problems

Departments and Sections were employing temporary workers without consulting the Personnel Section. They also transferred staff without the Section's knowledge and this has created problem in record keeping.

Delay in fulfilling the requirements for joining the Civil Service Commission has created problem as to whether the Project's employees should be administered according to CSC regulations or Labour Proclamation.

E. Inputs

E.1 Staff

The section had one Ethiopian high level, two Ethiopian middle level and two other category staff. At the middle of the year, however, one Ethiopian middle level staff left the section for higher Education.

E.2 Investment in Equipment

Two shelves and a notice board worth of 895 Br. and 255 Br. respectively, were purchased.

6.2 Purchase & Stores Section

A. Goals

- Purchase and supply goods and services to all Department and Sections of the Project.
- Order, receive, store and issue various stock and non-stock and establish proper record keeping system both for stores and purchasing activities.

B. Activities

B.1 Local Purchases

99% of our local purchases have been carried out in and around Addis Ababa by local purchase unit. Purchase of spare parts for vehicles, tractors, combine harvesters, building and electric materials, food stuff, medicines and pharmaceutical instrument, fuel, oil and lubricants has been the major activities during the reporting period.

The monthly average purchase Value of some locally purchased items during the budget year has been as follows:-

1. Spare parts	111,000.00
2. Fuel, oil and lubricant	52,000.00
3. Building materials	31,644.00
4. Stationery	17,700.00
5. Medicine & pharmaceutical instruments	15,168.00

As can be seen from the above given figures, the monthly average purchase value of spare parts is almost double the figure given for the same item for 76/77. There are two factors which contributed to this increase.

- a) Continuous price increase during the budget year.
- b) Uneconomical usage of parts within ARDU which led to purchases of parts in large quantities. Purchase of uniforms and other working clothes which amounted to 98,000.00 Birr has also been carried out by the local purchase unit. The annual purchase expenditure on various locally purchased items amounted to three million Birr during the reporting period.

Purchase of repair and maintenance services has also been rendered by the Section to those Departments and Sections which were in need of services. The major repair and maintenance service purchases were for Catering, Transport, Seed Multiplication and Road Sections. Repair of nine big refrigerators, among many for about 5,000.00 Birr including materials for Catering Section which would have cost the Section around 36,000.00 Birr for the purchase of similar but new refrigerators. Repair and maintenance of engine blocks, vehicles, tractors and combines' motors and crank shafts, to mention a few, have been among major services purchased for Transport, Seed Multiplications and Road Sections.

B.2 Foreign Purchases

The Foreign Purchase Unit has placed orders for Scania spare parts amount to 51,400 Birr, spare parts for liquid Nitrogen Plant, Hydrogen Gas, various Veterinary medicines and Laboratory equipment with foreign suppliers. Transfers of purchase value for the above goods to foreign suppliers have been arranged through banks either by letters of Credit or by Cash against documents. About eight to ten applications for foreign currency have been prepared and submitted to Foreign Exchange Department for permission to import goods that ARDU required during the budget year.

The foreign purchase unit has also prepared Customs Declarations for the receipt of six (6) Yamaha Motor cycles with their spare parts, complete work shop equipment, drilling tools and some other goods.

Insurance coverage for all imported goods has also been obtained locally.

Total annual expenditure on imported goods amounted to 160,000 Birr for the period.

B.3 Stores

Central Store has maintained about 6,000 different items and supervised issues and receipts of these items. The major stock items are spare parts, building materials, fuel, oil and lubricants and electric materials. Central Store has received non-stock items and distributed to user departments and section concerned after necessary store documentation.

Receipts and issues of all items have been documented by the store. The Store has also been responsible for the despatch of various repairable equipment to Addis Ababa purchase unit for repair and distribution of same after separation.

Almost all requests for materials have passed through Central Stores to purchase units in order to avoid double purchasing and material wastage. Central Store has kept receipts and issues records of five fuel stations. Though day-to-day activities of these stations have been under the direct control and supervision of user sections.

In addition to passing requests from different sections over to purchase units, central store has also initiated orders for stock items based on minimum/Maximum levels.

C. Deviations

Although no major deviation is noted, the requesting sections have not been kept informed about their requests as required. Delays in delivering requested items when and where they were required could not be avoided though minimized. Since purchase situation reports have not been effective in giving informations to requesting sections, telephone services were used directly by the purchase unit or stores for information on purchases

Due to day-to-day price fluctuations, price surveying has not been effective except for some items.

D. Problems

D.1. Internal

D.1.1 Requesting sections have no either short or long term planning for purchases. Almost every purchase request has demanded a very short delivery time which could not met by the purchase & Stores Section. Most of the requests particularly for imported goods have been by airfreight which is shorter than sea freight but expensive.

D.1.2 Requesting section have no proper materials' mangement which enable them to learn how materials could be re-used or when and how requests are made.

D.1.3 Absence of constant cash flow at Addis Ababa Purchase Unit. Over 70% of local purchases have been on cash basis as a result of suppliers' refusal of credit terms.

D.2 External

Acute shortage of required materials in the market. Suppliers and local agents have not regularly replenished thir stocks. Requests could not be met on time even for ordinary items as a result of this major suppliers have refused to grant credit terms. Some have given us a short credit facility ranging from ten to fifteen days for those goods which have less demand in the market.

E. Inputs

Purchase & Stores Section has one EHL, one EML, 4 OCS and 4 temporary workers during the reporting period.

6.3 Transport and Garage Section

A. Goals

- Co-ordination and supply of transport facilities including maintenance repairing of vehicles and equipment.

B. Activities

B.1 The Garage Unit

The Garage Unit has repaired the Project's vehicles which had been referred to it as the result of partial break-downs, accidents and scheduled inspection. In the year 77/78 three Toyota Shortbase, four Toyota pick up, five standard vehicles, five Mercedes Trucks, four Buses and one Tractor were panel beated, one Land Rover, three Trucks, seven Standard, eleven Toyota vehicle engines were overhanled. Six Toyota vehicles engines were top overhauled. Six hundred minor inspection tyre repair washing and greasing were completed. Seventy private ARDU employees' vehicle and one hundred forty one Government, Projects and Farmers Associations vehicles were repaired and engine overhauled.

B.2 Transport Unit

The Unit which was mainly administered by an officer has been engaged in the arrangement of utilization and control of the Project vehicles. Total utilization of A.R.D.U's vehicles during 77/78 was 2,100,000 kms.

C. Deviation

Less utilization of vehicles has been noted during the reporting period. This was mainly as the result of fuel shortage.

D. Problems

The miss-use and bad handling of Project vehicles and the prevailing shortage of spare part and 10 Toyota and Truck drivers have conditioned the lagging of the activities of Section.

E. Inputs

There were 3 Ethiopian high level, 3 middle level and 66 other category staff during the reporting period. During the period 10 other category staff have been sent to the NPC Training Center in Auto Electric, Pavel Beating & Welding and Auto Mechanic fields. Two Truck drivers had resigned.

6.4 Staff Clinic

A. Goals

- To promote and maintain the health of the Project employees.
- To extend curative and preventive medicine to the families of the Project employees.
- To provide routine medical examinations to new employees.
- To give health education for extension trainees.

B. Activities

A grand total of 28,160 patients were visited in the Budget Year. Out of this 18,357 were new patients and 9,803 were repeat patients. From the total number of patients 11,262 were visited in the main Staff Clinic at Asella, and the rest were visited in the Peripheral Clinics (i.e. Gobe Staff Clinic (4819), Kulumsa Staff Clinic (5749) and Huruta Staff Clinic (6330)).

The common diseases seen were infective and parasitic diseases, respiratory tract diseases, digestive system diseases and neurological problems.

In addition to the above activity a total of 921 laboratory examinations were done. 689 medical certificate was given for the Project employees. Frequent supervision of the peripheral clinics was made. The Staff Clinic has run Family Planning Programme for about 110 women most of which are the wives of the Project employees.

C. Deviations

No major deviation was seen.

D. Problems

1. The clinic suffered from shortage of auxiliary personnel.
2. The pressing problem of shortage of space in both the main and peripheral clinics has not been solved. The Section deems it inappropriate to treat patients in the space condition as prevalent in the main clinic.

E. Inputs

The section had one health officer, one registered nurse, one junior Lab. technician, 4 health assistants, 5 junior health assistants and 2 cleaners.

7. Finance Department

7.1 Accounts Section

A. Goals

- Keep in custody ARDU's Cash, cheques and financial documents.
- Receipts and disbursements of funds.
- Keep accurate records for all financial documents (General and Cost Accounts)
- Prepare payrolls for all permanent employees.
- Prepare interm statements every 3 months.
- Prepare financial statements once a year.

B. Activities

In spite of the fact that Accounts Section has not closed its accounts for two years for various reasons, the section has kept in custody ARDU's Cash, Cheques and financial documents, kept records for all financial documents in compliance with the accounting principles (General & Cost), received and paid funds, prepared payrolls for all permanent employees with the exception of Gobe Cattle Breeding and prepared interim statements every 3 months.

C. Deviation

The Projects Accounts has not been closed for the last two years.

D. Problems

The involvement of our staff members in Kebeles' activities and the non-recruitment of Finance Department Head for almost a year are the major problems that lag the section's activities behind.

E. Inputs

The section consisted of one high level staff, eight middle level staff and four other categories staff.

LIST OF CADU/ARDU PUBLICATIONS

A. PROJECT PREPARATION PERIOD

1. Report No. I - On the Establishment of Regional Development Project in Ethiopia, October, 1966.

Part	I	General Background
"	II	Project Outline
"	III	Appendices

(A reprint of the Summary is also available.)
2. Report No. II - On the Establishment of Regional Development Programme in Ethiopia, May, 1967. (The building programme appears under separate cover.)
3. Trials and Demonstration Plots at Kulumsa in 1966, July, 1966.
4. Reconnoitering Survey of the Water Resources in Chilalo Awraja by Carl-Gosta Wenner, March, 1967.
5. Creation of a Forestry Administration in Arssi Province by Gunnar Poulsen, March, 1967.
6. Crop Sampling in the Chilalo Awraja 1966, Plant Production Department, May, 1967.
7. Results of Trials and Observation Plots at the Kulumsa Farm in Arssi Province, Crop Production Department, May, 1967.
8. Sagure, a Market Village in Ethiopia by Bo Wickstrom, June, 1967.
9. Forestry Nursery and Planting Techniques by Gunnar Poulsen, June, 1967.
10. Trials and Demonstration Plots at the Seed Improvement Station, Kulumsa and Swedish Mission, Asella in Arssi Province, Regional Development Project, July, 1967.
11. Grain Marketing Experiment in Arssi by Lars Leander, August, 1967.

B. IMPLEMENTATION PERIOD (CADU Phase I & II)

1. Plan of Operation for Regional Agricultural Development in the Chilalo Awraja, Arssi Province, Ethiopia, 1967-1970.
2. Some Reflections on Water Erosion in Chilalo Awraja by Gunnar Poulsen, October, 1969.
3. The Taungya Afforestation Method by Gunnar Poulsen, November, 1967.
4. Grow Better Bahir-Zaaf in Ethiopia by Gunnar Poulsen, January, 1968.
5. CADU Semi-Annual Report 1967/68, January, 1968.
6. Census in Sagure-Yeloma 1967 by R. Eksmyr, February, 1968.
7. The Changing Rural Society in Arssi Land: Some Findings from a Field Study 1966-67 by A. Lexander, March, 1968.

8. CADU (Pamphlet in English and Amharic).
9. CADU Plan of Work and Budget 1968/69 (with preliminary estimates for 1969/70).
10. Cultivation Practices and the Weed, Pest and Disease Situation in Some Parts of the Chilalo Awraja by Bo Bengtsson, March, 1968.
11. Introductory Agro-Botanical Investigations in Grazed Areas in the Chilalo Awraja by Sigurd Hakansson, June, 1968.
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