PROCEEDING OF THE NATIONAL SYMPOSIUM ON ENHANCING ECONOMICGROWTH THROUGH LIVESTOCK DEVELOPMENT IN ETHIOPIA

University of Gondar
Faculty of Veterinary Medicine
June 7-8, 2013, Gondar

Sponsors

USAID
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Proceedings of the First National Symposium
On
“Enhancing Economic Growth through
Livestock Development in Ethiopia”

Main Themes:

1. Contribution of Livestock in Ethiopian Economy
3. Animal Health Professionals Development in Ethiopia

Organized by:
The Faculty of Veterinary Medicine
University of Gondar

Editors: Dr. Legesse Garedew
Dr. Achenef Melaku
Dr. Tamiru Berhanu
Dr. Wassie Molla

External Editor: Professor Gatechew Abebe

June 7-8, 2013
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Dr. Tamiru Berhanu

Mr Tadegegn Mitiku

Student Takele Adugna

Dr. Wassie Molla

Mr Muhamed Yesuf Adem
ACKNOWLEDGEMENTS

The organizing committee expresses its deepest gratitude to those who contributed directly and indirectly to the successful delivery of the symposium. In particular, the committee wishes to thank Dr. Bewket Siraw, Dr. Wondossen Asfaw, Dr. Berhanu Admassu, and Professor Getachew Abebe.

This symposium would not have happened without the generous financial support from the United States Agency for International Development (USAID) Ethiopia, the Food and Agriculture Organization (FAO) Ethiopia Branch, The Donkey Sanctuary, and the National Veterinary Institute (NVI).

Finally, the committee wishes to acknowledge the University of Gondar and staff members of the Faculty of Veterinary Medicine (FVM) for unreserved commitment and devotion for successful accomplishment of the symposium.
<table>
<thead>
<tr>
<th>Acronym</th>
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<tbody>
<tr>
<td>AHA</td>
<td>Animal Health Assistant</td>
</tr>
<tr>
<td>BSc</td>
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<tr>
<td>BVSc</td>
<td>Bachelors of Veterinary Science</td>
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<td>CSA</td>
<td>Central Statistical Authority</td>
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<tr>
<td>DVM</td>
<td>Doctor of Veterinary Medicine</td>
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<td>Ethiopian Veterinary Association</td>
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<td>Food and Agriculture Organization</td>
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<td>FVM</td>
<td>Faculty of Veterinary Medicine</td>
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<td>GTP</td>
<td>Growth and Transformation Plan</td>
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<td>HEI</td>
<td>Higher Education Institute</td>
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<td>HERQA</td>
<td>Higher Education Relevance and Quality Assurance</td>
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<tr>
<td>IGAD-LPI</td>
<td>IGAD-Livestock Policy Institute</td>
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<td>ILRI</td>
<td>International Livestock Research Institute</td>
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<td>MoA</td>
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<td>National Veterinary Institute</td>
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<td>OIE</td>
<td>World Organization for Animal Health</td>
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<td>PVS</td>
<td>Performance of Veterinary Services</td>
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<td>SPS</td>
<td>Sanitary and Phytosanitary Measures</td>
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<tr>
<td>TLUs</td>
<td>Tropical Livestock Units</td>
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<tr>
<td>TVET</td>
<td>Technical Vocational Education and Training</td>
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<td>UN</td>
<td>United Nations</td>
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<td>USAID</td>
<td>United States Agency for International Development</td>
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<td>VLUs</td>
<td>Veterinary Livestock Units</td>
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<td>Veterinary Service</td>
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<td>VSB</td>
<td>Veterinary Statutory Body</td>
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<td>WVA</td>
<td>World Veterinary Association</td>
</tr>
</tbody>
</table>
TABLE OF CONTENTS

TITLE PAGE..........................................................................................................................................................1
ORGANIZING COMMITTEE MEMBERS...................................................................................................II
ACRONYMS...........................................................................................................................................................IV
SYMPOSIUM SCHEDULE.....................................................................................................................................VI
Brief Introduction to the Faculty of Veterinary Medicine.................................................................1
Executive Summary.............................................................................................................................................4
Welcoming Speech...............................................................................................................................................5
Opening Remarks.................................................................................................................................................7
Opening Speech.....................................................................................................................................................9
THEME I...........................................................................................................................................................11
The Role of Livestock for Ethiopian Economy Development.................................................................12
The Contribution of Livestock to the Ethiopian Economy...........................................................................17
Some Perspectives on the Funding of Animal Health Services in Ethiopia............................................27
Contribution of Poultry for Ethiopian Development...................................................................................37
THEME II............................................................................................................................................................54
Animal Health and Its Multidirectional Contribution in Ethiopia ............................................................54
Animal Health Service in Ethiopia.................................................................................................................55
Animal Health and Its Multidimensional Contribution..............................................................................58
Veterinary Service Opportunities and Challenges in Reference to Tigray Region and Future Trends of Veterinary Medicine in Ethiopia.................................................................71
Privatization of Veterinary Services in Ethiopia..........................................................................................86
Constraints in Animal Health Service Delivery and Sustainable Improvement Alternatives in North Gondar........................................................................................................................................98
THEME III ........................................................................................................................................................120
Animal Health Professionals in Ethiopia.................................................................................................120
Animal Health Professional Development in Ethiopia..............................................................................121
Veterinary Manpower in Ethiopia.................................................................................................................128
Quality Education in Veterinary Medicine: Status, Future, and the Way Forward..................................145
Current Supply and Demand of Animal Health Professionals in Ethiopia...........................................154
Conclusion and the Way Forward.................................................................................................................167
Closing Remark................................................................................................................................................174
# SYMPOSIUM SCHEDULE

National Symposium on “Enhancing Economic Growth through Livestock Development in Ethiopia”

The University of Gondar, Science Amba Hall

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Presenter(s)</th>
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<tbody>
<tr>
<td><strong>Day 1: June 7, 2013</strong></td>
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<tr>
<td>8:30 - 9:15 am</td>
<td>Registration</td>
<td>The University of Gondar (UoG)</td>
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<tr>
<td>9:15 - 9:25 am</td>
<td>Welcoming Speech</td>
<td>Professor Mengesha Admassu</td>
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<tr>
<td>9:45 - 9:55 am</td>
<td>Opening Remark</td>
<td>Dr. Sintayehu, W/Michael</td>
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<tr>
<td>9:25 - 9:35 am</td>
<td>Official Opening Addresses</td>
<td>Dr. Gebregziabiher, G/Yohannes</td>
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<tr>
<td>9:55 - 10:25 am</td>
<td>Tea Break</td>
<td>UoG</td>
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<tr>
<td><strong>Session I</strong></td>
<td></td>
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<tr>
<td>10:25 - 10:55 am</td>
<td>Plenary Speech I: The Role of Livestock for Ethiopian Economy Development</td>
<td>Dr. Berhanu Admassu</td>
</tr>
<tr>
<td>10:55 - 11:15 am</td>
<td>Contribution of Livestock to Ethiopian Economy</td>
<td>Mr. Kehsay Birhane</td>
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<tr>
<td>11:15 - 11:35 am</td>
<td>Some Perspectives on the Funding of Animal Health Services in Ethiopia</td>
<td>Dr. Peter Moorhouse</td>
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<td>11:35 - 11:55 am</td>
<td>Contribution of Poultry for Ethiopian Development</td>
<td>Prof Solomon Demeke</td>
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<tr>
<td>11:55 - 12:30 pm</td>
<td>Discussion</td>
<td>Participants</td>
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<td>12:30 - 2:00 pm</td>
<td>Lunch Break</td>
<td>UoG</td>
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<tr>
<td><strong>Session II</strong></td>
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<td></td>
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<tr>
<td>2:00 - 2:30 pm</td>
<td>Plenary Speech II: Animal Health and its Multidirectional Contribution</td>
<td>Dr. Wondwossen Asfaw</td>
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<td>in Ethiopia</td>
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<tr>
<td>2:30 - 3:00 pm</td>
<td>Animal Health Services in Ethiopia: Current Status and Strategies to</td>
<td>Dr. Bewket Siraw</td>
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<td></td>
<td>Improve the Service</td>
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<tr>
<td>3:00 - 3:20 pm</td>
<td>Privatization of Animal Health Services in Ethiopia</td>
<td>Dr. Peter Moorhouse</td>
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<tr>
<td>3:20 - 3:40 pm</td>
<td>Constraints in Animal Health Service Delivery and Possible</td>
<td>Dr. Hassen Kebede</td>
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<tr>
<td></td>
<td>Improvement Alternatives Towards Private Services in North Gondar</td>
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<tr>
<td>3:40 - 4:10 pm</td>
<td>Tea Break</td>
<td>UoG</td>
</tr>
<tr>
<td>4:10 - 5:10 pm</td>
<td>Discussion</td>
<td>Participants</td>
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<tr>
<td>5:10 - 6:30 pm</td>
<td>UoG Campus Visit</td>
<td>UoG Public Relations</td>
</tr>
</tbody>
</table>
### Symposium Schedule (cont...)

**National Symposium on “Enhancing Economic Growth through Livestock Development in Ethiopia”**

The University of Gondar, Science Amba Hall

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Presenter(s)</th>
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<tr>
<td><strong>Day II: June 8, 2013</strong></td>
<td></td>
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<tr>
<td><strong>Session I</strong></td>
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<tr>
<td>Moderators: Dr. Berhanu Admassu, Dr. Yingalem Gebremeskel</td>
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<tr>
<td>Rapporteurs: Dr. Elias Kebede, Dr. Getnet Abe</td>
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<tr>
<td>8:30 – 9:00 am</td>
<td>Plenary Speech III: Animal Health Professional Development in Ethiopia</td>
<td>Prof. Getachew Abebe</td>
</tr>
<tr>
<td>9:00 – 9:20 am</td>
<td>Quality Veterinary Education in Ethiopia</td>
<td>Prof. Abebaw Gashaw</td>
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<tr>
<td>9:20 – 9:40 am</td>
<td>Veterinary Manpower in Ethiopia: Could Surplus be a Point of Concern?</td>
<td>Dr Wudu Temesgen</td>
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<tr>
<td>9:40 – 10:10 am</td>
<td>Current Supply and Demand of Animal Health Professionals in Ethiopia</td>
<td>Dr Wassie Molla</td>
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<tr>
<td>10:10 – 10:30 am</td>
<td>Veterinary Service Opportunities and Challenges in Reference to Tigray Region and Future Trends of Veterinary Medicine in Ethiopia</td>
<td>Dr Sisay W/Gebriel</td>
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<tr>
<td>10:30 – 11:00 am</td>
<td>Tea Break</td>
<td>UoG</td>
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<td>11:00 – 12:30 am</td>
<td>Discussion</td>
<td>Participants</td>
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<tr>
<td>12:30 – 2:00 pm</td>
<td>Lunch Break</td>
<td>UoG</td>
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<tr>
<td><strong>Session II</strong></td>
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<tr>
<td>Moderators: Dr. Wondwossen Asfaw, Prof Abebaw Gashaw</td>
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<tr>
<td>Rapporteurs: Dr. Elias Kebede, Dr. Kassaye Aragaw</td>
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<tr>
<td>2:00 – 3:00 pm</td>
<td>Panel Discussion: Veterinary Education in Ethiopia</td>
<td>Participants</td>
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<tr>
<td>3:00 – 4:00 pm</td>
<td>Panel Discussion II: Veterinary Service Delivery in Ethiopia</td>
<td>Participants</td>
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<tr>
<td>4:00 – 5:00 pm</td>
<td>Summary, the Way Forward, and Recommendations</td>
<td>Participants</td>
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<tr>
<td>5:00 – 5:30 pm</td>
<td>Forum Establishment and Responsibility Sharing</td>
<td>Participants</td>
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<tr>
<td>5:30 – 5:40 pm</td>
<td>Closing Remarks</td>
<td>W/ro Workabebe Bahiru</td>
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<tr>
<td>5:40 – 5:50 pm</td>
<td>Group Photo</td>
<td>Participants</td>
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<tr>
<td>6:00 – 8:30 pm</td>
<td>Social Evening</td>
<td>UoG</td>
</tr>
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VII
Brief Introduction to the Faculty of Veterinary Medicine

Dr. Achenef Melaku (Dean of the Faculty of Veterinary Medicine)

History: In 2003, the University of Gondar (UoG) established the Faculty of Veterinary Medicine (FVM) in the historical town of Gondar, 738 kilometres northwest of Addis Ababa, the capital city.

Vision: To be the leading Veterinary Faculty in the country

Mission: To contribute to the sustainable development of the nation through education, research, and community services

Programs: Doctor of Veterinary Medicine (DVM), BSc in Animal Production and Extension, Bachelors in Veterinary Pharmacy, Masters of Public Health with a Specialization in Veterinary Public Health (MPH/VPH), MVSc in Veterinary Surgery and Imaging

Emerging Postgraduate Programs: Veterinary Pathology, Veterinary Immunology, Veterinary Epidemiology and Economics, Veterinary Parasitology, and Animal Breeding and Genetics.

Organization: The Faculty has five academic departments:

- Veterinary Pharmacy and Biomedical Sciences
- Veterinary Paraclinical Studies
- Veterinary Clinical Medicine
- Veterinary Epidemiology and Public Health
- Animal Production and Extension

Research Thematic Areas and Research Teams: The Faculty identified three areas of research focus:

1. Theme I: Farm and Wild Animal Health
   Two research teams:
   A. Respiratory, soil borne, and stomatitis of farm animals
   B. Poultry, wildlife diseases, and respiratory diseases of farm animals
2. Theme II: Veterinary Public Health
Two research teams:
A. Food-borne zoonosis and food safety
B. Non food-borne zoonosis and zoonotic tuberculosis

3. Theme III: Animal Production, Productivity, and Socioeconomic Matters

Research and Publications: Since its establishment, the FVM has completed 65 research projects and currently directs 23 active research projects. Teaching staff and students have published in international journals on more than 50 different research topics.

Teaching and Research Facilities: The Faculty has six laboratories:
- Veterinary Microbiology and Public Health Laboratory
- Veterinary Parasitology Laboratory
- Physiology, Pharmacology, and Biochemistry Laboratory
- Veterinary Histology Laboratory
- Veterinary Pathology Laboratory
- Veterinary Anatomy Laboratory

Community Service: The Faculty of Veterinary Medicine renders the following community services:
- Outbreak investigation and laboratory services
- Animal health care
- Artificial insemination
- Short-term training
- Animal production and health consultancy services
- Control and prevention of rabies and other serious infectious diseases

Farms: The Faculty has three farms for income generation, teaching and research: the Dairy Farm, the Poultry Farm (with capacity to rear 10,000 egg laying hens), and the Laboratory Animal Farm (with sheep, horses, mice, and guinea pigs).

Collaboration: The Faculty is interested in creating partnerships with national and international institutions. Students can visit and practice in the FVM, and staff members can teach courses and share their experiences.
**Staff Profile:** (2012/2013) The Faculty has five Ph.D., thirty-nine MSc/MVSc, six BVSc, four Diploma, and twelve administrative staff.

**Students:** The Faculty has 506 students enrolled in four programs:
- MPH-VPFI Master’s Degree
- MVSc in Veterinary Surgery and Imaging
- Undergraduate DVM
- Undergraduate Animal Production and Extension
- Bachelors of Veterinary Pharmacy

**Plan:**
- Construct a *veterinary teaching hospital*
- Construct a post-mortem hall and an abattoir
- Design postgraduate curriculum in Veterinary Pathology, Veterinary Immunology, Veterinary Epidemiology and Economics, Veterinary Parasitology, Animal Breeding, and Genetics
- Establish Biomolecular, Veterinary Virology, Animal Nutrition, and Veterinary Pharmacy Laboratories
Executive Summary

Dr Legesse Garedew (Chairperson of the Conference Organizing Main Committee)

A two days national symposium on “Enhancing Economic Growth through Livestock Development in Ethiopia” held at the University of Gondar on June 7th to 8th, 2013 organized by Faculty of Veterinary Medicine, University of Gondar, in collaboration with other veterinary institutes. Contribution of Livestock in Ethiopian Economy, Animal Health and Its Multidirectional Contribution in Ethiopia and Animal Health Professionals Development in Ethiopia were subthemes addressed during the symposium.

Although Ethiopia is endowed with largest livestock resource in Africa, the sector is not contributing well in terms of generating sufficient wealth commensurate to the potential. The main factor hindering the development of livestock in the nation, among others, is the existence of a number of animal diseases affecting both production and productivity that has led to the exclusion of the country from high paying lucrative international market, and lack of proper veterinary services that implicitly means poor animal health structure and delivery.

Being cognizant of all these paradoxes, the symposium coined to deal the contribution of livestock to Ethiopian economic development and bottleneck of the sector. The conference brought researchers, policy makers, decision makers, non-governmental organizations, private sector representatives, consultants and professionals to discuss and recommend important solutions and policy issues related to livestock development and maximization of the benefit to be obtained from the sector. At this critical junction of time, Contribution of Livestock to the Economy, Animal Health Services: Current Status and Strategies, Privatization of Animal Health Services, Quality Veterinary Education, and Supply and Demand of Animal Health Professionals in Ethiopia were thoroughly discussed. State Ministers, Parliamentarians, and renowned researchers and many others participated in the conference.

Having more than 200 participants, the symposium proceeded with oral presentations, panel discussions and outreach field visit. The symposium was very effective in achieving its goals in suggesting important way forwards and essential recommendations to utilize the available animal health professionals and huge livestock resources for the improvement of the livelihood of the society and for the attainment of the National Growth and Transformation Plan.
Welcoming Speech

Professor Mengesha Admassu (President of the University of Gondar)

Dear Ministers
Dear honourable member of FDRE house of the people representatives
Distinguished guests
Ladies and gentlemen

It gives me a great pleasure and honour to welcome you to this very important national conference of livestock with a central theme of "Enhancing Economic Growth through Livestock Development in Ethiopia"

Ethiopia has the largest livestock population in Africa. Livestock have diverse functions for the livelihood of farmers in mixed crop-livestock and pastoral systems in the nation. Livestock provide food in the form of meat and milk, non-food items such as draft power, manure, and transport services as inputs into food crop production, and fuel for cooking. Livestock are also a source of cash income through sale of the above items, animals, hides, and skins. Furthermore, they act as a store of wealth and determine social status within the community. With regard to these important functions, livestock play an important role in improving food security and alleviating poverty. Because they are central to nutrient cycling, livestock are important to the efficiency, stability, and sustainability of farming systems in Ethiopia. Securing the current and future livestock assets of the poor is a major pathway to get the rural poor out of the poverty spiral.

In Ethiopia, livestock contribute 44.54% of agricultural gross domestic product (GDP) and more than 85% of farm cash income. They also contribute about 13 to 16% of total GDP. However, performance in the production of the main food commodities of livestock origin in Ethiopia has been poor compared to other African countries. Widespread diseases and poor health, inadequate feed and nutrition, poor breeding stock, and inadequate livestock policies with respect to credit, extension, marketing, and infrastructure have been cited as major constraints affecting livestock performance.

As it is well known, livestock diseases affect production and productivity of livestock economy though decreased yield and work output and causing mortalities. The available estimates show that 10% of the cattle population, 16% of sheep population and 13% of goat population of Ethiopia are lost due to death per annum. The country also invests a huge sum of money for vaccine, drug and input supply to control and prevent animal diseases. Moreover, there are rampant zoonotic animal
diseases, which pose serious public health risks through the consumption of foods of animal origin and contact with infected animals and their products.

I am mentioning all of these with an interest of importance of animal health and animal health professionals that deals with day-to-day life.

Distinguished guests

Ladies and gentlemen

At this point, I would like to emphasize the environment of animal health service and its professionals in our country is one of the priority transformation we have to achieve in the coming few years. In order that animal health professional can play their essential societal roles in the control and prevention of livestock diseases, the education system needs well qualified staff, modern diagnostic and research laboratory, and sufficient veterinary infrastructure commensurate to international and national standards. Necessary input supplies in a sustainable way should be there under field condition also. These changes will have significant importance impact on the future animal health service and professionals in Ethiopia.

As a state Minister of livestock development sector, I would like to assure you that my government and specifically my ministry is committed to extend its all rounded support for animal health service and its professionals in your effort to achieve your objectives. I would also assure you that the Ministry of Agriculture would take up all the valuable recommendations coming out of you deliberations in this symposium.

As I conclude, I would like to express my gratitude to the University of Gondar for organizing such a wonderful and timely symposium on the timeline agenda of “Enhancing Economic Growth through livestock Development in Ethiopia”. I also would like to thank all National and international organization which joins hands with University of Gondar for realization of organization of this symposium.

Finally, it is a great honour to say you well come again. I wish you best of success in the two days of your deliberations and joyful stay at the historical town of Gondar..

Thank you!
Opening Remarks

Dr Sintayehu Woldemichael (Board Chairman, University of Gondar)

- You Excellency Dr. Gebregzieabher Gebereyohannis: State Minister for the Livestock Development Sector: Ministry of Agriculture
- You Excellency Mr. Addisu Arega: Adviser on Agriculture and Industry to the Prime Minister, Office of the Prime minister
- You Excellency Professor Mengesha Admassu: President of UoG

- Respected members of the House of Peoples Representative of FDRE
- Invited Guests, Ladies and Gentle men

Ethiopian has the largest livestock population and the highest draft animal population in the African continent. Livestock perform multiple functions in the Ethiopian economy by providing food, input for crop production and soil fertility management, raw material for industry, cash income as well as in promoting saving, fuel, social functions, and Employment.

Despite the aforementioned huge livestock potential and the corresponding roles in the Ethiopian economy its contribution so far has been suboptimal when compared with the potential it holds. There are several factors usually explained for the under performance of the sector, including rampant livestock diseases, lack of marketing system that uses Economic principles.

Dear distinguished guests, participants

Our plan in economic growth could be achieved and sustained if we explore all possible recourses we have. We have a very long history of rearing animals and we are getting foreign currencies by exporting live animals, meat, hide and skin and other products. These could be magnified if we utilize it very well. The livestock sector, if it has to contribute to the optimal level for our Economy tacking the bottleneck factors is a must rather than a choice. Furthermore, the production system must gradually evolve towards intensive production system using market oriented approaches. Both sustainability and enhanced contribution need multiple role integration across the various stakeholders. Such a highly demanding integration issue requires a common understanding and consensus among the different segments of the government structure and non government stakeholders which might involve in policy making, training of professionals who serve the sector, marketing of livestock and/or their products or supporting of the mentioned activities.

The development and growth of the livestock sector depends on the presence of relevant animal health structure, delivery system, and animal health professional training and development

7
strategies that can drive the sector towards a modern, commercial and high output system. The presence of good veterinary services delivery strategies that complies with global standards and norms is crucial. Indeed, it is the only means to ensure animal health and livestock production, veterinary public health and food safety concerns of the nation. It also enables regional and international market access for animals and animal products. Good veterinary services is a point by far relevant to Ethiopian context where the government has planned to raise billions of hard currency from the export of live animals, meat and leather products that often suffer from substandard quality profiles.

Dear distinguished guests, participants

With the expansion of Universities in our countries, institutes which teach veterinary profession are increased from one to eleven. The question of quality should always go in hand with quantity. Institutes which teach the profession should have standard laboratories and other facilities which help to make practically oriented education. Professionals should be competent at graduation (day one competency). There should be a control or check up mechanism by establishing a forum or group of senior experts that have fully power to evaluate the quality at various levels.

Common platforms like this symposium in progress are the springboards for such an important sector to create a common understanding across the way forward towards sustainable livestock development and enhanced Economic growth. The participants in this symposium are expected to discuss and contributed to discuss and contribute towards this demanding issue whole heartedly. I wish you a fertile and fruitful symposium.

I thank you!
Opening Speech

H.E. Dr. Gebregziabher G/Yohannes (State Minister of Livestock Development Sector, Ministry of Agriculture)

Dear honourable member of FDRE house of the people representatives
Distinguished guests

Ladies and gentlemen

It gives me great pleasure and honour to make this opening remark at this very important national conference of livestock with a central theme of “Enhancing Economic Growth through Livestock Development in Ethiopia”

Ethiopia has the largest livestock population in Africa. Livestock have diverse functions for the livelihood of farmers in mixed crop-livestock systems in the nation. Livestock provide food in the form of meat and milk, non-food items such as draft power, manure, and transport services as inputs into food crop production, and fuel for cooking. Livestock are also a source of cash income through sale of the above items, animals, hides, and skins. Furthermore, they act as a store of wealth and determine social status within the community. Because of these important functions, livestock play an important role in improving food security and alleviating poverty. Because they are central to nutrient cycling, livestock are important to the efficiency, stability, and sustainability of farming systems in the Ethiopia. Securing the current and future livestock assets of the poor is a major pathway to get the rural poor out of the poverty spiral.

In Ethiopia, livestock contribute 44.54% of agricultural gross domestic product (GDP) and more than 85% of farm cash income. They also contribute about 13% to 16% of total GDP. However, performance in the production of the main food commodities of livestock origin in Ethiopia has been poor compared to other African countries. Widespread diseases and poor health, inadequate feed and nutrition, poor breeding stock, and inadequate livestock policies with respect to credit, extension, marketing, and infrastructure have been cited as major constraints affecting livestock performance.

As it is well known, livestock diseases affect production and productivity of livestock economy though decreased yield and work output and causing mortalities. The available estimates show that 10% of the cattle population, 16% of sheep population and 13% of goat population of Ethiopia are
lost due to death per annum. The country also invests a huge sum of money for vaccine, drug and input supply to control and prevent animal diseases. Moreover, there are rampant zoonotic animal diseases, which pose serious public health risks through the consumption of foods of animal origin and contact with infected animals and their products.

I am mentioning all of these with an interest of importance of veterinary medicine and veterinary professionals that deals with day-to-day life.

Distinguished guests
Ladies and gentle men
At this point, I would like to emphasize the environment of veterinary medicine and its professionals in our country is one of the priority transformation we have to achieve in the coming few years. In order that veterinarians can play their essential societal roles in the control and prevention of livestock diseases, the education system needs well qualified staff, modern diagnostic and research laboratory, and sufficient veterinary infrastructure commensurate to international and national standards. Necessary input supplies in a sustainable way should be there under field condition also. These changes will have significantly important impact on the future veterinary medicine and veterinarians in Ethiopia.

As a state Minister of Livestock, I would like to assure you that my government and specifically my ministry is committed to extend its all rounded support for veterinary medicine and its professionals in your effort to achieve your objectives. I would also assure you that the Ministry of Agriculture will take up all the valuable recommendations coming out of you deliberations in this symposium.

As I conclude, I would like to express my gratitude to the University of Gondar for organizing such a wonderful and timely symposium on the timeline agenda of “Enhancing Economic Growth through livestock Development in Ethiopia”. I also would like to thank all national and international organization, which joins hands with University of Gondar for realization of organization of this symposium.

Finally, it is a great honour for me to declare this symposium is officially opened. I wish you best of success in the two days of your deliberations.

Thank you!
THEME I

Contribution of Livestock in Ethiopian Economy
The Role of Livestock for Ethiopian Economy Development

Dr. Berhanu Admassu (Senior Policy Advisor, Feinstein International, Tufts University)

The Livestock resource Base

- 101.5 million total ruminant population
- 8.1 million equine population
- 58.2 million TLUs
  - Cattle contribute overwhelmingly to the total livestock biomass.
- Livestock density: 29.5 TLU/km² (0.29 TLU/ha, 3.44 ha/TLU)
- The chicken population is estimated to be about 48 million heads
- The camel population is estimated to be about 2.3 million heads

Animal genetic Resources diversity

- The country is endowed with huge farm animal genetic diversity
- Reasons for this diversity:
  - Its diverse topographic and climatic conditions,
  - The huge livestock population size and
  - Diverse production systems (production environment)

<table>
<thead>
<tr>
<th>Species</th>
<th># of breeds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>27</td>
</tr>
<tr>
<td>Sheep</td>
<td>9</td>
</tr>
<tr>
<td>Goats</td>
<td>12</td>
</tr>
<tr>
<td>Chicken</td>
<td>10</td>
</tr>
</tbody>
</table>
Owning:
- 73% of goats
- 25% of sheep
- 20-27% of cattle
- 100% of camels

About 10 million pastoralists in Ethiopia – 8-9% of total population

Role of livestock

- Livestock plays a vital role in economic development particularly as societies evolve from subsistence agriculture into cash based economies.

- Livestock provides major additional contribution to agriculture through draft power, manure, fuel and as a fertilizer, animal products such as meat, milk eggs while poultry provide daily cash income and much required nutrition to rural population.

The Livestock Total Economic Value Framework

<table>
<thead>
<tr>
<th>Measured</th>
<th>Non-measured</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle offcut</td>
<td>Employment along the value chains</td>
</tr>
<tr>
<td>Sheep offcut</td>
<td>Husbandry knowledge &amp; skill</td>
</tr>
<tr>
<td>Goats offcut</td>
<td>Risk management / buffer</td>
</tr>
<tr>
<td>Camels offcut</td>
<td>Labour</td>
</tr>
<tr>
<td>Animal draught power</td>
<td>Socio-cultural values</td>
</tr>
<tr>
<td>Cattle milk</td>
<td>Indigenous knowledge</td>
</tr>
<tr>
<td>Camel milk</td>
<td>Dryland environmental knowledge &amp; skill</td>
</tr>
<tr>
<td>Cattle milk for butter</td>
<td>Fertilizer / manure</td>
</tr>
<tr>
<td>Goat milk</td>
<td>Domestic bio-diversity</td>
</tr>
<tr>
<td>Camel milk</td>
<td></td>
</tr>
<tr>
<td>Ruther residue</td>
<td></td>
</tr>
<tr>
<td>Transport</td>
<td></td>
</tr>
<tr>
<td>Sheep wool</td>
<td></td>
</tr>
<tr>
<td>Dung for fuel</td>
<td></td>
</tr>
<tr>
<td>Change in rice productivity</td>
<td></td>
</tr>
<tr>
<td>Taxes &amp; levies</td>
<td></td>
</tr>
<tr>
<td>Subsistence use</td>
<td></td>
</tr>
</tbody>
</table>
Gross value of the agricultural output of ruminant livestock

- The size of livestock's contribution to agricultural GDP is the most commonly quoted single measure of livestock's role to the overall national economy. It is therefore a very important figure.
- GDP estimates for Ethiopia are prepared by the National Accounts Department of the Ministry of Finance and Economic Development (MOFED) according to internationally recognized procedures described in the System of National Accounts 1993.
- Ethiopia follows the production approach to estimating GDP, in which the goods and services produced by all categories of economic activity are summarized to arrive at total GDP.

Contribution of livestock for Agriculture production

- About 80% of Ethiopian farmers use animal traction to plough their fields. Both the mean area cultivated by a farm household and their yields per hectare are positively associated with cattle ownership and ploughing.
- Despite these contributions to agricultural output, no attempt is currently made to impute the monetary value of animal traction for Ethiopian agriculture.

Contribution of livestock for the Agriculture GDP

- The value of the animal draught power input into arable production can be estimated at 26.4% of the value of annual crop production. This calculation transfers 26.4% of the value of the production of annual crops from the arable to the livestock subsector. Based on these figures, nearly a third (31%) of the total gross value of livestock output is represented by the value of animal draught power as an input into crop cultivation.
- The estimated draught power output = 21,500 billion Birr

Gross value of the agricultural output of ruminant livestock

For livestock the contribution calculation involves four stages.

1. First, national livestock populations are estimated by MOFED based on data supplied by the Central Statistics Agency (CSA).
2. Second, production coefficients are applied to the livestock population estimates to generate estimates of the total output of goods such as meat, milk, butter, dung for fuel etc.
3. Third, based on CSA producer price surveys, a monetary value expressed in Ethiopian birr – the gross value of output – is ascribed to the total output of each kind of livestock product.
4. Finally, input costs (intermediate costs) are deducted from the gross value of output to derive value added.

Gross value of the agricultural output of ruminant livestock

- In 2008-09, a combined gross value of 12 categories of ruminant livestock product output was estimated by a livestock Policy Forum (IGAD/LPI).
- Total estimated Offtake (cattle, sheep, goats, camel) = 12,757,000,000 Birr
- Total estimated milk + products (cattle milk, cattle milk for butter, goat milk and camel milk) = 30,000,000,000 Birr
- Other outputs (wool, dung, change in stock) = 4,818,000,000 Birr
- Total Ruminant product output = 48,095,000,000

<table>
<thead>
<tr>
<th>Gross Value of Ruminant Livestock Production 2008-09, billion EB</th>
<th>Revised Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product or service</td>
<td></td>
</tr>
<tr>
<td>Cattle offtake</td>
<td>12.757</td>
</tr>
<tr>
<td>Sheep offtake</td>
<td>2.354</td>
</tr>
<tr>
<td>Goats offtake</td>
<td>2.355</td>
</tr>
<tr>
<td>Camel offtake</td>
<td>0.145</td>
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<tr>
<td>Total estimated offtake</td>
<td>12.757</td>
</tr>
<tr>
<td>Cattle milk</td>
<td>10.889</td>
</tr>
<tr>
<td>Cattle milk for butter</td>
<td>5.824</td>
</tr>
<tr>
<td>Goat milk</td>
<td>6.439</td>
</tr>
<tr>
<td>Camel milk</td>
<td>3.346</td>
</tr>
<tr>
<td>Butter residue</td>
<td>4.015</td>
</tr>
<tr>
<td>Total estimated milk + products</td>
<td>10.32</td>
</tr>
<tr>
<td>Sheep wool</td>
<td>0.005</td>
</tr>
<tr>
<td>Dung for fuel</td>
<td>3.439</td>
</tr>
<tr>
<td>Change in stocks</td>
<td>1.384</td>
</tr>
<tr>
<td>TOTAL RUMINANT PRODUCT OUTPUT</td>
<td>68.099</td>
</tr>
<tr>
<td>Animal draught power</td>
<td>21.5</td>
</tr>
<tr>
<td>TOTAL RUMINANT PRODUCTION</td>
<td>69.595</td>
</tr>
</tbody>
</table>
Total Economic Value of pastoralism = 15 billion Birr/year equals 16% of GDP in 2005-6

Direct values: milk, meat, hides/skins, sales, exports = 11 billion Birr per year

Meat = 150,000 MT/year, 29% of national production

Milk = 1.1 billion litres/year, 41% of national production

Indirect values: traction/manure, tourism, incense/gums = 4.1 billion Birr/year

Number of animals exported = 250,000

Total estimated contribution of livestock to national economy = 69.595 billion Birr per year = 48.32% (Ethiopia national budget June 2011 = 144 billion Birr)

...but how much support does it receive from the national budget?

% of national budget to livestock agriculture sector:
- 1993-1998: 0.3%
- 2003: 20%
- 2004: 16%
- 2005 and 2006: 12%
- (CAADP) 2009

% of national budget to livestock sector???

Trends in livestock and meat

<table>
<thead>
<tr>
<th>Year</th>
<th>Live animals</th>
<th>Value (US$ million)</th>
<th>Meat</th>
<th>Value (US$ million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005-6</td>
<td>183,000</td>
<td>27.3</td>
<td>7,717</td>
<td>15.6</td>
</tr>
<tr>
<td>2006-7</td>
<td>234,000</td>
<td>36.5</td>
<td>7,917</td>
<td>18.4</td>
</tr>
<tr>
<td>2007-8</td>
<td>298,000</td>
<td>40.9</td>
<td>5,875</td>
<td>15.5</td>
</tr>
<tr>
<td>2008-9</td>
<td>150,000</td>
<td>77.4</td>
<td>6,400</td>
<td>24.5</td>
</tr>
<tr>
<td>2009-10</td>
<td>334,000</td>
<td>91.0</td>
<td>10,000</td>
<td>34.0</td>
</tr>
<tr>
<td>2010-11</td>
<td>472,041</td>
<td>149.9</td>
<td>16,877</td>
<td>63.2</td>
</tr>
<tr>
<td>2011-12</td>
<td>783,078</td>
<td>207.1</td>
<td>17666</td>
<td>78.7</td>
</tr>
</tbody>
</table>

SUBSISTENCE
- Consumption by herding household
- Consumption by other groups

EMPLOYMENT IN LIVESTOCK PRODUCTION
- Self-employed herders
- Waged labour in herding
- Veterinarians and technical personnel
- Sellers of street grilled-meat

INFORMAL FINANCIAL SERVICES & SOCIAL CAPITAL (SAVINGS, CREDIT AND INSURANCE)
- Livestock as savings and investment
- Livestock as credit
- Livestock as private insurance
- Livestock as collective insurance (risk pooling)
Bottle necks for the contribution of livestock for economic development

The major constraints for livestock development in Ethiopia can be broadly categorized into technical, organizational, institutional, infrastructural, environmental and policy aspects.

Institutional / organizational constraints
- Weak attention to the sector – marginalized
- Lack of proper institutional arrangement at all level for long period of time.
- Absent / or poor linkages between Teaching, research and development institutions.

Technical constraints
- Feed shortage / under-nutrition and malnutrition.
- High prevalence of diseases, Ensuring quality, sanitary and phytosanitary standards and food safety are key elements for market participation.
- Relatively low genetic potential for productive traits, lack of animals of good quality.
- Poor management practices and weak market infrastructure.
- The development of market infrastructure and market institutions is also very important for inducing efficiency and incentives for market participants along the value chain.
- It has to be noted that livestock development programs are expensive, have long gestation period, and require strong and continuous commitment and collaboration from stakeholders at all levels.

Recommendations
- The TEV of livestock to a new understanding of the importance of livestock and a clearer appreciation of its true economic significance to Ethiopian economic development should be endorsed and require streamlining into all concerned organizations.
- Changes in institutional and organizational arrangements need to be addressed and refocused to respond to most of the constraints mentioned in this presentation.
- The research system has to also refocus its efforts to addressing key constraints to quantify the contribution of livestock to the economic development along the value chain.
- Capacity building of farmers and the private sector in knowledge-based commercial livestock production and processing is also essential.

Thank you
The Contribution of Livestock to the Ethiopian Economy

Fitaweke Metaferia (Ministry of Finance and Economic Development, National Account Section)
Email: fitaweke@yahoo.com

Abstract

This article briefly discusses the empirical aspects of the contribution of animal farming in the Ethiopian economy. Measurement issues pertaining to activity coverage, classification and valuation of livestock products, by-products and services occupy an important place in portraying the relative importance of the industry in agriculture and the wider economy. Economic indicators such as the value added and its share in GDP are the basis as tools for development planning and policy decisions. Although livestock sector is believed to play a multifaceted role in the socioeconomic development of the society – having a significant positive impact on the rural livelihood, empirical studies in Ethiopia revealed that livestock’s contribution to the economy is believed to be not well addressed in the official statistics. It is found that the actual contribution is by far greater than the official statistics that uses the United Nations System of National Account framework. During the last decade, livestock’s gross value added has shown an upward trending while its share in the GDP has shown a declining trend. Hence, for this industry to contribute up to its potential level in the economic and non-economic spheres, due policy emphasis should be in place to realize a sustained backward and forward linkages that can bridge to a modernized structurally transformed agricultural system. An equally important aspect, to be capitalized is strengthening the quality of statistical inputs to measure all conjectural as well as diverse empirical but differing fact and figures in calibrating the sector’s real contribution.

Keywords: Agriculture, Livestock, Value Added, Contributions to GDP, Economic Growth, Ethiopia.
1. Background

Globally, agriculture provides a livelihood for more people than any other industry. Growth in agriculture production and productivity is needed to raise rural income, to support the increasing numbers dependent on the industry and to meet the food and raw material needs of the faster growing urban population. Enhancing agricultural productivity contributes to industrial growth by providing cheap labour, capital investment, foreign exchange and markets for manufactured consumer goods.

Livestock, as a subsector of Agriculture, is believed to provide over half the value of global agricultural output and one third in developing countries. Rapid growth in demand for livestock products, in the developing countries, is viewed as a ‘food revolution’. It contributes to rural livelihood, employment and poverty relief, integrate with and complement crop-production, embody savings as a reserve against risks and sometimes play a special role in traditional culture.

Ethiopia has been reported to rank first in cattle population in Africa having the latest survey report by the CSA. Its livestock population is 48.9 Million Cattle, 27.6 Million Sheep, and 24.5 Million Goats, among the most animal production sources for meat and milk. Despite the numbers, it is frequently claimed that the output of this subsectors is under estimated in official statistics and also its potential is not well exploited.

The aim of this paper is to provide an economic snapshot of the current state of the Ethiopian livestock industry as a component in the GDP. The role of livestock in the wider economy is assessed both from the conventional system of national accounts (SNA) framework and a different accounting technique that try to address comprehensive issues to uncover practical benefits claimed by the affiliates in the livestock sector. Further, issues of statistics and measurement of values of livestock are appraised as a discussion agenda to be placed before decision makers. Based on official statistics and reports of separate case studies, empirical performance indicators are discussed to equip interested groups to communicate in policy debates. Finally, with some concluding remarks recommendations are forwarded for due attention by both policy elites and implementers.
2. Methodology

The general methodology adopted to address the objectives in this paper is basically quantitative and descriptive by making use of secondary data. Data and information are based on the official statistics as well as case studies to improve statistical inputs to derive aggregate indicators and to reveal the unaccounted contributions. The time path pattern (trends), structural and growth decompositions on available data are presented in illustrative manner.

3. Discussions and Results

3.1. Macro/Micro Perspectives of Animal Production

The internationally agreed (conventional) way of estimating the economic values of livestock tries to capture its role both from the supply and demand side of the GDP. In the supply side of GDP the livestock economic activity (formally referred as “animal production” in ISIC, used interchangeably in this paper) is broadly defined as and includes “Raising (farming) and breeding of all animals, except aquatic animals.” A worse off to animal production affiliates is that there are exclusions from the livestock class of economic activities that are listed under non-livestock categories.

With the SNA’s production approach (supply side) estimates the contribution of animal production mainly includes production of the ‘Meat group’, ‘Milk group’, Wool, Honey and Wax, Animal Dung for fuel and manure, Eggs, Animal Power, and annual changes in animal stocks. In contrast, the contribution to the aggregate demand (macro) or uses side of GDP encompasses livestock demand for final consumption (by Households, Government, NPISHs), Gross Capital Formation (as “Produced or cultivated assets in the past, contributing to the future output”), Exports and Imports where applicable. Moreover, the outputs of animal production are considered to have a significant benefit as ‘intermediate consumption’ goods in the process of producing other products like in manufacturing sector, etc.


Note: ISIC refers to “International Standard Industrial Classification of all economic activities” and consists of a coherent and consistent classification structure of economic activities based on a set of internationally agreed concepts, definitions, principles and classification rules. It provides a comprehensive framework within which economic data can be collected and reported in a format that is designed for purposes of economic analysis, decision-taking and policy-making. The classification structure represents a standard format to organize detailed information about the state of an economy according to economic principles and perceptions.

The “Animal Production” activities includes: Raising of cattle and buffaloes, Raising of horses and other equines, Raising of camels and camelsids, Raising of sheep and goats, Raising of swine/pigs, Raising of poultry, and Raising of other animals (raising and breeding of semi-domesticated or other live animals such as ostriches and emus, other birds, insects, rabbits and other fur animals, production of fur skins, reptile or bird skins from ranching operation, operation of worm farms, land mollusc farms, snail farms etc., raising of silk worms, production of silk worm cocoons, bee-keeping and production of honey and beeswax, raising and breeding of pet animals, raising of diverse animals.
Apart from its contribution to the GDP by the SNA framework, there are diverse and changing roles of livestock in the macroeconomic perspective. Even though these are not reported as components of GDP, they are believed to reflect the other side of livestock’s benefits beyond the conventional restricted estimation figures. These benefits include consideration of livestock as:

- A sector for employment and income generation that integrate with and complement crop production in proving the balance between current consumption as well as production.
- That embodies savings and provide a reserve against risks – i.e. contributing to economic stability a hedge against inflation and a reserve against crop loss
- That contributes to government revenue via tax and levies
- Believed to have potential for substituting imports, hence, reduce the outflow of scarce foreign exchange

From the Microeconomic (Households) perspective, Animal Production is considered as a major source of subsistence for rural households serving as a source of food, income, manure, draft power, hauling services, savings and insurance. Besides, economic transactions in a modern commercial sphere, animals are believed to give their holders unquantifiable benefits by strengthening the social cohesion as an attribute to a higher status-quo and moral economy.

### 3.2. Empirical Estimates Based on SNA Framework

Based on the SNA value added approach, official estimates in Ethiopia have revealed that Gross Value Added (GVA) from livestock sector amounted 45.8 Billion Birr during 2003 EFY. During the last decade (1992-2003 EFY), averagely it contributed to about 24% of the Agricultural GVA and 12 % of the total real GDP - ranking the third position. However, though the level of livestock GVA has shown an upward trending pattern, its share in the GDP has witnessed a downward decreasing trend –from about 15% to 10 % in the last decade. Moreover, from a different analytical angle, a crude sectoral growth accounting or decomposition technique has revealed that the livestock (animal production) sector contributed to about 6.5% of the registered 11.1% growth in real GDP during 2003 EFY – claiming the sixth position. Further, vertical investigations into the composition of outputs (GVO) of the sectors has revealed that the proportion of ‘Milk and Related Products’ have occupied the lion’s share (59%) followed by ‘Meat Related Products’ (20%). (To be gleaned from the following consecutive illustrations).
The observed phenomenon of declining contribution of animal production to the total GDP could be explained as either due to the relative decline in the pace and level of animal production performance or, in contrast, due to a relative high and outsmarting pace and level of performance observed in other non-livestock sectors. The later explanation seems plausible because with the advancement of the economy, the structure of the economy tends to transform from primary economies like agriculture to the secondary (industry) and tertiary (service) sectors more rapidly—hence calling for modernizing the former category.
3.3. Measuring Up the Measurement Issues

The fact that flaws and distortions in statistical and related issues would have a fatal repercussion in policy decisions urges and triggers one to focus on and improve as much as possible. As quality performance measurement would yield a real indicator for the right policy intervention, insufficient and distorted indicators would, inevitably, tend to result in policy failures. To these grounds, the following issues deserve worth noting in the Ethiopian context.

3.3.1. Quality of Statistics

- Activity coverage is not comprehensive in time and space (i.e. all the livestock related economic activities; in the form of goods and service outputs, as well as intermediate inputs, are not exhaustively, covered by the Agricultural Sample Surveys)
- Available statistical figures suffer from problems of consistency and timeliness in reporting. Moreover, existence of heterogeneous (and some time contradicting) statistics from different sources.
- The different productivity and growth indicators like rates, coefficients, ratios, proxies etc. are outdated to reflect present day real picture of the sector.

3.3.2. Classification, Analysis and Interpretations

Apart from the statistical drawbacks, mentioned above, the real picture of the livestock sector is also believed not to be well represented due to 'standardization' conventions in economic classification. Therefore, because of international classification standard (ISIC) recommendations for
comparability reasons, some of 'animal production' and related services are scattered and concealed in other industries – like manufacturing, transport, trade etc. Moreover, due to the volatile nature of performance reporting and insufficiency in information, generating a robust economic analysis and interpretations are not possible – hence, subject to distorted implications in policy fronts.

3.3.3. Facts and Figures beyond GDP Framework

As per an empirical study done by the IGAD-LPI and adoption of the satellite accounting techniques, the livestock sector contribution to the wider economy is much higher than thought and represented by the conventional GVA estimation method (Behnke and Metaferia, 2011).

Accordingly, this study confirms that because of the problems of deficiencies in data conventional rules of national accounting estimation technique, the agricultural GDP calculations are believed to underestimate the contribution of livestock, and thus, adjustments with the most recent figures resulted in upward increment by 47%. Moreover, the value of ploughing services, if accounted properly to livestock, would have provided 45% of agricultural GDP in 2008-09.

The empirics from this assessment have underscored the fact that the value of the economic benefits that are derived from livestock are much more than what is included in agricultural GDP estimates. These include animal power (for traction, transport and haulage), as source of financial services, as self-insurance and pastoralist collective insurance, source of dung for fuel, for construction and as fertilizer. A rough estimate of these services is believed to be about 65.5 billion birr (i.e. Animal draft power (26.4 %) of crop production (21.5 Bill. Birr), the credit benefit of livestock (12.8 Bill. Birr), Livestock as self-insurance (8.6 Bill. Birr), pastoralist collective insurance (3.6 Bill. Birr) and Livestock transport and haulage (19 Bill. Birr).

In general, during 2009 the official estimate of the livestock contribution to agricultural GDP was slightly more than 32 billion Ethiopian birr. However, in the same year, if we add the value of livestock services excluded from GDP calculations, we arrive at a total value for livestock’s contribution of 113 billion Ethiopian birr. With regard to transaction with the rest of the world, combined with hides, skins and leather exports live animal and meat exports probably constitute

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1 Satellite accounts or systems generally stress the need to expand the analytical capacity of national accounting for selected areas of social concern in a flexible manner, without overburdening or disrupting the central system. As relevant to the interest of this paper, satellite accounts allow for: (a) the provision of additional information on particular social concerns of a functional or cross-sector nature; (b) the use of complementary or alternative concepts, including the use of complementary and alternative classifications and accounting frameworks, when needed to introduce additional dimensions to the conceptual framework of national accounts. (Source: SNA 2008).
about a fifth of all of Ethiopia's exports. Approximately half of these livestock sector exports are not recorded and not recognized by the National Bank of Ethiopia because they are produced by the informal cross border trade in live animals. By excluding these informal exports, official figures again undervalue the real contribution of livestock to the national economy. Hence, the contribution of livestock to the Ethiopian economic, social, environmental, etc aspects at large is by far greater than what is reported by the conventional GDP estimation approach dictated by the SNA framework. Therefore, the study concluded that ‘Livestock’s Contribution to Ethiopia’s Economy is Much Higher than Previously Thought’.

4. Conclusions and Recommendations

As discussed above a comparative analysis of the data available on the contribution of livestock to the Ethiopian economy with both the SNA framework - production accounting and an extended satellite approach revealed different realities. With the satellite investigation, it was possible to have an insight that the livestock is believed to contribute much more than what is reported by the SNA’s Value Added approach. It is found that the role of animal farming in the Ethiopian economy is visible both from macro and micro perspectives. Moreover, there are diverse and changing socio-economic roles that are not officially reported hence, undermining its real picture. As a component of national GDP, animal farming contribution is among the leading sectors.

What this paper mainly addressed relates to the role that measurement issues play in portraying the real picture of the livestock sector should need due considerations by all stakeholders and there are identified areas where improvements should be given proper attention – like classification issues, statistical quality and reporting issues and analytical and interpretation concerns. With these concluding remarks, the following suggestions and recommendations are found to be worth noting:

✓ While putting efforts to enjoying the bliss of high livestock population bonus in Ethiopia, cautious policy direction should also be put to increase productivity with an eye on modernizing the production system towards structurally transformed and dynamic livestock industry.

✓ As measurement and classification issues are crucial, need should be emphasized to improve livestock statistics through improved data collection methodology and analysis for better indicators in time and space. Hence, parallel (together) with the annual ISIC estimates, need
might be imperative for livestock affiliates to prepare livestock related special industrial classification for comprehensive picture periodically.

☑ Special survey for updating outdated productivity rates and estimates should be availed to the national economic accounting process regularly. Moreover, surveys relating to intermediate consumptions in animal production should be availed through annual surveys and administrative reports.

☑ Commensurate with the objectives of increased productivity, policy interventions should basically target investment in the sector to tap the potential resources embodied in this sector that will affect inter and intra industry economic transactions or along the value chain of livestock.

☑ In line with the SNA framework, other accounts in addition to production account, like generation of income account, allocation of primary income account, gross capital formation as well as livestock’s output by institutional units should be estimated to show the diverse importance of livestock for policy making.

5. References

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Some Perspectives on the Funding of Animal Health Services in Ethiopia

Dr. Peter Moorhouse (Veterinary Epidemiologist and Key Expert 2, “Improving and Integrating Animal Health Service in the Livestock Value Chain through Public – Private Dialogue in Ethiopia”)

Introduction

The purposes of this document are (i) to show that current levels of funding of public veterinary services in Ethiopia are inadequate, (ii) to make an evidence-based case for improving these funding levels, and (iii) to recommend that veterinary clinical services are progressively transferred to the private sector thereby freeing existing (and augmented) public resources for implementation of much needed improvements in delivery of veterinary core public good functions.

The Broad Context

As a result of structural adjustment and related programmes there are increasing fiscal constraints on government spending and these have led to under-funding of veterinary services (and most other public bodies). Alternative strategies for delivery of animal health services must be considered. Options for these are given in Table 1.

Table 1: Recommended responses to funding constraints and the status of each in Ethiopia

<table>
<thead>
<tr>
<th>Serial</th>
<th>Strategy*</th>
<th>Status in Ethiopia</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Increase degree of cost recovery for veterinary drugs, vaccinations, etc.</td>
<td>Being considered. May be complicated as animal health services are delivered by some 800 decentralised Districts.</td>
</tr>
<tr>
<td>2</td>
<td>Reorganization of public services to correct the imbalance between staff and operating means and to strengthen these services in animal health control, policy planning, and livestock research and extension</td>
<td>In process. Also require increased funds for transport, equipment, consumables, TAD vaccines, per diem payments etc.</td>
</tr>
<tr>
<td>3</td>
<td>Liberalise drug importation and distribution</td>
<td>100% completed</td>
</tr>
<tr>
<td>4</td>
<td>Transfer responsibility for delivery of animal health care to veterinary professionals, middle level technicians, and specially trained community-based animal health workers.</td>
<td>Approximately 7-12% completed (LVC-PPD 2012). Amongst other factors required are enabling policy, regulation and legislation (in progress).</td>
</tr>
</tbody>
</table>


1 In the veterinary field public good services like quarantine and meat inspection are pure public goods as they do not directly benefit the owner of the animal and do not exclude other producers from benefiting from that service.
Funding of District-level Veterinary Services

Districts are the major point of delivery of field veterinary services. Decentralisation has given significant power to district administrations, for example they are responsible for providing the means and funding for delivery of development activities, including animal health services. District Administrations set priorities and allocate the scarce resources at their disposal according to local priorities and lobbying. The district animal health teams (or equivalent) are a component of the district livestock process (or equivalent) which in turn is part of the agriculture office - except Oromia National Regional State (ONRS). This structure (Figure 1) distances animal health teams from decision makers (in the District Council and District Executive Committee) and excludes them from lobbying for additional resources.

Figure 1: Simplified Organogram of a District

Reference to Figure 2 below will show that approximately 1% of total district funds and 9% of funds earmarked for agriculture are allocated to animal health. This situation pertains to the 'average' district. In districts, with large and important livestock populations, the proportion of funding for animal health services will be greater than shown, and vice versa.
Behnke revisited the annual GDP contribution of the livestock sub-sector in Ethiopia by (i) updating estimates of livestock production parameters and the sizes of livestock populations and (ii) including estimates of the contribution of animal draft power to crop production. His findings indicate that livestock GDP in Ethiopia has been significantly undervalued. Whereas previous estimates indicated that livestock contributed some 25% of agricultural GDP, Behnke’s work raises this to 45%. This highlights the relative under-estimation of the role of the livestock sub-sector which contributes significantly to agricultural GDP yet receives only 9% of the agricultural budget. The economic returns accruing from control and prevention of important diseases (including disease surveillance, and veterinary public health) can be substantial and readily justify allocation of funds required for disease control. For example the following benefit: cost ratios have been reported: contagious bovine pleuropneumonia, 2.6:1, Kenya, (Tambi et al., 2006); rinderpest, Ethiopia 2.5:1 (Tambi et al., 2000); peste des petites ruminants 3.3:1 in goats, 4.2:1 in sheep (Awi, 2000); foot and
mouth disease, 11.5:1 in South Sudan, (Baroso et al., 2008); and East Coast fever 9.0 to 17.0:1 depending on assumptions, (Mukhebi et al., 1992).

Major Components of Animal Health Field Services.

There are two major components of animal health field services: (a) animal health clinical services and private good disease control or prevention, and (b) national prevention system (NPS).

Animal Health Clinical Services and Private Good Disease Control

This component is the preoccupation of district animal health services because (i) some resources (particularly veterinary drugs, some equipment and consumables) are made available and (ii) livestock owners require these services. The public sector contributes some 30-40% of clinical services (LVC-PPD, 2012) currently provided. The balance is satisfied by formal private sector and informal (illegal) operators.

This emphasis on provision of animal health clinical services by public sector is unfortunate as it means that (i) core public good activities (animal disease surveillance, control of priority diseases, inspection and regulation, veterinary public health activities, etc) tend to be neglected and ii) the scant resources are diverted away from these core functions.

The estimated mean annual district budget for animal health services is ETB 3.31 per veterinary livestock unit (VLU4), details are presented in Table 2 (LVC-PPD 2012). These indicate that salaries make up 41% of the total allocation for animal health. However the allocation for veterinary drugs should be considered as a loan made by district administration to animal health services because partial cost recovery is applied. Veterinary drugs are supplied to livestock producers at cost and revenues are credited to the district treasury. Removing the veterinary drug allocation from the budget increases the proportion of the budget allocated to staff salaries to 59% which is considerably more than recommended – FAO recommends a ratio of non-staff salary: staff salary allocation of 1.5:1 (i.e. staff costs are 40% of total), and ILRI a ratio of 1:1 (ILRI 1995). It should

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2 In the veterinary field, a private good (i) only benefits the animal owner receiving the service, ii) can be enjoyed exclusively by that owner (exclusion principle) and (iii) when provided excludes someone else from that service (rival principle).

3 Estimate of heads of district animal health services – LVC-PPD 2012

4 One veterinary livestock unit is equivalent to one head of cattle, one camel, 10 head sheep or goats, 2 equids, or 100 poultry (de Haan, Animal Health Services in Sub Saharan Africa. Initial Experiences with Alternative Approaches, World Bank Technical Paper # 134, 1991)
be noted that the proportion of the budget allocated to district-level staff in Ethiopia is not an indication of their availability for public good activities as they spend the greater part of their work time on providing (private good) clinical services.

Table 2: Allocation of District Funds for Animal Health Services, by Category

<table>
<thead>
<tr>
<th>Item</th>
<th>ETB allocated per VLU</th>
<th>Required allocation</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salaries</td>
<td>1.35</td>
<td></td>
<td>41% of total including vet. drugs</td>
</tr>
<tr>
<td>Veterinary drugs</td>
<td>1.03</td>
<td>11.23</td>
<td>9.5% of requirement</td>
</tr>
<tr>
<td>Equipment</td>
<td>0.06</td>
<td></td>
<td>Very limiting</td>
</tr>
<tr>
<td>Transport</td>
<td>0.02</td>
<td></td>
<td>Very limiting</td>
</tr>
<tr>
<td>Regional support</td>
<td>0.14</td>
<td></td>
<td>Very limiting</td>
</tr>
<tr>
<td>Per diems</td>
<td>0.15</td>
<td></td>
<td>Very limiting</td>
</tr>
<tr>
<td>TAD Vaccines</td>
<td>0.32</td>
<td></td>
<td>Very limiting</td>
</tr>
<tr>
<td>Other vaccines</td>
<td>0.18</td>
<td></td>
<td>Very limiting</td>
</tr>
<tr>
<td>Other</td>
<td>0.06</td>
<td></td>
<td>Very limiting</td>
</tr>
<tr>
<td>Total</td>
<td>3.31</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: LVC-PPD, 2012

It is estimated that approximately 20% of estimated total demand for veterinary drugs is satisfied from public funds (district, pastoral commission and regions); 5% from NGOs (in pastoral areas), and the remaining 75% from private pharmacies and drug shops and illegal (informal) sources (it is not possible to estimate the proportions of each; however the informal sector is large) – LVC-PPD (2012). Thus the total supply of veterinary drugs per VLU is some ETB 3.09 (75/25 * 1.03), namely 28% of needs (3.09 / 11.23). It is estimated that for the public sector to bridge the gap between current and required drug supplies in an "average" district will require an additional drug budget in excess of one million ETB per year (a drug fund that revolves 4 times per year would require more than 250,000 ETB per top-up). These estimates highlight the probably important and very regrettable role played by the informal sector in provision of veterinary drugs.

Privatisation of veterinary clinical services and effective regulation is the best option to mitigate the problems associated with public provision of veterinary clinical services, namely severe underfunding and diversion of public sector staff away from the essential public good core functions.

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3 This represents the annual age- and species-weighted wholesale cost of the following: control of endo- and ecto-parasites (3 treatments per animal per year), treatment of infectious disease (1 antibiotic treatment for 1% of population per year), and treatment of trypanosomosis (1% of population per year).

6 This is an estimate of wholesale value of veterinary drugs.
The National Prevention System

This is the sum of all services and activities of public veterinary services that enable early detection and rapid response to emerging and re-emerging animal diseases plus, for the purposes of this discussion, related inspection and regulatory tasks.

The triad of activities illustrated in Figure 3 is a critically important responsibility of public veterinary services. This is largely ineffective in Ethiopia because of the (i) undue emphasis on clinical activities and (ii) under-funding. The triad includes disease surveillance that yields an understanding of disease epidemiology (and attendant losses), surveillance findings inform disease control / preventive strategies and these strategies will modify disease patterns. Changing patterns are detected and quantified by the surveillance systems, which again inform disease control strategies. Therefore, the triad continues to cycle and reduce disease frequency, reduce losses, improve productivity etc.

A radical change is required in the priorities of the Animal Health Directorate and related activities at the regional and district levels so that implementation of core functions in given far more importance. Optimally this would be achieved by progressively transferring delivery of animal health clinical services from public to private sector. In this way clinical coverage will markedly improve to the greater benefit of livestock producers (and consumers) and public veterinary services can concentrate on fulfilling the important core functions and therefore provide improved benefits to society as a whole. These would include (i) facilitating exports and improving inflow of hard currency, (ii) enhancing food safety – for example control of residues and food-borne diseases in products of animal origin, and (iii) improving regulation and inspection thereby reducing moral
hazards, for example sale and use of low quality and/or inappropriate veterinary drugs, and (iv) improved disease control.

The Animal Health Directorate intends to place far more emphasis on public good core functions and for this purpose requires high-level support and greatly improved levels of funding. The annual budgetary requirements for the NPS as estimated by the OIE Gap Analysis team are shown in Table 3.

Table 3: Required total budgetary allocation

<table>
<thead>
<tr>
<th>Category</th>
<th>ETB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrent expenditure</td>
<td>23.3 per VLU</td>
</tr>
<tr>
<td>Investment, per year for 5 years</td>
<td>9.1 per VLU</td>
</tr>
<tr>
<td>Total</td>
<td>32.4 per VLU</td>
</tr>
</tbody>
</table>

Source: OIE, 2012

Given a total of 64 million VLUs in Ethiopia (CSA 2011/12) livestock report, with adjusted sizes of pastoral livestock populations then the required total annual budgetary allocation for public veterinary services is some ETB 2.1 billion.

The current allocation is estimated as ETB 7.5 per VLU or some ETB 480 million in total. This is approximately one quarter of the recommended amount. Substantial additional funding of some ETB 1.63 billion is well justified.

How to achieve the required increase in funding of national veterinary services? The following strategies could be implemented:

- Evidence-based advocacy of senior decision makers.
- Additional funds for core function animal health services would be ring fenced to ensure that they are used for the intended purpose and cannot be allocated to other activities by district administrations. At the district level the amount allocated for these core functions would be in proportion to the contribution of livestock to the district’s economy (this would be determined at the regional level). Using the methodology of Behnke et al (2010) a computer-

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8 These include the disease triad shown in Figure 3, inspections and regulation, veterinary public health activities, international veterinary certification, control of quarantine facilities, operation of laboratories. It should be noted that implementation of some or all of these activities could be subcontracted to the private sector with the public sector monitoring and controlling quality.

9 The annual sample surveys of the agricultural sector conducted by the Central Statistical Agency (CSA) focus on sedentary populations of livestock and therefore grossly under-estimate the numbers of livestock in the pastoral areas. The Ethiopia Livestock Development Master Plan Study team used the only CSA studies of pastoral livestock populations (the aerial survey of Somalia and the enumeration of Afar, both carried out in 2002. Numbers were then extrapolated to 2006.
based model (LVC-PPD 2013) was developed. This uses the sizes of livestock populations, and the value of grain production, to provide estimates of the total value of livestock products at national, regional and district levels. This would be a useful tool, *inter alia*, to inform allocation of resources by district.

- Prioritise use of resources
- Demonstrated efficient and effective use of funds
- Progressive increases in funding to enable the AHD to effectively and efficiently utilise these additional resources – as training, new structures and management procedures will be required. A summary of selected national-level and livestock-related economic parameters is presented in Table 4.

### Table 4: Summary of Annual Livestock-related Financial Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>ETB (billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value exports of livestock and products</td>
<td>6.650</td>
</tr>
<tr>
<td>Total value livestock production</td>
<td>142.217</td>
</tr>
<tr>
<td>Direct losses due to diseases</td>
<td>64.625</td>
</tr>
<tr>
<td>Total budget requested</td>
<td>2.105</td>
</tr>
</tbody>
</table>

**Action that Could be Taken Now**

Table 1 presents a list of possible strategies to improve funding. Of those outstanding, the most obvious choice would be full cost recovery for clinical services. A previous study indicated that a full cost recovery for clinical services would, on average, require a doubling of the wholesale price of drugs used – this would cover cost price of drugs, salary, breakages, handling costs etc. The estimated mean allocation for veterinary drugs per district per year is ETB 161,773 and full cost recovery would therefore yield ETB 323,546 per year. Repaying half of this to the district treasury would leave a ‘surplus’ of ETB 161,733. This could be utilised either locally, or at the regional level – at both of these level strong agreements must be made between animal health services and the respective executive committee to ensure that these savings are totally retained within, and used exclusively by animal health services.
**At the District Level**

The saving could be allocated to other budget lines. For example in an average district the per diem allocation could be increased approximately 3 fold to some ETB 70,000, the transport line allocation by 20 fold to 67,000, and the equipment allocation 3 fold to ETB 26,000.

**At the Regional Level**

The savings from all participating districts could be credited to a Regional Livestock Development Fund (to be established) and used to fill priority funding gaps for surveillance and / or animal disease control in the region according to the decision of the Regional Animal Health Officer in consultation with the heads of district animal health services. Applying cost recovery would have the added advantage that it is a very helpful prerequisite for privatisation.

**Summary**

- Public funds should be used to further the public good: for animal health, public goods include animal disease surveillance, prevention and control of notifiable diseases, meat and other inspections, regulation, export certification, and other components of the NPS
- The economic benefits of informed investments in disease control/ prevention are well documented and attractive, especially for livestock-exporting nations.
- Veterinary clinical services are a private good and costs should be progressively borne by livestock producers.
- A national policy to privatise veterinary clinical services is required.
- Use evidence-based advocacy to lobby for the required increased funding for NPS

**References**


ILR 1995, ILRI Training Manual No 2, Livestock Policy Analysis

LVC-PPD 2012. Gap analysis survey of 26 districts in 4 regions conducted in 2012

LVC-PPD 2013. MS Access® - database management system uses the basic methodology described in Behnke 2010 and the latest data of livestock populations, production parameters, and producer prices.


OIE 2012. Report of the OIE Gap Analysis Team for Ethiopia


Contribution of Poultry for Ethiopian Development

Professor Solomon Demeke (Jimma University, College of Agriculture and Veterinary Medicine)

Summary
This paper focuses on the socio-economic role and the contribution of poultry to the development efforts of the Ethiopian government. It deals with the contribution, current status, and major bottlenecks and suggested development strategy of the Ethiopian indigenous chickens kept under the rural traditional management system. The paper discusses the role of scavenging village Ethiopian poultry as an integrated and complementary farming, contributing to the well-being of the rural households. The Ethiopian modern poultry sub-sector seems to be dominated by small-scale modern poultry farms run as a business. The emergence of this sub-sector is influencing the livelihoods of landless youth, women and urban poor. The potential and constraints of the growing small-scale modern poultry are also discussed. There are few private large-scale commercial poultry farms, all of which are located in Debre Zeit, are also briefly discussed.

Structure of the Ethiopian Poultry

Poultry includes all domestic birds kept for the purpose of human food production (meat and eggs) such as chickens, turkeys, ducks, geese, ostrich, guinea fowl, doves and pigeons. In Ethiopia, ostrich, ducks, guinea fowls, doves and pigeons are found in their natural habitat whereas, geese and turkey are uncommon. Thus, poultry production is synonymous with chicken production under the present Ethiopian conditions (Solomon, 2007).

In Ethiopia, poultry production systems show a clear distinction between the traditional, low input system on the one hand and modern production system using relatively advanced technology on the other hand (Yami, 1995). All the available evidences tend to indicate that the poultry sector in Ethiopia could be characterized into three major production systems based on some selected parameters such as breed, flock size, housing, feeding, health care and bio-security (Alemu & Tadelle, 1997; Bush, 2006; Goutard & Magalhaes, 2006). These are village or backyard poultry...
production system, small-scale intensive poultry production system and large scale commercial poultry production system. Alternatively, the FAO classifies poultry production systems into four sectors, depending on the level of bio-security. Based on this system of classification, Ethiopia has three poultry production systems: village or backyard production with minimal bio-security, small commercial poultry production with “low to minimal” bio-security and large commercial poultry production with “moderate to high bio-security” (Nzietcheung 2008).

The village production system, as currently practiced in Ethiopia is more or less similar to sector 4 of FAO classification. Even though there are certain disparities, the modern poultry production system seems to be synonymous with sector 1 and 2 of the FAO classification. Few of the large modern poultry farms (ELFORA Agro Industry, Alema and Genesis etc) located in Debre Ziet could collectively be considered as sector 1 of FAO classification. There is a third emerging “small scale intensive” system as an urban and peri-urban household income source, corresponding more or less to the sector 3 of FAO classification. These being the case, for the purpose of this report, poultry production in Ethiopia could be classified into

- Traditional production system
- Small scale intensive production system
- Large scale commercial production system

**Traditional Poultry Production System**

**Socio-Economic Contribution**

Throughout the African continent poultry keeping has been practiced by village communities for many generations. These birds currently make up more than 80% of the continent's poultry flock. Rural family poultry are a valuable asset to local populations as they contribute significantly to food security, poverty alleviation and the promotion of gender equality, especially in disadvantaged groups and less favoured areas of rural Africa (Guèye, 2000). Ethiopia is not exception to these conditions. The Ethiopian Growth and Transformation Plan (GTP) states that livestock resources development will be practiced as part of the economic growth scaling up strategy. The focus will be on the expansion of livestock fattening and dairy resources development technology. In addition to this, honey production technology and poultry resources development technologies will be put in place, indicating that poultry is included in the development strategy of the Ethiopian government (MoFED, 2010)
In Ethiopia, village poultry is rarely the sole means of livelihood for the household but is one of a number of integrated and complementary farming activities contributing to the overall well-being of the household. There is no reliable data indicating the annual contribution of village poultry for the national economic development in Ethiopia. Nevertheless, it is believed that rural poultry accounts for 99% of the national total production of poultry meat and eggs in Ethiopia (Tadelle et al., 2000). An ILRI (2000) estimate showed that poultry meat production in Ethiopia grew, on an average, only by 0.34% per annum during the period 1985-1994 while the annual hen egg production declined by 0.39% per annum during the same period. This growth rate of poultry production is, indeed, much lower than that of the fast growing population. In recent years some improvements have occurred, yet the poultry sector is characterized by low productivity and production. In 2005, the total poultry meat and egg production were estimated at 42,560 and 36,624 tonnes, respectively. According to FAO (2008), mean annual egg and poultry meat production in Ethiopia was estimated at 68 million USD between the agricultural year of 2000 and 2005 (Table 1).

Table 1. National Contribution of the Ethiopian Poultry Sector for the Year 2000-2005

<table>
<thead>
<tr>
<th>Parameters</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual hen eggs in shells(tonne))</td>
<td>28583</td>
<td>37764</td>
<td>39240</td>
<td>37060</td>
<td>36624</td>
<td>36624</td>
</tr>
<tr>
<td>Egg price (US$/tonne)</td>
<td>712.16</td>
<td>617.4</td>
<td>609.5</td>
<td>696.8</td>
<td>724.6</td>
<td>775.5</td>
</tr>
<tr>
<td>Annual egg value( million, US$)</td>
<td>28.4</td>
<td>23.3</td>
<td>23.9</td>
<td>25.8</td>
<td>26.5</td>
<td>28.4</td>
</tr>
<tr>
<td>Annual chicken meat (tonne)</td>
<td>37730</td>
<td>49840</td>
<td>54064</td>
<td>50160</td>
<td>47096</td>
<td>42560</td>
</tr>
<tr>
<td>Meat price(US$/tonne)</td>
<td>994.98</td>
<td>858.3</td>
<td>775.4</td>
<td>886.2</td>
<td>921.6</td>
<td>986.4</td>
</tr>
<tr>
<td>Annual meat value( million, US$)</td>
<td>37.5</td>
<td>42.8</td>
<td>41.9</td>
<td>44.5</td>
<td>43.4</td>
<td>42.0</td>
</tr>
<tr>
<td>Annual total value (million, US$)</td>
<td>65.9</td>
<td>66.1</td>
<td>65.8</td>
<td>70.3</td>
<td>69.9</td>
<td>70.4</td>
</tr>
</tbody>
</table>

Source: FAOSTAT, September 2008

Indigenous chicken based village poultry by its own provides a major income-generating activity from the sale of birds and eggs. Eggs can provide a regular, albeit small, income while the sale of live birds provides a more flexible source of cash as required. Village poultry is a source of self-reliance for women, since the sale of live birds and eggs are decided by women (Aklilu et al., 2007), both of which provide women with an immediate income to meet household expenses such as food. Annual income from sale of eggs and live birds is estimated to be about Birr 322/ household in the Tigray regional states, indicating that village poultry in extremely poor areas of the country play important economic, nutritional and socio-cultural roles in the livelihoods of the rural households.
For poor families, poultry are often one of their few sources of petty cash and so the birds are kept for sale rather than home consumption. Yearly income from household indigenous chickens ranges from Birr 50 to over Birr 300 and is largely under the control of women. This income is significant and represents 25% of the typical annual income of poor families in SNNPR (Bush, 2006). Village poultry is the first step on the ladder for poor households to climb out of poverty. It is also the only capital that households have left when declining into poverty because of various reasons such as drought. Poultry also play an important socio-cultural role in many societies. Village Poultry keeping uses family labour, and women (who often own as well as look after the family flock) are the major beneficiaries. For smallholder farmers in developing countries (especially in low income, food-deficient countries), including rural Ethiopia, family poultry represents one of the few opportunities for saving, investment and security against risk. In some of these countries, family poultry accounts for approximately 90 percent of the total poultry production (Branckaert, 1999).

Occasional consumption of eggs and poultry meat provides a valuable source of protein in the diet. For the poor, poultry meat is the only special meal they can afford during religious festivities like New Year, Christmas and Easter. In general, socio-cultural roles are more important in the area with the poorest market access (Aklilu, 2007). Unfortunately however, eggs have never been among the top ten animal products (milk, butter, cheese, honey, beef, mutton and goat meat etc) consumed at the household level in rural areas of SNNP Regional State. There are some case studies in which farmers are asked to rank the importance of poultry against other categories of food materials in the SNNP Regional State. The results indicated that both eggs and chickens have never been among the top ten (coffee, enset (false banana), beans, maize, teff, sweet potato, wheat, milk, meat etc) means of survival and income generation (Bush 2006).

Poultry keeping is traditionally the role of women in many developing countries. Female-headed households represent 20 to 30 percent of all rural households in Bangladesh (Saleque, 1999), and women are more disadvantaged in terms of options for income generation. According to Aklilu (2007), in Tigray female-headed households tend to belong to the poorest groups and constitute nearly 30% of the regions’ population. Female-headed households are more involved in poultry keeping as means of earning income since they have fewer other opportunities than the male-headed ones. A non-parametric test showed that a significantly higher proportion of female-headed households have poultry but no other animal. In Ethiopia, men make major decisions regarding production strategies, purchase and sale of many of the livestock activities. Women do not have
control over such activities. In a study conducted by Tadelle and Ogle (1996), to characterize poultry production systems in the highlands of Ethiopia, it was learnt that women look after the birds, and the earnings from the sale of eggs and chicken are often their only source of cash income. It is therefore, important to actively involve women in the process of poultry improvement, which has actually been neglected in the past.

Population, Flock Structure and Regional Distribution

There is no accurate figure representing the Ethiopian poultry population. CACC (2003) and FAO (2005) estimated the country's poultry population (the indigenous chicken) at 42.9 and 39 million, respectively while the Central Statistical Authority (2004-2005) reported 31 million for both the indigenous and commercial chickens. In the agricultural year of 1984 the Ethiopian human and poultry population was estimated to be 39 and 56 million respectively, whereas in 2005; the country's human and poultry population was estimated to be 74 and 30 million respectively (Fig 1). This shows that the Ethiopian human population increased by 40 million while the poultry population declined by 9 million during the same period (1984-2005). Sub-Sector Review (1984) estimated the average number of chickens per household at 6.5 in 1984 whereas, the average number of chickens per household is estimated at 4.1 in 2003 (CACC, 2003). These figures show that average number of chickens per household declined by 37% over the last 20 years.

![Figure 1.Trends in the Ethiopian Poultry (red) and Human Population between 1954 & 2005(million)](image-url)
According to CSA (2003) about 41.7%, 18.5%, and 39.7% of the national poultry population are chicks to an age of 8 weeks, growers aged from 9 to 20 weeks and adult birds of more than 20 weeks respectively. According to the Central Statistical Authority (2004-2005) about 97.82% of the total national poultry population consists of the indigenous chickens, whereas, the remaining 2.18% consists of the introduced exotic breeds of chickens. The majority of the national chicken population comprises of chicks of 0-8 weeks of age, characterized by high mortality of about 40-60% (Fig 2). The laying flock seems to be dominated by old age and surplus breeding males. About 30.9% of the total national standing chicken population is hens of which about 16% are none layers.

Figure 2. Population Structure of the Ethiopian poultry

The four major Regional States, in terms of land area and human population (Oromia, Amhara, SNNP, and Tigray) collectively accounts for about 96% of the total national poultry population. Chicken rearing is not common in the lowlands of Ethiopia and the lowlands of Ethiopia i.e. Somali, Gambella, Afar and Benishangul-Gumze Regional States collectively own 3.24% of the total national chicken population of which 2.2% is owned by Benishangul-Gumuz Regional State. Oromia region has about 34.4% of the total national chicken. The major religion in northern Ethiopia particularly that of the Tigray, Amhara and Northern Oromia Regional States is largely Orthodox Christianity. The Amhara and Tigray Regional States collectively own about 43% of the total national poultry population. The average number of chickens per household (flock size) is

42
estimated at 7.2 and 4.4 in Tigray and Amhara Regional State respectively, the values of which are above that of the national average of 4.1. Annual poultry meat and egg consumption per household is estimated 2.19 Kg and 1.72 kg respectively in the Tigray Regional State. On the contrary, the Afar, Somali, Gambela, Harari, Addis Ababa, Dire Dawa and SNNP Regional/Administrative States collectively own 20% of the national poultry population. The average number of chickens per household (flock size) of these regional states ranges between 1.4 and 3.9, all of which are lower than that of the national average, indicating that the socio-economic role of village poultry in the livelihood of the rural community of these Regional States is not as important as that of the rural community of Northern Ethiopia (Solomon, 2007). In summary, all the available evidences tend to indicate that there is decline in the national poultry population, annual poultry meat and egg production and per capita poultry meat and egg consumption gradually with time attributed to long reproductive cycle and poor health care and high chick mortality.

Management and Reproductive Cycle

The Ethiopian, traditional poultry production system comprises of the indigenous chickens and is characterized by small flock sizes and low input and output. There is no separate poultry house and the chickens live in family dwellings together with human population. There is no purposeful feeding of chickens and scavenging is almost the only source of diet. There is no planned breeding. It is by natural incubation and brooding that chicks are hatched and raised all over rural Ethiopia. A broody hen hatching, rearing and protecting few number of chicks (6-8) ceases egg laying during the entire incubation and brooding periods of 81 days. Yet the successes of the hatching and brooding process depends on the maternal instinct of the broody hen and prevalence of predators in the area, such as birds of prey, pets and some wild animals, all of which are listed as the major causes of premature death of chicks (Solomon, 2007). Mean survival rate to an age 3-months of baby chicks reared under natural brooding condition in Ethiopia is about 40% (Sub Sector Review 1984; Hoyle 1992; Ethiopian Statistical Authority 1985-1996), indicating that the broody hen ceases egg laying for 2.7 months for the purpose of rearing 2.8 chicks to an age of 3 months. Artificial chick brooding should be adopted to initiate improvement in poultry production in Ethiopia. Electricity is not available in rural Ethiopia. According to Solomon (2007), hay-box chick brooding technology (developed at JUCAVM) in which no artificial heat is employed seems to be a brooder of choice by smalls-scale poultry producers in Ethiopia (Picture 1 & 2).
Poultry Disease and Predators

The bio-security of the traditional poultry production system is very poor and risky, since scavenging birds live together with people and other species of livestock. Poultry movement and droppings are very difficult to control and chickens freely roam in the compounds used by households and children. There is no practices (even means) of isolating sick birds from the household flocks and dead birds could sometimes be offered or left for either domestic or wild predators. Chickens and eggs are sold on open markets along with other food items and the current live bird marketing system displays significant and potential hazard to people (picture 3).
Newcastle disease (NCD) is the most important disease recognized in virtually every country. Sonaiya (1990), after summarizing the reports from six African countries, reported that the mortality caused by Newcastle disease ranges from 50-100% per annum and that severity is higher in the dry season, whereas the disease is more widespread in the rainy season in the central highlands of Ethiopia (Tadelle and Ogle, 1996). Even with such high mortality, the farmers do not have any preventive medicine or practice for this fatal disease, and only after the start of an outbreak do they treat their birds with socially accepted medicines (Tadelle and Ogle, 1996). However, the effectiveness of these treatments is not satisfactory.

The Ethiopian National Veterinary Institute (NVI) produces a range of NCD vaccines and provides them on request to modern poultry subsector. There is no national NCD control policy or coordinated prevention and control program in rural Ethiopia. Vaccination against NCD occurs in rural areas only in response to an outbreak. According to CACC (2003), the estimated number of vaccinated and treated animals in the country in the agricultural year of 2003 was estimated at 11.5 and 2.8 million of which 1.39% and 10% was poultry respectively. On the other hand, the great majority of afflicted (56%) and dead (67%) animals were poultry. Data on the number of poultry vaccinated, treated, afflicted and died during the agricultural year of 2003 are given in Table 2. However, the specific information pertaining to specific diseases is not given. At the beginning of the agricultural year of 2003, the total chicken population was estimated at 42 million of which 0.37, 0.68, 26.4 and 24.2% was vaccinated, treated, afflicted and died respectively. The number of poultry died over the year was estimated at 10.2 million (24% of the national poultry population) resulting in the poultry population of 32 million at the beginning of 2004.

The Four Major Regional States:

The four major Regional States (Oromia, Amhara, SNNP and Tigray) collectively accounts for about 94% of each of the national chicken population vaccinated, treated, afflicted and died over the year. Oromia Regional State reported about 44% of each of the national chicken population vaccinated, treated, afflicted and died over the year. On the other hand, SNNP Regional state lost about 33% of its regional chicken population to disease condition over the period of one year, followed by Oromia, which lost 30% of its chicken population over the same period due to disease. Among the four major Regional States, mortality during the year specified was lower for Tigray Regional State (8.3%) as measured by percent of the regional chicken population lost due to disease condition over the year.
Table 2. Number of poultry vaccinated, afflicted, treated and died by region (2003)

<table>
<thead>
<tr>
<th>Geographic areas</th>
<th>Vaccinated (%)</th>
<th>Afflicted (%)</th>
<th>Treated (%)</th>
<th>Died (%)</th>
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<tr>
<td>Ethiopia</td>
<td>0.37</td>
<td>26.4</td>
<td>0.68</td>
<td>24.2</td>
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<tr>
<td>Tigray</td>
<td>15.0</td>
<td>4.03</td>
<td>4.7</td>
<td>4.0</td>
</tr>
<tr>
<td>Afar</td>
<td>NA</td>
<td>0.27</td>
<td>0.02</td>
<td>0.28</td>
</tr>
<tr>
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<td>33.0</td>
<td>21.9</td>
<td>22.5</td>
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</tr>
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<td>41.8</td>
<td>47.0</td>
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<td>0.14</td>
<td>NA</td>
<td>0.13</td>
</tr>
<tr>
<td>Benishangul</td>
<td>4.0</td>
<td>4.4</td>
<td>4.7</td>
<td>4.2</td>
</tr>
<tr>
<td>S.N.N.P.R</td>
<td>12.9</td>
<td>26.2</td>
<td>20.2</td>
<td>25.9</td>
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<tr>
<td>GAMBELLA</td>
<td>NA</td>
<td>0.69</td>
<td>0.3</td>
<td>0.68</td>
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<td>Harari</td>
<td>NA</td>
<td>0.06</td>
<td>NA</td>
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<tr>
<td>Addis Ababa</td>
<td>NA</td>
<td>0.38</td>
<td>0.4</td>
<td>0.39</td>
</tr>
<tr>
<td>Dire Dawa</td>
<td>NA</td>
<td>0.03</td>
<td>NA</td>
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</table>

Source: CACC, 2003  
Key: NA represents data not available.

Death rate registered from Afar, Benishangul, Addis Ababa, SNNP and Gambella Regional States were higher than that of the national average for the year 2003, whereas, the largest number of mortality was recorded from SNNP Regional State. Other diseases (other than NCD) found in rural poultry include Gomboro, coccidiosis, fowl pox, fowl typhoid, fowl cholera, external and internal parasites. Aerial and terrestrial predators account for far more mortality than is usually recognized. Prevention by means of proper housing, shelter and bush clearing is the best policy. Hunting, poisoning, trapping and the use of natural enemies of the predators are control methods available.


According to FAO (2008), the outbreaks of Highly Pathogenic Avian Influenza (HPAI) that has occurred in many countries in Asia, Europe and Africa since 2003 have inevitably called for the address of the crisis at its source, which is the poultry population. The main danger of this disease lies in the way in which humans interact with and handle the production, distribution, processing and marketing of live poultry and poultry products. The direct and indirect socio-cultural and economic impacts of disease outbreaks influence policy measures and disturb markets, causing economic losses. In study conducted by Safari et al. (2004), the economic impact was assessed in the context of how and how much the disease affected the level of inputs and outputs. The qualitative and quantitative assessment of the impacts of the disease was made at the farm level. Coccidiosis was identified as a cause of direct and indirect losses in all farms. Losses occurred in the form of mortalities, coccidiostat costs, reduced weight gains, reduced market value of affected birds, culling, delayed off take and reduced egg production. Average losses due to mortalities,
Culling and coccidiostat costs were estimated at Ethiopian Birr 898.80 and 5301.80 per farm or 0.55 and 0.53 Ethiopian Birr per chicken in small scale and large-scale poultry farms, respectively. This contributed to an average of 11.86% and 8.40% loss in enterprise profit per farm in small and large-scale farms, respectively. Proportional mortality rates due to coccidiosis were 14.5% and 13.3% in small scale and large-scale poultry farms.

Small Scale Intensive System

In this system, modest flock sizes usually ranging from 50 to 1000 exotic breeds are kept for operating on a more of commercial basis. Most small-scale poultry farms are located around Debre Zeit town and Addis Ababa city. This production system is characterized by medium level of feed, water and veterinary service inputs and minimal to low bio-security. Most small-scale poultry farms obtain their feed and foundation stock from large-scale commercial farms (Genesis or Alenia) (Nzietchueung 2008). They are also involved in the production and supply of table eggs to various supermarkets, kiosks and small roadside restaurants through middlemen. The small-scale modern poultry farms located in Debre Zeit and Addis Ababa enjoy the privilege of being advised and assisted by health professionals and Faculty of Veterinary Medicine. They are also at the reach of information, vaccination and treatment drugs. The small-scale modern poultry production systems located outside of these locations has limited access to such service. Reliable economic data concerning the value of commercial poultry products sold in any one year is not available. The general indications are that they supply eggs and meat to urban and peri-urban population, particularly to supermarkets, kiosks and hotels. Some of the small-scale modern poultry producers, along with Bureaux of Agriculture, Cooperatives and Debre Zeit Agricultural Research Centre distribute breeding seeds and promote improved poultry and feeding technologies.
A small number of NGOs and FAO (Food and Agricultural Organization of the United Nation) are involved in the implementation of poultry development projects in support of vulnerable households. Smallholder poultry production has been a sub component of a number of Donor & NGO funded Projects (youth & women-led enterprise or micro-financing). FAO provided a considerable and extensive support in the development and finalization of the three-year national avian and human Influenza strategic preparedness and response plan. Donors and NGOs involved in training on small modern poultry of exotic breeds included (among others) CIDA, GTZ and FCE (Facilitator of Change in Ethiopia). Many NGOs that operate under the umbrella of the Christian Relief and Development Agency (CRDA) are involved in training and chicken distribution (Solomon 2007). The Ethiopian government is also involved in promotion of small-scale poultry farms in support of poverty alleviation and food security initiatives. The areas of involvement of the government include infrastructure development & formulation and supervision of disease control legislation and policies and development of National Strategic Preparedness and Response plan for the avian human influenza pandemic threat.

The majority of the small-scale intensive poultry farms are characterized by harsh climatic condition, low management standard, poor housing condition, availability, quality and cost of feed and poor disease control practices. There are small modern poultry farms that are not officially registered and characterized by the use of informal marketing channel. The major bio-security problems associated with small scale modern poultry include poor housing conditions, unsecured source of chicks and feed, free movement of people and problems of manure disposal. It may be
difficult to evaluate the economic, financial & sustainability of the interventions (investment) and small-scale poultry as a commercial enterprise might not be profitable in all instances.

Large Scale Commercial Poultry Production

There are few private large-scale commercial poultry farms, all of which are located in Debre Zeit. ELFORA, Alema and Genesis are the top 3 largest commercial poultry farms with modern production and processing facilities. ELFORA annually delivers (www.ethiomarket.com elfora), around 420,000 chickens and over 34 million eggs to the market of Addis Ababa. Alema poultry farms is the second largest commercial poultry farms in the country delivering nearly half a million broilers to Addis Ababa market each year. The farm has its own broilers parent stock, feed processing plants, hatchery, slaughterhouses, cold storage and transportation facilities. The large-scale commercial poultry provide fertile eggs, table eggs, day old chicks, broiler meat and adult breeding stocks to the small-scale modern poultry farms. They are kept as full time business and highly dependent on market for inputs. The small-scale modern poultry farms (sector 3) could either be kept as supplementary to family income or as full time business. Reliable economic data concerning the value of commercial poultry products sold in any one year is not available. The general indications are that the intensive poultry industry plays a key role in supplying poultry meat and eggs to urban markets at a competitive price. The industry also provides employment for a range of workers from poultry attendants to truck drivers to professional managers.

Formal marketing operations exist in urban and peri-urban areas practicing large-scale commercial poultry production. The majority of the products sold within the formal sector come from the commercial industry but a small number of frozen indigenous chickens are supplied through supermarkets in Addis Ababa. The larger commercial poultry units have agreements with their clients and most poultry meat is sold frozen. The majority of the products sold within the formal sector come from the commercial industry but a small number of frozen indigenous chickens are supplied through supermarkets in Addis Ababa. dressed poultry carcass and table eggs are sold to residents and hotels either in supermarket or small shops/kiosks. Most of the supply of dressed poultry carcass to Addis Ababa supermarket came from Alema poultry farm but many unidentified sources also supply the supermarkets.

It is very difficult to detect the health measures and bio-security of this poultry farms from their broacher, web sites and organizational structure, which largely deals with market information.
According to Abebe (2006), day old chickens are imported from countries like Egypt, UK, Germany, Kenya and Holland as a parent stock by ELFORA, Genesis Farms and Alema farm. Information obtained from the federal MoARD indicates that, the OIE recommendations are followed during importation of bird in the country.

**The Way Forward**

In the past, development initiatives of village poultry placed special emphasis on genetic improvement through the introduction of exotic breeds of chickens and set up of national poultry extension package and government owned breeding and multiplication centres. The initiation of the Ethiopian national poultry extension package goes back to the early 1950s and comprised of the distributions of three months old exotic pullets and cockerels. This was aimed at promoting small-scale exotic poultry production within the rural farming population and up-grading of the indigenous chickens by crossing with exotic males (Alemu Sida, 1987). The Ministry of Agriculture (MoA), being responsible for the Ethiopian national poultry extension package, established several poultry multiplication and breeding centres in different parts of the country to be used as a source of breeding stock and management information. The supply of improved pullets and cockerels from the government poultry multiplication and breeding centres however was not adequate for the demand. Hence, the MoA cannot claim to have had a sustainable and measurable impact on the rural communities that it was expected to serve in the area of poultry production. Moreover, there is a growing awareness of the need to balance the rate of genetic improvement with improvement in feed availability, health care and management. There is also an increased recognition of the potential of indigenous breeds and their role in converting locally available feed resources into sustainable production. Village poultry has the potential to satisfy the large segment of the current demand for poultry meat and eggs through better management of stock health and local feed resources. It would appear that simple changes in management practices (supplementary feeding and control of disease and predators) are believed capable of bringing losses well below the reported high mortality and in turn improve the off-take rate from traditional chicken farming.

The major bottleneck of the small modern poultry sub-sector is the supply of improved genetic &feed materials and diseases control. Poor quality chicks, limited market access, high start-up costs, poor quality and high cost of feed, and low veterinary inputs are also reported to be some of the major constrains of small poultry of exotic chickens. There is a strong need for the set up of input
supply system (day old chicks, feed packages, vaccines) through the encouragement of the private & cooperative supplier system and provision of adequate technical and marketing support.

Critics on importation regulation indicate that although certifications that testify freedom from major diseases are used as criteria for importation, follow up quarantine and inspection activities are not in place either at Federal or at the importing farm level. In the absence of effective veterinary service and mechanisms of verifications, such provisions could pose potential treat to Ethiopian poultry production. The bio-security status in many of the intensive poultry farms is extremely poor (Abebe, 2006). The management and health care practices are generally inadequate in view of ensuring prevention against the introduction of HPAI as well as in controlling the disease in times of outbreaks. Selling of poultry waste for animal feed, exchange of sacks and lack of bio-security and hygienic measures at feed processing plants, inadequate bird slaughtering and packaging facilities and sourcing, handling and storage of poultry products in supermarkets are some of the issues that require utmost considerations and clearly elaborated policy decisions with emphasis on bio-security aspects. The export market for poultry products is very limited due to international competition, especially with frozen Brazilian broilers that are sold at very low prices. It may be worthwhile studying consumer preferences in neighbouring countries to determine if niche markets exist for extensively raised indigenous birds and their eggs. In summary

- There seems to be significant decline in local chicken population, annual egg & poultry meat production and per capita consumption in Ethiopia. There is a need for consultative talk of all the concerned parties.

- The low performance of local chickens is due to low management standard, long reproductive cycle and high mortality. Awareness creation, improvement of health measures & the use of appropriate technologies such as hay-box brooder seem to be appealing.

- The modern sector is dominated by small-scale production, characterized by shortage of improved genetic & feed materials and health care. The set up of input supply system (day old chicks, feed packages, vaccines etc) seems to be appealing. There are NGOs & institutions involved in small-scale poultry in support of vulnerable households. There is a need to coordinate all the available efforts.
The commercial farms involved in importations of eggs, baby chicks and other facilities represent high risk of disease entry to the country. Well-defined breeding & importation policies seem to be appealing. Lack of strong bio-security and hygienic measures and inadequate slaughtering & packaging facilities are some of the issues that require considerations and policy decisions with emphasis on bio-security.

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Gueye EF. 2003. Poverty alleviation, food security and the well-being of the human population through family poultry in low-income food-deficit countries. Senegalese Institute of Agricultural research (ISRA), Dakar-hann, Senegal.
Safari M. Kinung’hi, Getachew Tilahun, Hafez M. Hafez, Moges Woldemeskel, Moses Kyule, Matthias Grainer and Maximillian P. O. Baumann 2004. Assessment of Economic Impact Caused by Poultry Coccidiosis in Small and Large Scale Poultry Farms in Debre Zeit, Ethiopia
THEME II

Animal Health and Its Multidirectional Contribution in Ethiopia
Animal Health Service in Ethiopia

Dr. Bewket Siraw (Director, Plant and Animal Health Directorate, Ministry of Agriculture)

Part I: Current Status of the Veterinary Services

1.1. Background on the Evaluation Process

- The tool used for the evaluation was PVS, developed by the OIE to help Member States:
  - Assess the efficiency, quality, and effectiveness of their national veterinary services against international standards.
  - Is an external/independent evaluation by a team of experts from the OIE upon countries' request.

1.2. Summary of the Evaluation

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<td>- Competencies of veterinary paraprofessionals</td>
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<td>- Continuing education</td>
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<td>- Management of resources and operations</td>
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Overall average score is 2.63/5

... Summary of the PVS results continued

IV. INTERACTION WITH StakeHOLDERS

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Overall average score is 2.63/5

... Summary of the PVS results continued

V. ACCESS TO MARKETS

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Overall average score is 2.63/5
Veterinary Infrastructure and manpower

Infrastructure
- Public
  - 782 district and 1850 station clinics
  - 11 export abattoirs
  - 296 municipal abattoirs
  - 2 international standard quarantines stations (under construction)
  - 12 check posts
  - 1 national vaccine production facility
  - 1 ISO 17025 certified veterinary laboratory with BL3 unit
  - 14 regional veterinary laboratories
  - 1 Quality control laboratory
  - 1 Tsetse and Trypanosomiasis control center
  - 1 Sterile male rearing center
  - 11 veterinary schools-faculties housed under different universities
  - 1 middle level career college

Livestock policy contd

Private
- 163 Veterinary clinics
- 632 Drug shops

Manpower
- 968 veterinarians
- 8900 animal health assistants
- 99 Bsc holders
- 3403 community animal health workers

2. Strategies to Improve the service

1. Improving Animal welfare
2. Improving Public Health
3. Improving Animal Health

Many thanks
Animal Health and Its Multidimensional Contribution

Dr. Wondwosen Asfaw (President of the Ethiopian Veterinary Association)

Abstract

The livestock sector in Ethiopia is the largest in Africa. Despite these huge resources, the sector faces numerous constraints. Undoubtedly, the widely prevalent livestock diseases are major constraints to Ethiopian livestock development. The impact of animal diseases stems from direct losses due to mortality and its indirect effects that result from morbidity. The losses from livestock disease have significant economic, food security and livelihood impacts on livestock keepers and the national economy. The widely prevalence of these diseases has denied the country its fair share in the international livestock and livestock products market. Moreover, some of these diseases are zoonosis seriously impacting human health.

Despite these constraints, there are opportunities for improving the livestock value chain system and increasing livestock production and productivity. This will require adequate investment and improvement in SPS compliance, disease prevention and control, disease surveillance, veterinary public health and early detection and response capacity for animal health emergencies. Defining and enhancing the relationship of the public and private sector will be key to unblocking some of the constraints as well as developing supportive policies, appropriate legal frame work and institutional arrangements.

Pursuing these activities will increasingly become the key to enhance livestock production and productivity, maintain and expand market opportunities and to achieve the set targets in the country’s Growth and Transformation (GTP) plan.

1. Introduction

Livestock are extremely important in Ethiopia to economic development and to poverty reduction. Ethiopia has one of the largest livestock inventories in Africa providing support for the livelihoods of an estimated 80 per cent of the rural poor. Animal rearing is an integral part of agricultural production. However, the economic benefit derived from the livestock sector does not commensurate with the potential and the sub-sector remained untapped. Undoubtedly, the widely
prevalent livestock diseases are major constraints to Ethiopian livestock development. The vulnerability of livestock production and trade to disease epidemics is undermining investment in a potentially valuable economic activity, which would increase employment in rural areas, raise rural incomes and assist in alleviating poverty.

2. The Economic Impact of Animal Disease

**Mortality:** The impact of animal diseases stems from direct losses due to mortality. An annual loss due to mortality ranges 8-10% for cattle, 12-14% for sheep, 11-13% for goats, 8% for camels and 47% for poultry. These figures are even much higher more calves, lambs and kids. The monetary value of these losses is very substantial. Direct losses from morality could reach between 16-21 billion Birr (Table 1).

<table>
<thead>
<tr>
<th>Species</th>
<th>Number in Million</th>
<th>Mortality in percentages</th>
<th>Mortality in millions</th>
<th>Value in Birr (in millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>52.1</td>
<td>8-10%</td>
<td>4.168-5.21</td>
<td>10920-13650</td>
</tr>
<tr>
<td>Sheep</td>
<td>24.2</td>
<td>12-14%</td>
<td>2.904-3.388</td>
<td>2178-2541</td>
</tr>
<tr>
<td>Goat</td>
<td>22.6</td>
<td>11-13%</td>
<td>2.486-2.938</td>
<td>1988.8-2350.4</td>
</tr>
<tr>
<td>Camel</td>
<td>2.2</td>
<td>8%</td>
<td>0.176</td>
<td>616</td>
</tr>
<tr>
<td>Poultry</td>
<td>44.9</td>
<td>47%</td>
<td>21.103</td>
<td>1055.15</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td><strong>21.103</strong></td>
<td><strong>16758-20112</strong></td>
</tr>
</tbody>
</table>

**Morbidity:** Indirect effects through slow growth, low fertility and decreased work output that result from morbidity. Existing data indicate that annual production losses emanating from these diseases could reach 30-50 percent.

**Human Health Impacts (Zoonosis):** This includes the costs that arise when animal diseases affect human populations such as treatment costs and losses in productivity due to illness or death. Zoonoses are diseases transmissible between animals (domestic and wildlife) and humans. Around 60% of all human diseases and around 75% of emerging infectious diseases are zoonotic (Taylor et al., 2001; Woolhouse et al., 2005). In aggregate, they have high impacts on human health,
livelihoods, animals and ecosystems. In the first global syntheses of the impact (partial) of zoonotic diseases, Grace et al. (2011a) estimated that, in least developed countries, 20% of human sickness and death was due to zoonoses or diseases recently jumped species from animals to people.

The significance of zoonotic diseases in Ethiopia is expanding and their health and socioeconomic impacts are increasingly being experienced, the burden falls especially heavily on poor people which are more at risk of contracting many zoonoses. Thus, zoonotic diseases continue to further burden public health systems as well as to undermine efforts to boost livestock production and exports. The most important ones include Tuberculosis, Brucellosis, Rabies, hydatidosis, cysticercosis and Food borne illnesses due to \textit{Salmonella} and \textit{Escherichia coli}.

**Impact of Diseases on Land Use:** In Ethiopia, the potential for sustainable increased livestock-agriculture productivity is highest in those areas endemic for tsetse-transmitted trypanosomosis, a lethal parasitic disease of humans and livestock. Tsetse infested but otherwise well rain-fed and virgin vast (est 220,000 km$^2$) fertile low laying areas in the west, southwest, south and northwest are not under sound and sustainable agricultural production and development due to the debilitating and catastrophic effects directly and/or indirectly attributed to trypanosomosis that tsetse flies transmit to livestock. A total of some 10 million head of cattle and many small ruminants are at risk.

The disease, through livestock morbidity, mortality and exclusion, denies the farming communities the use of draught animals, the main and, in the majority of cases, the only source of energy for crop production. Due to the fear from the disease in vast areas of in the lowlands, people and livestock are concentrating on tsetse free, over exploited, exhausted and degraded fragile high grounds causing further damage to available accessible land resource.

**Treatment and Prevention Costs:** Treatment and prevention costs account for a large part of the economic loss incurred by many diseases, both at individual herd and national level. Moreover, there are costs related to culling of sick animals, quarantine and biosecurity measures.

**Loss of Farm Productivity:** Through their effects on performance, diseases of livestock have additional indirect impacts on other agricultural enterprises, in particular crops. This is through the reduction in traction capacity for ploughing, the effect of reductions in manure output on soil fertility and nutrient cycling, and the reduction in traction for harvesting and marketing of crops, and for general transport, including essential water supplies, all of which can severely affect
livelhoods of smallholder farmers. This impact is often highly under-estimated, and has generally been poorly quantified.

During the late 19th century, Ethiopia suffered one of the worst famines in the country’s history commonly referred to as Kifu Ken, meaning ‘mean days’ or ‘evil days’. The rinderpest, which got a foothold through an Ethiopian seaport in 1887, decimated the cattle of northern Ethiopia and travelled to the rest of Ethiopia and the rest of Africa by 1897 (Pankhurst, 1964, Zewde, 2001). Like so many of the other droughts that Ethiopia has suffered, the country could have survived the drought of the late 1880’s at much lower loss of lives if it had not been for the rinderpest plague. An Italian eye-witness, Capucci, estimated that 90% of the cattle of Ethiopia perished, while Skinner the first United States envoy to Ethiopia, later quoted the view that not more than 7 or 8% were spared (Pankhurst, 1964).

**Impact on the Leather Industry:** During the period 2000-2005, the revenue generated by the leather industry ranged between US$31.6 million (1998) and US$76.12 million (2000) having an annual average of US$54.1 million. The revenue generated by this industry also showed a fluctuating trend but did not follow the path of the total export revenue earnings (LDMP, 2007). According to Ministry of Finance and Economic Development export earnings of the Ethiopian leather industry for the fiscal year 2010-11 rose above US$ 104 million (MoFED, 2011).

The national income derived from the sector is far lower than the potential due to quality deterioration of the raw hide and skin caused by diseases such as lice, keds, and mange mites, Lumpy Skin Disease (LSD), Sheep and Goat Pox etc. Cockle is regarded as an economically catastrophic disease since it causes over 50% of skin rejection or downgrading (Bayou, 1998 cited by ELMPS 2007). In Ethiopia, among the sheepskin rejects, 100% had cockle. During 1993/1994, the Modjo tannery reported rejection of 325,507 pickled skins. Of these 95.1 per cent had ekek, an allergic dermatitis from lice and ked infestation (cockle).

The Livestock Marketing Authority (LMA, 2000) of Ethiopia conducted a study involving 5 potential regions (Tigray, Amhara, Oromiya, SNNPS and Addis Ababa) and covering 9,703 samples. The findings indicated that the proportions of the collected hides/skins, which were sold as first grade rate, were as small as 2%. The remaining balance, i.e., 98% of the total 9,703, comprising 54 and 40% sheep and goats’ skins respectively and 6% of hide/skin were found to harbour various types and levels of defects. The annual loss of the tanning industry in Ethiopia, due
to rejects alone, (not considering losses from low grades) was estimated to at USS 7.1 million. Among the hides and skins produced in 2005, more than 70% were downgraded or rejected because of the defects categorized as pre-slaughter defects and could take a share as high as 65%, while peri- and post-slaughter defects accounted for 20% and 15% respectively.

**Poverty and Livelihood Impacts:** Disease erodes the households' assets and degrades the asset base of the poor. Production loss result reduced farm income. In areas where local economy heavily depends on livestock burden will be severe and local income and food security impaired. Animal diseases keep the poor trapped in poverty.

**Impact on Human Nutrition:** Inadequate food and nutrition security takes an enormous toll on economies and damages the livelihoods and economic capabilities of already vulnerable populations. Stunted children are those who are chronically underweight or small for their age due to a lack of access to healthcare and nutritious food. Stunting prevents these children from reaching their full mental and physical development and thus hampers their future. Animal disease control and livestock products have been shown to have considerable impacts on improving child nutrition among poor people, particularly in pastoralist communities, in which 75% or more of general and child nutrition is based on milk and livestock products.

**Impact on Trade:** At present, Africa remains a relatively small player in global export markets for meat products. Currently, only few countries such as South Africa, Botswana and Namibia export meat to high priced markets in Europe. Moreover, some other countries including Ethiopia export outside the continent, mainly to the Middle East and North African (MENA) countries. Trade between countries in the region is weak. These livestock exports have suffered from repeated trade bans due to importing countries' concerns over transboundary diseases. These bans have disrupted trade patterns and dealt severe economic blows to the country.

**The Major Bans on Ethiopian Meat and Livestock Include:**

- In 1983, cattle exports from and through Somalia to Saudi Arabia were banned as a result of rinderpest and it had indirectly affected Ethiopian cattle export. Since 1989, systematic control and eradication activities implemented through PARC and PACE projects have successfully eradicated the disease from the country. Saudi Arabia has lifted the ban on meat in 2009. Saudi Arabia and United Arab Emirates are the largest importers of Ethiopian livestock and livestock products.
Following the epidemic of Rift Valley fever in the Horn of Africa in 1997/98, Saudi Arabia, Bahrain, Oman, Qatar, Yemen and the United Arab Emirates had banned livestock imports from nine African countries including Ethiopia.

An outbreak of Rift Valley Fever in Southern Saudi Arabia and Yemen in September and October 2000 has left dozens of people dead and hundreds infected. As a consequence, six Gulf States - Saudi Arabia, Bahrain, Yemen, and the United Arab Emirates had banned livestock imports from nine African countries, including Ethiopia. The ban was imposed on the expectation that the disease was introduced from the Horn of Africa. Field and laboratory surveillance results indicate that Ethiopia had never experienced an outbreak of RVF within its territories.

Following the 2001 outbreak of FMD in the United Kingdom, Saudi Arabia and Indonesia had imposed trade bans on Ethiopia’s export meat and pickled sheep and goatskin respectively.

Imports of live cattle from Ethiopia resumed in 2010 after being suspended in 2007 due to FMD, LSD and three-day fever, which were reportedly transmitted to the Egyptian herd, causing severe losses.

In January 2007, the United Arab Emirates (UAE) has imposed a ban on live animals and meat from Ethiopia, Somalia and Kenya as a result of the widespread outbreaks of RVF in Kenya.

The ban on livestock exports from the Horn of Africa has had a major impact on the livestock dependent economy of Somali Region in Ethiopia. An evaluation of the costs of the ban on Ethiopia’s main exporting region (Somali) and their distribution among different types of households, producers and traders is conducted using a standard Computable General Equilibrium (CGE) model. Investment strategies to regain access to the Gulf market and reduce the probability of future bans are also evaluated. Results of the simulation show that the ban has a devastating effect on Somali Region’s economy. GDP is reduced by US$ 91 million in nominal terms, which represents a 25% reduction compared to a normal year. Evaluating the effects of the ban at the micro-economic level, we find that in the short-run, the ban sharply reduced livestock prices directly affecting the activities most dependent on livestock sales, and deteriorating pastoralist’s input/output price ratio. The total loss in value added generated in the region is US$ 132 million or almost 42% of total value added produced in a normal year by pastoralists and agro-pastoralists in the region (Nin Pratt et al, 2005).
4- Opportunities

Globalization: Technological advances have made the planet a smaller, more accessible, more interconnected and interdependent place for people to visit, relocate, conduct business, expand trade, exchange culture and ideas, share information, and mobilize in support of common interests. While globalization has yielded many benefits for society, it also has created many new challenges, particularly with regard to animal, human, and environmental health. In recent years, there have been notable increases in the occurrence of emerging and re-emerging infectious diseases, many of them diseases of livestock with zoonotic potential. Modern jet travel now allows passengers to move from virtually any place in the world to any other place within 36 hours less than the incubation period of many viral and bacterial diseases. This means that infections can become globally disseminated before clinical disease is recognized. These diseases have negatively affected animal and human health around the world and caused considerable social disruption and economic losses.

The Livestock Revolution: A ‘livestock revolution’, fuelled by a massive growth in global demand for food of animal origin (milk, meat, eggs) (Rosegrant et al., 2001), is being hailed, with important development implications for countries like Ethiopia. The livestock sector in the developing world is growing at a rate of up to 7 per cent per annum, much faster than the agricultural sector as a whole and by 2020 it is predicted to become the most important sub-sector in terms of added value. It is argued that Africa can and should capitalise on its enormous wealth in livestock, gain access to new markets opening up in Asia and particularly the relatively affluent and nearby Middle East, and expand exports to Europe and North America. This could be the key to the much-needed growth impetus for stagnating agricultural economies.

The One Health: The One Health Initiative was formed in 2007 to promote, improve, and defend the health and well-being of all species by enhancing cooperation and collaboration between physicians, veterinarians, and other scientific health professionals. One Health approach had become a critical, strategic need for Ethiopia to address the emerging disease problems associated with zoonosis and food borne pathogens. Despite its advantage to address complex challenges that threaten human, animal and environmental health, there are many barriers to its implementation. Among these were the needs for key leadership to embrace the concept and bring together human medical, veterinary medical, industrial, and environmental partners to collaborate and coordinate their activities in a sustainable way.
Alternative Approaches to Trade: Current international standards governing trade in livestock commodities centre on the disease status of geographical areas (countries or zones) or compartments containing establishments, not on the safety of commodities emerging from these. This excludes many developing countries including Ethiopia from participating in trade. It has been proposed that a commodity based trade (CBT) approach would allow developing countries to engage in the increasing global demand for beef (Thompson et al., 2004). Commodity-based approaches focus on the attributes of the product (quality, food safety) rather than the disease status of the place of origin. A growing body of evidence has further led to increased dialogue in international standards-setting bodies on CBT as a means to increase market access in livestock products.

Geographic Proximity: Ethiopia has the advantage of geographical proximity to the Gulf States, but several logistical factors constrain its competitive advantage. Moreover, consumer preferences matter and Ethiopian products enjoy a high level of consumer demand by specific market segments.

5- Challenges

Stringent SPS Standards: In the wake of globalization many countries are moving to rapidly integrate SPS and world trade organization principles. As a result countries are reviewing their policies and practices and major changes are underway that will have an important impact on livestock trade. These escalating standards for livestock and livestock products, with all their auditing and certification requirements, present a growing challenge for Ethiopia seeking access to external markets.

Emerging or Evolving Diseases (TADs & Zoonosis): There are multiple, complex reasons for this emergence, including the movement of pathogens through modern jet travel, landscape transformations that result in closer contact between wildlife and humans, the intensification of livestock production, the raising of livestock and poultry in close association with people, inadequate biosecurity in livestock management, and the development of antibiotic resistance in some bacterial diseases.

Quality of Veterinary Services and PPP: The adoption of formal quality assurance systems in the management and delivery of Veterinary Services has led to the extending of evaluation principles to take account of this new direction. Under its global mandate to set international standards for animal health and zoonoses, the OIE has developed the PVS pathway. This pathway seeks to assess
and then sustainably improve the national Veterinary Services' (VS) compliance with OIE standards on the quality of VS. This is an important foundation for improving animal and public health and enhancing national compliance with SPS standards.

**Competitiveness:** Trade in livestock has become increasingly global in nature. Competition between exporting countries is intense. Regulations governing its structure, conduct and performance have become more stringent over time. Such trends demand for not only compliance to international standards but also appropriate export certification and risk analysis strategies. Global competition has become more intensified in terms of quality, price, supply chain management, and dependability of delivery systems. Moreover, SPS requirements for international trade of meat and livestock are increasingly rigorous. Major exporters, such as Argentina, Australia, and Brazil have made major investments in order to meet these requirements. Ethiopia must do likewise in order to be competitive.

**Intensification and Vertical Integration:** Increasing intensification of livestock production systems will increase the risk of spread of serious zoonotic diseases. Concentration of livestock production, particularly dairy, pigs and poultry, in peri-urban areas will increase the interface between animals and humans and hence the opportunity for zoonotic diseases to spread from animals to people. There is a growing trend for commercialization and intensification of livestock production in Ethiopia. This would result increasing risks of zoonosis and food-borne illnesses.

**Public Concern for Food Safety and Welfare:** In light of the increasing consumer demand for safe, high-quality food and recent public health concerns about food-borne illness, countries are under pressure to provide comprehensive food safety policies and programmes consistent with international best practice. Countries that export food commodities derived from livestock must meet both the requirements of the importing country and domestic standards. Animal welfare is an issue of growing importance in the international trade for livestock and livestock products. There is an increasing awareness among consumers and producers about the effects that breeding and farming techniques may have on animals, on their health and welfare and on the environment.

**Residue Testing:** Residues such as antibiotics, pesticides, heavy metals and hormones in livestock and livestock products destined for human consumption is now becoming a growing public health risk. Residue testing is not so far a requirement by our current trading partners, but it is expected to be so in the near future. Moreover, most of the high priced potential future markets for Ethiopian
products demand residue testing. Residue monitoring provides evidence of good practice in the usage of pesticides and veterinary medicines by livestock producers. Its primary purpose is to ensure that livestock and livestock products produced in Ethiopia meet national and international residue requirements, to support access to key export and domestic markets.

**Animal Identification and Traceability:** - Traceability is defined as “the ability to follow an animal or group of animals during all stages of its life” (Terrestrial Animal Health Code, 2008) and is becoming a requirement. The future of livestock and meat export trade essentially depends on animal identification and traceability. In addition, demand for traceability as means for verification of quality for both livestock and livestock products is gaining prominence for international consumers. Today, even in traditional markets, traceability is valued as a trend in market requirements. The presence of such systems is also associated with higher price premiums.

**Livestock Supply Issues:** One of the major challenges facing the meat export abattoirs has been that the competitiveness of these firms in the domestic and export markets has been limited by the underutilization of their meat processing capacities. It has been observed that the live animal throughput is inadequate and as a result of the existing meat processing facilities operate below their operational capacities. This is apparently due to inadequate supply of the required quality live animals at profitable prices for meat processing by the export abattoirs. There is a strong need to identify and assess on ways how to effectively and efficiently integrate smallholder farmers and pastoralists to the high value domestic and export markets value chains for live animals and meat through the development of appropriate institutions, policies and marketing infrastructure and support services.

**Climate Change:** There is a two-way relationship between livestock production and environmental health. On the one hand, livestock contribute to climate change and other environmental problems, and at the same time, these same environmental issues can adversely affect livestock health and productivity. Patterns of disease in animals and humans are influenced by environmental and climatic change. Global warming is associated with the northward spread of Blue Tongue disease in Europe (Purse et al., 2005). Outbreaks of Rift Valley Fever in East Africa are linked to El Niño Southern Oscillation events (Linthicum et al., 1999). Climatic factors can have a major effect on the rate of transmission of many infectious diseases. Microbial agents and their vector organisms are sensitive to factors such as temperature, humidity, precipitation, surface water, wind and changes in vegetation. It is projected, therefore, that climate change and altered weather patterns will affect the
range, intensity, and seasonality of vector-borne and other infectious diseases. Priority endemic and exotic diseases include East Coast Fever (ECF), Rift Valley Fever (RVF), Blue Tongue (BT), African Horse Sickness (AHS) and Trypanosomosis, transmitted by tsetse flies.

6- Conclusion

Livestock health related interventions reduce livestock mortality and other losses caused by animal diseases, and thereby contributing to increased livestock production and productivity, improved drought preparedness, improved access to international markets and consequently building resilience of the livestock keeping communities in Ethiopia.

The Ethiopian government policy, i.e. the Growth and Transformation Plan (GTP) covering the period from 2010 to 2015 recognizes the importance of the livestock sector in addressing poverty and lifting Ethiopia to a middle-income status by 2025. The GTP plan states that the Ethiopian government wishes to increase domestic production and export earnings from livestock and livestock products by ten fold until 2015. The export earnings from live animal, meat and leather industry are roughly around 400 million USD. The GTP plan to increase this earning to 1.5 billion dollars by the end of 2015 is very ambitious and requires concerted effort if the plan is to be achieved. The following are recommended to achieve this objective:

- Enhance Veterinary Governance in Line with the World Organization for Animal health (OIE) Performance of Veterinary Services (PVS) pathway: The Ethiopian veterinary services have undergone the PVS evaluation in May 2011 (OIE, 2011) and the PVS gap analysis in September 2012. The veterinary services will need to continue to pursue subsequent stages in the pathway to strengthen the VS and ensure compliance with international standards.

- National Implementation of OIE Standards and Guidelines is an essential medium-term goal for Ethiopia wishing to access Middle Eastern markets and beyond. Pursuing this goal will increasingly become the key to maintaining or opening market channels. Without an internationally approved SPS certification system, Ethiopia will always be subject to arbitrary trade restrictions imposed with little or no advance notice.

- Control and/or Eradicate Livestock Diseases: Rinderpest is the only disease so far eradicated from the country. On-going efforts to prevent and control the various livestock diseases were
not supported with appropriate strategies. Lack of approved plans and resources for disease prevention, control and lack of command structure of veterinary services need to be addressed.

- **Investment in Surveillance Activities as Information for Action is Warranted.** The lack of confidence expressed by decision-makers in animal health certificates in part stems from a lack of confidence in national surveillance systems. National authorities need to reach beyond passive surveillance approaches to more active systems that engage production stakeholders as partners.

- **Expansion of Private Animal Health Service and Strengthen Public Private Partnership:** There are a number of strong arguments for promoting increased private sector involvement in veterinary service delivery. At present, the government service does not cover even 45% of the country. With more private companies and individuals involved, service coverage will increase and government expenditure will be reduced. This would allow to concentrate, for public veterinary services, on core functions and to divest non-core functions to the private sector.

- **Regulate the Veterinary Profession and Uphold Professional Standards and Ethics:** Ethiopia does not have an autonomous statutory body to regulate the veterinary profession, license and register veterinary surgeons and veterinary practitioners, and regulate professional education and professional conduct.

- **Improving National Capacity for Early Detection and Response to Animal Health Emergencies:** Animal disease emergency can have serious socio-economic consequences, which, in extreme cases, can affect the whole national economy. If a new disease can be recognized quickly while it is still localized and prompt action taken to contain and then progressively eliminate it, the chances for eradication of the disease are markedly enhanced. Conversely, eradication may be extremely difficult, costly, and even impossible if the disease is not quickly recognized, and appropriate control action taken before it becomes widespread.

- **The Quality of Veterinary Education is at Stake with the Growing Number of New Veterinary Schools in the Country.** Over the past decade, the number of veterinary schools in Ethiopia has grown from one to eleven. With such rapid growth comes a risk relating to maintaining educational and professional standards in teaching and in professional practice. Moreover, the education system is not geared to address new and growing challenges in the sector such as trade, diversification and intensification of production systems.
**Legislation and Regulations:** The effective performance of animal health and biosecurity services relies fundamentally on the legislative base provided by the government. Complete disease control and core national biosecurity can be delivered only when comprehensive legislation is in place to empower these organisations to perform their functions adequately.

7- Reference


Veterinary Service Opportunities and Challenges in Reference to Tigray Region and Future Trends of Veterinary Medicine in Ethiopia

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Abstract

Veterinary medicine covers all veterinary activities, including animal production and health, and is a core discipline that performs essential public health functions and directly influences human health via different ways. Ethiopia's first veterinary school, established at Debre Zeit in 1979, has been unable to meet the country's veterinary needs because of low student enrolment. The Federal Government of Ethiopia in its effort to democratize education and address the trained manpower requirement of the country and to fill the existing gap, very recently has established eleven more veterinary schools, including Alage TVET College, train veterinarians at DVM, BSc and Diploma levels. There are currently 11 veterinary schools in Ethiopia namely: - School of Veterinary Medicine at Debre-Zeit, Gondar, Jimma, Mekelle, Haramaya, Jigjiga, Hawassa, Samara, Welaya-Sodo and Wollo Universities certifying vets as doctor of veterinary medicine (DVM) and Alage TVET college providing a three year diploma program in animal health. Currently, there are 119 governmental and 3 rented which gives a total of 122 veterinary clinics in the Tigray region in which 17 DVM, 39 Bachelor and 159 Diploma (n = 215 in total) veterinary and animal health professionals are available. However, there is a need to have 191 veterinary clinics in the 39 districts (districts) of Tigray region, which needs a minimum of 611 veterinary graduates from all the veterinary schools in Ethiopia. There are also only nine meat inspectors, 2 DVM and 7 animal health assistants, in the whole region and there is a proposed need to have 27 meat inspectors in towns where an ideal abattoir is established. The short time survey of the distribution of veterinarians in the Tigray region reveals that there are very limited vets being allocated in the districts and neither of them were found satisfied with the present structure. Veterinary graduates are at present become as potential candidates for academic positions in Universities and colleges in Ethiopia and the government policy is opening the path for expansion of higher education programs and hence from this single and positive hole, veterinarian themselves start developing veterinary
curriculum and launching new veterinary schools to the benefit of themselves or as an income generation means and in order to have academic payable loads in teaching and to get additional institutional budget from opening new veterinary training milieu. Alternatively, they present a highly positive request to University authorities and get the permission to open a veterinary school despite the centre of excellence of a district. This led to the increasing number of graduate veterinarians to the extent, which the regional states could not employ them or the existing work-structure do not support them. The existing veterinary professionals in the districts were morally blind, unhappy and dissatisfied with the existing working structure of the veterinary practice. One of the sources of dissatisfaction is that the increasing number of veterinary graduates and the absence of job market in regional districts. There are DVM holder being employed at diploma levels with a salary which doesn’t deserve them and even the regional government doesn’t know the employment of DVM professionals at the position of Diplomas because districts have the mandate to employ themselves for any sector of their gap despite the qualification of applicants for a given job. Majority of the graduates from the different Universities in Ethiopia are not getting government employment positions and are forced to involve themselves in other directions of the government policy, which in fact doesn’t create job satisfaction to the excessive veterinary and other field professionals. District authorities are declaring that there is a budget and high demand of veterinary professionals at grass root level but the main problem is the civil service structure particularly to the veterinary medicine in Ethiopia. Finally, urgent structural amendments should be made in order to impart veterinary and animal health professionals and achieve the desired professional input and enhance the overall livestock productivity in the region and in the country at large.

Keywords: Bachelor; Diploma; DVM; Tigray; Meat inspectors; Veterinary

1. Introduction

Veterinary medicine contributes to human health by promoting the health of animals, which provide necessary income, food, transport, draught power and the raw materials for clothing throughout the world. Modern Veterinary practice in Ethiopia dates as early as the Italian invasion in the mid 1930’s. However, it was not until the early 1960’s that the UNDP-FAO and the MOA agreed to establish a school of Animal Health Assistants and modern Veterinary practice stated to take shape in Ethiopia. Faculty of Veterinary Medicine (FVM) was established in 1979-80 in Debre-Zeit, under the umbrella of Addis Ababa University (AAU) as centre of excellence in animal health, it provides six years and two year training program that leads to the attainment of Doctor of Veterinary
Medicine (DVM) and Master of Veterinary Science (MVSc), respectively. The faculty (school) is located 45 km away from the capital, Addis Ababa and currently, the institution renamed as school of Veterinary Medicine (Takele et al., 2005).

The missions of the veterinary schools are to contribute to the promotion of standard functional animal health care under different production system, to enhance animal and human wellbeing through promotion of health, welfare and sustainable production of domestic animals as well as the health and welfare of humans and wildlife. It aims to achieve this by educating Veterinary Doctors and specialists in various fields of veterinary science (Takele et al., 2005).

Therefore, the objectives of the two months regional survey were -

- To see the role of government and veterinarians in veterinary expansion veterinary schools
- To indicate the job opportunities and challenges to veterinary practitioners.
- To show the existing vet service and working structure in the Tigray regional state and related moral issues
- To estimate future trends of veterinary medicine in Ethiopia

2. Methodology

This paper is constructed from information from published veterinary service issue articles and related websites and from questionnaires presented to field veterinarians, veterinary students of College of Veterinary Medicine, Mekelle University, and agricultural officers in the districts of Tigray regional state as well as from personal communications and observations made at the veterinary clinic station of the districts and also data were collected from document containing regional professional demand for 2005 E.C.

2.1 Role of Government in Higher Education Expansion

Until the final decade of the 20th century, higher education in Ethiopia was not given due attention. Curricula were not always relevant to the country's problems, while graduate production capacity was not in line with the country's need for trained individuals (Ministry of Education, 2002). Since then, actions have been implemented to change that situation. Government has re-aligned the higher education system so that it can contribute more directly to its national strategy for economic growth and poverty reduction (Saint, 2004). There has been a steady increase in the number of students in higher education. Between 1994 and 2002 alone there was a 45% increase. On average, the total
number of students was growing at 15.0% per annum (MoE, 2002). As noted by Yizengaw (2007), expansion without the necessary and planned interventions could easily compromise quality. The number of public higher education institutions has also grown from only two universities eight years ago to 21 by 2009 (Tesfaye and Kassahun, 2009). Currently 10 are established to give a total of 31 Universities in Ethiopia. The Government has also facilitated and encouraged the establishment of private institutions of higher education and there are now more than 60 such institutions.

Veterinary Medicine Expansion

The number of veterinarians was very low until the last decade. There was only one veterinary college graduating on the average 25 veterinarians per year and the ratio of veterinarians to animals was about 1: 500,000 (One veterinarian to five hundred thousand animals). The Federal Government of Ethiopia in its effort to democratize education and address the trained manpower requirement of the country and to fill the existing gap, very recently has established ten more veterinary schools, including Alage TVET College, train veterinarians at DVM, BSc and Diploma levels. There are currently 11 veterinary schools in Ethiopia namely: - Addis Ababa, Gondar, Jimma, Mekelle, Haramaya, Jigjiga, Hawassa, Samara, Welayta-Sodo, Nekemte and Wollo Universities certifying vets as doctor of veterinary medicine (DVM) and also Alage TVET college is providing a three year diploma program in animal health. This has spiked the number of veterinarians to about 600 graduates per year. Ethiopia clearly understands that economic growth in the 21st century will be driven by the nation’s performance in raising its levels of national productivity in comparison to its economic competitors and it is determined to make up the ground lost over the past two decades because of political instability and economic stagnation. The rapid expansion and resource limitation has hampered the quality of education (Tesfaye and Kassahun, 2009; Melaku, 2010).

Although no research is done, at the annual conference of the Ethiopian Veterinary Association (EVA) which was held at the African Union in June, 2010, many veterinarians complained about quality of current veterinary graduates and the problem is very serious and critical. The profession is steadily falling. This will result in negative effect through accumulation of unqualified staff. Despite all difficulties, enrolment in higher education is on the increase. Between 2008-2013 enrolment increased by 20% with massive expansion plan.
2.2. Role of Veterinarians in Veterinary Expansion

Veterinary graduates are at present become as potential candidates for academic positions in Universities and colleges in Ethiopia and the government policy is opening the path for expansion of higher education programs and hence from this single and positive hole, veterinarian start developing veterinary curriculum and launching new veterinary schools to the benefit of themselves or as an income generation means and in order to have academic payable loads in teaching and to get additional institutional budget from opening new veterinary training milieu. Alternatively, they present a highly positive request to University authorities and get the permission to open a veterinary school despite the centre of excellence of a district. This led to the increasing number of graduate veterinarians to the extent, which the regional states could not employ them or the existing work-structure do not support them. Hence, it can be said that 'the veterinarians themselves killed the veterinary profession in Ethiopia'.

3. Veterinary Job Opportunities

As an opportunity, veterinary graduates can be engaged in private farms (dairy, fattening, poultry, swine-emerging sector) and can be employed in town abattoirs as meat inspectors other than usual professional veterinary worker within district livestock community. As per the existing working structure of the veterinary practice, the veterinary clinics at district levels have only two job divisions, the control and prevention of animal diseases and the finance and stock, which limits the number of veterinary professionals from being employed at district veterinary clinics (which can be considered as a challenge). Veterinary graduates can process laboratory tasks and diagnostic procedures for successful veterinary therapeutic approach. In addition to these, vets can treat severe cases of animal ailments like surgical and gynaecological problems if supported with quality specializations and skills. Moreover, veterinary medicine professionals can perform as quarantine and vaccination experts and as environmental health, agricultural and veterinary research centres, butcher house sanitation expert, community service based NGOs and veterinary pharmacist at different levels for the successful livestock health achievements and overall livestock economic growth at regional and national levels. Generally, the veterinary education in Ethiopia has played a very vital role in preparing human resource as researchers, teachers, extension workers and clinical
service providers contributing significantly to the economic development of livestock (Melaku, 2010).

4. Challenges Aside with the Veterinary Service

Veterinary education should lead to produce “Omni-competent” professionals. It is believed that decline in quality will change Omni-competence to increasingly become Omni-incompetence. The veterinarian will increasingly become a veterinary technician. The level of competence in all branches of veterinary practice will fall. In Ethiopia “Veterinary Profession” still lacks best practice or any coherent structure for employment, enforcement of operating standards, certification and accreditation (Melaku, 2010). However, the absence of DVM in every regional district, absence of DVM in town abattoirs, absence of DVM as a veterinary pharmacist, absence of research sectors, and absence of clinic coordinator at clinic station levels coupled with the absence of positive observation by higher officials at district level hampers the efficiency of veterinary profession in the district. The veterinary service at district level is not supported with the necessary laboratory diagnostic approach and treatment is mostly given on tentative diagnosis, which inevitably leads to failure to achieve the desired outcome. The existing veterinary students and professionals are morally blind, unhappy and dissatisfied with the existing working structure of the veterinary practice. One of the sources of dissatisfaction is that the increasing number of veterinary graduates and the absence of job market in regional districts. There are DVM veterinarians being employed at diploma levels with a salary which doesn’t deserve them and even the regional government doesn’t know the employment of DVM professionals at the position of Diplomas (Table 1) because districts have the mandate to employ themselves for any sector of their gap despite the over qualifications of applicants for a given job.

5. Existing Vet service and Working Structure in the Tigray Regional State

An attempt has been made to see the present distribution of veterinary service provision across districts of the Tigray regional state with their corresponding future demand of veterinary professionals at DVM, Bachelor and Diploma levels. As per the data from the Tigray Regional Bureau of Agriculture and Rural Development; field animal health and regulatory expert (3λήτος Αγροτικής και Αναπτυξιακής Μελέτης Εκπαίδευσης και Διαχείρισης), currently there are 119 governmental and 3 rented which gives a total of 122 veterinary clinics in the Tigray region in which 17 DVM, 39 Bachelor and 159 Diploma (n = 215 in total) veterinary and animal health professionals are available. However, there is a need to have 191 veterinary clinics in the 39 districts of Tigray region, which needs a minimum of 611 veterinary
graduates from all the veterinary schools in Ethiopia. There are also only nine meat inspectors, 2 DVM and 7 animal health assistants, in the whole region and there is a proposed need to have 27 meat inspectors in towns where an ideal abattoir is established. The short time survey of the distribution of veterinarians in the Tigray region reveals that there are very limited vets being allocated in the districts and neither of them were found satisfied with the present structure. Majority of the graduates from the different Universities in Ethiopia are not getting government employment positions and are forced to involve themselves in other directions of the government policy, which in fact doesn’t create job satisfaction to the excessive veterinary, and some other field of professions.
Fig 2. Existing work structure for the veterinary practice in the Tigray regional state
6. Moral Issues

There are plenty of veterinary issues at different levels of the community. In fact, the livestock owning society imparts the veterinary profession maximum affection and respect even beyond the other community civil service providers. However, the main painful harm is from management authorities at districts and vet clinic areas. Majority (73/122) of the veterinary clinic in the districts of Tigray region are led by animal and crop science professionals who really don’t have the desired know how and input requirement for the veterinary service.

There are lists of moral issues enumerated at district and vet clinic station levels. Mistreatments and disrespect to vets, hostility from the great affection and respect of farmers to the vet, requested budget cuts by district authority, being animal health worker regards vets as animal associates being it is fact and professional payment discrepancies are the main ones.

Regarding professional salaries; a BVSc animal or crop science professional exceeds or is the same as a DVM graduates. Because district level officers do not have a document stating what the vet, profession deserves to fulfil and support the professional needs. Moreover, there are humble DVM professionals employed at the position of diploma in different districts of Tigray region (Table 1).

Table 1. DVM employed at Diploma level positions in Tigray regional districts

<table>
<thead>
<tr>
<th>District/area</th>
<th>Number of DVM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tselemti/welkayit-tsegede'</td>
<td>3</td>
</tr>
<tr>
<td>Setit Humera</td>
<td>5</td>
</tr>
<tr>
<td>Atsbi/Dera</td>
<td>1</td>
</tr>
<tr>
<td>Kola Temben</td>
<td>3</td>
</tr>
<tr>
<td>Kuwiha</td>
<td>1</td>
</tr>
<tr>
<td>Adua Abattoir</td>
<td>1</td>
</tr>
<tr>
<td>Hagereselam</td>
<td>3</td>
</tr>
<tr>
<td>Hawzen</td>
<td>2</td>
</tr>
<tr>
<td>Alamata + Sekota</td>
<td>2</td>
</tr>
<tr>
<td>Kafta Humera</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>24</strong></td>
</tr>
</tbody>
</table>
7. History of the College of Veterinary Medicine of Mekele University, Vets’ Enrolment and Graduates

In Ethiopia, the first veterinary faculty was established at Debre-Zeit in 1979, and till 2002 it was the only such faculty in the country. In 2002, the then faculty of Veterinary Medicine in Mekelle University was established as a consequence of government insistence on the need for more trained veterinarians in order to be able to promote the export of meat, hides, and skins to the European Union and other countries. Over the past few years, the college has been contributing its share in meeting the additional demand for qualified professional veterinary graduates with the following achievable missions: Develop High Quality Academic Training Programs; Perform Pertinent Applied Research and Promote Community Services.

The MoE allocate students to the University based on their high school score to different departments. Most students have a preference to join the medicine and technology departments because from the existing milieu those who graduated from these departments are seen benefited economically and socially in the outside working environment. Only about 20% are given their first choice (20/101). From this actual fact, those who are allocated to the veterinary departments are unhappy.

The College of Veterinary Medicine started to enrol the first regular veterinary students in 1995 E.C from the old and the new Ethiopian high school academic curricula.
### Table 2: Number of student enrolments and fate of veterinary graduates

<table>
<thead>
<tr>
<th>Year E.C./G.C.</th>
<th>Request to MoE</th>
<th>Placement from MoE</th>
<th>No of graduates from MU CVM</th>
<th>Employed @ vet clinic in different regions of Ethiopia</th>
<th>In private sectors/farms</th>
<th>In TVET colleges</th>
<th>Idle</th>
<th>Working in cafeterias/Cobblestone/trade</th>
<th>At higher academic institutions</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000/2008</td>
<td>40</td>
<td>72</td>
<td>57</td>
<td>26</td>
<td>2</td>
<td>7</td>
<td>9</td>
<td>1</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>2001/2009</td>
<td>54</td>
<td>80</td>
<td>74</td>
<td>16</td>
<td>7</td>
<td>5</td>
<td>18</td>
<td>5</td>
<td>4</td>
<td>19</td>
</tr>
<tr>
<td>2002/2010</td>
<td>60</td>
<td>92</td>
<td>60</td>
<td>8</td>
<td>6</td>
<td>4</td>
<td>14</td>
<td>7</td>
<td>3</td>
<td>18</td>
</tr>
<tr>
<td>2003/2011</td>
<td>60</td>
<td>60</td>
<td>45</td>
<td>9</td>
<td>3</td>
<td>5</td>
<td>19</td>
<td>6</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>2004/2012</td>
<td>60</td>
<td>80</td>
<td>60</td>
<td>11</td>
<td>9</td>
<td>3</td>
<td>17</td>
<td>3</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>2005/2013</td>
<td>60</td>
<td>93</td>
<td>No graduates</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>296</strong></td>
<td></td>
<td><strong>71 (24%)</strong></td>
<td><strong>27 (9.1%)</strong></td>
<td><strong>24 (8.1%)</strong></td>
<td><strong>77 (26%)</strong></td>
<td><strong>22 (7.4%)</strong></td>
<td><strong>23 (7.8%)</strong></td>
<td><strong>52 (17.6%)</strong></td>
<td></td>
</tr>
</tbody>
</table>

### Table 3: Academic Staff Profile by Rank

<table>
<thead>
<tr>
<th>Rank</th>
<th>On duty</th>
<th>On study leave</th>
<th>Total</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Professor</td>
<td>6</td>
<td>0</td>
<td>6</td>
<td>Exp.</td>
</tr>
<tr>
<td>2 Associate Professors</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3 Assist. Professor</td>
<td>19</td>
<td>4*</td>
<td>23</td>
<td>1-Indian Exp.</td>
</tr>
<tr>
<td>4 Lecturer</td>
<td>6</td>
<td>5</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>5 Graduate assistant</td>
<td>3</td>
<td>4</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>6 Tech. Assistant</td>
<td>10</td>
<td>0</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>11 Laboratory attendant</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>48</strong></td>
<td><strong>15</strong></td>
<td><strong>63</strong></td>
<td></td>
</tr>
</tbody>
</table>

### Teaching staff profile and number for each program offered

<table>
<thead>
<tr>
<th>Profile/Qualification</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ph.D.</td>
<td>8</td>
</tr>
<tr>
<td>MSc/MVSc</td>
<td>23</td>
</tr>
<tr>
<td>DVM</td>
<td>11</td>
</tr>
<tr>
<td>BSc/BVSc in animal health</td>
<td>7</td>
</tr>
<tr>
<td>Bachelor in Vet. Lab. Technology</td>
<td>7</td>
</tr>
<tr>
<td>Diploma</td>
<td>4</td>
</tr>
<tr>
<td>Other (Lab attendants)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>63</strong></td>
</tr>
</tbody>
</table>

**Source:** Mekelle University, College of Veterinary Medicine record and documentation office.
Summer (BSc) Enrolment

The college of veterinary medicine of Mekelle University invites interested candidates for a BVSc degree in the summer season to give a two-month course for three consecutive years and one full research year for the attainment of a BVSc degree in animal health and/or in laboratory technology. Those from TVET colleges, from animal science and those who have certificate or diploma in animal health and artificial insemination (Al) want to upgrade their knowledge to the BVSc degree level with the intention of increasing their salary. However, districts do not consider the BVSc degree of their staff and hence, Bachelor graduates are forced to continue with their previous position and salary for years till a vacant position is posted for a BVSc and/or BSc degree holder.

8. Future Trends of Veterinary Medicine in Ethiopia

The “health for all” strategy is guided by two policy objectives: making health central to human development, and developing sustainable health systems to meet people’s needs. Over the past two decades, the impetus for health for all has come from primary health care. However, although some improvements have been made, progress has been hampered for several reasons, including insufficient political commitment towards implementing the necessary measures, and to achieving inter-sectoral actions for health. Veterinary expertise is an essential component of the public health response to emerging and re-emerging infectious diseases. Veterinary professionals, however, have more to offer to the public health response than expertise in traditional surveillance and control of zoonoses. In many health departments, communicable disease activities do not include or have access to veterinary expertise. Complete integration of veterinary medicine into the full range of communicable disease control activities will result in a broader perspective for responding to emerging and re-emerging infectious disease issues. For example, the involvement of veterinary medicine professionals in investigations of outbreaks of food borne diseases would provide additional expertise for addressing public health concerns at the source of such outbreaks. Public health surveillance is the ongoing and systematic collection, analysis and dissemination of health data.

Disease reporting from clinical and veterinary diagnostic laboratories is a critical element in public health surveillance. Veterinary medicine professionals are essential partners, together with other public health officials, and agricultural and diagnostic laboratory staff. Veterinary staffs are needed to develop and enhance surveillance of outbreaks of emerging and re-emerging
diseases, and to monitor changes in the incidence and geographical distribution of these diseases.

The role of veterinary medicine within the global health agenda is to promote activities that contribute to the achievement of health for all and help realize its objectives. A number of global changes will occur during the next 25–30 years that will have a dramatic impact on most professional groups, especially physicians and veterinarians. A number of these changes are under way and their consequences are already apparent; in two to three decades, these changes will reach a point where to delay recognition of them might result in providing inadequate responses. The major foreseeable changes that will have an impact on veterinary activities are:

The human population is expected to double before 2030.

• The proportion of the total population of developing countries that lives in urban areas will increase to one fold by 2030.

• Health problems related to environmental pollution are likely to increase in both developing and developed countries.

• The global temperature will continue to increase and produce environmental changes.

• Patterns of zoonotic diseases will change. During the past few years many zoonotic diseases have occurred as newly recognized (emerging) or previously recognized (re-emerging) diseases. There are many reasons for the increased occurrence of zoonotic disease, including alteration of the environment, establishment of human settlements in formerly uninhabited areas, a greater demand for animal protein, intensification of animal production, and acceleration of trade in live animals, animal products and other foodstuffs.

• Patterns of human disease will change. The patterns will be affected by high population densities, movements of human populations within and between countries, and changes in lifestyles. Infections coupled with chronic diseases (cancer, diabetes mellitus, hypertension) will be the major causes of mortality in most developing countries, with human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS) and opportunistic infections (including zoonoses) being especially important.

The recent foot and mouth disease (FMD) occurrence in Tigray region, for example, has shown the need for a clearer delineation of responsibilities between that part of the public sector that deals with economic issues of animal health, production and trade, and that concerned with public health and consumer protection. Generally:

- Veterinarians will promote the health for all in the twenty-first century strategy.
- Veterinarians will come up with the incidences associated with the increasing population.
Veterinarians will adopt and adapt new advanced technologies for the diagnosis of livestock diseases.

- Veterinarians will tackle health consequences of climatic changes.
- Veterinarians will realize the globalization of healthy livestock trade.
- Veterinarians will challenge emerging and re-emerging zoonoses related to the HIV/AIDS epidemic.

9. Conclusion and Recommendations

It is fact that veterinary practitioners have a duty to society to advance veterinary knowledge; promote livestock and public health; ensure responsible use of medicines; promote responsible animal ownership; uphold the integrity of veterinary certification; protect the environment; and conserve livestock resources and promote bio-security. In all countries, veterinary efforts improve animal health and quality assurance of foods of animal origin contributes to food security at local and national levels. Veterinary efforts and agricultural policies encourage small-scale producers and larger operators contribute to economic development through national and international trade in health animals and safe animal products. Veterinary medicine expertise increase livestock productivity that facilitate rural development and reduces rural–urban migration by stimulating the rural economy. Quality vet education and veterinarians are the key to support the livestock health and productivity in order to enhance the contribution of livestock to the national economy.

Hence, veterinary medicine must remain relevant to the changing needs of society. On the basis of the above conclusion the subsequent suggestions are specified.

- There should be different activity wings of existing veterinary service structure at district level in order to increase the veterinary job opportunity.
- Regional and district authorities should recognize job market and opportunities by identifying areas of professional focus
- The Federal Ministry of Education (FMoE) should recognize which field of study needs high student enrolment and graduates to contribute to the existing working milieu despite the need of the government to produce and create literate people in the nation.
- Veterinary schools should request and enrol students based on their staff profile, institutional settings and should improve the quality of veterinary education instead of increasing the number of graduates.
• Veterinary schools should identify the possible job opportunity areas /governmental and/or none governmental sectors/, and should follow and know the fate of their graduates.

• There should be direct linkage between veterinary schools and district veterinary clinics in order to know the demand of professionals at the veterinary clinic station.

• The livestock stream structural positions at district level should be occupied by veterinarians who can easily understand the desired veterinary inputs required to deliver appropriate veterinary service.

• The existing veterinary clinics at district level should be strengthened to the desired level which consequently creates competent privatized veterinary clinics and to attract the livestock owning community.

• Veterinary clinics should be constructed in all districts and peasant associations comparable to the number of livestock available and to accommodate veterinary practitioners and consequently improve healthy livestock productivity in the region and the country at large.

Acknowledgements

• Dr. Abraha Gmedhin, District Veterinarians, DVM graduates of CVM MU, University of Gondar, FVM

10. References


Privatization of Veterinary Services in Ethiopia

Dr. Peter Moorhouse (Veterinary Epidemiologist and Key Expert 2, “Improving and Integrating Animal Health Service in the Livestock Value Chain through Public – Private Dialogue in Ethiopia”)

Introduction

The aim of this document is to present arguments and justification for accelerating the process of privatisation of animal health clinical services in Ethiopia. This issue has been discussed for at least two decades without resulting in significant change. It is believed that the current policy and economic frameworks are now more favourable and other circumstances (e.g. large numbers of newly-qualified and unemployed veterinarians) may mean that now is the time to vigorously promote privatisation.

Current Situation

A recent gap analysis survey of 26 districts in 4 regions (LVC-PPD 2012a) included a study of the distribution of formal\(^{12}\) veterinary clinical service centres\(^{13}\) between the public and private sectors. Findings are presented in Table 1 and show that the majority (66%) of these centres is in the public sector.

Table 1: Numbers of formal veterinary clinical service centres, by type and sector

<table>
<thead>
<tr>
<th>Sector</th>
<th>Clinics</th>
<th>Drug sales outlets</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>178 (83%)</td>
<td>0</td>
<td>178 (66%)</td>
</tr>
<tr>
<td>Private</td>
<td>37 (17%)</td>
<td>55 (100%)</td>
<td>92 (34%)</td>
</tr>
<tr>
<td>Total</td>
<td>215</td>
<td>55</td>
<td>270</td>
</tr>
</tbody>
</table>

The fact that public veterinary staff devotes the majority of their time and effort to provision of veterinary clinical services is most unfortunate as it diverts these staff from what should be their primary role: that of providing core public good services\(^{14}\). Privatisation is the optimal strategy to address this problem. Transferring responsibility for delivery of animal health clinical (and other) services from the public to the private sector will

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\(^{12}\) Formal implies that these centres are certified
\(^{13}\) defined as centres from which clinical services and / or veterinary drugs can be obtained
enable public sector veterinary staff to concentrate on delivery of public good services. In this way public resources can be used for the benefit of society as a whole. For example:

- Improved animal disease surveillance will lead to better knowledge of disease patterns and enable development of informed and focussed strategies to prevent and control important diseases. Increased quantities of reliable epidemiological information will also lead to improved quality of international veterinary certificates and thereby help to promote exports.
- More effective delivery of veterinary public health services, for example of meat inspection (which is a core responsibility of Veterinary Services - OIE 2012) thus safeguarding human health.
- Improved inspection and enforcement of the law will reduce the number and intensity of moral hazards faced by livestock owners (overcharging, out-of-date drugs, poor standards of service, etc) and the general public – (unsafe animal products, residues in animal products, etc).

Privatisation must lead to improved accessibility and quality of animal health clinical services and ensure that the interests of poorer livestock owners are safeguarded. The process must be managed and the roles and responsibilities of public and private players clearly defined. Table 1 shows that the private sector concentrates on veterinary drug retailing - 60% of private centres are pharmacies and drug shops. This distortion must be corrected so that the need for clinical services at the farm gate can be satisfied.

Under a system of sanitary mandates the public sector can contract private veterinary practices to undertake public good services such as disease surveillance, disease control activities etc. This has two important advantages in that it contributes to the financial sustainability of private practices and frees public sector staff to concentrate upon surveillance, disease control, inspection and regulation.

Privatisation of veterinary services is a global trend that enjoys widespread support from animal health professionals and paraprofessionals in Ethiopia (LVC-PPD, 2012a, LVC-PPD, 2013a). Despite this, Ethiopia is lagging behind other countries due to lack of harmonised policies and direction.
Pre-requisites for Privatisation

A stakeholder privatisation consultation meeting was conducted to gather experiences, views and recommendations from animal health workers in public and private sectors (LVC-PPD, 2013a). Important pre-requisites for privatisation were identified and these are presented below.

Policy

National Regional States in Ethiopia have adopted different approaches to privatisation. A clear federal policy that strongly promotes privatisation and includes the progressive withdrawal of public provision of veterinary clinical services in privatised areas is required. A complementary policy that defines the roles and responsibilities of the public veterinary sector in privatised areas is also required. The responsibility for formulating these policies lies with the Federal Veterinary Authorities in close consultation with Regional Authorities and other stakeholders.

Credit

The significant problem in obtaining credit is a long-standing constraint to veterinary privatisation. Micro Finance Institutions and Savings and Credit Cooperatives give small loans (several thousand Birr) for a maximum period of, usually, 12 months (Berhanu Taye, 2008) which is totally unsuitable for the private veterinary sector. Banks are difficult as they require collateral. Informal credit sources (family, friends, money lenders etc) supply the bulk of credit to start up private practices and veterinary drug retail outlets.

Strategies must be identified to solve this key problem. As a start, financial data could be collected from a range of existing private veterinary practice models (anonymity must be assured) and analysed to determine their financial performance and their ability to service loans, by size, interest rate and repayment period. Reasonable estimates of the size of a loan to enable the establishment of different veterinary practice models should be obtained. These findings would be used to write an evidence-based proposal which would then be presented to a number of commercial banks by the EVA with the aim of gauging their interest and willingness, in principle, to advance loans to aspiring veterinary entrepreneurs.

Possibly this strategy could be promoted by establishment of a veterinary loan guarantee fund underwritten by (i) the public sector as privatisation is definitely in the public interest, and / or (ii) a savings and loan cooperative created within the aegis of the EVA.
Assured High Quality of Services:

The future of private veterinary practice, with all of its attendant benefits will stand or fall on the quality of services offered. If clients perceive that, the major aim of private practitioners is to make a ‘quick buck’ rather than supply high quality and professional services then the strategy will fail. It would then take a long time, much lobbying and the provision of high quality services before the confidence of clients can be regained.

It is therefore most important that high quality be assured at the outset. This must be based on an ethical and professional commitment and appropriate technical skills, which will be promoted and enforced by an established veterinary statutory body. This approach must be an integral component of veterinary professional and para-professional training and stressed in continuing professional development (CPD) programmes.

The veterinary statutory body (VSB), driven by OIE standards, must play a key role in assuring quality assurance of services by:

- Setting the qualifications required for registration by the VSB for veterinary professionals, para-professionals (B.Sc. holders, animal health assistants, animal health technicians - this category is being phased out - and community-based animal health workers). It must be universally recognised that registration by the VSB will be a legal requirement for a person to engage in work as a veterinary professional or para-professional.
- Registering veterinary professionals and para-professionals and maintaining these registers and collecting the initial and annual registration fees.
- Developing a code of professional conduct and enforcing this - thus sanctions will be applied against registered veterinary professionals and para-professionals who have been found guilty of misconduct.
- Approving veterinary training establishments. Approval will be granted if the range and standard of training produces graduates with the day 1 competencies required for registration by the VSB.

The educational institutions will be responsible for:

- Developing and delivering curricula that meet the day 1 competencies required for registration by the VSB, in terms of technical knowledge, practical experience, and ethics;
- Maintaining these standards;
• In consultation with the VSB and as required, design and deliver courses to upgrade the knowledge and experience of existing animal health workers to the level of the defined day 1 competencies;
• In consultation with the VSB design and deliver targeted CPD programmes to ensure that animal health workers remain technically competent and are kept abreast of new developments, and;
• Develop and deliver postgraduate courses leading to the award of masters and doctorate degrees, and certificates in specialist subjects as required by public and private sectors.

Thus, before privatisation can be promoted on a broad scale (i) the VSB must be active, maintain membership registers, and have defined day 1 competencies and (ii) training institutions are producing graduates with these competencies, have commenced upgrading courses, and developed and delivering continuing professional development (CPD) programmes.

**Awareness**

Ongoing consultations (e.g. LVC-PPD, 2013b) clearly demonstrate considerable lack of awareness and misconceptions regarding the details of veterinary privatisation on the part of stakeholder groups. It is essential that all stakeholders are made fully aware of the principles of privatisation, the benefits and costs, and their roles and responsibilities, in advance of any push towards privatisation. The design, implementation and monitoring of the required awareness campaigns must be the responsibility of public veterinary services in consultation with other stakeholders, particularly the EVA and any identifiable representatives of livestock producers.

**A Much Improved Veterinary Drug Distribution System**

Currently the majority of private practitioners experience severe problems (LVC-PPD, 2012a) in accessing readily available (i.e. not too distant) sources of veterinary drugs of the required range (currently this is very restricted), quality (some veterinary medicines are of poor quality or ineffective – e.g. resistance, poor storage, adulterated), and price.

A system is required that includes importation of drugs of the types demanded by private practitioners, and which are of good quality, fairly priced and supported by a nation-wide wholesale distribution system. The options for providing such a demand-driven system include (i) a private sector system dedicated to serving the needs of private practitioners, (ii) a social enterprise system along the lines of Sidai Kenya, and (iii) a veterinary cooperative dedicated to procuring and distributing veterinary drugs. Discussions with entrepreneurs and interested
parties should be instigated now by the Animal Health Directorate (AHD). Strategies arising from these consultations could be implemented once a critical mass of private practices and veterinary medicine outlets has developed.

The provision of the required practitioner-friendly drug supply system must be complemented by enforcement of existing legislation to control the veterinary drug market and close down the activities of the informal drug market.

**A Process for Promoting Veterinary Privatisation**

Privatisation of veterinary services will be a long term activity which will probably taking from 10 to 20 years to cover all eligible areas – ad hoc strategies will be required for areas remaining with significant proportions of poor livestock producers. In part, the duration and impact of the process will depend upon continued improvements in per capita rural incomes - over the period 2004/5 and 2010/11 rural poverty (head count) in Ethiopia declined from 39.3% to 30.4% (Anon 2011). This is encouraging.

**Rationale for a Process Approach**

The process of privatisation must be carefully managed to ensure, as far as is possible, that:

- Financially viable practices are established, an important criterion here is the ability of livestock producers to pay private sector prices for drugs, service fees, transport costs etc. – see 4.2.1 below.
- There are no gaps in service provision during the hand over from public to private sector - one way to achieve this would be to apply the following process: (i) public sector removes all subsidies currently applied to provision of veterinary clinical services, this will most likely require a doubling of prices (Anon 1997), (ii) animal health clinical services provided by both public and private sectors co-exist and compete until the latter is established and functioning as required, and (iii) the public sector ceases providing animal health clinical services.
- Service quality and professionalism (ethics) are assured – this requires an active VSB
- Privatisation is successful from the outset – failures will lead to complaints, loss of confidence in the system, and possibly loss of political support. These could be catastrophic.
- All concerned stakeholders are aware of the principles, advantages, drawbacks of privatisation and of their roles and responsibilities
• There is local political support for the process – implying support from livestock producers

Possible Criteria for Classifying an Area as Suitable for Privatisation

There are many approaches for classifying an area as suitable for veterinary privatisation, including the following.

Indicators of Ability to Pay

Clearly, and in absence of public sector support (e.g. sustained subsidies, sanitary mandates, etc), a financially viable private veterinary practice must depend on fees and margins on veterinary drugs paid by clients (livestock producers). This in turn requires that the majority of clients have the required financial resources.

In theory, indicators of a livestock owner’s ability to pay for private animal health clinical services could be based upon:

- Livestock density - > 60VLU/Km² this includes the upper 3 quartiles of owners who, according to other criteria should be able to pay for private services - see Bogale et al. (2005).
- Mean number of VLUs per holding – >4, and mean number of oxen per holding - >2.0. Highly significant association with poverty p<0.01 (Bogale et al., 2005)
- Food security index (IPC15). This is mapped in the IFPRI ‘Food Security Updates for Ethiopia’ – see Figure 1 (FEWS NET).
- Food Availability Ratio as recommended by Woodford (2002)

15 The Integrated Food Security Phase classification is a set of analytical tools and processes to analyse and classify the severity of a food security situation according to international standards. It aims at providing decision makers with a rigorous analysis of food insecurity in both emergency and development contexts and key objectives for response to better coordinate the interventions.
The preliminary findings of an ongoing study (LVC-PPD, 2013b) indicate that given (i) the high importance of livestock, particularly in the case of oxen and their contribution to crop production (estimated by Behnke, 2010 to be 26.4% of the total value of grain produced), and (ii) increasing market prices of livestock, the majority of livestock owners (including the poor) are willing to pay for private animal health clinical services as long as these are provided in a professional manner – namely including a full examination of the sick animal(s) followed by an accurate diagnosis and treatment.

**Livestock Production System**

These must be profitable for example: developed / developing such as peri-urban, semi-commercial, and improving traditional. Given access to a nearby market, milk production offers promise as it generates daily income. Special consideration must be given to privatisation in the pastoral areas, which differ markedly from the highlands. For example, (i) livestock densities are far lower – 16 VLU per km$^2$ in pastoral areas compared with 88 VLU per km$^2$ in the highlands (compared with 54 VLU per km$^2$ overall), (ii) movement of herds and flocks according to spatial distribution of graze and browse, (iii) difficulties in accessing livestock, and so on.

**Communications**

The relevant components of the communications system include :- condition and extent of road network, and coverage by mobile telephone network preferably at least 2.5G (or EDGE - enhanced data rates for GSM evolution) to enable the rapid transfer of data -for ordering drugs and equipment, seeking information, and reporting suspected occurrences of notifiable diseases.

**Market Access**

Good local markets will tend to favour privatisation due to their potential to improve farm incomes. Such markets may include good communications (facilitating producers taking their produce to market, and for traders to move purchases to towns and cities), and/or a large population of local consumers.

**Proportion of Poor Livestock Producers in a Given Area**

The greater the proportion of poor livestock producers in a given area, the more difficult it will be for a private veterinary practice to survive and prosper. It is important for moral and political reasons that the poorer producers are protected.
One possible strategy to address this issue would be to set a maximum proportion of poor producers in an area destined for privatisation. Areas with a higher proportion would not be privatised unless there were mitigating circumstances. The production system and proposed private practice model(s) would be important considerations when determining this maximum proportion of financially disadvantaged producers.

**Effective Enforcement of Regulations by the Public Sector**

Enforcing regulations will be essential in order to close down the informal drug sales / distribution operators. These are highly undesirable as they: (i) can lead to misuse of veterinary drugs, (ii) present a significant moral hazard to livestock producers (possible poor quality, adulteration, out-of-date sticks, incorrect dosing, lack of respect for withdrawal periods, etc), and (iii) frustrate efforts to privatise veterinary services.

This point was stressed again and again by stakeholders during a baseline study of veterinary privatisation (LVC-PPD, 2013b). Informal drug sales and use probably represents a significant proportion of all veterinary drugs sales. The existence of this ‘third’ system was deemed (correctly) to be undermining the provision of professional animal health clinical services. One version of the privatisation process is presented in Figure 2.
Widespread awareness campaigns covering all stakeholder groups
High level advocacy
Required policy framework, Educational institutes have responded Political support assured
including establishment and to VSB requirements

Meetings, presentations, evidence-based arguments aimed at

AdDr.ess issue of Drug range, quality and distribution

AdDr.ess issue of accessing credit

AdDr.ess issue of safeguarding access to services by poor

Determine criteria for classifying an area as suitable for privatisation

AdDr.ess issue of public sector subsidies

Enforce regulations

Public vet. services, and EVA select suitable areas, publicise, review business plan, credit, practice model, VSB registration etc of applicants. Select best candidate.

Private practice established.

Monitor privatisation. As required modify process

Figure 2: A Summary of One Possible Version of the Process of Privatisation

A pilot database management system (LVC, PPD, 2012b), has been developed to predict the progress of privatisation in terms of (i) the numbers of new practices, by type, that are established in each year, (ii) supply and demand for veterinary professionals and paraprofessionals, by category, sector, type and year and (iii) the numbers of districts privatised, and so on. As time passes and performance is reported and used to population database tables, so the systems output is updated and comparisons can be made of actual against predicted performance. In this way, planners can monitor the process and identify areas requiring revisiting and / or improvement.
Positive Outcomes of Veterinary Privatisation

The positive outcomes of veterinary privatisation include the following:

1. Improved coverage of livestock populations by animal health clinical services
2. Improved quality of service (as the informal sector is squeezed out)
3. Improved livestock productivity and production due to improved control of fortifiable diseases, easier access to animal health clinical services, a cord of trusted animal health service providers who, in addition to treatment of sick animals can provide, can serve as trusted livestock advisors for disease prevention, management (housing, feeding, care of sick animals etc), and eventually the design and delivery of control programmes such as strategic deworming and vaccination against private good diseases such as pasteurellosis, blackleg
4. Improved livelihoods of livestock producers
5. Improved safeguarding of exports of livestock and livestock products
6. Public veterinary services can concentrate on discharging core functions
7. Improved employment opportunities for the growing pool of unemployed veterinary graduates.

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Constraints in Animal Health Service Delivery and Sustainable Improvement Alternatives in North Gondar

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ABSTRACT
Poor livestock health service remains one of the main constraints to livestock development in many developing countries including Ethiopia. Consequently, disease control services remain an important input for the livestock sector development. Improving the existing veterinary services has received a strong impetus, following entry into the world livestock market in order to leverage and develop available livestock resources. A study on the current status and constraints on animal health service delivery was carried out in ten districts of North Gondar, from December 2011 to September 2012, with the objective of identifying the existing status and constraints of animal health service delivery, and recommending possible alternatives for sustainable improvement of animal health service delivery in the North Gondar zone. A structured and pre-tested questionnaire was prepared as part of the survey of ten to fifteen farmers within each district, supported by group discussions using a checklist to evaluate all available service delivery staff in both government and private sectors, at the regional and district level of administration. The survey revealed that 46.34% of the responding farmers had experience of taking their animals to government veterinary clinics after initially trying treatments with local medication. Within the government veterinary service, only 10% were known to have access to even basic laboratory diagnostic tools. More than 90% of the clinical cases were diagnosed solely on clinical signs or even history alone. None were seen to use local or general anaesthetic or analgesic agents. The antibiotics found in the veterinary clinics, which were visited included Penicillin (with or without streptomycin), Oxytetracycline and sulpha drugs, while Albendazole, Tetramisole and Ivermectin were the main anthelmintics. A thermometer was the only instrument available in all clinics, while only 9 (45%) of the clinics had a refrigerator to handle vaccines or drugs which need cool storage conditions. In the private sector, almost 95% were private retail pharmacies, and of those visited only 41.2% fulfilled the requirement criteria set out by the regional Bureau of Agriculture. Almost all of these shops handled pesticides and common antibiotics in the same area. In 30% of them, non-licensed clinical services were observed. Livestock owners and professionals working in the government
highlighted government constraints on service delivery. The problems cited related to poor management, which included a lack of awareness (60%), shortage of budget (40%) and minimal attention paid to the livestock sector (5%). From the perspective of the livestock owners, the most frequent problems included a lack of awareness and knowledge of animal diseases, and physical distance from the service centre (50%). From the professional perspective, lack of incentives (70%) was the most common complaint. For private sector, service those using the services mentioned delivery failure of adherence to regulatory norms and a prevalence of unethical practices. Those professionals working in private practice were concerned about the free service offered by government clinics (100%), failure to follow ethical practices (74%), and a culture of indiscriminate drug use from the black market (23%). More than 47% of farmers showed a preference for the government service because of the lack of any charges, while 52.78% of farmers preferred the private service because of its availability on demand. Willingness to pay for a quality service was also assessed, and 60% of farmers indicated that they would pay a reasonable price for services, including general clinical examination, caesarean section, and normal delivery, both open and close castration as well as wound management. In conclusion, sustainable improvement of animal health service delivery needs to include a well-regulated private service in order to mitigate the constraints apparent in the government service.

Keywords: Animal health service delivery; North Gondar; privatization

1. BACKGROUND

Globally, agriculture provides a livelihood for more people than any other industry. Growth in agricultural production and productivity is necessary in order to raise rural incomes, to support the increasing numbers of people dependent on this industry, and to meet the food and raw material needs of fast growing urban populations. Enhancing agricultural productivity contributes to industrial growth by providing cheap labour, capital investment, foreign currency and markets for manufactured consumer goods. Agriculture has a key role in reducing poverty since most of the world’s poor live in rural areas which are largely dependent on agriculture, and food prices determine the cost of living for the urban poor. Livestock provide over half of the value of global agricultural output, and one third in developing countries. Increased livestock production and higher self-sufficiency would reduce the need for foreign aid, and increase GDP, as a result of the export of livestock and their products. Livestock production contributes to rural livelihoods, employment and poverty relief, integrating with, and complimenting crop-production, acting as a reservoir for savings and providing a buffer against risks (Sen and Chander, 2003; Upton, 2004).
Poor livestock health service remains one of the main constraints to the development of livestock production in many developing countries. In Sub-Saharan Africa losses due to disease are estimated at US$2 billion per year, of which half are attributable to direct losses from mortality, and the other half to indirect losses, as a consequence of reduced growth, fertility and ability to work. These losses caused by animal disease are not simply restricted to lower outputs, in addition disease prevents the introduction of livestock into certain areas (for example, in Africa large tracks of land with high yield potential are lost because of African trypanosomosis and skin diseases such as dermatophilosis), precluding the use of more productive animals including as crossbred dairy cattle, improved pigs and poultry breeds. Trade embargos are enforced by importing countries as a result of the presence of highly contagious diseases, creating another important bottleneck for the sector, reducing trade and the inflow of foreign currency. Furthermore, certain livestock diseases are zoonosis, which means that the control of animal disease is not only of economic importance, but also of social and political significance. Consequently disease control services, will continue be an important factor in the developments of the livestock sector (Chilonda and Van Huylenbroeck, 2001; Cheneau et al., 2004).

As in many developing countries, most veterinary services in Ethiopia are currently provided by the government. Empirical experience has shown that delivery of veterinary services by the government has been heavily constrained by lack of sufficient veterinarians in many of the rural settings, poor infrastructure, inadequate budgets and a heavily centralized planning system, which offers little flexibility for local managers to respond to local needs. Veterinary services, like many publicly provided livestock services to smallholder farmers in Ethiopia are economically inefficient, and in many cases may actually cost the government more than their value to the farmer. The pattern of budgetary allocations has resulted in the animal health public sector provision meeting less than 30 percent of demand (De Haan and Bekure, 1991; Cheneau et al., 2004).

The current global economic and political climate is forcing sharp reductions in government expenditure on state funded services, and a need for an increased transparency and public accountability. The government of Ethiopia is making ongoing efforts to privatize many businesses in the service sector, but it seems no priority is being given to veterinary services. It is now time to explore opportunities for a more decentralized, client-oriented, cost-effective approach to the delivery of animal health services (Silkin and Kasirye, 2002).

With the changing global economic situation, public services are being challenged to perform more effectively. Thus the concept of privatization is finding wide acceptance as an alternative.
Veterinary services are no exception to this trend. Privatization means relying on society’s private institutions rather than on those provided by the government. It is the act of reducing the role of government, or of increasing the role of private sector in an activity, or in the ownership of assets. Privatization of veterinary services has become a necessity for several reasons. These include the reduction in financial resources, the small size of the budget allocated to the livestock sector, the difficulty experienced by the public sector in meeting the demands placed upon them, as well as the increasing inability of the government structure to absorb all the veterinarians and animal health assistants being trained (Tber, 1995).

Privatization in the context of the delivery of animal services is the transfer of activities, functions, responsibilities and property from the public to the private sector. It should be seen as a process of refocusing public sector veterinary services by devolving responsibilities, not merely as a means of reducing government expenditure. In planning for such changes, it is important to consider current and future projected consumer demand, including disease epidemiology, changing livestock systems, socioeconomic growth, the availability of suitably qualified professionals, current and future infrastructure needs and the views of the existing clinical veterinary service. This will enable preparation of a sustainable programme, which will help to facilitate effective privatization of the animal health services (Mlangwa and Kisauzi, 1994; Sparagano, 1999).

Hence, the objectives of this study were to identify the existing status and constraints of animal health service delivery, and to recommend possible alternatives for sustainable improvement of animal health service delivery in the North Gondar administrative zone.

2. METHODOLOGY

2.1 Study Area

North Gondar is located in Amhara National Regional State, bordering Sudan from the West, South Gondar and West Gojam from the South, Waghemra from the East, and Tigray from the North. It encompasses different agro-climatic zones including Kola (lowland), Woina Dega (midland) and Dega (highland). North Gondar zone harbours the northwestern lowlands, which have huge agricultural potential, especially for livestock and cash crops, such as sesame and cotton.

The study was conducted in 11 districts namely: Metema, Gendawuha ketema zuria Chilga, Dembia, Gondar Zuria, Gondar Ketema, Lay Armachiho, Wegera, Dabat, Debark Ketema and
Debark district. These districts in North Gondar were selected since they are intervention area of sustainable natural resource development (SNRD) project and used to assess the current status of the veterinary service.

2.2 Study Design

2.2.1 Questionnaire survey

A structured and pre-tested questionnaire format was used to interview 10 to 15 farmers in each district, and veterinary practitioners involved in both the public and private sector. The questionnaire was designed to assess the occurrence of common diseases in the area, the treatment regimes adopted when disease develops and the level of satisfaction with the existing animal health service delivery, including reasons for any dissatisfaction. For professionals, the questionnaire format was used to assess academic background, common diseases in the area, existing problems encountered, both financial and administrative. Opinions were sought from government and private practitioners regarding the plans for animal health service improvement, and the opportunities and threats, in terms of implementation. The methods used for routine diagnosis and commonly used therapeutic agents were also recorded. An assessment was made of the costs, including professional personnel and therapeutic agents, provided by private practitioners and the public service, together with any charges made.

2.2.2 In situ Observation of Infrastructural Set Up

Both private and public animal health service delivery centres were inspected, in terms of premises and facilities.

2.2.3 Retrospective Data Collection

A five year retrospective data record of the financial records was collected from the agricultural district offices in order to assess budgetary and administrative constraints – planned activities and the ability to implement with the available spend. The five year regional drug price record was assessed for the most common and routinely used drugs in public service delivery.

2.2.4 Discussions with District Agricultural Officers

After interviews with professionals in the public and private animal health service, delivery staff and farmers, the problems raised were forwarded to key personnel in the Ministry of Agriculture (MOA), and their views sought with respect to the prospects of privatizing the service.
2.2.5 Discussions with Concerned Regional Bureaus

After completion of the assessment survey, a checklist was also prepared for the regional bureau of agriculture, regional livestock agency, finance and economic development and the diagnostic veterinary regional laboratory. The checklists were targeted to assess the administrative and policy issues relating to improvement strategies for the sustainable development of animal health delivery at the regional level. In discussions undertaken in the regional laboratory and livestock agency, senior experts and middle level professionals were involved. The existing constraints in terms of service delivery, options for improvement, opportunities and threats presented by privatization, and what type of service to privatize, were all raised for discussion.

Discussions with the regional bureau of finance and economic development, the regional bureau of agriculture, including directors took place, in order to evaluate the necessary policies for privatization and the technical feasibility, in terms of existing personnel and resource management.

3 Results

3.1 Epidemiology of Livestock Diseases

3.1.1 Cattle

Infectious and non-infectious diseases were described. Farmers included lumpy skin disease more frequently (46.34%), whilst anthrax and gastrointestinal parasites were more frequently mentioned by professionals in the public and private services, respectively. Foot and mouth disease was frequently mentioned by both professionals and farmers.

3.1.2 Small Ruminants

Small ruminants (sheep and goat) in the zone were also affected by several diseases. Sheep and goat pox was the most frequently mentioned by farmers and professionals working in the public sector. Gastrointestinal parasitism was mentioned most frequently by professionals working in the private sector.

3.1.3 Poultry

Farmers and professionals were also asked to list diseases that affect poultry. Newcastle disease was the most frequently mentioned and then coccidiosis, fowl pox, and ectoparasites.
3.1.4 Equine

Of the Diseases that affect equine, anthrax is most frequent mentioned, then mange, colic, African horse sickness and back sores.

3.1.5 Pet Animals

The most frequently mentioned disease of pets (dogs and cats) in the zone was rabies. Ectoparasites, internal parasites, flea allergic dermatitis were the most common problems indicated by farmers, government workers and private practitioners respectively.

3.2 Current Status of Service Delivery

3.2.1 Existing Practices by Farmers

Assessment of animal disease management practices indicated that 46.34% of the respondents had experience of taking their animals to veterinary clinics (government) after initially trying local medicaments. 19.5% of the respondents administered modern medicines themselves, when their animals became sick (Table 1).

<table>
<thead>
<tr>
<th>No</th>
<th>Options practiced to combat animal health problems by farmers</th>
<th>Total Respondent</th>
<th>Respondent experience</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Traditional medicine alone</td>
<td>123</td>
<td>6</td>
<td>4.8</td>
</tr>
<tr>
<td>2</td>
<td>Modern medicine by their own</td>
<td>123</td>
<td>24</td>
<td>19.5</td>
</tr>
<tr>
<td>3</td>
<td>Going to veterinary clinic only</td>
<td>123</td>
<td>35</td>
<td>28.4</td>
</tr>
<tr>
<td>4</td>
<td>Traditional initially and then going to Veterinary Clinic</td>
<td>123</td>
<td>57</td>
<td>46.34</td>
</tr>
<tr>
<td>5</td>
<td>Modern medicine by their own, and then going to veterinary clinic</td>
<td>123</td>
<td>3</td>
<td>2.44</td>
</tr>
</tbody>
</table>

3.2.2 Expenditure on Veterinary Services

The estimated average costs spend by livestock owners in different species per year is summarized in Table 2. A greater amount of money was spent on cattle than any other species. Table 3 shows the price recommendations which were given by farmers for services delivered by the private sector.
Table 2: Average cost incurred for animal disease estimated by respondents (n=123) (in Ethiopian birr)

<table>
<thead>
<tr>
<th>S/No.</th>
<th>Species</th>
<th>Per case/Year</th>
<th>Per herd/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cattle</td>
<td>38.00</td>
<td>128.40</td>
</tr>
<tr>
<td>2</td>
<td>Shoat</td>
<td>18.10</td>
<td>75.74</td>
</tr>
<tr>
<td>3</td>
<td>Equine</td>
<td>19.41</td>
<td>47.57</td>
</tr>
<tr>
<td>4</td>
<td>Camel</td>
<td>5.50</td>
<td>16.25</td>
</tr>
</tbody>
</table>

Table 3: Voluntary Price recommendations given by farmers for services delivered by private service (n=65) (in Ethiopian birr).

<table>
<thead>
<tr>
<th>S/no</th>
<th>Service type</th>
<th>Recommended service charge range by farmers - per animal</th>
<th>Mean ±SD*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wound Management</td>
<td>3-50</td>
<td>17.7±15.80</td>
</tr>
<tr>
<td>2</td>
<td>Normal but assisted delivery(cattle)</td>
<td>5-20</td>
<td>11.5±3</td>
</tr>
<tr>
<td>3</td>
<td>General clinical examination</td>
<td>2-10</td>
<td>3.5±2.5</td>
</tr>
<tr>
<td>4</td>
<td>Castration</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Small animals</td>
<td>0.5-15</td>
<td>3.28±2.78</td>
</tr>
<tr>
<td></td>
<td>Large animals</td>
<td>1-20</td>
<td>5.92±4.07</td>
</tr>
<tr>
<td>5</td>
<td>Rumenotomy</td>
<td>21-100</td>
<td>35.64±23.61</td>
</tr>
<tr>
<td>6</td>
<td>Spray for ectoparasites</td>
<td>2-5</td>
<td>2.55±1.11</td>
</tr>
</tbody>
</table>

*SD= Standard deviation

3.2.3 Existing Practices in Government Service Delivery

From the total number of clinics visited under the office of agriculture, only 10% were known to use any laboratory diagnostic aids. These included parasitological procedures, whilst none of them were found to use any microbiological techniques. In none of the government clinics, neither local nor general anaesthetic agents were evident, which indicates surgical procedures were not practiced, or if they were, they were unethical, without pain management. The only antibiotics found in all of the veterinary clinics were penicillin (+) streptomycin combination, oxytetracycline and sulphur drugs. The anthelmentics found were Albendazole, Tetramisole and Ivermectin and there were no antifungal agents. The disinfectants found in nearly 20% of government clinics were potassium permanganate and gentian violet. More than 90% of the clinical cases were diagnosed solely from the clinical signs or the history alone. In almost all sites, anthelmentics were given based on the history taken from the owner.
3.2.4 Existing Premises in Government Service Delivery

From the results of the visits it was evident that many of the government clinics lacked appropriate facilities to restrain and handle clinical cases, and the majority of the clinics were not well equipped. A thermometer was the only instrument available in all clinics. Only 9 (45%) of the clinics had a refrigerator which means that less than 50% of clinics were able to handle vaccines or drugs which need cold chain storage. In some clinics, the refrigerator was available, but was not functional due to the absence of the expertise to repair it. None of the clinics had a stereomicroscope for diagnosis of ectoparasites. In order to raise the standards of health service delivery, the deployment of highly skilled professionals must be accompanied by the appropriate diagnostic tools and facilities.

3.2.5 Existing Practices and Facilities in Private Veterinary Service

Nearly 95% of private services workers were private drug retail shops, and of those visited only 41.2% were shown to fulfill the requirement criteria set by the regional bureau of agriculture. Almost all drug shops handled pesticides and common antibiotics in the same dispensing area. In 2% of the drug retail shops, there were complaints about the sale of expired drugs, and, in 30% clinical services were seen to be given during the survey, for which they were not licensed.

3.2.6 Reason for Engagement in Private Service

A question was forwarded to private practitioners asking why they were engaged in private business. Nearly 35.29% of them answered in order to acquire money to live, 23.53% answered for greater profitability.

3.2.7 Farmer’s Preference

Out of all responding farmers, 58.54% preferred the government service, 21.14% liked both services equally and 20.33% preferred the private service. The reasons mentioned by farmers for their preference for either the public or private sector are listed in Table 4 and 5. About 47.22% of farmers preferred government service because of the cheaper service charge. The farmers with preference for the private service attributed their preference to the availability of service whenever it was needed. The existing service delivery under the current animal health service was seen to be unsatisfactory, both in the private and public service systems, in terms of both quality and range. Many respondents were seen to use veterinary drugs without any veterinary supervision, because of the distance from clinics or their lack of availability in the existing clinics. Willingness to pay for a quality service, including general clinical examination,
castration, caesarean section, normal delivery, open and closed castration and wound management was assessed with an estimate of reasonable prices to pay (Table 3).

Table 4. Reasons indicated by farmers as preference for government service.

<table>
<thead>
<tr>
<th>S/n</th>
<th>Reasons</th>
<th>Number of respondent*</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Government services are more cheaper (less costly)</td>
<td>34</td>
<td>47.22</td>
</tr>
<tr>
<td>2</td>
<td>Government service are more effective</td>
<td>10</td>
<td>13.89</td>
</tr>
<tr>
<td>3</td>
<td>More qualified professionals are available in government service</td>
<td>2</td>
<td>2.78</td>
</tr>
<tr>
<td>4</td>
<td>Better quality of drugs in government</td>
<td>15</td>
<td>20.83</td>
</tr>
<tr>
<td>5</td>
<td>Better diagnostic service in government</td>
<td>6</td>
<td>8.33</td>
</tr>
<tr>
<td>6</td>
<td>The service is available nearby</td>
<td>2</td>
<td>2.78</td>
</tr>
<tr>
<td>7</td>
<td>Trust</td>
<td>5</td>
<td>6.94</td>
</tr>
<tr>
<td>8</td>
<td>Good cooperation by professionals</td>
<td>1</td>
<td>1.39</td>
</tr>
</tbody>
</table>

*One farmer may give more than one reasons

Table 5. Reasons indicated by farmers for preference to private service

<table>
<thead>
<tr>
<th>S/n</th>
<th>Reasons</th>
<th>Number of respondent*</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Greater variety of drugs are available</td>
<td>4</td>
<td>16.00</td>
</tr>
<tr>
<td>2</td>
<td>The service is always available</td>
<td>11</td>
<td>44.00</td>
</tr>
<tr>
<td>3</td>
<td>The service is fast</td>
<td>7</td>
<td>28.00</td>
</tr>
<tr>
<td>4</td>
<td>Farmers get what they wanted</td>
<td>6</td>
<td>24.00</td>
</tr>
<tr>
<td>5</td>
<td>The service is available nearby</td>
<td>3</td>
<td>12.00</td>
</tr>
</tbody>
</table>

*One farmer may give more than one reasons

3.2.8 Level of Satisfaction

A question was forwarded to farmers to give their level of satisfaction when they use the service, either in the government or private sector. About 37.70% of farmers were satisfied with the private service and fairly satisfied with the public service (Fig. 1).

![Degree of Satisfaction](image)

Figure 1. Level of satisfaction of farmers by private and government services
3.3 Expectations for Privatization

Possible impacts of privatization for the future were assessed. Most (75%) of the respondents said that privatization would have a positive effect on veterinary service delivery in the zone. Reductions in the quality of service and job losses were also mentioned by respondents (Table 6).

Table 6. Expectations in government service staff on outcomes of privatization schemes

<table>
<thead>
<tr>
<th>S/No</th>
<th>Expectations in government service staff on privatization (n=20)</th>
<th>Number</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Reduce engagement in government Service</td>
<td>9</td>
<td>45.00</td>
</tr>
<tr>
<td>2</td>
<td>Service will be improved</td>
<td>15</td>
<td>75.00</td>
</tr>
<tr>
<td>3</td>
<td>Loss of job</td>
<td>3</td>
<td>15.00</td>
</tr>
<tr>
<td>4</td>
<td>Reduce the quality of service</td>
<td>4</td>
<td>20.00</td>
</tr>
<tr>
<td>5</td>
<td>Proper supply of drugs on time as needed</td>
<td>1</td>
<td>5.00</td>
</tr>
</tbody>
</table>

3.4 Constraints of Veterinary Service Delivery

3.4.1 Government Veterinary Service

Constraints of veterinary service delivery in the public sector were related to management, clients (livestock owners) and professionals working in government. Some of the problems related to management were lack of awareness, shortage of budget and also the minimal attention given to the sector. Among client related problems, distance from the service centre was most frequently mentioned by respondents. Lack of incentives was the most important problem conveyed by the professionals (Table 7).

Table 7. Problems in public veterinary service

<table>
<thead>
<tr>
<th>S/n</th>
<th>Problems indicated by respondents (n=20*)</th>
<th>Frequency</th>
<th>Percent</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Management related</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Lack of awareness</td>
<td>12</td>
<td>60.00</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Shortage of budget</td>
<td>8</td>
<td>40.00</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>less attention given to the sector</td>
<td>1</td>
<td>5.00</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Client related</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Low perception</td>
<td>8</td>
<td>40.00</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Cost of service</td>
<td>4</td>
<td>20.00</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Distance from service centres</td>
<td>10</td>
<td>50.00</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Farmers need anthelmintics without bringing their animal(s)</td>
<td>3</td>
<td>15.00</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Coming after several trials by themselves</td>
<td>1</td>
<td>5.00</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Professional (staff) related</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Lack of commitment</td>
<td>4</td>
<td>20.00</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Shortage of manpower</td>
<td>11</td>
<td>55.00</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Engagement in non professional activities</td>
<td>4</td>
<td>20.00</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Lack of incentives</td>
<td>14</td>
<td>70.00</td>
<td></td>
</tr>
</tbody>
</table>

*One respondent was giving more than one problems, that is why the percentage is greater than 100
3.4.2 Private Veterinary Service

The constraints in private veterinary service delivery are listed in Table 8. Problems related to cost were most frequently mentioned by respondents. Failure to adhere to accepted norms, and some unethical practices were also mentioned by some respondents (30%).

Table 8. Constraints in private veterinary service

<table>
<thead>
<tr>
<th>s/n</th>
<th>Problems</th>
<th>Respondents (n=20)</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Frequency</td>
<td>Percent (%)</td>
</tr>
<tr>
<td>1</td>
<td>Failure to adhere norms (dose, expired drugs) and ethics</td>
<td>6</td>
<td>30.00</td>
</tr>
<tr>
<td>2</td>
<td>Failure to sterilize instruments</td>
<td>2</td>
<td>10.00</td>
</tr>
<tr>
<td>3</td>
<td>Non-professional practices</td>
<td>4</td>
<td>20.00</td>
</tr>
<tr>
<td>4</td>
<td>Failure to give good service without proper diagnosis</td>
<td>3</td>
<td>15.00</td>
</tr>
<tr>
<td>5</td>
<td>Inadequate qualification, non professional involvement</td>
<td>2</td>
<td>10.00</td>
</tr>
<tr>
<td>6</td>
<td>High cost of service or drugs</td>
<td>8</td>
<td>40.00</td>
</tr>
</tbody>
</table>

3.5 Retrospective Assessment

3.5.1 Annual Budget Allocation in Government Service

Comparison was made between the planned and allocated budget in the public veterinary service. No district was satisfied during the last five years because the budget allocation was lower in all districts than the planned budget (Fig. 2). There was also no indication of any increment in the annual government budget allocation to match the increase in drug prices; rather there was a relative decline in the budget (Fig. 3). Thus an inverse relationship was observed between the annual budget allocation and the price of drugs (Correlation 'r' = -0.67).

![Figure 2: Average planned and allocated budget in thousands*](image)
Figure 3. Average planned and allocated budget in thousands*

Figure 3. The average price of drugs in Ethiopian birr and the allocated budget in ten thousands

3.5.2 Annual Physical Plan Execution Report

The average annual vaccination and execution of the treatment plan are shown in Figures 4 and 5, respectively. The vaccination performance ranged from 50 to 75% whilst the therapeutic plan execution performance was greater than 70% during the last five years. However, the vaccination performance should also be evaluated based on the epidemiology of diseases and the number of animals in need of vaccination.
Figure 4. Average vaccination plan and execution in the last five years

Figure 5. Average annual animal health service plan and execution record in the last five years (thousands)

3.6 Group Discussion

3.6.1 District officials

Representatives from district office of agriculture as well as members of the animal health service team were involved in the group discussions undertaken in all assessment study sites. Problems experienced by individual farmers and animal health service personnel were presented and discussed and possible solutions discussed. Problems raised by farmers regarding the government service included shortage of different drug types, absence of an accessible regular
daily service from animal health assistants. Strengths included reliability of drugs when available and their value for money. People in the private animal health sector highlighted unfair price competition with government clinics; lack of implementation the laws on illegal drug circulation, and lack of ethical practice by individuals working in adjacent services. The public sector raised issues around adequate staffing to support a dual mobile and ambulatory based health service (during the mobile service delivery a single animal health assistant is expected to cover three neighbouring peasant associations in rural service centres). Lack of incentives was also cited in almost all of the study sites. Engagement of public service delivery staff in non-animal health service activities was also raised in 60% of the group discussions except Metema, Dembia, Debark and Chilga districts.

District representatives have agreed partly on the questions raised by farmers and individuals engaged in service delivery. Solutions include reinforcing and refreshing the illegal trade (drug) regulatory team, implementing the new regional livestock agency and sequential implementation of a regional plan for service cost recovery. From group discussions the issue of privatization was also encouraged as a solution.

### 3.6.2 Regional Bureaus

From discussions with individuals from regional bureaus of economic development, it is evident that the government remains committed to its responsibilities for the delivery of public services, for the benefit of the community. In this respect, the provision of an animal health service available to the vast majority of the community, especially farmers, remains an important commitment, with the aim to provide a reliable service, addressing the deficits. The failure to privatize agricultural support services in other African countries has been highlighted, suggesting that privatization may be difficult to implement in Ethiopia. However, for the long term, privatizing of at least parts of veterinary service cannot be overlooked. So far policies to either support or impede privatization have not been prepared at a regional level, with specific relationship to agricultural services. Absence of an agency to manage privatization agency at a regional level, was also raised.

During the discussion the following constraints in animal health service delivery were listed:

- Deficiency in budget allocation,
- Gaps in control of illegal drug circulation and implementation of ethical practices
- Absence of adequate training and capacity building for existing government staff
- Poor routine practice in procedures relating to animal health service delivery,
The need for existing professionals in public service to engage in non-professional duties and responsibilities in the office of agriculture,

Problems related to paraprofessional practice (paravets)

The low level of incentives to encourage individuals into the veterinary service - base pay and related allowances

Poor support services for animal health.

Shortage of laboratory facilities including reagents and materials

Poor networking with other stakeholders - University faculties and multiplication centres

Free service delivered by the government service and constraints upon the necessary facilities, diagnostic tools, prophylaxis and treatment.

The option of privatization was also discussed in all of the group discussions. Pre-requisites include the implementation of an appropriate code of practice, in the public and private sectors, a change in attitude of both farmers and professionals towards a quality service, and the establishment of cost recovery for government services.

Concerns regarding privatization of the service were also raised, with respect to business drivers becoming predominant before the proper implementation of a code of practice to ensure that strong ethical values are maintained, in order to change attitudes, so that delivery of a quality animal health service to farmers could be achieved.

The issue of what to privatize was also discussed. There was strong debate about whether to recommend that the vaccination service should be handled by private service or not. The issue of covering the costs of transboundary disease vaccination by the MoA, as well as difficulties with the requirement for cold chain maintenance was also discussed. It was then concluded that, although it may be difficult at the initial stage, providing a quality private service could help solve the problems, and that the MoA can play a role in its facilitation.
4 DISCUSSION

4.1 Disease Epidemiology

North Gondar administrative zone comprises highland, upland and lowland agro-ecologies. These diverse agro-ecological zones create an ideal environment for the prevalence of a variety of animal diseases. Government and private sector professionals and farmers described several livestock diseases. These included major viral, bacterial, parasitic and metabolic diseases affecting cattle, sheep, goats, horses, cats and dogs. The presence of various animal diseases in the zone was also reported by Tegegne et al. (2009). These diseases result in huge economic loss by either directly killing animals, or indirectly, by reducing their productivity. A significant proportion of livestock owners, despite potentially making their own initial attempts to treat, do eventually take their animals to veterinary clinics, and buy drugs from veterinary pharmacies. This demonstrates a high demand for a veterinary service to both control and prevent disease, and to increase productivity.

4.2 Status of Existing Service

The existing service delivery, under the current animal health system was considered to be unsatisfactory, in both private and public sectors, in terms of quality and effective widespread delivery. From personal observation of respondents, a considerable number of veterinary drugs were being administered without veterinary direction, because of remoteness of clinics or non-availability of adequate services in existing clinics. Willingness to pay for a quality service was also assessed for general clinical examination, castration, caesarean section, normal delivery, both open and closed castration as well as wound management. Farmers were willing to pay suggested acceptable prices, in nearly 52.2% of the respondents. The remaining respondents would not volunteer acceptable prices because they felt that services should be provided by the government or the service deliverer should determine prices. Respondents in areas of greater economic potential emphasized the value of a quality service rather than being price led. The indicated acceptable prices were comparable to regional prices studied for the implementation of cost recovery under the MoA, in selected milk shade areas of the region (SIDA, 1994).

4.3 Options for Service Delivery Improvement

Privatization of veterinary services was preferred as a possible solution for improving animal health service delivery by respondents in the current survey. Similar ideas put forwards by Sen and Chander (2003) suggested privatization of veterinary services as one strategy for providing
an efficient veterinary service. Cheneau et al. (2004) also reported on the improvement in veterinary services in developing countries as a result of privatization. Consequently, many countries in the world have started to implement, or have already implemented privatization. Privatization has been shown to bring significant progress, together with careful planning, in Morocco. The availability of drugs and their use in animals are significantly higher in countries that have privatized veterinary services and adequate drug supplies (Cameroon, Central Africa republic, Cote d’Ivoire, Ghana, Mali, Senegal, and Kenya) (Sen and Chander, 2003). As a consequence many African governments are moving to privatize their veterinary services. For many years, measures for the control and prevention of East Coast fever (ECF) in Kenya have been carried out by private veterinarians. The government of Zambia is also encouraging free competition among veterinarians (Mlangwa et al., 1997).

Despite successes in different corners of the world, it doesn’t mean that privatization is free from problems. Some of the respondents in this research suggested that the quality of the veterinary service might actually be reduced by privatization. Private practitioners may fail to adhere to norms and professional ethics. They may also concentrate in and around urban areas, leaving remote rural communities isolated (Sen and Chander, 2003; Cheneau et al., 2004). They may also focus solely on profit rather than providing effective quality services.

In Ethiopia, there is a free market ideology, and there are policies that promote the private sector. There has been some progress in veterinary services. Almost all importation and distribution of veterinary drugs is handled by private companies. Any veterinary professional can have a license and set up in private practice. In any district, there are one or more private veterinary pharmacies, and in big towns like Gondar there are private veterinary clinics. Despite this, the process of transferring decades of a state monopolized service into the private sector is still slow. Accordingly, no progress has been made in delineating public and private responsibilities with respect to animal health service delivery, and in promoting private practice. Private veterinary practice has been promoted under the EU-funded PARC programme.

In 1993, a condition of continued funding was that the program should show greater progress, and the most recent report from the Veterinary Privatization Promotion Office shows that compared with other countries, considerable advances have indeed been made. The report also shows that between 1995 and 2001 the percentage of private clinics rose from 6 percent to 14.7 percent of the total, and the percentage of private health posts from 1 percent to 6.5 percent (Silkin and Kasirye, 2002).
Livestock owners spend some money on veterinary services. The value presented in Table 3 is a rough estimate, since most farmers do not keep records. However, it does indicate the willingness of farmers to pay for some veterinary services. The sustainability of a private service depends on the profitability of livestock owners. The types of production systems, livestock densities, the market price of the animals, all impact upon profitability for the private practitioner (Umali et al., 1992). There is a resistance in the public sector to charging real costs (full cost recovery) for the services it provides. It is however, essential to do so, if the private practitioner is to be assured of an adequate income, and if the economy is to grow.

The government service is confronted by many problems. Respondents mentioned inadequate availability of instruments, lack of awareness, shortage of budget and insufficient government attention to the sector, resulting in an inability to maintain full service provision. The government budgets have not kept pace with the increased livestock population and price of drugs. Each year no satisfactory budget has been allocated to the districts. The presence of significant constraints in the government, concerns rose about the efficiency and efficacy of the public sector veterinary service, and the diverse demands of farmers have led to a search for alternative ways of providing the service. Privatization could be the solution to these problems (Sen and Chander, 2003).

5 CONCLUSIONS

From this study, the range of endemic disease and the severity of their impact on livestock production were seen to be critical by professionals in government service and the private sector, as well as the farming community. The most important diseases notified as list A in the OIE list of diseases were highlighted because of their wide distribution, and frequency of occurrence: Foot and mouth disease (FMD), lumpy skin disease (LSD), Peste des Petits Ruminants (PPR), Newcastle disease (NCD), African Horse Sickness (AHS) and Contagious Caprine Pleuropneumonia (CCPP). The most frustrating disease of zoonotic importance, rabies, was also highlighted because of its occurrence in all study areas.

The status of veterinary service is in its infancy, in terms of both widespread coverage and a standardised service provision, in both the government and private sector. There was a view that the budget allocation was insufficient to provide a quality service delivery, accessible to all of the community. The yearly budget allocation does not match the requirements for resources to spend on trained personnel, equipment, facilities and drug price inflation, so precluding implementation of the five years action plan. The attitude of officers in the government sector towards a privatized veterinary service seemed to be favourable in terms of encouraging the
private sector to be involved, rather than a total service transfer from the public to private sector. A considerable proportion of professional respondents from study districts were somewhat pessimistic about the current trends in the public sector if they continue, and made suggestions for service improvement.

In addition, respondents also attributed constraints on the quality of service delivery from the government veterinary service, to management related constraints in resource allocation, shortage of the required tools and facilities and a lack of awareness and perception of the needs of livestock owners. Private Service was judged to be constrained by problems related to the subsidized government service, gaps in implementation of legal and ethical practices, absence of institutions for securing financial requirement to start up businesses, lack of trust by farmers in a private service, as well as unwillingness/inability to pay for services delivered. Deficiencies in access to services by farmers have also led farmers to use modern veterinary drugs as well as traditional remedies, without veterinary supervision.

The regional bureaus of agriculture as well as the bureau of finance and economic development have studied the issues relating to privatization of the veterinary service. Some officials maintained that the service provision should be a responsibility of the government. Others have raised the point that there is no particular policy directive, which would either preclude or facilitate the implementation of a private veterinary service. The only regulations related to private veterinary practice were encountered in the regional livestock agency. Consequently, from the observations made to date, a slow step by step engagement with a privatized service could be a solution to the future sustainable management of the animal health service.

6 RECOMMENDATIONS

Based on the conclusions from this study, the existing constraints on veterinary service delivery could be ameliorated using the following recommendations.

- Increased privatisation, with a continuing reduced, but properly resourced government service. The benefits need to be demonstrated to farmers in livestock production so that there is an obvious working partnership, which can be seen to be beneficial in terms of good disease control and improved productivity, through ready access to a robust service. This needs to include an outreach service for ongoing education of the farming community.
• Regulations need to be enforced to ensure that ethical service delivery is maintained so that both public and private animal health service firms can enjoy a professional service delivered to a high standard.

• The government service delivery should cease to provide a free service, and implement cost recovery programmes at regional levels, so that private veterinary service can be encouraged to play its role in animal health service delivery with appropriate ethical standards.

• Strategies developed for privatization of veterinary services should underline the possible pitfalls to their sustainable implementation.

• Policies, rules and regulations regarding privatization of veterinary service need to be clearly established in advance.

• Implementation of privatization programmes need to be phased, monitored and demonstrated to work.

• If the government prefers to continue with its commitment to the existing level of public service, then appropriate resources must be made available, including recruitment and outreach education, to ensure the expected quality service delivery and the understanding of disease control measures by the farming community.

• The privatization process requires initial seed money for those would be private practitioners. To address this case, the saving and credit associations and the government structure must make a deal and device strategy to make credit availability and accessibility.

• The non-governmental organizations working in livestock productivity should also consider supporting the privatization procedure and associated seed money issues as one area of focus to let privatization a working platform in improving animal health and productivity.

• Entrepreneurship and business management courses need to be considered to be included in the veterinary medicine curriculum or else situations must be arranged to give such courses after graduation to let the new graduates consider providing private veterinary service as one alternative job market and ultimately survive and thrive thereof.
7 REFERENCES


SIDA, 1994. Study on cost recovery of veterinary services provided by Ministry of Agriculture in selected districts of Amhara region by group of consultants.


THEME III

Animal Health Professionals in Ethiopia
Animal Health Professional Development in Ethiopia

Professor Getachew Abebe (Food and Agriculture Organization of the United Nations, Addis Ababa, Ethiopia, (Getachew_Abebe@fao.org))

Abstract

In Ethiopia, the School for Animal Health Assistants was established in 1963 (UNDP-FAO and MOA of Imperial Ethiopian Government). The training of animal health assistants was oriented toward the recognition of livestock diseases by clinical and post-mortem examination, preserving and sending of materials to laboratories for further examination, implementation of treatment and controlling mechanisms of diseases, with particular emphasis on vaccination and improved animal husbandry, feeding and management. In 1979 Addis Ababa University established the Faculty of Veterinary Medicine at Debre Zeit. In 1996, the Faculty started its first graduate programme in Tropical Veterinary Epidemiology, in collaboration with the Free University of Berlin. Since 2003 additional ten veterinary faculties were established at Haramaya, Hawassa, Gondar, Jimma Mekelle, Jijiga, Wollega, Wolaita Sodo, Wollo, and Samara Universities. Even though Ethiopia has a huge livestock resource the number of veterinary faculties is of great concern when considering the quality aspect of veterinary education.

Introduction

Ethiopia is the most populous nation in Eastern Africa and the second most populous in Africa after Nigeria (over 80 million inhabitants). With an annual population growth of more than 2%, Ethiopia will have more than 120 million people by 2030. The diverse ecology makes Ethiopia the home for large populations of different domestic and wild animals with considerable contributions to the national economy. The livelihood of both rural and urban, or sedentary and pastoral communities in the country is, to a large extent, associated with the various outputs drawn from this sector. Livestock play an enormous role in reducing poverty in the livelihood of the majority of the rural and the peri-urban poor. They contribute to food and nutritional security; they generate income and are an important storage of wealth, transport and sources of power, and their manure maintains soil fertility. Furthermore, animal food products such as meat, milk, and eggs are concentrated sources of high quality protein, vitamins and minerals. Livestock have a positive effect on diets, health, incomes, financial security, sustainable crop yields, employment prospects and social status. Livestock also have a significant share from the export earnings including hides and skin. The potential from this huge national domestic and
wild fauna, however, was not efficiently exploited to any significant level. The livestock productivity remained marginal due to partly wide spread diseases, sub-optimal nutrition, problems in policy enforcement, limitations in genetic potential and poor management practices. Most livestock diseases in Ethiopia being herd health problems rather than individual animal problem, training in Tropical Veterinary Medicine with emphasis on economic viability of the control and preventive measures are legitimately justified. To assist in the control and prevention of losses from animal diseases, The Ethiopian Government requested assistance from the United Nations Special Fund in 1960 to establish a training school for Animal Health Assistants. The project became operational in March 1963 and training activities began in October 1963 subsequent to an agreement reached between the UNDP-FAO and the Imperial Ethiopian Government, Ministry of Agriculture (FAO, 1973, Imperial Ethiopian Government, Ministry of Agriculture, 1972).

Establishment of Veterinary Schools in Ethiopia

In 1979 the Addis Ababa University established the Faculty of Veterinary Medicine at Debre Zeit and graduated the first batch of veterinarians in 1986. The graduate profile of the DVM programme has three components namely (1) Knowledge: Competent in the practice of general veterinary medicine, which includes food animal companion animal, wildlife, and laboratory animal practices and veterinary public health, (2) Skills: Equipped with the knowledge and skills in the diagnosis, treatment, prevention and control of animal diseases, veterinary public health, animal production, research and extension, (3) Attitude: Producing a person of higher creativity,
social consciousness, and professional ethics with a sense of responsibility to work towards national goals and development.

In 1996, the Faculty of Veterinary Medicine started its first graduate programme in Tropical Veterinary Epidemiology, in collaboration with the Free University of Berlin. Since, 2003 additional ten veterinary faculties were established at Haramaya, Hawassa, Gondar, Jimma Mekelle, Jijiga, Wollega, Wolaita Sodo, Wollo, and Samara Universities. Even though Ethiopia has a huge livestock resource the number of veterinary faculties is of great concern when considering the quality aspect of veterinary education.

Current roles
- Inspection & administration of animal welfare standards not only livestock but also companion animals & animals used for research
- Control of chemical residues in livestock & livestock products
- Risk assessment & quality assurance systems
- Contingency planning for major exotic disease outbreaks and for chemical emergencies

Traditional roles
- Field diagnosis & regulatory control of livestock diseases
- Lab. diagnosis and research on livestock diseases
- Meat inspection and prevention of zoonoses
Changing Roles of Veterinary Education

Principles of Veterinary Education

- Should be problem oriented in order to stimulate self-study and student’s curiosity
- Examinations should be based on the ability to use information in solving problems rather than on recall of facts
- Principles should be taught rather than single facts, rules rather than exceptions
- Students should be induced to assume a greater role in their own education. They must be taught in a manner that make them desire to learn, explore, improve and conquer
- Veterinary Schools should adopt the principles that their undergraduate students do not follow an identical educational programme. Diversity of the undergraduate curriculum must be encouraged.

Policy environment
the enabling environment and context for the institutions and individuals

Institutional level
(public, private and civil society organizations in Animal Health)

Individual
(Veterinary students and staff)

World demand for animal protein (milk, eggs, meat) will increase by 50% by the year 2030. This demand will only be met if Veterinary Services can provide a suitable level of sanitary surveillance to cope with the complexity of the animal production systems of the future. It is
estimated that more than 20% of animal production worldwide is lost as a result of disease. The demand for animal source protein is even higher in Ethiopia where regions with surplus crop production are still suffering from serious shortage of animal protein. Stunting rate is high in Amhara (52%) and Tigray (51.4%) compared to other regions of the country.

**Minimum Requirements in Veterinary Education**

With the prevailing number of veterinary faculties in Ethiopia, setting minimum requirements in veterinary education is timely and very urgent. In this aspect the Ethiopian Veterinary Association, the Federal Ministry of Agriculture and Rural Development and the various veterinary schools are the responsible bodies to initiate and setting the minimum requirements and standards for veterinary education. This can be handled and processed through the establishment of the Ethiopian Veterinary Council which is under way. To start with one could follow the minimum standards set by The World Veterinary Association (WVA). The minimum standards of veterinary education are (WVA, 1998):

1. A veterinary education institute must be of university level and must meet the standards specified by the WVA in its accreditation system. The veterinary curriculum must be under the immediate and sole direction of a veterinarian. The institution must be adequately financed, housed, equipped, and staffed.

2. The duration of the veterinary curriculum must of at least four years, not including a minimum of one year of pre-veterinary training at the university level. In each of the four years a minimum of eight months of instruction is required.

3. The veterinary curriculum must cover subjects in depth and provide an appropriate understanding of the following subject matters in relation to the various animal species and animal production systems of importance in the area:

4. Basic disciplines are Zoology, macroscopic and microscopic anatomy; physiology (mammalian and avian); biochemistry; pharmacology; microbiology; pathology; theriogenology; diagnosis, treatment and prevention of diseases; medicine; radiology; surgery; veterinary economics; animal husbandry and production (genetics); botany; cell biology; environment; professional ethics; animal welfare; population veterinary medicine; fisheries; laboratory animal medicine; immunology; epidemiology, and public health (meat inspection & food hygiene)
5. Appropriate library and audio-visual facilities as well as sufficient clinical, laboratory and practical training must be provided.

6. Student must be properly supervised and evaluated throughout the course of their studies.

7. The veterinary education must be able to demonstrate that research activities are performed on the premises, contributing to the acquisition of knowledge, both at applied and fundamental levels.

8. Continuing education: the veterinary education institutions must be able to assist practicing veterinarians, in their part of the country, regardless of the veterinarian's position, to cope with rapidly changing professional demands.

9. The internationally organized body such as the World Veterinary Association should certify veterinary education institutions fulfilling the above requirements.

**Conclusion and Recommendations**

Animal diseases are responsible for holding back much of the agricultural and economic development in Ethiopia. Gaining better control over important livestock diseases like rinderpest, CBPP, anthrax, blackleg, trypanosomosis, parasitic infestations and others would enable farmers and pastoralists to produce more and higher quality food in a sustainable manner. Along this line veterinary education and research have important role in enhancing the productivity of livestock in Ethiopia. The undergraduate veterinary education in Ethiopia is restrained by a number of factors, many of which are basically related to inadequate funding. The number of teaching and research staff and their level of qualification are insufficient. Unfavourable working conditions, including poor opportunity for research, low salaries and lack of incentives for staff development contribute to this situation. Teaching aids and facilities are insufficient. Computer hardware, lecture halls, laboratories and dormitories as well as transport facilities and radio communication to support ambulatory training are unavailable.
In order to achieve or maintain an appropriate educational profile of veterinary faculties in Ethiopia, it is important that a training need assessment for undergraduate education of veterinarians in relation to the requirements of veterinary services be undertaken. Such assessments, which should take into consideration the professional needs of veterinary services in the public as well as private sectors.

With the prevailing increase number of veterinary faculties in Ethiopia, setting minimum requirements for veterinary education is justifiable. Therefore, the establishment Veterinary Council of Ethiopia that facilitates the setting of minimum standard of veterinary education is highly required. If the veterinary education, research and service delivery is governed by a qualified and powerful body like the Veterinary Council, the veterinary institutes including education in the country will have a common understanding and joined effort to handle animal health problems. It will also have a positive impact on the quality of veterinary education as well as veterinary services delivery.

Considering the recent development on the upgrading of the livestock sector to State Ministry level, it is expected that the required attention will be given to the sector to address the livestock issues more than ever. To this end the professionals both in the public and private sectors are required to delivery their profession with sound ethics and code of conduct. The gaps identified during the OIE PVS evaluation is considered as a way forward in the right direction and the strategy document developed for the improvement of animal health services (2013 -15) addressing the gaps is expected to give a strong foundation to the new Livestock Resource Development Sector at a state minister level.

**Further reading**

Brown C.C., Essential veterinary education in the cultural, political and biological complexities of international trade in animals and animal products, Rev. sci. tech. Off. int. Epiz., 2009, 28 (2), 519-524


OIE, 2012: A Guide to Veterinary Education Twinning Projects

OIE, 2012: OIE recommendations on the Competencies of graduating veterinarians (‘Day 1 graduates’) to assure National Veterinary Services of quality


Veterinary Manpower in Ethiopia

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Summary

Although livestock production has been considered as a strategic economic sector in the economic development goals of Ethiopia, its performance, as it currently exists, is far from commendable. A host of effective policy and technical interventions are needed to harness the resource to its full potential. Veterinary service is one of the essential technical services needed throughout the value chain of the livestock sector. A balanced supply of well-trained veterinary manpower is a key requirement for an effective veterinary service. With massive expansion of higher education in Ethiopia in the past decade, veterinary training and training institutions have increased dramatically. This has caused a concern in supply-demand balance of the veterinary manpower in Ethiopia. This paper tried to examine the existing and projected supply-demand balance of veterinary manpower and training capacity in Ethiopia, its determinants and the potential repercussions of the imbalance based on document analysis. Based on veterinary manpower staffing standards available in literature, the professional veterinary manpower supply in Ethiopia, which is estimated to be about 2618 veterinarians currently, is less than a liberal demand estimate of about 3333 veterinarians. However, this gap will take only two years to be met. The future supply from existing veterinary faculties will outbalance the projected demand and create an ever increasing veterinary manpower surplus in the foreseeable future. Ethiopia has the largest number of veterinary schools in Africa that account roughly more than one third (34%) and one fifth (22%) of all veterinary faculties in sub-Saharan Africa and in Africa respectively. This is an over training capacity to match the veterinarian demand of the country. Unmanageable surplus of veterinary manpower could have a negative consequence in the performance of the veterinary service, economy of the country, the veterinary profession and professionals. Checking further proliferation of public veterinary training institutions and consolidating and strengthening of existing institutions should be considered for a balanced manpower and effective veterinary service.

Keywords: Demand-supply, Ethiopia, Training institution, Veterinary Manpower, Veterinary service

1. Introduction

Livestock has a strategic economic importance in the economic development goals of Ethiopian government which has been, and still is, poverty eradication through broad based, accelerated and sustainable economic growth. This is not only because of the enormous size and diversity of the livestock resource but also its key place in the livelihoods of most of rural poor population of
Ethiopia. However, as it currently exists, the livestock production is subsistence and its development is far from commendable. A host of effective policy and technology interventions are needed to harness the resource properly for the benefit of the livestock keepers and the country.

The veterinary service is one of the essential technical services needed for development of the livestock sector. Disease loss in the livestock sector represents the major constrains in production and productivity of the sector. Disease constraints are estimated to cause loss of up to 30 % annual outputs of livestock in developing countries (FAO, 1990). Disease loss are not restricted to lowering of outputs but also can totally prevent livestock production (e.g. trypanosomosis in tsetse belt of Africa) or prevent use of optimal technology like improved breeds, and restrict access to lucrative markets. Furthermore, certain livestock diseases are transmitted to man and are direct human welfare concerns. An adequate supply of well-trained veterinary personnel is a key requirement for an effective veterinary service. Veterinary personnel provide essential services and advices throughout the livestock chain starting from supplying input technologies and advices for producers to safeguarding of consumers through insuring safety and quality foods of animal origin. Veterinarians are also entrusted with the maintaining of national biosecurity with regard to livestock and zoonotic diseases.

Veterinary service is one the oldest public serve established in Ethiopia. When the Ethiopian Government for the first time organized ministries at the turn of 20th century, Ministry of Agriculture was one of them. One of the main activities of this ministry at that time was providing veterinary service specially fighting livestock epidemics like rinderpest (APHRD, 2009). The veterinary service, after the five year Italian occupation and restoration of Ethiopian Government, was organized as an autonomous agency as the Imperial Veterinary Service and endeavour to improve the animal health situation in the country specially fighting epidemic disease like rinderpest and Contagious bovine pleuropneumonia. Since 1962, it become under Ministry of Agriculture organized at different levels in different times (EVA, 2004). A local formal training in animal health was started in 1963 with the establishment of the School of Animal Health Assistants under auspice of the Ministry of Agriculture. In 1979, the first faculty to train veterinarians was opened by Addis Ababa University and later on takeover the Animal Health Assistants School from Ministry of Agriculture. The Faculty has been the only institution in the country to train animal health personnel at diploma and degree level until 2003. Because of the limited output of veterinary personnel from this Faculty the veterinary manpower to livestock ratio especially in terms of professional veterinarians in Ethiopia used to be one of the least in Africa (Smith and Hunter, 1993.)
The higher education expansion in Ethiopia in the past decade has been very remarkable. The number of public universities has grown from two before 2003 to 33 in 2012 and the annual enrolment in public universities from 35,000 in 1995/96 to 185,788 in 2009/10 (FDRE, 2010). This has also created an opportunity for Ethiopian veterinary education to grow. Until 2003 there was only one veterinary faculty with average annual graduation output of 25 veterinarians. But by 2011 the number of veterinary faculties increased to 11 with total graduate output of several hundred every year. The attention and the commitment of the government in the expansion of veterinary education is generally commendable. However, this unprecedented rapid and massive expansion has created both quality and quantity concerns in veterinary education. Although the quality issue is very pressing as well (Mayen, 2006; Kelay, 2011), only the quantity issue was the focus of this paper. The graduation of large number of veterinarians from newly opened faculties every year without any significant change in the way the veterinary service is working to deploy the new work force, arose a concern of job security for graduates. A survey in 2011, three years after the newly opened faculties start to graduate, 27.5% of the preceding years graduates were without jobs for at least one year (Kelay, 2011). The job security concerns have been also felt by students in the veterinary faculties and cause digitations in the veterinary faculties nationwide in 2012. The OIE PVS evaluation report of Ethiopia has raised concerns about possible oversupply of veterinary graduates and recommended undertaking PVS Gap Analysis to assist with matching supply of veterinary graduates across the country with the demand (OIE, 2011). The objective of this paper was to do a preliminary assessment of the existing and projected supply-demand balance of veterinary manpower and training capacity in Ethiopia, and discuss factors that determine manpower need and potential repercussions of the imbalance based on document analysis.

2. Materials and Methods

2.1. Definitions

A veterinary manpower refers to veterinarians and veterinary paraprofessionals serving in the veterinary service, however, this paper focuses mainly on veterinarians. According to OIE code Veterinarian means "a person registered or licensed by the relevant veterinary statutory body of a country to practice veterinary medicine/science in that country" and "a veterinary paraprofessional is a person who is authorized to carry out certain veterinary tasks with authorization from a Veterinary Statutory Body, under the responsibility and direction of a registered or licensed veterinarian" (OIE 2012a). However, because of absence of veterinary statutory body, and registration and licensing of veterinarians in Ethiopia, a veterinarian in this
study is considered any DVM graduate or equivalent from a university level training institution. 

*Veterinary service* includes animal health service that is given both by public and private sectors.

### 2.2 Data and information source

Livestock resource data are obtained from statistical databases like from central statistical agency of Ethiopia (CSA, 2012) and food and agricultural organization statistical database (FAOSTAT, 2010). Veterinary manpower data for Ethiopia were taken from different published and unpublished sources. Ministry of education website is consulted for veterinary medicine student enrolment and graduation rate. Official reports/sources from the national veterinary service were sought for information related to the current actively working veterinary manpower. An extensive literature search was done including the websites and publications of international organization in the domains of animal health like that of World Organization for Animal Health (OIE), Food and Agricultural Organization (FAO) of the United Nations and World Health Organization (WHO) of the United Nations for information on standards of veterinary service staffing and veterinary training institution needs. Literature resource was also used to discuss the factors that determine the veterinary manpower of a country and consequences of unbalance in veterinary manpower.

**Manpower Analysis**

Analysis of demand and supply of veterinary manpower was done to estimate the present and future demand of veterinary manpower in the country.

Estimating the demand of veterinarians was approached in two ways. The first was to find out already available official demand estimates by Ethiopian veterinary service. The other was to calculate the demand based on veterinary personnel to the livestock ratio recommended in literature. Different standards of animal health personnel to livestock ratio were recommended in literature. For this analysis always the most liberal ratios (high veterinarian to livestock ratio) were chosen unless there was another convincing reason to use otherwise. The livestock resource of the country was changed to tropical livestock units (TLU) and veterinary livestock units (VLU) to standardize different veterinary service need of the various livestock species.

Projection of demand was done considering two components: expansion demand and replacement demand. The expansion demand is a demand due to new jobs in the livestock industry which may arise from increasing number of livestock units or change in the structure of
production (intensification and commercialization). The replacement demand is on the other hand a demand for replacing those veterinarians that leave the job market for different reasons like retirement, illness, death and moving into other careers.

On the supply side, the existing veterinary manpower was estimated from graduate outputs of the veterinary faculties in the country. This was because of absence of any institution in Ethiopia that registers veterinarians. This estimation took an assumption that the number of veterinarian that are trained locally and are out of work for various reasons is compensated by the number of veterinarian who studied aboard and still working. It was also assumed all graduating veterinarians work in the Ethiopian veterinary service, while actually, though relatively insignificant, few are working in international organizations or other countries abroad. The future supply of veterinarians was projected from the current student enrolment rate of veterinary faculties in the country.

The estimated existing and projected demand of veterinary manpower was compared with the estimated existing and projected supply to see the manpower balance. Finally, the number of veterinary faculties that are needed to maintain the equilibrium manpower were determined based on economic and technical capacity considerations.

3. Results

3.1 The existing demand-supply equation of veterinary manpower

Demand

i. The demand for veterinarians from veterinary service official sources.

There are some official sources which indicate the demand for veterinary personnel in the public veterinary service. Zewdie (2004) reported a demand of 1620 veterinarians for disease prevention in the government service (478 working at that time plus additional need of 1142 veterinarians). In Animal and plant health regulation directorate (APHRD) 2009/10 animal health year book, it was indicated that 661 veterinarians are working in the public veterinary service and 562 additional vacant post which gives a total demand of 1223 veterinarians in the public veterinary service (Table 1). (APHRD, 2010).
Table 1. Veterinary manpower in veterinary service of Ethiopia

<table>
<thead>
<tr>
<th>Service category</th>
<th>Number of veterinarians</th>
<th>Number of veterinary para-professionals and other technical staff</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Filled posts</td>
<td>Vacant posts</td>
</tr>
<tr>
<td>Public animal health</td>
<td>527</td>
<td>499</td>
</tr>
<tr>
<td>Public veterinary public health</td>
<td>34</td>
<td>44</td>
</tr>
<tr>
<td>Public veterinary laboratory</td>
<td>100</td>
<td>19</td>
</tr>
<tr>
<td>Total public</td>
<td>661</td>
<td>562</td>
</tr>
<tr>
<td>Total private</td>
<td>795</td>
<td></td>
</tr>
</tbody>
</table>

Data source: APHRD (2010)

*The source shows only the total of animal health personnel in the private sector without distinction on qualification level and service category.

ii. Demand Estimate Based on Veterinarian to Livestock Ratio as Recommended in the Literature

The demand of the veterinary personnel needed for veterinary service in this case was estimated based on the size of the livestock resource. The Ethiopian livestock biomass in TLU and VLU are presented in Table 2. The demand for veterinary personnel was computed quantitatively as the ratio of animal health personnel to livestock population in tropical TLUs or VLUs. There is no, however, a single universally used ratio and different authors recommend different ratios. Some recommended ratios available in the literature are compiled in Table 3.

Table 2. The livestock resource in Ethiopia

<table>
<thead>
<tr>
<th>Species</th>
<th>Number in million</th>
<th>*TLU factor</th>
<th>TLU</th>
<th>Share of total TLU (%)</th>
<th>**VLU factor</th>
<th>VLU</th>
<th>Share of total VLU (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>52</td>
<td>0.7</td>
<td>36.4</td>
<td>72.84</td>
<td>1</td>
<td>52</td>
<td>80.04</td>
</tr>
<tr>
<td>Sheep</td>
<td>33</td>
<td>0.1</td>
<td>3.3</td>
<td>6.60</td>
<td>0.1</td>
<td>3.3</td>
<td>5.08</td>
</tr>
<tr>
<td>Goat</td>
<td>30</td>
<td>0.1</td>
<td>3</td>
<td>6.00</td>
<td>0.1</td>
<td>3</td>
<td>4.62</td>
</tr>
<tr>
<td>Horse</td>
<td>1.78</td>
<td>0.8</td>
<td>1.42</td>
<td>2.85</td>
<td>0.5</td>
<td>0.89</td>
<td>1.37</td>
</tr>
<tr>
<td>Mule</td>
<td>0.373</td>
<td>0.7</td>
<td>0.26</td>
<td>0.52</td>
<td>0.5</td>
<td>0.1865</td>
<td>0.29</td>
</tr>
<tr>
<td>Donkey</td>
<td>5.42</td>
<td>0.5</td>
<td>2.71</td>
<td>5.42</td>
<td>0.5</td>
<td>2.71</td>
<td>4.17</td>
</tr>
<tr>
<td>Camel</td>
<td>2.5</td>
<td>1</td>
<td>2.5</td>
<td>5.00</td>
<td>1</td>
<td>2.5</td>
<td>3.85</td>
</tr>
<tr>
<td>Poultry</td>
<td>38</td>
<td>0.01</td>
<td>0.38</td>
<td>0.76</td>
<td>0.01</td>
<td>0.38</td>
<td>0.58</td>
</tr>
<tr>
<td>Total</td>
<td>49.98</td>
<td>100</td>
<td>64.9665</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Veterinary personnel to livestock ratio recommended by different authors

<table>
<thead>
<tr>
<th>Veterinarian livestock ratio</th>
<th>to Vet to Paravet. ratio</th>
<th>Literature source</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: 200 000 VLU</td>
<td>1: 20</td>
<td>De Haan and Solomon Bekure, 1991</td>
<td>For public sector in extensive systems</td>
</tr>
<tr>
<td>1: 100 000 TLU</td>
<td>1: 10-50</td>
<td>Smith and Hunter, 1993</td>
<td>For government service</td>
</tr>
<tr>
<td>1: 240 000 TLU</td>
<td>1: 10-12</td>
<td>Anteneh, 1983</td>
<td>For prevention system in traditional (extensive) systems</td>
</tr>
<tr>
<td>1: 5000 head (cattle)</td>
<td>---</td>
<td>FAO 1978 cited de Haan and Nissen, 1985</td>
<td>Preventive and curative treatment in intensive dairy herds and feedlot</td>
</tr>
<tr>
<td>1: 30 000 head (cattle)</td>
<td>---</td>
<td>FAO 1978 cited De Haan and Nissen, 1985</td>
<td>For traditional system (with only technical consideration)</td>
</tr>
<tr>
<td>&gt;1:50 000 VLU</td>
<td>---</td>
<td>FAO 1978 cited De Haan and Nissen, 1985</td>
<td>Traditional system (with economic consideration)</td>
</tr>
<tr>
<td>1: 200 000 TLU</td>
<td>1: 20-30</td>
<td>Sandford, 1983 cited ILRI, 1995</td>
<td>Public services like field diagnosis, quarantine and disease control</td>
</tr>
<tr>
<td>1:10 000 - 30 000 TLU</td>
<td>1:10</td>
<td>Sandford, 1983 cited ILRI, 1995</td>
<td>Public service plus complex prevention and control at herd or flock level</td>
</tr>
<tr>
<td>1: 5000 TLU</td>
<td>1: 1-5</td>
<td>Sandford, 1983 cited ILRI, 1995</td>
<td>Full range vet service including individual animal health care and artificial insemination, breeding and production</td>
</tr>
<tr>
<td>1: 10 000 VLU</td>
<td>---</td>
<td>CFR 42, USA</td>
<td>For food animal veterinarians</td>
</tr>
</tbody>
</table>

As can be seen in Table 3 different authors calculate the ratio in different ways which differ in the type of service considered (public versus private), production system (extensive versus intensive), types considerations (technical versus economical) and type of measures of livestock units (VLU, TLU, head). Among this ratio the ones that reasonably fit to Ethiopian situation are selected and used. The demand was computed in two ways based on these selected ratios:

1. Calculating the demand for the public service (which provides only public goods) and private service (which provides private goods) separately and summing together to estimate the total demand.

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16Public good. A good or service wherein the consumption of the good or service by one individual does not reduce its availability to others and the person who paid for the service cannot exclude others from "free riding" or using the service as well (for example, food hygiene and inspection). Private good. A good or service wherein the person who paid for the good or service exclusively benefits from it and no one else is able to avail of the good or service at the same time (for example, treatment of an animal's broken leg). (Umali et al., 1992)
ii. Calculating the demand for veterinary service that provided both public goods and private goods together like what is currently practiced in Ethiopia.

In the first case the liberal ratio of 100 0000 TLU per veterinarian (Smith and Hunter, 1993) is selected for public service and 30000 cattle per veterinarian (1 head of cattle is same as 1 VLU) (De Haan and Nissen, 1985) is selected for private service in the extensive system. In this calculation the requirement for the 50 million TLU of Ethiopia in the public service will be 50 million TLU divided by 100 000 TLU/Veterinarian which is equal to 500 veterinarians. On the other hand the requirement for private service is 65million VLU of Ethiopia divided 30 000 VLU/Veterinarian which is equal to 2167 veterinarians. The total demand both in the public and private service will be 2667 veterinarians.

In Second case, i.e. for a veterinary service that provides both public and private service together, a ratio of 10 000- 30000 TLU per veterinarian (Sandford, 1983 cited ILRI, 1995) is selected and used. Taking the middle value 15 000 TLU per veterinarian, the total veterinarian demand for the current livestock resource will be 50 million TLU divided by 15 000 TLU/veterinarian which is equal to 3333 veterinarians.

Supply

The number of working veterinarians in Ethiopia as estimated from graduate outputs of the veterinary schools since the opening of the first school in 1979 in Addis Ababa university is about 2618 (Table 4).

Table 4. The number of veterinarians graduated from Ethiopia veterinary schools

<table>
<thead>
<tr>
<th>University</th>
<th>Establishment year</th>
<th>Graduate output until 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addis Ababa</td>
<td>1979</td>
<td>1012</td>
</tr>
<tr>
<td>Gonder</td>
<td>2004</td>
<td>233</td>
</tr>
<tr>
<td>Harmaya</td>
<td>2003</td>
<td>402</td>
</tr>
<tr>
<td>Hawassa</td>
<td>2003</td>
<td>249</td>
</tr>
<tr>
<td>JiJiga</td>
<td>2007</td>
<td>44</td>
</tr>
<tr>
<td>Jimma</td>
<td>2003</td>
<td>305</td>
</tr>
<tr>
<td>Mekele</td>
<td>2003</td>
<td>302</td>
</tr>
<tr>
<td>Semera</td>
<td>2011</td>
<td>0</td>
</tr>
<tr>
<td>Woliata</td>
<td>2010</td>
<td>0</td>
</tr>
<tr>
<td>Wollega</td>
<td>2007</td>
<td>26</td>
</tr>
<tr>
<td>Wollo</td>
<td>2007</td>
<td>45</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>2618</td>
</tr>
</tbody>
</table>

Source: Compiled from faculties’ records
Balance of the Equation

Different figures of demand estimated were found by the different approaches followed. The demand figures for government service mentioned in the official veterinary sources (1620 and 1223 veterinarians) are already surpassed by the 2618 veterinarian estimated to currently exist in the country. The demand estimate that was obtained by calculating for public service and private service separately which was 2667 veterinarians is just met. The largest figure was that of the demand calculated for a veterinary service that provides both public and private goods together which was 3333 veterinarians. This estimate will used for subsequent calculations and discussions as it is more relevant to Ethiopian situation and is also the most liberal one in putting the demand. When this figure is taken, the demand for veterinarians in Ethiopia is not yet met by currently available estimated 2618 veterinarians. Taking this liberal estimate, currently there is a deficiency of 715 veterinarians.

Projection of Demand and Supply

Projected Demand

The expansion demand is a demand due to new jobs in the livestock industry which may arise from increasing number of livestock units or change in the structure of production (intensification and commercialization). Considering a high case scenario growth, the growth rate of livestock in tropical livestock units in Ethiopia is estimated to be 2.67% which gives rise to similar growth rate in demand for veterinarians (Table 5). Using this rate the demand for veterinarians due to increase in livestock units for 2013 will be 89 (2.67% of the 3333 veterinarians needed in 2012).

Table 5. Annual growth of livestock population in Ethiopia

<table>
<thead>
<tr>
<th>Species</th>
<th>Population growth rate in number (%)</th>
<th>The total population growth rate in Tropical Livestock Unit (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>2.64</td>
<td></td>
</tr>
<tr>
<td>Sheep</td>
<td>3.73</td>
<td></td>
</tr>
<tr>
<td>Goat</td>
<td>4.10</td>
<td>2.67</td>
</tr>
<tr>
<td>Camel</td>
<td>4.76</td>
<td></td>
</tr>
<tr>
<td>Poultry</td>
<td>3.15</td>
<td></td>
</tr>
</tbody>
</table>

Source: MORAD (2007)

*The source did not include growth rate of equines. However, the TLU growth computed in here is applied for the whole livestock population. ** The rates are high case scenario growth rates
No study is available for the replacement rate of veterinaries in Ethiopia. Kelay (2011) assumed 3% replacement rate in Ethiopia but how this assumption is taken was not clear from the paper. A roughly similar rate of replacement of 3.5% is implied from Smith and Hunter (1993), when they estimated annual number of graduates used to maintain veterinary work force in UK. A detail study in Netherlands which studied replacement demand for about 80 occupational classes showed replacement demand (8%) for veterinary professionals (Willems and de Grip, 1993). Taking this 8% replacement rate for Ethiopia, the annual demand for replacement for 2013 will be 267 (8% of 3333) veterinarians.

Projected Supply

Currently in 2012/13 there are 11 veterinary faculties in the country with an average enrolment of 53.55 students (Table 6). From this enrolment, an average of 50 graduates per year per faculty is expected. This will result in annual supply of 450 veterinarians from the nine faculties which have already started graduating and 550 when the new ones start to graduate.

Table 6. The 2011/12 enrolment rate in veterinary schools in Ethiopia

<table>
<thead>
<tr>
<th>University</th>
<th>1st yr</th>
<th>2nd yr</th>
<th>3rd yr</th>
<th>4th yr</th>
<th>5th yr</th>
<th>Total</th>
<th>Average enrolment of faculties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addis Ababa</td>
<td>66</td>
<td>62</td>
<td>81</td>
<td>134</td>
<td>58</td>
<td>401</td>
<td>80.2</td>
</tr>
<tr>
<td>Gondar</td>
<td>55</td>
<td>77</td>
<td>64</td>
<td>75</td>
<td>70</td>
<td>341</td>
<td>68.2</td>
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<td>69</td>
<td>95</td>
<td>314</td>
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<td>36</td>
<td>87</td>
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<td>Mekelle</td>
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<td>26</td>
<td>21</td>
<td>27</td>
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<td>Wollo</td>
<td>41</td>
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<td>39</td>
<td>21</td>
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<td>189</td>
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<tr>
<td>total</td>
<td>542</td>
<td>503</td>
<td>467</td>
<td>588</td>
<td>533</td>
<td>2548</td>
<td>589.1</td>
</tr>
</tbody>
</table>

Source: MoE (2012)

N.B. Yr represents year

The Projected Demand Supply Balance

Equating the projected demand and supply indicates the projected demand will be met in 2015 and the supply will continue to exceed there after creating high surplus (Table 7).
Table 7. A 10 year projected demand and supply of veterinarians in Ethiopia

<table>
<thead>
<tr>
<th>Year</th>
<th>Total livestock population in TLU('000)</th>
<th>Basic veterinarian demand</th>
<th>Annual replacement demand</th>
<th>Total demand</th>
<th>Total supply*</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>50000</td>
<td>3333</td>
<td>0</td>
<td>3333</td>
<td>2618</td>
<td>-715</td>
</tr>
<tr>
<td>2013</td>
<td>51335</td>
<td>3422</td>
<td>267</td>
<td>3689</td>
<td>3068</td>
<td>-621</td>
</tr>
<tr>
<td>2014</td>
<td>52706</td>
<td>3514</td>
<td>274</td>
<td>3788</td>
<td>3518</td>
<td>-270</td>
</tr>
<tr>
<td>2015</td>
<td>54113</td>
<td>3608</td>
<td>281</td>
<td>3889</td>
<td>3968</td>
<td>79</td>
</tr>
<tr>
<td>2016</td>
<td>55558</td>
<td>3704</td>
<td>289</td>
<td>3993</td>
<td>4518</td>
<td>525</td>
</tr>
<tr>
<td>2017</td>
<td>57041</td>
<td>3803</td>
<td>296</td>
<td>4099</td>
<td>5068</td>
<td>969</td>
</tr>
<tr>
<td>2018</td>
<td>58564</td>
<td>3904</td>
<td>304</td>
<td>4208</td>
<td>5618</td>
<td>1410</td>
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<tr>
<td>2019</td>
<td>60128</td>
<td>4009</td>
<td>312</td>
<td>4321</td>
<td>6168</td>
<td>1847</td>
</tr>
<tr>
<td>2020</td>
<td>61733</td>
<td>4116</td>
<td>321</td>
<td>4437</td>
<td>6718</td>
<td>2281</td>
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<tr>
<td>2021</td>
<td>63381</td>
<td>4225</td>
<td>329</td>
<td>4554</td>
<td>7268</td>
<td>2714</td>
</tr>
<tr>
<td>2022</td>
<td>65074</td>
<td>4338</td>
<td>338</td>
<td>4676</td>
<td>7818</td>
<td>3142</td>
</tr>
</tbody>
</table>

* Note: the supply increases by 450 every year until 2015 and by 550 then after when other two new faculties start to graduate.

Need of Veterinary Training Institutions

Another important consideration in planning veterinary manpower need is how many teaching institutions are needed to produce the required number of veterinarians. Ethiopia having 11 veterinary faculties owns the largest number of veterinary schools in Africa that account roughly more than one third (34% (11/32)) and one fifth (22% (11/50)) of all veterinary schools in sub-Saharan Africa and in Africa respectively (Table 8). Although it has also the largest livestock resource in the content, its percentage share in this case (17%) is less than that of the number of veterinary schools. Contemporary veterinary medicine has featured the evolution of many academic and practice specialties. As a consequence there is a strong pressure to expand staff numbers sufficient to give adequate coverage to the various specialties that make up the totality of veterinary medical education (Nielson et al., 1977). Since staff numbers are ultimately based on student numbers, small institutions will not be able to afford the size of staff that permits a full range of specialties (Nielson et al., 1977). Because of this there is a critical mass of staff to run an effective veterinary program which is estimated to be about 60 (Smith and Hunter, 1993). To economically accommodate this size of staff, the student enrolment should not less than 300 (Smith and Hunter, 1993).

In Ethiopian situation this requires annual new enrolment of more than 50 candidates in veterinary programs. Fifty students in six years (batches) will give the required minimum enrolment of 300 students in a faculty. Once the veterinary manpower demand is met (after two
years, the manpower that is needed to maintain the equilibrium demand would be about on
average about 400 (see table 7 above). If this to be met by the existing 11 veterinary faculties
each faculty has to graduate less than 40 graduates annually and the total enrolment rate to
achieve this would be about 240 which is less than the economically viable enrolment rate.
Looking from the other side the number of schools that are required to maintain the veterinary
work force would be about eight. This show the 11 faculties operational in the country are over
training capacity for the country.

Table 8. Schools and faculties of veterinary medicine in Africa

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Algeria</td>
<td>6</td>
<td>11</td>
<td>Mozambique</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Angola</td>
<td>1</td>
<td>12</td>
<td>Nigeria</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>Congo (DR.)</td>
<td>1</td>
<td>13</td>
<td>Senegal</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Egypt</td>
<td>9</td>
<td>14</td>
<td>South Africa</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Ethiopia</td>
<td>11*</td>
<td>15</td>
<td>Sudan</td>
<td>1**</td>
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<tr>
<td>6</td>
<td>Ghana</td>
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<td>16</td>
<td>Tanzania</td>
<td>1</td>
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<tr>
<td>7</td>
<td>Kenya</td>
<td>1</td>
<td>17</td>
<td>Tunisia</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>Libya</td>
<td>1</td>
<td>18</td>
<td>Uganda</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Madagascar</td>
<td>1</td>
<td>19</td>
<td>Zambia</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>Morocco</td>
<td>1</td>
<td>20</td>
<td>Zimbabwe</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: OIE (2012b)
* In the cited data source, the number was 10. It is corrected to 11 based on personal knowledge
of this author.
** Other sources indicate Sudan has more than 1 veterinary school (e.g. Swan and Kriek, 2009)

Determinants of Veterinary Manpower Need

Many influencing factors are identified as basis for planning veterinary human resources
development (i.e. for identifying future educational needs) by different authors (Kouba, 2003;
Smith and Hunter, 1993, Cheneau, 1985). Only the major ones are described below with their
relevant implication in Ethiopian situation.

- The national animal herd size and the animal disease position of the country: The livestock
herd size of the country is the major determinants of the veterinary manpower size. Ethiopia
having the largest livestock resource in Africa may need to have a large number of
veterinarians in this respect.

- The stage of development of the animal industry (type of production system): A developed
livestock industry demands more intensive and complex veterinary services and at the same
time is able to pay attractive remuneration for such veterinary services. So high veterinary
to livestock ratio may be needed in intensive and technology dependent livestock system as compared to subsistence production system like the dominant system in Ethiopia.

- The standard of living of the human population: The standard of living also affects the need for veterinary service. Demand for veterinary service increases with affluence. This is specially related animals welfare concerns and keeping companion animals. People in the developed countries are sensitive to animals’ welfare and want to insure the food they bought finally has come from welfare friendly production which requires more veterinary service. Companion animal veterinary service need increases and with economic affluence. This has been witnessed in developed world and more than 50 % of veterinarians are engaged in the companion animal practice.

- The part played by veterinarians in animal husbandry: In some countries the whole livestock technical service including nutrition, husbandry and breeding are performed by veterinarians and this increase the demand for veterinary services. These services in Ethiopia are provided by separate animals science professionals

- The use made of auxiliary personnel: The presence of high number of auxiliary personnel (veterinary paraprofessionals) in a country decreases the demand for professional veterinarians. In the traditional extensive production systems in which the livestock are reared by small holders and the returns per animals are lower, which is the case of developing countries like Ethiopia, the deployment of private professionals would neither be attractive financially nor justified economically. Such gap could be covered by auxiliary staffs which make the need for professional veterinarians moderate.

**Effect of Veterinary Manpower Surplus**

In the balance of demand and supply of veterinary manpower, excess is more problematic than shortage for many reasons. Deficits may be made up in a matter of months, by importing veterinarians from countries with a surplus, or with training in a span of few years. However, excesses are a glut on the market and rather more difficult for national economies to absorb (FAO, 1997). Veterinary training is one of the most expensive in the world including in Ethiopia. Veterinary faculties in Ethiopia needs high budget per student than most other educational programs and students sign the highest cost sharing (debt) amount up to 3 fold of most other degree programs. It takes also long years of training (six years in Ethiopia which is again double of most degree courses). This makes production of surplus veterinary graduates
economically unaffordable both for the country and the graduates. The long years training makes the graduates less flexible and costly to divert or change career.

Employing excessive manpower by government will have a negative effect on effective functioning of the veterinary service by incurring huge salary cost as expense of operational funds. Rising staff costs, coupled with a relative (and real) decline in funds available to meet other recurrent costs, has been a major cause of failure in animal health services of many countries in sub-Saharan Africa in 1980s (De Haan and Nissen, 1985). The increased personnel put pressure on the government fund and the salary paid may be short of what the veterinarians deserve on grounds of their training. This could lead to poorly motivated staff and poor veterinary service performance. Likewise, competent practitioners cannot survive long term in the private sector as they may not earn sufficient income due to stiff competition for the available service demand, to be able to invest in new equipment and acquire skills provided by further education. Surplus of veterinarians that lead to unemployment will have also an important repercussion in the future of the profession and the veterinary service. A prospect of unemployment by veterinarians means no competent and motivated candidate will apply to study veterinary medicine in the universities. This will lead poor quality graduates from universities who cannot provide quality service to the society and cannot command respect from the society.

Discussion

In this paper an attempt has been made to analyse what the current and future trend of the veterinary manpower balance looks like. However, the output of any analysis can only be as good as the input used. There were challenges in getting and identifying the right input in the veterinary manpower demand supply estimate, and it would be wise to put these limitations in perspective to rightly understand the results. The final demand calculation was done based recommended staffing standards available in literature. These standards (Veterinarian to livestock ratios) were highly variable and difficult to choose among. Similarly variable replacement rates of veterinarians were encountered. The most liberal ratio was taken in both cases for analysis not to underestimate the demand for veterinary professionals. These sources were also mostly old that might not consider the recent developments in the role of veterinarians like in the concept of one health, animal welfare and increasing international trade volume. A highly simplifying assumption was also made in the supply side by equating the number of veterinarians trained aboard who are still working with the number of those trained locally and
are out of the work in estimating the existing active veterinary work force. So the result of this analysis should be seen in light of these limitations.

The rough analysis done in this work indicated a possible absolute surplus in the veterinary work force in the coming few years. However, it must be noted that before that actual surplus is coming, there is an apparent surplus currently which is witnessed by massive unemployment of the recent year graduates. This indicates the need for some restructuring changes in the veterinary service to properly serve the livestock industry and effectively deploy the veterinary manpower that is produced at high cost. This change may include changing the structure of public veterinary service and strengthen it with sufficient budget (it is a common knowledge that many districts in different regions of the country are reluctant to staff their animal health positions with veterinarians for budgetary reasons). Creating enabling environments for young graduates to establish their own practice should also be considered for effective use of the available work force. This may include from availing credits for initial capital investment to privatization of private good components of the veterinary service.

The true surplus that is expected to be ensuring after two to three years could only be managed with regulating the public veterinary education. The current expansion of work force came as result of expansion of training institutions which makes the expansion economically costly and quality wise demanding. Checking the opening of additional veterinary faculty should be the first step in managing the surplus. The currently operational veterinary faculties are overcapacity to meet the demand of veterinary manpower in the country. Lowering their enrolment rate could be seen as one solution to match their output with the demand but this will make the enrolment rate below an economical critical. This would make the training costly and difficult to justify the huge human and material investment. It will be good for faculties to be big enough to use economy of scale for the high capital investment needed for quality education. Taking this into account the ideal solution with regards to the current overcapacity veterinary training would be consolidating the existing veterinary schools into fewer and stronger faculties. This has been recommended by other authors who wrote on Ethiopian veterinary education (Mayan 2006) in that case from the perspective of ensuring quality. If this is thought to be a tough decision another option that can be considered would be as suggested in FAO (1997) exploiting existing overcapacity for providing continuing education, short-course refresher training, in-service training to meet governmental needs; or vocational courses for animal health assistants and auxiliary personnel. Changing some well-organized faculties in to post graduate and research institute can also be considered.
A comprehensive empirical study should be commissioned for accurate forecast and planning of veterinary manpower need of the country in the different sectors of the veterinary profession.

References


Quality Education in Veterinary Medicine: Status, Future, and the Way Forward

Professor Abebaw Gashaw (School of Veterinary Medicine, Jimma University)

Preamble

"Tell me and I forget. Teach me and I remember. Involve me and I learn"

Benjamin Franklin

The aim of this paper was to explore the quality of veterinary education in Ethiopia. We have reviewed different documents to see the current state of veterinary education in the public universities of Ethiopia. In the review we have tried to look why Quality assurance in Higher Education? We have also reviewed the concept of quality education, the driving force for quality and the components of higher education quality assurance with the constraints in Ethiopian Higher education institutions.

Furthermore, we have analyzed the documents in relation to the status of veterinary education in Ethiopia taking into consideration the core competences expected from day one graduating veterinarians. In the data collection we have identified the tools to measure quality of veterinary education which focus on the organization and administrative structure of veterinary schools in the public higher education institutions, curriculum and the process of curriculum development, quality of the admitted students looking the field of choice and capability, staff profile in relation to national and international standard, availability of laboratory facilities and their supplies with the trained technician, library and documentation capacity availability of textbooks, journals, the status of information technology facilities in relation to computer centre seats and connectivity status with accessibility to students, and also the availability of other teaching facilitation structures such as abattoir, clinic, teaching animal hospital, and livestock farms.

Finally, the future of veterinary Education, the challenge ahead and the way forward have been suggested and brought for discussion.

Why Quality assurance in Higher Education?

- To assist institutions in enhancing the quality of their provision
- To promote public confidence, at home and overseas
- To generate reliable public information that is helpful to stakeholders
- To ensure that there is clarity and transparency about the purposes of programs and awards
- To provide a measure of accountability for the resource provided from the Public Money

Quality of Education

Quality of Education is context bound. During evaluation we have to consider:
Quality is in the eyes of the beholder. Therefore, there are many beholders who will give their own interpretation of quality when it comes to HEIs.

**The Concept of Quality**

HE Quality defined as:

- **Transformative**: the development and capacity of individual learners for personal enrichment. The ability to empower and enable the learners through the various activities.
- **Fitness for purpose**: the core activities will be seen in relation to the vision and mission of the University and how well the colleges/faculties and their academic programs are aligned to the vision of the University.
- **Value for money**: also the effectiveness and efficiency of provision will depend on the quality and relevance of the education and training judged in relation to the full range of higher education purposes.
- **Fitness of purpose** is conformance to requirements.

**Driving force for Quality**

- To produce global graduates
- To develop the economy
- To prove that we have fitness of purpose
- To put a mechanism to be fit for purpose

**Quality in Higher Education Includes:**

- program quality, (Curriculum)
- instructional facilities quality and
- instructor quality

- In turn, these elements will influence student quality and ensure that graduates are effective in their future careers.
- Ensuring high quality at all level is imperative to the success of the institution and to the graduates.

**Constraints of Quality Assurance in Ethiopian Higher Education Institutions**

- The need to increase student participation in HE (Miss much)
• Inadequate and depleted infrastructure and shortage of facilities, libraries and learning equipment
• Poorly paid, demotivated, and not well qualified academic workforce
• Underprepared student, (for language of instruction and forced to the field of not their choice) leads to poor throughput rates, low success rate
• Graduates demand by employers (Employers are not involved in curriculum development)
• HEIs are dependent on state funding, therefore, no Autonomy (we have to accept the direction of MoE)

Veterinary Education

Veterinary training program and curriculum need constant review and adaptation to keep abreast of trends in both national and international developments and requirements. Currently quality standards and controls for veterinary studies are not established in Ethiopia. We don't have any type of veterinary council or oversight body to establish such standards or the essential evaluation and credentialing procedures. In order to meet Ethiopia's needs for both a reliable and high-quality veterinary education and a trustworthy animal disease surveillance mechanism, it is important that veterinary education in Ethiopia should be revisited.

Core Competencies Expected from Day One Graduating Veterinarians

• Multispecies knowledge and clinical competency on diagnostic, therapeutic and control of diseases
• Knowledge of prevention and control of zoonotic diseases,
• Have Knowledge of:
  – Epidemiology
  – Transboundary animal diseases
  – Emerging and re-emerging diseases
  – Disease prevention and control programs
  – Food hygiene
  – Veterinary products
  – Animal welfare
  – Veterinary legislation and ethics
  – General certification procedures and also have: Communication, collaboration and management skills
Scenario of Veterinary Training in Ethiopia

Until 2002, it was only Addis Ababa University run the program and graduating 20-30 veterinarians yearly. The establishment of additional veterinary schools in other Universities of the country at that time was therefore justifiable considering the needs. Today, there are 11 public veterinary training institutions in the country and there are still more coming in. The rate at which the new veterinary schools are established, the high rate of enrolment, the low level of academic staff profile and the poor facilities in the new schools become a concern to the professionals. However, these institutions have been striving hard to improve their staff profile and also laboratory and other facilities with the unreserved support of the Federal Government of Ethiopia. There is a wide spread fear that the quality of veterinary education is going down and the number of graduates every year is saturating the job market (Kelay, 2011).

Tools Used to Measure Quality of Veterinary Education

- Organization and administrative structure
- Curriculum
- Quality of admitted students
- Staff profile
- Laboratory facilities
- Library and IC facilities
- Teaching abattoir, veterinary clinic, livestock farm

Veterinary Education Quality Status in Ethiopia

Organization and Administrative Structure

The veterinary schools in Ethiopia have different levels of structural organization and administrative autonomy. Some are at school level; some are at college level while others are at department level. Except AAU all the other veterinary schools in the country don’t have a separate budget for most of their activities. If veterinary schools do not have a separate and adequate budget to run their academic, research and development activities, it is obvious that they are under the jurisdiction of officers from other disciplines. This is not in line with the recommendations of WVA (1998).
Curriculum

The curriculum used by all the veterinary schools in Ethiopia is prepared in a harmonized manner under the directives of the Federal Ministry of Education. The curricula in these veterinary schools are thus basically the same except few peculiarities related to their comparative advantages. The course content of the harmonized curriculum is in accordance with the ones recommended by WVA (1998). The credit hours allotted for practical classes including laboratory hours, clinical practices and field experience clinical, laboratory, abattoir and farm management practices varies from 30-35% which is below the recommended value 45% by WVA (1998), Halliwell (2004).

Table 1. Academic programs in the Universities

<table>
<thead>
<tr>
<th>Universities</th>
<th>Type of program offering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addis Ababa University</td>
<td>DVM, MSC, Ph.D., BSc</td>
</tr>
<tr>
<td>University of Gondar</td>
<td>DVM, MSc</td>
</tr>
<tr>
<td>Hawassa University</td>
<td>DVM</td>
</tr>
<tr>
<td>Mekelle University</td>
<td>DVM, MSC, BVSc</td>
</tr>
<tr>
<td>Haramaya University</td>
<td>DVM, MSc, BVSc</td>
</tr>
<tr>
<td>Jimma University</td>
<td>DVM, MVSc, BSc AH</td>
</tr>
<tr>
<td>Wellega University</td>
<td>DVM, BSc</td>
</tr>
<tr>
<td>Jigjiga University</td>
<td>DVM</td>
</tr>
<tr>
<td>Wollo University</td>
<td>DVM</td>
</tr>
<tr>
<td>Samara University</td>
<td>DVM</td>
</tr>
<tr>
<td>Wolaita-Sodo University</td>
<td>DVM</td>
</tr>
</tbody>
</table>

Quality of Admitted Students

The relative quality of students admitted currently to veterinary education as measured by the preparatory school leaving examination score is not poor but lower than students admitted to medicine, which used to be comparable to veterinary medicine. As shown in EVA assessment report students joined veterinary education as their first choice (18.2%), second choice (28.6%), third choice (24.6%) and fourth or more choice (28.6%). However, almost all the students admitted that veterinary medicine are interested and likeable to science (90.5%) irrespective of their choice for the field (Kelay, 2011).
**Staff profile**

The staff profile of the veterinary schools satisfies the national standard in terms of total number (Staff: student ratio) but not the requirement for staff with terminal degree. All veterinary schools assessed do not fulfil the national standard for the proportion of staff with Ph.D. (30%) set by HERQA (2008). The staff profile of the veterinary schools is not in accordance with international standards set for total number of staff and staff profile in terms of academic rank and qualifications.

**Table 2: Staff Profile of Universities**

<table>
<thead>
<tr>
<th>Universities</th>
<th>Qualification and number of teaching staff</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dip</td>
</tr>
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<td>Addis Ababa</td>
<td>10</td>
</tr>
<tr>
<td>Gondar</td>
<td>2</td>
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<tr>
<td>Hawassa</td>
<td></td>
</tr>
<tr>
<td>Mekelle</td>
<td>10</td>
</tr>
<tr>
<td>Haramaya</td>
<td>1</td>
</tr>
<tr>
<td>Jimma</td>
<td>2</td>
</tr>
<tr>
<td>Wollega</td>
<td>2</td>
</tr>
<tr>
<td>Jigjiga</td>
<td>4</td>
</tr>
<tr>
<td>Samara</td>
<td>4*</td>
</tr>
</tbody>
</table>

*study leave

**Laboratory Facilities**

The fact that veterinary schools in Ethiopia managed to establish modest laboratory facilities within a short period of time is admirable. According to EVA and our assessment all the veterinary schools assessed have basic laboratory facilities but their function is highly limited by lack of accessory equipments, lack of technical expertise to install and run the machines and/or also difficulties to get regular supply of laboratory consumables. The availability of adequate and up-to-date laboratory facilities (infrastructure, equipments, instruments and supplies) is set as important requirement to run an efficient veterinary education by WVA (1998).
Table 3: Status of laboratory facilities in the Universities

<table>
<thead>
<tr>
<th>Universities</th>
<th>Anatomy</th>
<th>Histology</th>
<th>Physiology &amp; Biochemistry</th>
<th>Parasitology</th>
<th>Pathology</th>
<th>Clinical Pathology</th>
<th>Microbiology</th>
<th>Vet Public health</th>
<th>Pharmacology</th>
<th>Molecular Biology</th>
<th>Animal Nutrition</th>
<th>Multipurpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addis Ababa</td>
<td>Adequate</td>
<td>NA</td>
<td>AV</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Gondar</td>
<td>Adequate</td>
<td>Not available (NA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mekelle</td>
<td>Available (AV)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haramaya</td>
<td>Adequate</td>
<td>Not available</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jimma</td>
<td>Available</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Welega</td>
<td>Available</td>
<td>NA</td>
<td>AV</td>
<td>Not available</td>
<td></td>
<td>AV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jigjiga</td>
<td>Available</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Samara</td>
<td>Not available</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Library**

The library facility of veterinary schools in Ethiopia is reported to be adequate in terms of space and reading materials by majority of Universities. Some schools are constrained either by space or availability of reading materials or both. The adequacy of the library service in assessed veterinary schools is judged as inadequate by over 66% of the staff interviewed. Library materials allow students and staff to make them updated with current knowledge and technological advancements on veterinary medicine practice (Kelay, 2011).

**ICT Facilities**

Students and staff must have access to internet and adequate computer hardware, information technology support services, software and electronic media, to support the educational program. The availability of electronic reading materials is inadequate in most of the veterinary schools while the internet facilities are modestly adequate.
Table 4: Universities’ Library and ICT facilities

<table>
<thead>
<tr>
<th>Universities</th>
<th>Library seats</th>
<th>Text books</th>
<th>Reference books</th>
<th>Periodicals</th>
<th>Internet</th>
<th>Computer</th>
<th>Room seats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addis Ababa</td>
<td>Available but not adequate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gondar</td>
<td>Available but not adequate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hawassa</td>
<td>Available but not adequate</td>
<td></td>
<td></td>
<td>Data not communicated adequate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mekele</td>
<td>Available but not adequate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jimma</td>
<td>Available but not adequate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wollega</td>
<td>Available but not adequate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haremaya</td>
<td>Available but not adequate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jigjiga</td>
<td>Available but not adequate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Samara</td>
<td>Available but not adequate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Teaching Abattoir, Veterinary Clinic, Livestock Farm

The veterinary schools in Addis Ababa, Gondar, Jimma, Jijiga and Mekelle Universities have their own teaching veterinary clinics all others depend on public veterinary clinics in their surroundings. All assessed veterinary schools do not have teaching abattoir and to use municipality abattoirs have limited transportation facility. Except Jijiga and Samara Universities all other have teaching animal farms of different level and species.

Table 5: Veterinary clinic, Abattoirs, Farms and Laboratory animal facilities

<table>
<thead>
<tr>
<th>Universities</th>
<th>Vet. clinic</th>
<th>Supplies in the clinic</th>
<th>Abattoirs</th>
<th>Farms</th>
<th>Lab. Animal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addis Ababa</td>
<td>AV</td>
<td>AV</td>
<td>AV</td>
<td>Dairy, Fattening</td>
<td>NA</td>
</tr>
<tr>
<td>Gondar</td>
<td>AV</td>
<td>AV</td>
<td>NA</td>
<td>Dairy, Poultry, Apiary</td>
<td>AD</td>
</tr>
<tr>
<td>Hawassa</td>
<td>NA</td>
<td>Not adequate</td>
<td>AV</td>
<td>AV (not specified )</td>
<td>NA</td>
</tr>
<tr>
<td>Mekelle</td>
<td>AV</td>
<td>AD</td>
<td>AV</td>
<td>Dairy and fattening</td>
<td>AD</td>
</tr>
<tr>
<td>Haramaya</td>
<td>Not adequate</td>
<td>Not adequate</td>
<td>Not adequate</td>
<td>Dairy, poultry, fattening</td>
<td>NA</td>
</tr>
<tr>
<td>Jimma</td>
<td>AV</td>
<td>Not adequate</td>
<td>NA</td>
<td>Dairy, Poultry, Swine, Beef, Apiary and Fish pond</td>
<td>AD</td>
</tr>
<tr>
<td>Wollega</td>
<td>NA</td>
<td>NA</td>
<td>AV</td>
<td>Dairy, Ranch</td>
<td>NA</td>
</tr>
<tr>
<td>Jigjiga</td>
<td>AV</td>
<td>AV</td>
<td>AV</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Samara</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>
Future of Veterinary Education

Veterinary medicine is known as one of the most fulfilling, interesting, and challenging professions and it offers exciting and broad career choices to those entering the profession. However, in our country veterinary education and the profession at large face important challenges and opportunities that are increasing at an accelerated pace. Many agree that veterinary education and the profession urgently need to respond to this changing landscape in order to ensure that graduates can continue to meet societies and personal needs. The prevailing shortage of qualified human resource and facilities in the educational institutions pose serious threat on the quality of professionals produced.

The Way Forward

The curriculum should enable graduates acquire adequate theoretical knowledge and practical skills and hence graduates would be confident to practice their profession in the public and private sectors. Therefore, the curricula of veterinary education should be revised in such a way that more time is allocated for practical classes in general and clinical experience in particular. There is a need to strengthen veterinary education by developing and implementing a comprehensive staff development program and strengthening the laboratory, library, clinics, abattoir, livestock farm and transportation facilities of the veterinary schools. The current number of veterinary schools should be adjusted in accordance with the strategic need the country for veterinarians and also the annual enrolment rate of the schools. We have to promote the intensification of the livestock production system and privatization of veterinary services in Ethiopia that is crucial in increasing the need for veterinarians. Influencing policy and decision makers through establishment of a veterinary statutory body is also an important step in promoting the quality of veterinary education and professional services in Ethiopia.

Take home message

"This is the time where the boat of Veterinary Education in Ethiopia must not only be rocked it must be either changing the direction or overturned altogether".

References

Kelay Belihu, 2011 Assessment of the Quality of Veterinary Education and Career Opportunities for Veterinarians in Ethiopia EVA proceeding
Current Supply and Demand of Animal Health Professionals in Ethiopia

Dr. Wassie Molla, Dr. Tamiru Berhanu and Dr. Legesse Garedew
(Faculty of Veterinary Medicine, University of Gondar)

Abstract

A survey on the demand and supply of animal health professionals was conducted in all regional states and city administration of Ethiopia with the objectives to show the magnitude of animal health professionals supply, indicate the demand and employment opportunity of animal health professionals in the country. The data was collected from all regional Agriculture Bureau and Livestock Agencies through interview, questionnaire, and focus group discussions. The study also used secondary data available in the database of concerned institutions. The data collected showed that the existence of more than 9203 animal health personnel currently working in different parts of the country under public and private veterinary services and animal health research. Of this, 9.31% are veterinarians and 90.69% veterinary paraprofessionals. However, the veterinarians currently working in the field is about 464 and is not sufficient to deliver animal health services properly to the huge livestock population exist in the country (1: 107716). The number of veterinary schools has grown from only one until 2003 to 11 in 2012 and at the same time the number of graduates is increasing alarmingly. The total number of veterinarians graduated from veterinary schools until 2012 is 2590, but the larger portion (1926) is graduated from the year 2008-2012. Generally, on average 385 veterinarians are graduated annually from veterinary schools of the country. The survey also indicated the existence of a total of 6316 (1359 veterinarians, 391 BVSc/BSC, 3047 diploma/level and 1519 unspecified) unmet needs for animal health professionals, however, on the other hand only about 63% of veterinarians graduated from year 2008 - 2012 are employed in their profession. Based on the survey findings, we can conclude that in Ethiopia there is surplus skilled animal health professionals particularly veterinarians but there are unmet needs for animal health professionals due to various reasons. Therefore, it is crucial to match the demand and supply of veterinary and veterinary paraprofessionals in the country.

Key words: Animal Health Professionals, Demand, Employment, Supply, Veterinary Schools, Veterinary Paraprofessionals
1. INTRODUCTION

Ethiopia owns huge livestock resources in Africa. Livestock perform multiple functions in the social and economic life of majority of Ethiopians by providing food, raw material for industry, cash income, fuel, input for crop production and soil fertility management, social functions, and employment. Livestock directly contributes to the livelihoods of more than 70% of Ethiopians. Generally, livestock accounts for 15-17% of total GDP and 35-49% of agricultural GDP (EATA, 2013).

Although Ethiopia is endowed with the large livestock resources, the sector does not perform well in terms of generating sufficient wealth commensurate to the potential this is mainly attributed to the presence of widespread animal diseases, feed shortage and lack of proper veterinary services in the country.

The development and growth of the livestock sector depends on the presence of relevant animal health structure, delivery system, and animal health professional training and development strategies that can drive the sector towards a modern, commercial and high output system. The presence of good veterinary services delivery strategies that complies with global standards and norms is crucial. Good veterinary services is a point by far relevant to Ethiopian context where the government has planned to raise billions of hard currency from the export of live animals, meat and leather products that often suffer from substandard quality profiles.

In Ethiopia although the demand for veterinary care in food-animal practice is generally increasing, primary veterinary services are still at its infant stage in rural areas where widely dispersed population is found. The very few numbers of field veterinarians has left a gap in animal care and raises concerns about the level of animal disease surveillance in the field, which is critical to the prompt detection of outbreaks with potentially massive economic consequences.

Thus to put Ethiopia at the safest side and protects its global interests, staffing the Veterinary Services of the country with adequate number and well qualified animal health professionals is mandatory. Inline to this the government of Ethiopia has employed some 800 professionals, of whom more than 660 are veterinarians with varied specialization and 7156 veterinary para-professionals. More than 2600 community-based animal health workers also deliver animal health services, particularly in pastoralist areas where public and private services are weak (APHRD, 2012). The government also opened several veterinary schools and technical and vocational education and training (TVET) colleges in the country to fulfil the demand of animal health professionals. Besides various nongovernmental organizations has also trained a huge
number of community animal health workers in different parts of the country to meet the demand of animal health services by assuming that there is a shortage of trained manpower. On the other hand, however, there are a good numbers of veterinary graduates who didn’t yet start work.

The current return on investment for veterinary education is unsustainable and the cost of veterinary education is at a crisis point. The profession may be at risk for lowering the quality of applicants to the profession and the quality of veterinary education. The veterinary profession has been slow to respond to these challenges. The financial reward for the investment of 6 years for a student to obtain a professional veterinary degree is also not attractive.

Thus it is essential to analyze the present veterinary education and the job market to facilitate manpower planning and strategies to ensure the provision of veterinary education appropriate to the needs of the country in order to enhance the livestock development and then achieve the livestock sector growth and transformation plan. Therefore, the objectives of this paper are to show the magnitude of animal health professionals supply, indicate the demand and employment opportunity of animal health professionals in the country.

2. Methods of Assessment

2.1. Study Area

The study was conducted in all regions of the country. The data was collected from Agriculture Bureau and Livestock Agencies and other concerned offices of Tigray, Amhara, Afar, Oromia, Somalia, Benshangul Gumuz, Gambella, SNNP and Harari regional states, and Diredawa and Addis Ababa city administrations. Data was also collected from Mekele, Gondar, Wollo, Samara, Addis Ababa, Wolega, Jimma, Hawassa, Haramaya and Jigjiga Universities.

2.2. Data Collection

Data was collected from all regional Agriculture Bureaus and Livestock Agencies through interview, questionnaire, and focus group discussions. The study also used secondary data available in the database of concerned institutions. All most all public Veterinary Colleges/Faculties/Schools were involved in collecting the required information from their assigned regional states and City Administrations Agriculture Bureaus or Livestock Agencies (Table 1), public and private animal health training institutions and other relevant offices.
Table 1: Tasks distribution among veterinary schools for regional data collection on animal health professionals

<table>
<thead>
<tr>
<th>S/No</th>
<th>Institution</th>
<th>Region covered</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>College of veterinary medicine, Mekele University</td>
<td>Tigray region</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Faculty of veterinary Medicine, Samara university</td>
<td>Afar Region</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Faculty of veterinary medicine, University of Gondar</td>
<td>Amhara Region</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>School of veterinary medicine, Wollo University</td>
<td>Amhara Region</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>College of veterinary medicine and agriculture, Addis Ababa University</td>
<td>Addis Ababa and Oromia regions</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>School of veterinary Medicine, Wolega University</td>
<td>Benishangul Gumuz region</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>School of veterinary Medicine, Jimma University</td>
<td>Gambella Region</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>School of Veterinary Medicine, Hawassa University</td>
<td>SNNP Region</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>School of Veterinary Medicine, Wolaita-Sodo University</td>
<td>SNNP Region</td>
<td>Not participated</td>
</tr>
<tr>
<td>10</td>
<td>College of Veterinary Medicine, Haramaya University</td>
<td>Harare Region and Dire Dawa City Admin.</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>College of Veterinary Medicine, Jigjiga University</td>
<td>Somali Region</td>
<td></td>
</tr>
</tbody>
</table>

The data collected includes number of animal health students requested, enrolled and graduated per year, number of animal health professionals actively practicing the profession, demand of animal health professionals, list of potential veterinarian employment areas and associated constraints.

2.3. Data analysis

The collected data were first entered to MS excel and then summarized using descriptive statistics such as tables, graphs and percents.

3. Findings and Interpretations

3.1. Animal Health Man Power Supply of the Country

In Ethiopia the Federal Veterinary Service has the responsibility for control and prevention of trans-boundary and trade sensitive diseases, while the regional veterinary services have obligations for the implementation of activities that are planned and budgeted by the Federal department. The Government field service is based upon a system of district veterinary clinics.
and increasingly supported by satellite animal health posts. Like Federal Veterinary Services, the regional veterinary services are responsible for both animal and veterinary public health activities (Ministry of Agriculture and Rural Development, 2006).

For ensuring better animal health, food safety, and emergency response to animal health threats and for enhancing animal and animal products foreign trade, staffing the Veterinary Services of the country with adequate number and well qualified animal health professionals is essential. Based on this the regional and Federal government of Ethiopia employed various animal health professionals.

3.1.1. The Existing Animal Health Personnel

There are more than 9203 animal health personnel currently working in different parts of the country under public and private veterinary services and animal health research. Of the total animal health professionals working at the veterinary services, 9.31% are veterinarians and 90.69 % veterinary paraprofessionals involved at different capacities all over the country (Table 1). There are also more than 325 (269 veterinarians and 56 Veterinary paraprofessionals) working in public universities. Manpower status of the country is dynamic and on constant increase. Activities of animal health staff are mainly based in the field for clinical and ambulatory services, but veterinary laboratories and public health services (inspection and quarantine) also engaged many veterinary professionals and paraprofessionals. Animal health staff is also based at Federal and Regional Offices to provide regulatory, technical and management services. However, the veterinarians currently working in the field is about 464 and is not sufficient to deliver animal health services properly to the huge livestock population (49,980,000 TLU) exist in the country. The veterinarian to livestock population ratio is 1:107716.

Field veterinary staffing at district and sub-district levels is variable. A quick calculation across regions indicate that approximately 50-60% of the districts (more than 550 districts in the country) have at least one qualified veterinarian working in the district animal health clinic. However, this represents only a small proportion of all field staff as district field services are also provided by a team of Animal Health Assistants who may work independently from the clinic in separate Animal Health Posts (Amanfu et al., 2011).

Along with the public sector there is a small but a growing private sector animal health services delivery in the country. Currently there are more than 132 (42 veterinarians and 90 para-veterinarians) private practitioners involved in clinical, and drug import and retail services.
Table 2: Existing animal health professionals actively practicing the profession in the country

| Region         | Poor | MSc/ MVSc | DVM | BSc/ BVSc in animal health | Bachelor in Vet. Lab. Technology | Diploma Level 4 | Level 3 | Level 2 | Level 1 | Others (store keeper) | Total |
|----------------|------|-----------|-----|---------------------------|---------------------------------|-----------------|--------|--------|--------|--------|----------------------|-------|
| Federal        | 3    | 30        | 1   | 16                        | 40                              |                 |        |        |        |                    | 90    |
| Tigray         | 17   | 39        |     |                           | 159                             |                 |        |        |        |                    | 215   |
| Afar           | 1    | 30        |     |                           | 97                              |                 |        |        |        |                    | 391   |
| Amhara         | 15   | 199       | 404 |                           | 1241                            | 106              |        |        |        |                    | 1981  |
| Oromia         | 1    | 6         | 240 |                           | 99                              | 2363             |        |        |        |                    | 2718  |
| SNNP           | 1    | 5         | 247 |                           | 24                              | 1394             |        |        |        |                    | 1653  |
| Somali         | 1    | 5         | 34  |                           | 280                             | 769              |        |        |        |                    | 1091  |
| Benishangul    | 2    | 9         | 35  |                           | 169                             | 13               |        |        |        |                    | 200   |
| Gambella       | 1    | 3         | 4   |                           | 8                               | 5                | 3      | 2      |        |                    | 24    |
| Harari         | 2    | 2         | 2   |                           | 30                              | 30               |        |        |        |                    | 30    |
| Dr. edawa      | 2    | 4         | 12  |                           | 53                              | 14               |        |        |        |                    | 142   |
| Addis Ababa    | 2    | 4         | 7   |                           | 21                              | 5                |        |        |        |                    | 114   |
| Total          | 5    | 80        | 772 |                           | 639                             | 5003             | 1399   | 1191   |        |                    | 9203  |

| Proportion in % | 0.05 | 0.87 | 8.39 | 6.94 | 54.16 | 15.20 | 12.94 | 1.24 | 100 |

*DVM holders employed at technical assistant post

3.1.2. Animal Health Manpower Training of the Country

A tertiary level education in animal health was started in Ethiopia in 1963 when the Institute of Animal Health Assistants established at Debre Zeit. Later on the Faculty of Veterinary Medicine of Addis Ababa University was established in 1979 at Debre Zeit. Until the foundation of the Faculty of Veterinary Medicine in Addis Ababa University, veterinary students had to study in foreign countries. In 1989, the Institute of Animal Health Assistants was integrated into Faculty of Veterinary Medicine, Addis Ababa University. Faculty of Veterinary Medicine of Addis Ababa University remained to be the only veterinary educational institute training veterinarians until 2002. Within this period the faculty has been graduating 20-30 veterinarians yearly for about 18 years, which couldn’t satisfy the country’s need for qualified veterinarians (Belihu, 2011). The establishment of additional veterinary schools in different Universities was therefore justifiable. The number of veterinary schools has grown from only one until 2003 to 11 in 2012 and there is still an interest to open in other universities. Besides, there are so many public and private technical colleges that trained veterinary paraprofessionals at different levels.

Regarding to placement of students, the Ethiopian public Universities are not yet practicing selection and enrolment of their students but Ministry of Education (MoE) place the students to the different Universities using certain set criteria. Some time, however, many students, which are beyond the request of the universities, may be assigned to the University. If we see the request and enrolment data of eight public Universities in the year 2008-2012 (Table 3), 32%
Excess students to the University needs were placed (Fig 1). This shows that the presence of pressures on the side of MoE to the Universities to accept more students. This has its own drawback on the quality of education, job opportunity and employability of graduates.

In the last few years, the numbers of veterinary graduates are increasing alarmingly (Table 3) and the job markets are saturated. The total number of veterinarians graduated from veterinary schools in Ethiopia until 2012 is 2590, but the larger portion (1926) is graduated from the year 2008-2012. It is claimed that the number of graduates has been within the requirement range in 2010/11 but start to surpass the requirement as of 2011/12 (Belihu, 2011). However, the creation of new job opportunities is very sluggish. The livestock resource in the country claim to accommodate from 132 to 188 new graduates annually (Belihu, 2011) while on average about 385 new graduates are produced every year (Table 3).
Table 3: Animal health student Enrolment and Graduates of public universities since 2008-2012

<table>
<thead>
<tr>
<th>Institution</th>
<th>Program</th>
<th>Year</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>DVM</td>
<td>Requested</td>
<td>280</td>
<td>294</td>
<td>360</td>
<td>390</td>
<td>385</td>
<td>1709</td>
</tr>
<tr>
<td>Universities</td>
<td>Enrolled</td>
<td>614</td>
<td>585</td>
<td>723</td>
<td>685</td>
<td>588</td>
<td></td>
<td>3195</td>
</tr>
<tr>
<td></td>
<td>Graduated</td>
<td>390</td>
<td>321</td>
<td>345</td>
<td>386</td>
<td>484</td>
<td></td>
<td>1926</td>
</tr>
<tr>
<td>BSC/BVSc</td>
<td>Enrolled</td>
<td>225</td>
<td>293</td>
<td>296</td>
<td>509</td>
<td>164</td>
<td></td>
<td>1487</td>
</tr>
<tr>
<td></td>
<td>Graduated</td>
<td>35</td>
<td>41</td>
<td>38</td>
<td>62</td>
<td>57</td>
<td></td>
<td>233</td>
</tr>
<tr>
<td>MSc/MVSc</td>
<td>Enrolled</td>
<td>56</td>
<td>35</td>
<td>32</td>
<td>37</td>
<td>59</td>
<td></td>
<td>219</td>
</tr>
</tbody>
</table>

3.2. Demand of Animal Health Professionals in the Country

Since Ethiopia has huge number of livestock population the need of professionals’ engagement to enhance the health and productivity of livestock are inevitable. The supply and demand for animal health professional in the public sector will depend on the future government policies in animal health, public health, animal welfare and wildlife protection (Sugiura et al., 2008). The data collected from regional state agriculture bureaus and livestock agencies showed that there is a need of a total of 6316 (1359 veterinarians, 391 BVSc/BSc, 3047 diploma/level and 1519 unspecified) additional animal health professionals to fill the vacant post exists in the public animal health services sector (Table 4). The figure indicated the existence of unmet needs of animal health professionals particularly for veterinarian positions; however the problem is not due to workforce shortage but due to the precipitous decline in hiring of veterinary graduates in the past few years.
Currently, there is a problem of a boom in supply (that is, vets) and a decline in demand (namely, veterinary services) in the country. Due to this only about 63% of veterinarians graduated from year 2008 - 2012 are employed in their profession (Table 5). Now a days, it is common in Ethiopia to wait after graduation two to three years without job (Tefera, 2010). Even though there is evidence showing the need of veterinarians at the regions, zones and districts levels, for some unknown reasons there is precipitous decline in hiring of veterinary graduates and the position of veterinarians are occupied by veterinary paraprofessionals who had a different and low educational qualifications. Apart from this, in some regions (e.g. Amhara region) there is no a clear demarcation between DVM graduates and other veterinary paraprofessionals for posts in the public sector which in turn lead the saturation of vacant posts that assumed for DVM graduates.

The main employer s for the public sector, Ministry of Agriculture, teaching institutions, research institutions and NGOs are declined to employ veterinary graduates. Hence, the private

### Table 4: Demand of animal health professionals in the nation

<table>
<thead>
<tr>
<th>Region</th>
<th>Number and Qualification of Animal Health Professionals Working in the Region</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MSc/ MVSc</td>
<td>DVM</td>
</tr>
<tr>
<td>Tigray</td>
<td>176</td>
<td>9</td>
</tr>
<tr>
<td>Afar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amhara</td>
<td>1519</td>
<td></td>
</tr>
<tr>
<td>Oromia</td>
<td>284</td>
<td>145</td>
</tr>
<tr>
<td>SNNP</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Somali</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benshangul</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gambella</td>
<td></td>
<td>19</td>
</tr>
<tr>
<td>Harari</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Dr. edawa</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Addis Ababa</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>1327</td>
</tr>
<tr>
<td></td>
<td>1359</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1359</td>
<td></td>
</tr>
</tbody>
</table>

Currently, there is a problem of a boom in supply (that is, vets) and a decline in demand (namely, veterinary services) in the country. Due to this only about 63% of veterinarians graduated from year 2008 - 2012 are employed in their profession (Table 5). Now a days, it is common in Ethiopia to wait after graduation two to three years without job (Tefera, 2010). Even though there is evidence showing the need of veterinarians at the regions, zones and districts levels, for some unknown reasons there is precipitous decline in hiring of veterinary graduates and the position of veterinarians are occupied by veterinary paraprofessionals who had a different and low educational qualifications. Apart from this, in some regions (e.g. Amhara region) there is no a clear demarcation between DVM graduates and other veterinary paraprofessionals for posts in the public sector which in turn lead the saturation of vacant posts that assumed for DVM graduates.

The main employer s for the public sector, Ministry of Agriculture, teaching institutions, research institutions and NGOs are declined to employ veterinary graduates. Hence, the private
practice is the only remaining opportunity (Tefera, 2010). The demand for increased man power should be to address the needs rather than compete with existing veterinarians. There should be a balance between job market and graduate numbers. Training veterinarians is a costly business for both the government and the trainee students themselves. Furthermore, it shares a good proportion of the trainees’ productive life time (6 years). Most other health-related jobs require fewer years of education and offer higher salaries but not the case for veterinarians. Thus, it is essential to analyze the present veterinary education and the job market to facilitate manpower planning and strategies and for veterinary schools achieve educational goals. Therefore, a close collaboration between veterinary education establishments, National Veterinary Services and National Veterinary Statutory Bodies is encouraged in order to ensure the provision of veterinary education appropriate to the needs of the country.


<table>
<thead>
<tr>
<th>S. N</th>
<th>Year</th>
<th>University</th>
<th>Number of graduate</th>
<th>Employment status and employment area</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Public</td>
<td>Private</td>
</tr>
<tr>
<td>1</td>
<td>2008</td>
<td>Mekelle</td>
<td>57</td>
<td>45</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Haramaya</td>
<td>96</td>
<td>78</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>2009</td>
<td>Mekelle</td>
<td>74</td>
<td>25</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Haramaya</td>
<td>54</td>
<td>40</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>2010</td>
<td>Mekelle</td>
<td>60</td>
<td>15</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Haramaya</td>
<td>93</td>
<td>55</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>2011</td>
<td>Mekelle</td>
<td>45</td>
<td>17</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Haramaya</td>
<td>67</td>
<td>50</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gondar</td>
<td>69</td>
<td>23</td>
<td>28</td>
</tr>
<tr>
<td>Subtotal</td>
<td></td>
<td></td>
<td>181</td>
<td>122</td>
<td>7</td>
</tr>
<tr>
<td>%</td>
<td></td>
<td></td>
<td>67.40</td>
<td>3.87</td>
<td>26.52</td>
</tr>
<tr>
<td>5</td>
<td>2012</td>
<td>Mekelle</td>
<td>60</td>
<td>16</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Haramaya</td>
<td>96</td>
<td>37</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gondar</td>
<td>95</td>
<td>59</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nekemte</td>
<td>26</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wollo</td>
<td>45</td>
<td>21</td>
<td>7</td>
</tr>
<tr>
<td>Subtotal</td>
<td></td>
<td></td>
<td>322</td>
<td>197</td>
<td>14</td>
</tr>
<tr>
<td>%</td>
<td></td>
<td></td>
<td>61.18</td>
<td>4.35</td>
<td>20.5</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>937</td>
<td>592</td>
<td>42</td>
</tr>
<tr>
<td>%</td>
<td></td>
<td></td>
<td>63.18</td>
<td>4.48</td>
<td>18.36</td>
</tr>
</tbody>
</table>

2.3. Demand versus supply of animal health professionals in Ethiopia

Matching the supply of veterinarians to demand for veterinary expertise depends on the commitment of the profession to promote and develop diverse careers paths in veterinary medicine and on the efficient delivery of veterinary services (National Research Council, 2012).
It is good to produce competent animal health professionals to meet the demand of the nation and enhance the contribution of livestock to Ethiopian economy growth as stipulated in transformation and growth plan. However, we have noted the existence of unmet needs for veterinarian positions. Societal needs for veterinary expertise are substantial and growing, but the potential contributions of veterinary medicine are not realized because appropriate positions in relevant sectors are lacking. True personnel shortages occur when positions go unfilled, even as employers attempt to attract and employ qualified candidates. In contrast, a situation of unmet needs occur in settings where employers lack interest for varying reasons to fill the vacant post (National Research Council, 2012) which is the prevailing situation in Ethiopia. Therefore, in Ethiopia there is no shortage of skilled animal health personnel but there are unmet needs for animal health professionals. The current demand and supply status of animal health professional in Ethiopia is indicated in Table 6.

<table>
<thead>
<tr>
<th>S. No</th>
<th>Qualification</th>
<th>Available</th>
<th>The demand to fill the vacant post</th>
<th>Replacement with 3%</th>
<th>Unemployed</th>
<th>Produced per year</th>
<th>Years need to meet the demand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DVM and above</td>
<td>857</td>
<td>1359</td>
<td>26</td>
<td>37/100*1926=713</td>
<td>385</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>BVSc/BSc</td>
<td>639</td>
<td>391</td>
<td>19</td>
<td>211</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Diploma/level</td>
<td>7707</td>
<td>3047</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not specific (Mix-up)</td>
<td>0</td>
<td>1519</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>9203</td>
<td>6316</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Conclusions and Recommendations

In view of the importance of increasing world food supplies, and the growing global trade in foods of animal origin, the existence of strong animal health services system with competent veterinary manpower will put Ethiopia at the safest side and protects its global interests. Currently there are more than 9203 animal health personnel working in different parts of the country and on top of this a large number of animal health professionals produced every year by the public veterinary schools, and public and private technical and vocational education and training colleges. Though the employment rate of veterinarians (who graduated in year 2008-2012) in their profession is about 63%, there is still a total of 6316 (1359 veterinarians, 391 BVSc/BSc, 3047diploma/level and 1519 unspecified) unmet needs for animal health professionals in the country. This shows that in Ethiopia there is no shortage of skilled animal
health personnel but there are unmet needs for animal health professionals due to various reasons. Based on the above conclusions we forwarded the following recommendations.

- The Ministry of Agriculture, Ministry of Education (Veterinary Schools) and Ethiopian Veterinary Association should develop realistic strategies for demand and supply of animal health workforce.
- Veterinary Medical Organizations /Associations and the deans of veterinary colleges should work to increase the visibility, standing, and potential of the profession to address national and global food security.
- Veterinary statutory body should be established to regulate the standard of veterinary education and professional services in the country.
- Annual enrolment capacity of veterinary schools should be determined and notified.
- The Ministry of Education has to have a clear policy and firm stand on the enrolment of veterinary students and the establishment of new veterinary schools or veterinary related programs.
- The government should design a means to utilize a trained animal health professional properly.
- The government shall encourage privatization of veterinary services through provision of loans and creating enabling policy environs.
- The government should reconsider the number of veterinary schools and their enrolment rate.

Acknowledgements

We would like to acknowledge all veterinary schools and regional agriculture bureaus which participated in data collection and provision.

Reference

3. Belihu, K., (2011): Assessment of the quality of veterinary education and career opportunities for veterinarians in Ethiopia, a National survey of veterinary schools in Ethiopia commissioned by the Ethiopian Veterinary Association In: proceeding of the


Conclusion and the Way Forward

A two-day national symposium on “Enhancing Economic Growth through Livestock Development in Ethiopia” was organized by University of Gondar, Faculty of Veterinary Medicine on 7th and 8th June 2013 at Science Amba meeting Hall, Gondar. The symposium was sponsored by a number of international and national organizations. The symposium was attended by invited participants from the government ministries, parliament, universities, UN, NGOs, donor organizations and professional societies.

The general objective of the symposium was to assess opportunities, challenges and prospects of livestock production and professionals in Ethiopia in the era of transformation. The symposium looked in detail to the contribution of livestock to Ethiopia economy, and the past and present contribution of livestock to the livelihood of the society especially for smallholder livestock farmers. In addition, the role of animal health professionals in food security and safety, the demand and supply of animal health and science professionals, and the opportunities to the standard animal science and veterinary medicine practices were discussed.

The symposium was divided into three plenary sessions namely (1) The role of livestock for Ethiopian Economic Development, (2) Animal Health and its Multidirectional Contribution in Ethiopia and (3) Animal Health Professional Development in Ethiopia. For each session there was a plenary speech followed by presentations on relevant topics, which were used as discussion points.

Session I: The role of livestock for Ethiopian Economic Development was presented as plenary speech followed by three technical papers namely Contribution of Livestock to Ethiopian Economy, Budget allocated for animal health and economic return from livestock and Contribution of Poultry for Ethiopian Development.

Session II: Animal Health and its Multidirectional Contribution in Ethiopia was presented as plenary speech followed by technical papers on Animal Health Service in Ethiopia, Animal health privatization status and opportunity in Ethiopia and Constraints in Animal Health Service Delivery and Possible Improvement Alternatives Towards Privatization in North Gondar.

Session III: Animal Health Professional Development in Ethiopia, which was focusing on Animal health professional development in the country. Higher education in animal health was started with the establishment of the School for Animal Health Assistants in 1963, subsequent to an agreement reached between the UNDP-FAO and the Ministry of Agriculture of the Imperial
Ethiopian Government. The training of animal health assistants was oriented toward the recognition of livestock diseases by clinical and post-mortem examination, preserving and sending of materials to laboratories for further examination, implementation of treatment and controlling mechanisms of diseases, with particular emphasis on vaccination and improved animal husbandry, feeding and management. In 1979 Addis Ababa University established the Faculty of Veterinary Medicine at Debre Zeit. In 1996, the Faculty of Veterinary Medicine started its first graduate programme in Tropical Veterinary Epidemiology, in collaboration with the Free University of Berlin. Since 2003 additional ten veterinary faculties were established at Haramaya, Hawassa, Gondar, Jimma Mekelle, Jigjiga, Wollega, Wolaita Sodo, Wollo, and Samara Universities. Even though Ethiopia has a huge livestock resource the number of veterinary faculties is of great concern when considering the quality aspect of veterinary education.

The technical papers following the plenary speech were on Quality Veterinary Education in Ethiopia, Veterinary Manpower in Ethiopia: Could Surplus be a Point of Concern?, Veterinary and Animal health Graduates, Job Opportunities and Employability status in Ethiopia and Veterinary Service Opportunities and Challenges in Reference to Tigray Region and Future Trends of Veterinary Medicine.

The two major areas given due emphasis were veterinary services and education, and the paragraphs below briefly highlights the core elements of the discussion.

**Veterinary services:**

Huge livestock resource, globalisation (which makes the planet a smaller, more accessible, more interconnected and interdependent), recent revolution on livestock production and the counties geographic proximity to several countries to sell organic products are opportunities to livestock production and animal health service in the country that help to achieve the GTP.

Despite these opportunities, SPS compliance, lack of market oriented production system (quality, intensification, off-take rate, mortality, and informal trade), competitiveness, and poor coverage and quality of veterinary services are major constraints in the service.

As the solution, the public-private partnership arrangement can facilitate the veterinary services in a way that each sector does its own responsibility in a complementary fashion where the output of one complements the other and contribute to the animal health and production at large. In this way, the public sector concentrates on a limited range of public good core functions such
as primary regulation, policymaking, inspection and quarantine, disease surveillance and monitoring, and research and extension. By subcontracting defined public good activities to the private sector, the public veterinary service can reduce its workload enabling it to minimize staff levels and concentrate on core activities. Furthermore, can implement field programs in a more cost effective manner due to the greater flexibility and motivation of the private sector, and strengthen the public-private partnership and, by improving the financial viability of private practices, enhance the quality and coverage of veterinary services. Sub-contracting implementation of public good activities has several important advantages. For instance, the private sector could implement many of the contestable activities in a more cost-effective way due to its greater flexibility compared with the public sector. It would improve the financial viability of private veterinary practices and thereby contribute to creation of an enabling environment for privatization.

In addition to these, a salary which is compatible with the level of education, work load and risk, facilitate change in cost sharing arrangement, continuous professional development, standard operating procedures are necessary for qualified and motivated veterinary staff which is also a very important issue in improving veterinary service in the country.

Questions forwarded by participants

Q1. Are we saying that we have enough veterinarians or saying we need to take corrective measures and continue?
Q2. What is the relationship of this unemployment rate with lack of interest to work on remote areas?
Q3. How is One Health implemented?
Q4. Is that we do not have Standards or there are but not used?
Q5. Ethiopia is doing well on PVS but today’s presentation is in contrast. Why is the discrepancy?
Q6. What are the reasons for 27.5% unemployment rate of veterinarians?
Q7. What are the reasons for quality decline?
Q8. Why solution is so late to the problems on the profession?
Q9. How far the demand supply estimates of the presentations reflect the real situation?

Some reflections by the participants:

It was reflected that the discussion should go in a direction of policy, institution and individual based to make a useful conclusion and a way forward. It was mentioned that the problems of
unemployment are related to low operational budget and low salary is related to the problem in the career structure. The working structure amendment should be done at the district level. It was also reflected that all regions should have presented to share experience from each other. The Sector is deteriorating, but we need to increase GDP.

There are also two proclamations forwarded in the last 2 years. These need to be communicated to the various stakeholders including students. The livestock Agency in Oromia is working but in Amhara not working why? Why the situation is bad in Tigray? All these questions could have been answered if all regions have presented. It was also emphasized the frustration reflected in some of the presentations is so much but why without exploiting all the opportunities in the GTP?. Participants have also reflected that the veterinary professionals are not surplus rather mismanaged.

Feedbacks to the questions given by the presenters

Feedback to Q1

We are not saying close the faculties but quality is a major concern in considering global market as an option of employment.

Feedback to Q2

The lack of interest to work in remote areas is a generational effect. It was also mentioned that amendments should be done on the district level to make it a workable place as the situation on the ground affects the interest and the choice bias related to profession.

Feedback to Q3

One health is an approach that works to solve problems that need the involvement of different sectors. Through collaboration of the different professions lasting solutions can be forwarded to complex problems related to zoonoses, ecosystem and pandemics. For instance Trypanasmosis control in cattle has helped controlling sleeping sickness in humans. Brucellosis control in sheep in Mongolia has decreased the human infection as well.

Feedback to Q4 and Q7 and Q8

In a country like ours, we need custom made standards for a specific profession (For example for veterinary professionals). Qualification framework is not implemented for this field. Other factors for low quality are the district empowerment related as they prefer to hire low level
professionals with salary. In addition, when people are sceptical about their futurity they do not choose to enrol in the profession and has an impact on quality, as there will be quota based assignment rather than choice based. Furthermore, if we reduce the enrolment the capacity versus unemployment issue can be solved.

*Feedback to Q6*

For the current unemployment rate, it is the mismanagement, budget as well as attitude related issues. The agency is not working in Amhara region as it is still under the Regional Agricultural Bureau, so it is practicing little power to change situations.

*Feedback to Q9*

The presentations are representative as the information is gathered from all the regional as well as federal stakeholder institutions. In addition, the estimation is based on taking liberal ratio so it is believed it works. Regarding the surplus issue, the current situation is an apparent surplus whereas after three years we are going to have an absolute surplus.

**Veterinary education:** In order to achieve or maintain an appropriate educational profile of veterinary faculties in Ethiopia, it is important that a training need assessment for undergraduate education of veterinarians in relation to the requirements of veterinary services be undertaken. Such assessments, which should take into consideration the professional needs of veterinary services in the public as well as private sectors.

With the prevailing increase number of veterinary faculties in Ethiopia, setting minimum requirements for veterinary education is justifiable. Therefore, the establishment Veterinary Council of Ethiopia that facilitates the setting of minimum standard of veterinary education is highly required. If the veterinary education, research and service delivery is governed by a qualified and powerful body like the Veterinary Council, the veterinary institutes including education in the country will have a common understanding and joined effort to handle animal health problems. It will also have a positive impact on the quality of veterinary education as well as veterinary services delivery.

Considering the recent development on the upgrading of the livestock sector to State Ministry level, it is expected that the required attention will be given to the sector to address the livestock issues more than ever. To this end, the professionals both in the public and private sectors are required to delivery their profession with sound ethics and code of conduct. The gaps identified during the OIE PVS evaluation is considered as a way forward in the right direction and the
strategy document developed for the improvement of animal health services (2013 -15) addressing the gaps is expected to give a strong foundation to the new Livestock Resource Development Sector at a state minister level.

**Recommendations for the way forward**

- Unemployment in the profession will have a negative implication on the teaching and learning process solving this demands a concerted effort
- Establishment of a viable veterinary counsel
- MoE and MoA need to work jointly on human resource demand plan
- Quality curriculum design and review on skill knowledge attitude of graduates.
- Collaboration with HEI, EVA MoA, MoE and HERQA
- Make availability of Teaching and learning resources and facilities

**Comments from audience on the Veterinary Education panel discussion**

- External evaluation of major course and off campus training practiced in Gondar University should be taken as a good experience to be followed by others
- There are some policies at hand but not implemented so there is a need to work on the grass root level
- The duty confusion between the different professional levels such as DVM, BVSC, BSC, Diploma need to be clearly demarcated on the graduate profile and communicated to the civil service minister
- Practical sessions are not given in an adequate and accessible form, so should be corrected
- Off campus needs to be done on places with facilities
- Salary should match credit hours taken, the responsibility, remoteness of the area and work load
- Human resource development & Equipping the premises should be given due attention
- The enrolment rate of students per each faculty should be reduced
- New horizons for veterinarians to work should be indicated
- One health oriented educations should be implemented
- Staff incentive should be practiced to contribute to quality education
- On job training CPD organization for faculties
- Welfare should be indicated as one among the gaps
- Confusion between BSC and BVSc upgrading should be from AHA to DVM
- Need assessment should be conducted thoroughly prior to commencing a new program
- Regulation of number of faculties ,there are some in the pipeline, should be prohibited to do so
✓ Curriculum ratio between practical and theoretical session needs revisions
✓ Active learning method promotion
✓ Facilitation of bulk purchase for laboratory supplies and equipments must be seen as an option
✓ Recurrent follow up of the aforementioned issues by MOA, MOE and other concerned bodies
✓ Forum establishment including MoE, MoA, HERQA, EVA, whereas the parliament should do the follow up
✓ Commitment should be an issue of day to day activity both for student, staff as well as the government
✓ Strict control on curriculum development
✓ Quality should be internalized
✓ Each one of us need to do our homework

Comment from HERQA

✓ Finally, the HERQA delegate of MoE made a remark that MoE is keen to consider the comments. In addition, it was reflected to look into the works done by the government such as qualification examination for specific professions. The veterinary professional association should come up with the specificities of the different levels about quality of a graduate (E.g. Threshold, moderate, advanced). HERQA urges the establishment of quality assurance units in each university, many of them opened, and it is operational. The unit has to be strong to make either internal or external audits to assure quality of education.
Closing Remark

W/ro Workabeba Bahiru (Delegate from Ministry of Civil Service)
Your Excellency Dr. Gebregziabeher G/Yohannes, State Minister of Livestock Development Sector, Ministry of Agriculture
Your Excellency Ato Addisu Arega, Prime Minister Office Agriculture and Industry Sector State Minister.
Honourable Members of the Federal House of Representatives,
Invited Guests,
Dear Participant,

Ladies and Gentlemen,

It is a great pleasure for me to be here today to address such a distinguished audience on this momentous closing ceremony of the National Symposium on “Enhancing Economic Growth through Livestock Development in Ethiopia”. In the last two days, we have been discussing on many issues under the umbrella of the themes: The role of livestock for Ethiopian economy development, animal health and its multidirectional contribution and animal health professional development in Ethiopia. From the presentations and discussions, we understood the importance of livestock in social and economic life of majority of Ethiopians and its great potential to assist the economic development of the country. By virtue of the important role that the livestock sector plays in the economy of the country, formulation of development plan for the sector is vital. Cognizant of this the government has already set important targets in the livestock sector to be achieved at the end of the growth and transformation plan.

Distinguished guests
Ladies and gentle men
The government of the Federal Democratic Republic of Ethiopia tries its level of best to fulfil the necessary facilities, inputs and manpower to enhance the development of the livestock sector and exploit the benefits expected from this huge resource. However, from the symposium we have also learnt the existence of some problems related to animal health services, animal health professionals training and employment that influence the sector development negatively. If the different concerned parties work jointly, I hope these problems will be solved soon. However, here we have to be conscious and smart enough in coordinating our efforts and use the existing opportunity to enhance the livestock sector development.

In view of the importance of increasing world food supplies, and the growing global trade in foods of animal origin, the existence of strong animal health services system with competent veterinary manpower will put Ethiopia at the safest side and protects its global interests. The
concern showed by the participants on animal health professional development and animal health services of the country are very much crucial and deserves due attention by the concerned government bodies. Thus, there should be a balance between job market and graduate numbers in order to utilize the trained professionals properly. To be effective on this regard, therefore, there should be a close collaboration among veterinary education establishments, National Veterinary Services and other concerned bodies.

Distinguished guests
Ladies and gentle men
During the two days symposium, we have been lucky to listen to many important fresh and current statuses of the veterinary education and animal health services in Ethiopia. I believe the outcome of the symposium has enabled the participants to deliver the essential recommendations on the future direction of livestock sector development. I am confident that from the deliberations of the two days conference the government of Ethiopia will be willing to commit to do what is feasible and what it can. Finally, I would like to thank all who contributed for the success of this workshop and declare that the workshop is closed officially closed.

I thank you!