Overview of Animal Health Program Activities

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Background

The major activities of the Animal Health Program are: 1) efforts to decrease the incidence and severity of external parasite infestation in support of the hides/skins industry; 2) investigating causes of high lamb/kid mortality; 3) providing health leadership for imported sheep and goats during the quarantine period and at Nucleus and Breeding Evaluation and Distribution (BED) sites; and 4) supporting training activities.

External parasite control

Ectoparasite infestation is one of the most important health constraints in small ruminant production in Ethiopia, not only to skin/hide quality, but just as or more importantly in transmitting tick and insect borne diseases, limiting growth rate and often causing mortality. Until recently, Ethiopia’s second largest earner of foreign income was the hides and skins sector where small ruminants, and in particular sheep, were very important. However, the percentage of skins having defects that downgrade quality has increased tremendously. Tanneries state that currently only 10 to 15% of harvested skins qualify for top grades, with the rest downgraded. These percentages are the direct opposite to those seen 20 years ago. There are a number of factors that cause skin defects, but most important are those caused by ecto-parasites, which are mainly lice, keds and mange mites. Lice and keds cause an allergic condition known as cockle (ekek in Amharic) in sheep. Cockle is characterized by the formation of skin nodules, which form ulcers that leave scars. The scars form blemishes after tanning that do not readily accept dyes, with the resulting hide either downgraded or rejected after tanning.

Cockle defects are not easily noticeable while the animal is alive, because the blemishes are located on the dermis, which is the layer next to the hair and the epidermis. This makes it difficult for skin selectors to reject the affected unprocessed skins when buying raw materials.

Adequate knowledge of the necessary and cost-effective management strategies exist for mitigation of this production constraint. The Animal Health Program has undertaken training and establishment of private Spraying/Dipping Service Providers (SDSP) to control external parasites. The control method offers a long-term sustainable solution to this problem and an economically viable opportunity for many individuals.

Study on major causes of lamb/kid mortality

National estimates of livestock number for 2005 indicate that Ethiopia has 23.2 million sheep and 22.8 million goats. The major cause of direct economic losses and a significant cause of poor productivity in livestock is the widespread prevalence of a range of diseases and parasites in all agro-ecological zones of the country. The direct loss due to
mortality is generally estimated to be 14 to 16% of the national sheep flock and 11 to 13% of the national goat herd per annum. In some parts of the country mortality rates of lambs and kids are estimated to be over 60%. Reducing the mortality of lambs and kids will increase productivity of small ruminants and increase the income of smallholder farmers and pastoralists. Knowing the cause of lamb and kid mortality would lead to the development of appropriate extension messages for farmers and pastoralists and to the formulation of sound disease prevention and control strategies. Therefore, a research project is being conducted to monitor lamb/kid mortality, determine the causes of mortality and design appropriate prevention and control strategies.

**Provision of herd health leadership**
To enhance the genetic potential of sheep and goats in Ethiopia, the ESGPIP imported Boer goats and Dorper sheep from South Africa. The herd health program has supported these activities through work on the quarantine and testing procedures for the imported animals. These animals have since been assigned to four Nucleus breeding sites. In addition, there are Breeding, Evaluation and Distribution (BED) sites where crossbreeding takes place to produce animals for village distribution and sale. The herd health program of the ESGPIP oversees the herd health at all of these sites.

**Progress on Activities**

**External parasite control to improve quality of hides/skins**
The main thrust of this activity is to train individuals to be SDSP. These individuals are selected by the community and assigned the task of providing external parasite control service. To start the external parasite control activity, SDSP must purchase knapsack sprayers, protective gear and acaricides. To cover their expenses and for the service they provide, owners of small ruminants are charged a small fee. The ESGPIP is trying to link SDSP with Service Cooperatives so that they could be one source of acaricides. Currently, Service Cooperatives buy supplies in bulk and sell to their members with small profits. In the same way they can buy acaricides in bulk and sell to the SDSP. In addition to training, the ESGPIP provides some supplies such as mobile dipping vats, knapsack sprayers and initial acaricides and safety equipment to communities and trained SDSP. The dipping vats and knapsack sprayers, in the majority of cases, will belong to the Peasant Associations. Should the person selected to be trained as SDSP cease providing service, these items are returned to the Peasant Association.

The current external parasite control activity of the program focuses mainly in areas where the Nucleus and BED sites are located and where their crosses are planned to be distributed in order to reduce the risk of introduction of ectoparasites and tick-borne diseases to these animals.

A training curriculum for SDSP was prepared in consultation with appropriate institutions. In six training sessions, 105 individuals have been trained as SDSP and were provided with dipping vats/knapsack sprayers, chemicals and protective gears. The ESGPIP contracted a consultant to conduct a financial cost-benefit analysis of SDSP. Suggestions of methods to make the service sustainable were provided. The main
findings of the study are as indicated below. In Tigray, Amhara and Afar regions, the first phase campaign of Ectoparasite Control Program (EPCP) was planned to be completed by the end of 2008. Thereafter, the campaign is expected to be run by Farmer/Peasant Associations (FA/PA). The SDSP will provide their services as entrepreneurs. Provision of technical expertise and guidance is to be availed by woreda agriculture and rural development offices (WARDO). The SDSP are recruited from the interested farmers in the associations and work on a part-time basis to improve their livelihood and food security. At other times, the SDSP conduct agri-businesses similar to the rest of their fellow farmers or pastoralists. This approach delivers built-in capacity and enables smallholder farmers and pastoralists to perform EPCP on their own, through FA/PA. The action provides employment opportunity and sustainable flow of income to SDSP.

Since poor smallholder farmers and pastoralists cannot afford to fund the EPCP from the outset, a seed money (working capital) scheme should be established. The fund is suggested to be run by an executive committee drawn from FA/PA in each of the program study woredas. Each WARDO should ensure that the accounts of the FA/PA are audited annually. Moreover, internal finance and accounting control mechanisms plus procedures of Commercial Bank of Ethiopia (CBE) branch office in each woreda need to be observed in using the blocked account seed fund. The fund must be under the direct management of an executive committee of an FA/PA and it should be used only for EPCP of sheep and goats. SDSP are to be paid by farmers or pastoralists, who get services through their FA/PA.

Parasite infestation downgrades the quality of skins and is a threat to the Leather and Leather Products Industry (LLPI) (including rural cottage industries) of the country. It is highly recommended that beneficiaries from improved productivity of sheep and goats, such as traders, exporters of live sheep and goats and carcasses, LLPI, and the Government of Ethiopia (GoE), be the major contributors to the seed fund. It should be viewed from a public-private partnership viewpoint.

Technical and management sustainability of EPCP activities is developed by periodic capacity building of SDSP and the executive committee members of FA/PA through provisions of training and expertise support from each WARDO. The projects are financially feasible, with very high returns to household heads and family labor. Sustainability of EPCP and SDSP employment are reliable, provided that the seed fund is in place and used only for running EPCP appropriately. The capacity and livelihood of SDSP and entire members plus families of FA/PA is expected to improve, including food security.

A workshop was held to discuss the findings of the consultant on June 30, 2008, at the ESGPIP office. The workshop was attended by pertinent professionals from Tigray, Afar and Oromia regions, and from FINTRAC, COMESA, Ministry of Agriculture and Rural Development and the National Animal Health Diagnostic and Investigation Center. Participants appreciated efforts of the consultant and recommended that the service be used by the regions as one option to provide sustainable external parasite control services for farmers and pastoralists. The finalized report was distributed to Bureaus of
Agriculture and Rural Development of Tigray, Afar, Oromia, SNNPR, Amhara and Somali regions and to FINTRAC, COMESA, Animal and Plant Health Regulatory Department and the National Animal Health Diagnostic Center of Ministry of Agriculture the Rural Development.

Practical training on control of external parasites

Study of major causes of lamb mortality
The study of lamb mortality was commissioned in the Amhara and Tigray regions in July, 2008. In 2009, causes of kid mortality will be studied in the Oromia Region. For the lamb study in the Amhara region at Ebinat woreda, two PA, Jiman Dergha and Zeha were selected. In each PA, 30 farmers were selected. In the Tigray Region at the Wukro woreda, two PA; Negash and Gemad, were selected. The ESGPIP Health Program Officer and other animal health professionals of the regions met the selected farmers and held discussions on the objective of the study and what was expected from farmers, ESGPIP and regional animal health staff. Subsequently, selected farmers were interviewed to collect base line data.

For each selected PA, one enumerator was hired based on the following criteria; residence in the PA, completion of the 10th grade and acceptance by members of the PA. The enumerators were expected to collect data from the selected farmers’ sheep on birth, death, disease, entry of new sheep to the flock and exit of sheep from the flock. A memorandum of understanding describing the roles and responsibilities of each party was signed between the ESGPIP and Bahir Dar Laboratory of the Amhara Region and among ESGPIP and the Mekele Regional Animal Health Laboratory and Mekele University of the Tigray Region.

In the Amhara Region the monitoring activity started in July, 2008, and will run for one year. In Tigray, the monitoring activity was delayed because Mekele Regional Laboratory staff were busy with Business Process Reengineering. The enumerators
collect data from the selected farmers’ sheep every week and regional laboratory staff collect fecal and other samples every month. Information on the first three months of monitoring activity in the Amhara region is summarized as follows.

The first three months of monitoring revealed respiratory disease, diarrhea, sudden death, orf (contagious ecthyma) and sheep pox to be important health constraints. Parasitological examination indicated that most study animals were infected with strongyle groups of helminth parasites. Other internal parasites such as liver fluke (*Fasciola*), stomach fluke (*Paramphistoma*) and blood fluke (*Schistosoma*) were rarely detected. Moreover, faecal culture was made for species identification of infective larval stage of strongyle groups of parasites. *Bunostomum* and *Strongyloides* were found in abundance and *Haemonchus* and *Ostertagia* were rarely encountered during observation of the fecal cultures.

The mortality rate of adult sheep (above six months of age) was 2.4% and of young sheep (six months of age and younger) was 7.8%. Mortality occurred due to diarrhea and pneumonia, respectively.

**Animal health activities in the importation of Dorper sheep and Boer goats**

Following purchase of the animals in South Africa, the quarantine requirements of the Ethiopian Veterinary Department for the importation of sheep and goats were prepared and sent to the South African Veterinary Services. Furthermore, in-country quarantine requirements and biosecurity measures to be implemented at the quarantine facility were prepared which are listed below.

- Before the arrival of sheep and goats from South Africa, all necessary preparations such as drugs, veterinary equipment, chemicals and consumables that were to be used for the quarantine animals were completed.
- In consultation with the ESGPIP Health Program Officer, a veterinarian and two animal health assistants were assigned by the National Animal Health Diagnostic and Investigation Center to monitor health of the animals while at the quarantine center.
- Animal attendants were recruited based on experience in animal care and not owning any small ruminants. Selected individuals were given an orientation on all necessary precautionary and security measures to follow during the quarantine period. Vaccination and fecal and blood sampling dates were set.
- Dr. Lionel J. Dawson, a consulting veterinarian from Oklahoma State University, visited the quarantine station at Sebeta. Dr. Dawson inspected the facilities and made suggestions for changes. After arrival of the animals, he assisted in initial treatment of sick animals. Dr. Dawson also participated in vaccinating and collecting blood samples for brucellosis, bluetongue and Maedi-visna tests. He also provided training to ESGPIP and Nucleus site veterinarians on vaccination, deworming and preventive medicine for goats and sheep.
- The trucks assigned to bring the sheep and goats from Bole airport to the quarantine center were cleaned and disinfected before loading and after unloading of the sheep and goats.
• On the first day of arrival, three diarrheic and five severely coughing animals were treated. One female goat, which was very depressed, diarrheic and dehydrated upon arrival, died the following day.
• To clear any possible illnesses resulting from travel stress, all animals were treated with long-acting oxytetracycline on the second day following their arrival.
• All animals were vaccinated for anthrax, sheep pox, foot and mouth disease and peste des petits ruminants (PPR). In addition, goats were vaccinated against contagious caprine pleuropneumonia (CCPP).
• A recommendation to the program was made to vaccinate the sheep and goats for Clostridium CD &T to prevent enterotoxaemia and tetanus.
• To prevent animals from having a dry cough, it was recommended to pull up shades and leave doors open at night for better ventilation and prevention of respiratory diseases. Animals that were coughing had normal temperature and respiratory rates. By keeping the plastic shades rolled up and doors open, coughing was reduced.
• Slatted flooring was removed in the 3rd week because there were four fractured legs in both sheep and goats.
• All animals were treated for internal and external parasites using Ivermectin.
• Blood samples were collected from all sheep and goats for testing of Maedi-visna, bluetongue and brucellosis as set out by the Animal Health Department of the Ministry of Agriculture and Rural Development. The animals were treated with a broad spectrum antibiotic at the Sebeta Quarantine Center to prevent respiratory diseases one day before they were transported to Nucleus sites.

Animal health activities at the Nucleus and BED sites
The following health related activities were undertaken at each of the Nucleus and BED sites.
• Fecal samples were tested for internal parasites.
• Thirty-four lambs born at the Sebeta Quarantine Center were vaccinated against anthrax, PPR, sheep pox, anthrax and Pasteurellosis at Werer and Fafen Nucleus sites.
• It is known that the Werer and Adami Tulu sites are copper deficient. Therefore, imported and local goats at Adami Tulu and imported sheep at Werer were given copper supplements.
• Female sheep and goats purchased by BED sites for crossbreeding were given a broad spectrum antibiotic before being transported to their respective BED sites to prevent transport fever.
• Female goats and sheep were also treated with a broad spectrum antibiotic on the second day after arrival at the BED sites. They were also treated against external and internal parasites and vaccinated for anthrax, sheep pox, Pasteurellosis, and PPR at the BED sites. In addition the goats were vaccinated against CCPP.
• Animal health guidelines for Nucleus and BED sites were prepared and distributed.
**Training activities**
In partnership with the Farmer to Farmer Program, Professors Dwight D. Bowman and Janice L. Liotta from Cornell University visited Ethiopia in late May and early June, 2007, to give training on internal parasite management in small ruminants. Initial training activities focused on training animal health laboratory staff in laboratory diagnostic techniques. In the two weeks of training, 34 animal health workers from the National Animal Health Diagnostic and Investigation Center, regional laboratories and Nucleus sites took part.

Drs. Bowman and Liotta also presented other training courses on the diagnosis of helminths, arthropods, and protozoal infections of goats and sheep. The training focused on the diagnosis of parasitic infections, methods for assessing resistance within populations of nematode helminths, and methods for isolation and immunologic and molecular identification of species of *Giardia* and *Cryptosporidium* in samples. Training consisted of lectures followed by hands-on laboratories assisted by members of the National Animal Health Diagnostic and Investigation Center. Visits were made to three of the regional sites where the new Boer×local goats and Dorper×local sheep were to be housed prior to distribution to regional centers and, ultimately, Ethiopian farmers. The three sites visited were Adami Tulu Research Center, Hawasa University and Werer Agricultural Research Center. There were discussions on methods to protect drinking water from contamination with pathogens from animal manure, methods for treating and disinfecting drinking water to destroy or inactivate pathogens, and methods for immune-detection and molecular characterization of stages of parasites found in drinking water, soil, feces, and manure.

**Challenges/Problems Encountered**

**External parasite control**
The SDSP faced the following challenges.

- The currently used hard plastic dipping vats are heavy, break easily, are short-lived and have to be fixed in a trench for use.
- Dipping demands a large volume of water and shortages in available water supply cause problems when it has to be transported from a long distance. This is a particularly significant issue in pastoral areas.
- Though no previous experience has been observed, there are worries on the part of farmers/pastoralists that pregnant sheep and goats will abort during the process of dipping.
- Farmers and pastoralists fear the transfer of ectoparasites and other diseases from infected to healthy animals at dipping sites.
- There is a problem of acquiring drugs from an efficient and high quality source.

**Study on the major causes of lamb/kid mortality**

- The animal health staff of Mekele Regional Animal Health Laboratory has been busy with BPR, so they could not undertake the study as planned.
Animal health activities at Nucleus and BED sites
- Animal health service activities in woredas where Nucleus and BED sites are located are weak.
- Some vaccines such as enterotoxaemia and supplements like copper are not available in the country.
- There is lack of animal health staff at Sirinka, Abergelle and Areka BED sites.
- Other animals have access to Worer nucleus site.

Steps Taken to Solve Problems

External parasite control
- The provision of hard plastic vats has been terminated. Knapsack sprayers are being provided.
- An attempt is being made to link SDSP with private veterinarians for sustainable drug supply.

Study of major causes of lamb/kid mortality
- A discussion was made with the head of the Mekele Regional Animal Health Laboratory to avail some staff for the study, and this has been done.

Animal health activities at Nucleus and BED sites
- A discussion was started with the Animal and Plant Health Regulatory Department of the Federal Ministry of Agriculture and Rural Development to urge regions to give priority and strengthen animal health activities in woredas where the Nucleus and BED sites are located.
- Vaccine for enterotoxaemia and copper supplement were imported.
- At some BED sites where there is no animal health staff, the ESGPIP has written letters to the appropriate authorities requesting them to assign Animal Health Assistants. However, temporarily they are making use of Animal Health Assistants from neighboring institutes. The biosecurity concern at the Werer Nucleus site has now been solved by fencing the premises.

Thoughts on Sustainability

External parasite control
- To make the exercise sustainable, the community should participate in the selection of candidate farmers/pastoralists for SDSP training. There should be a clear understanding within the community about incentives for SDSP to keep working and proper pricing of drugs.
- There should be support, regular training and supervision of SDSP from the respective office of Agriculture and Rural Development.
- A sustainable drug supply by private veterinarians or government veterinary services should be ensured.
**Study of major causes of lamb/kid mortality**

- The regional animal health laboratories should undertake the study near the laboratory so that they can overcome the problem of transportation.
- It is advisable to use externship veterinary students to undertake the study so that cost could be reduced.

**Animal health activities at Nucleus and BED sites**

- Sheep and goats at Nucleus and BED sites should be regularly vaccinated against endemic diseases of the country.
- Animal health staff of Nucleus and BED sites should get regular information about the sheep and goat disease status of the woreda where Nucleus & BED sites are located.
- Nucleus and BED sites should maintain linkages with regional animal health laboratories and the National Animal Health Diagnostic and Investigation Center for laboratory diagnosis of diseases.