

# Assessment of Livestock Production Constraints and Technology Need Identification of Pastoral and Mixed Crop-Livestock Production System in Malle and Benatsemay Districts of South Omo Zone Southern Ethiopia

Bizuayehu Ayele\* Mekete Girma Tegegn Tesfaye/Dr./ Yidnekachewu Alemayehu  
Southern Agricultural Research Institute, Jinka Agricultural Research Center Livestock Research Process ,P. O.  
Box 96 Jinka, Ethiopia

## Abstract

The study was conducted in Malle and Benatsemay Districts of South Omo Zone with the objectives of assessing livestock production system constraints and appropriate technology need identifications through better understandings of the existing condition in specific agro-ecology for the study area. A total of 80 pastoral and agro pastorals were participated on key informants' group discussion 20 participants in each selected PAs. According to the key informants' discussion with in each group we had summarized the consensus ideas of the participants in group discussion. Despite of these there were some common and serious constraints on the aspects of livestock production system in each study Pas such as shortage of feed/due to high No of livestock and their trampling indigenous forage seed sources are lost/,Shortage of water animal diseases/long distance traveling for water and feed searching/, Storage and processing material problem for dairy products, Poor genetic makeup of the breed, high environmental temperature, poultry disease/bacterial, viral and parasitic, honey quality and productivity problem and toxic honey bee forages, seasonal price fluctuation, lack of market information and brokers problem and others constraints were identified during problem assessment study. According to discussion male house hold headed make decision in disposal of large and small animals but, all family members are responsible for disposal of their products.

**Keywords:** constraints, livestock, pastoral and agro-pastorals, South Omo

## Introduction

Livestock is an important economic sector in Ethiopia which contributes to economic development. Ethiopia holds the largest livestock population in Africa, estimated at about 55.0 million heads of cattle, 27.3 million sheep, and 28 million goats, 1.1 million camels, 51.3 million chicken, 1.96 million horses 6.95 million donkey and 0.36 million mules (CSA, 2014). Livestock contribute up to 20% to Ethiopian GDP and Lively hood of 60-70% of the population. However, the productivity of the livestock resources and the benefits obtained from the sector does not commensurate with the high livestock population. Dairy sector is a major contributor to economic development, especially among the developing countries.

Therefore it is imperative, identification of prevailing situation and understanding of the existing livestock production system constraints and opportunities for further research in the area and to devise appropriate development interventions. Therefore this study is initiated with objective of assess constraints and opportunities in livestock production systems; understand pastoral and agro pastorals indigenous technical knowledge, identifying users technology need, post-harvest handling and marketing system.

## Materials and Methodology

### General information of the study area

#### South Omo Zone

South Omo Zone is one of the 13 administrative zones found in SNNPRS which covers an area of 25530 km<sup>2</sup> and is located 4.43'-6.46' N and 35.79-36.06'E, and has a human population estimated 472977. The population density of the zone is 21 persons per km<sup>2</sup> it's bordering with Gamo Gofa Zone, Keffa Zone and Konta and Basketo special Woreda in north, Kenya in south, konso and Derashe special woredas in east and Sudan & bench magi Zone in west.

The Zone is divided into 8 woredas and 1 city administration. Generally the altitude of the zone ranges between 360 m.a.s.l and 3500 ma.s.l. The traditional agro-ecologies Dega,woina dega, kola and semi-arid cover 0.5, 5.1,60, and 34.4 percent respectively of the total area. Rainfall pattern in the area is both unimodal and bimodal. The mean annual rainfaill ranges between 400 and 1600 mm. the mean annual temperature ranges between 10.1 and >27.5oc.

The zone has a huge animal resource with an estimate of about 906,442 cattle, 497,092 sheep, 846,611 goats, 311 camels, 453,366 chickens, 322,599 bee colonies and 87510 equines. Whereas Maize, Sorghum, Barley, Wheat, Teff, Godore, Millet, Cassava, Haricot bean and field pea are the major crops grow in the area.

Regarding the land use the proportion of cultivated land, grazing land, forest land, cultivated land and

non-cultivable land and others are 11.22, 29.25, 12, 55, 15.69, 10.85, and 20.42 percent respectively.

There are 16 different ethnic groups found in 8 woredas. Except the Ari ethnic group which covers 2 of the 8 woredas and a farming system of sedentary farming. The rest of the ethnic groups having a farming system of pastoral and semi-pastoral type.

### Malle woreda

Malle woreda is one of the eight wordas found in south omo zone which covers an area of 1432 km<sup>2</sup> and has human population estimated 102870. The population density of the woreda is 66 persons per km<sup>2</sup>. The woreda is divided in to 23 rural and 1 urban PA. Generally, the altitude of the woreda ranges between 600-1500 m.a.s.l. Its astronomical locations are 5.08°N -6.01°N latitudinally and 36.3°E -37°E longitudinally. There are two major agro ecologies namely kola and woynadega 85% and 15% found in the woreda respectively. The mean annual RF ranges between 800-1200mm and the mean annual temperature ranges between 18-35°C.

The woreda has an animal resources with an estimated of about 324,652 cattle, 81,181 sheep, 452,943 goats, 213,456 poultry local and improved, 12,256 equines, 2870 dogs, 3028 cats and 267216 bee colonies.

The average land holding of the woreda ranges from 0.15-2.1 hectare. There is only one ethnic group/Malle/ and their farming system is mixed crop- livestock production system.

The major crops and their yields of the woreda described in table one below.

**Table1:- major crop types and their yields in malle woreda**

Types of crops	Area coverage /Ha/	Yield/qt/
Haricot bean	183.875	1576.97
Maize	6267	228718.19
Teff	362	4184.84
Sorghum	6526.25	205673.34
Finger millet	195.625	298
Seasame	7132.825	55903.07
Sunflower	12.9	129.4
Ground nut	89.875	1258.25
Cassava	20.25	3280.5
	36	360
Coffe	373.39	2173.13

Sources: malle woreda agricultural and rural development office

### Benatsemay woreda

Benatsemay woreda is one of the eight wordas found in south omo zone which covers an area of 2923 km<sup>2</sup> and has human population estimated 67797. The population density of the woreda is 20 persons per km<sup>2</sup>. The woreda is divided in to 29 rural and 2 urban PA. Generally, the altitude of the woreda ranges between 600-1500 m.a.s.l. Its astronomical locations are 5.01°N -5.73°N latitudinal and 36.38°E -37.07°E longitudinally. There are three major agro ecologies namely bereha, kola and woynadega 5%, 81.3 and 13.7% found in the woreda respectively. The mean annual RF ranges between 800-1300mm and the mean annual temperature ranges between 18-38°C. The woreda has an animal resources with an estimated of about 459,779 cattle, 146,868 sheep, 741,237 goats, 97205 poultry local and improved, 28877 equines, and 32500 bee colonies.

The average land holding of the woreda ranges from 0.15-2.1 hectare. There are two ethnic group/Bena and Tsemay/ and their farming system is mixed crop- livestock production system.

The major crops and their yields of the woreda described in table two below.

**Table2:- major crop types and their yields in Benatsemay woreda**

Types of crops	Area coverage /Ha/	Yield/qt/
Haricot bean	1616.625	12933
Maize	3498.34	82959.19
Teff	557.875	4676.72
Sorghum	4610.5	86036.5
Finger millet	855.75	6846
Seasame	256.65	1335.6
Sunflower	59	354
Ground nut	10.5	84
Cassava	2.5	87.5
	10	100
Coffe	21.84	103.75

Sources: Benatsemay woreda agricultural and rural development office

### **Sampling procedures and methods of data collection**

The study was conducted by a multidisciplinary team of researchers and development workers comprising of animal breeder, animal health, animal socioeconomics and honey bee researchers as well as animal experts and DAs from each selected woredas.

Before starting of the study, the study team made short discussion with Zone Department of Agricultural and rural development in order to select representative woredas and to gather some basic information's about south omo zone particularly on livestock production system. Accordingly, Malle and benatsemay woredas were selected. After the team made discussion with the zone the one of the team went to woreda to select representative kebeles as well as to gather relevant information's from different stock holders such as respective woredas agricultural rural development office, marketing and cooperative office, rural youth employment generation office. The study team confirmed that the staff of malle and Benatsemay woreda ARD office had selected each representative kebeles such as koybe and Benete as well as Alduba and Luka respectively.

Discussion was made to get information with regard to the important preliminary conditions for the study such as assignment of experts for the study team, the representatives of the PA, selection of the informant farmers and awareness created to the farmers of the selected PA and also to the PA administration and development agents working there. A total of 80 informant pastoralist and agro pastorals of extension groups representing each sub PAs/gott/,religious leaders, clan leaders, mix of variable ages and both sexes with different wealth status were selected in collaboration with four selected PA's administration and development agents of the woreda.

The discussion was conducted in each kebele comprising of 20 male and female, 20 males and females, 20 males and females and 20 males and females for formal group discussion participants were selected from Luka, Alduba, Koybe and Beneta respectively. Primary data were collected through discussion between the disciplinary based team and the corresponding farmers/agro pastoralists group. The discussion was guided by the check list prepared by multidisciplinary team at regional level and issues raised during discussion were incorporated. Up on completion of group level discussion, information particularly livestock production and production related constraints identified by the group of farmers/agro pastoralists/ was summarized. Then, all informant farmers/agro pastoralists were summarized series of constraints had been briefed to them and then they ranked the problems by consensus in order of their importance. Following the field study disciplinary based data organization and report writing were under taken. Finally, the whole findings were produced in the report separately with in each PA.

### **Data analysis**

Description and summarization of the key informants group discussion and primary data organization, interpretation of each the study PA.

### **Results and Discussions**

#### **Animal production**

##### **Luka kebele**

#### **Herd composition**

The types of livestock found in Luka PA of Benatsemay woreda are cattle, sheep, goat and donkey. The local livestock breeds are dominant in the study area which is not crossed with any other improved breeds. The type of goat breed in the area is Woito Guji local breeds and the black head somale sheep breeds were found. The milk productivity of local breeds is very low but, they can able to resist shortage of feed and diseases than improved breeds. Although the breed preference of the dairy cattle is exotic, they have the question of adaptability and productivity problem in their local environment due to harsh environmental condition and their susceptibility to different diseases.

#### **Purpose of keeping live stock**

Livestock of the PA are kept for multipurpose. The reasons of livestock rising are for consumption at house hold level, to generate income through selling the products and live animals. The main live stock products include milk, meat, butter, hide and skin. Among those butter and live animals are for income generation, milk for home consumption and hide and skin for bed and dressing purpose. Oxen mainly used for ploughing purpose.

#### **Breeding management**

The mating system in the area is natural that means breed freely in uncontrolled mating. Artificial insemination technology is not introduced to the area. The average age of heifer that gives birth for the first time is three years. The calving interval is ranges from 1-1.5 years and the lactation length ranges from 5-7 months which is comparable with the study report (Bizuayehu A.,2015) average lactation length was  $5.62 \pm 3.4$  months and (CSA,2015) reported at national level.

## **Livestock husbandry practices**

### **Feeds and feeding**

The major sources livestock feed in Luka PA are mainly natural pasture, grazing, browses and crop residues. The sources of water for animals are river and pipe water. As the discussion of pastoralists revealed, the main seasons which they face severe feed and water shortage during December to February due to absence of grasses on natural grazing land and drying of rivers. There is hay making practices from crop residues during crop harvesting period. Even though there is some practice of crop residue treatment with urea, but they didn't get any benefit from it. They provide mostly crop residues for fattening animals, for weak animals and for milking cows. Supplementation is practiced during pre-weaning for the calves by giving crop residues. Supplementation activities start after weaning for weak calves, kids and lambs. All family members are responsible for feeding and grazing of small and large animals in Luka PA. There is no improved forages usage and sources in the area. Accordingly there is no habit of purchasing livestock feed in the area when they faced feed shortage.

### **Decision making**

Informants are asked to prioritize the decision on the use and disposal of livestock and their products. According to discussion male house hold headed make decision in disposal of large and small animals but, all family members are responsible for disposal of their products.

### **Housing**

The pastorals are asked to describe housing system of large and small ruminants. Accordingly, there is no special house constructed for their large and small animals. They make fences without roof around their house for their small ruminants and around the grazing site for large ruminants.

### **Animal production constraints and opportunities**

According to discussion with informants the major constraints for dairy, meat and equine production of the area in order of importance are mentioned as follows.

- Shortage of feed/due to high No of livestock and their trampling indigenous forage seed sources are lost/
- Shortage of water
- Animal diseases/long distance traveling for water and feed searching/
- Storage and processing material problem for dairy products
- Poor genetic makeup of the breed
- High environmental temperature

The informants suggested that introduction of improved forage varieties and other improved livestock production technologies to solve the above mentioned constraints in the PA.

### **Poultry production**

Local chicken breeds are pre- dominant and have more resistance to disease. There are also some exotic breeds in the area, but they are susceptible to disease and harsh environmental conditions. The local chicken lay up to 20 eggs at sexual maturity and the number of hatches per a year is three times. According to the informants only half of the hatched chicken survives to adulthood.

The purpose of rearing poultry and poultry products is for income generation and for home consumption. Most of the time females have highest role in production, marketing and use of poultry and their products. The extension service such as provision of improved breeds, provision of technical assistance on production system and veterinary services are available.

### **Housing and feeding**

The house is constructed separately for egg laying and for chicken. Chicken feeding is in extensive way of scavenging and the owners offer for their chicken some grains of maize and sorghum in the morning and water in the afternoon.

### **Poultry production constraints**

Main poultry production constraints in the area are categorized in the order of their importance as follows

- poultry disease/bacterial, viral and parasitic
- feed shortage
- predators
- postharvest handling problem due to high temperature/egg/
- cannibalism

### **Apiculture**

There are both blackish and reddish types of honey bee races in the area. Mainly blackish honey bee races have aggressive behavior in active season than reddish honey bee races. The size of blackish honey bee races is smaller than reddish one. The swarming tendency of honey bee races in the area is medium. But, the reddish honey bee races swarm frequently as compared to blackish honey bee races. When the absconding behavior is assessed, the informants said all honey bee races abscond highly when the weather condition is unfavorable.

### Honey bee management and productivity

There is no colony multiplication, queen rearing and supplementary bee feeding practice in the area. There is no improved hone production technologies most pastoralists use traditional hives and there is no honey bee hunting practices and bee wax collection exercise.

Most of the time honey bee rearing, honey processing and storage are performed by male. There cultural harvesting tools for honey is locally called "kuisi/qill".

There is no cultivated honey bee forages in Luka PA but, natural forests and shrubs such as locally named as "Dile", Muguri", Zimba,"Girar", are the major sources of honey bee forages.

Different extension services such as training, new technologies/improved hive/are available but, the dwellers of the PA didn't use the service.

Productivity of blackish honey bee races is more productive than reddish honey bee races. They harvest honey two times a year and average hone yield is 6-7 kg per hive.

### Honey bee production constraints

- Honey quality problem/the operation is performed during night/
- Toxic plants locally /"Lola",Tentele"/
- Pest and predators
- Storage material problem

### Livestock health

#### Major diseases of large and small ruminants

There are a number of diseases and parasites that cause reduction in productivity and death of live animals.

**The main diseases of livestock that occur in the Luka PA related to season, spp, age and sex are the following table3.**

	Disease type	Spp affected	season	age	sex	Vaccination program	Prevalence
Common diseases and parasites	CCPP	Caprine	Dry season	All age groups	Both	Two times per year	
	Mange	Caprine, ovine and bovine	Both dry & rainy	All aged groups	Both	-	
	Trypanosomes	Bovine	Both dry & rainy	All age groups	Both	-	
	Tick	Caprine, ovine and bovine	Both dry & rainy	All age groups	Both	-	
Outbreaks	Black leg	Bovine	Rainy	All age	Both	When the outbreak happen	Once a year/rare/
	Anthrax	Bovine	Both dry and rainy	All age groups	Both	When the outbreak happen	Rare

### Livestock health services and ethno veterinary practices

According to the informants there is an animal health post and technician for the treatments of their livestock. Sometimes there is shortage of veterinary drugs, vaccine and biological.

In the Luka PA livestock diseases are treated traditionally by the pastoralists. Some of traditional treatments are:-

- ✓ Black leg- by branding with hot metal and slitting the infected part of the sick animals using knife.
- ✓ Ecto-parasite/lice/- washing the body of calves by grinding and mixing leaf of the tree locally named as "kulale" with water.
- ✓ Retained placenta – by drenching the mixture of the local tree known as "silvini" with water

#### 1.1 poultry disease control methods

The main poultry diseases in the Luka PA are cholera, Newcastle diseases, external parasites/lice/. Traditional treatment techniques that are functional to kill some of the above cases are by smoking the house of chicken of poultry by burning the grass locally called /"welkenta" and burning highly infested poultry house completely. They also use modern disease control methods like treating with tetracycline for cholera.

### Apiculture diseases and control mechanisms

According to the informants, there is no disease associated with honey bees in the area. But the following problems associated with pests, predators and toxic plants/chemicals/are encountered:

- Pests and predators/"zeriko",chilo", lizards
- Toxic plants/"lola, kentele"/
- Some chemicals applied for agro industrial purpose/cotton farm at woitto/

The degree of infestation and damaged by toxic plants especially"lola and kentele"/local name/ is very

high. There is some means of control and prevention method for the above pests which is by smoking bee hives frequently.

### **Marketing of live stock**

Pastoralists of luqa PA sell their live animals to both primary and secondary market at woito and keyafer, the capital town of Benatsemay woreda. They also sell livestock products to both consumers and secondary sellers in the local market. Livestock products such as butter, honey, egg, are mainly sold in the local market of the area. Unlike others, milk and hide and skin are not sold. They use milk for home consumption and hides and skins for bed and dressing respectively. The major actors in the market chain are traders, hotel, retailers, whole sellers and some organized group on business. Marketing of apicultural products/honey/ mostly performed by male. Male has also major role in selling of live animals and disposal of income. The price of livestock and their products vary from season to season. Accordingly during dry season the price of honey/crude honey/ and butter are increased. Also the price of poultry and their products and butter are increased during festivity. Whereas during dry season the price of live animals is decreased.

There is no available marketing infrastructure and services as well as market information system in the area. Also there is no marketing practice of none-stinging bees' honey in the area.

### **Livestock marketing constraints**

The major constraints in livestock marketing are

- quality problem/honey/
- draught
- seasonal price fluctuation
- lack of market information
- brokers problem

### **General constraints and challenges in livestock production, management and marketing in Luka PA.**

The major constraints and challenges in livestock production, management and marketing in accordance of their importance are listed as follows:

- ✓ Shortage of water
- ✓ Shortage of feeds and grazing land
- ✓ Livestock diseases
- ✓ Lack of awareness
- ✓ Lack of management
- ✓ Poor genetic makeup

According to the focus group discussion, they provided/suggested possible solutions for the above constraints. These are:-

- ✓ Long distance traveling for search of water and digging of sand to get water.
- ✓ Taking their animals to the place where grazing land is available and increasing of crop production to get enough crop residues
- ✓ Treating their animals at health center and traditional disease treatment practice
- ✓ Getting awareness through mass media and mobile
- ✓ Introduction of highly productive breeds

## **Animal production**

### **Alduba kebele**

#### **Herd composition**

The types of animals found in Luka PA of Benatsemay woreda are cattle, sheep, goat and donkey. The local livestock breeds are dominant in the study area which is not crossed with any other improved breeds but, there are some Boran and jersey cattle breeds are found in the area. The type of goat breed in the area is Woito Guji and local sheep breeds are found. The milk productivity of local breeds is very low but, they can able to resist shortage of feed and diseases than improved breeds. Although the breed preference of the dairy cattle is exotic, they have the question of adaptability and productivity problem in their local environment due to harsh environmental condition and their susceptibility to different diseases.

#### **Purpose of keeping livestock**

Animals of the PA are kept for multipurpose. The reasons of animals rising are for consumption at house hold level, to generate income through selling the products and live animals. The main livestock products include milk, meat, butter, hide and skin. Among those butter and live animals are for income generation, milk for home consumption and hide and skin for bed and dressing purpose. Oxen mainly used for ploughing purpose.

#### **Breeding management**

The mating system in the area is natural that means breed freely in uncontrolled mating and Artificial insemination even if that much not effective . The average age of heifer that gives birth for the first time is four

years. The calving interval is ranges from 1-1.5 years and the lactation length ranges from 8-12 months.

### **Livestock husbandry practices**

#### **Feeds and feeding**

The major sources livestock feed in Alduba PA are mainly natural pasture, grazing, browses and crop residues. They get the sources of water for their animals by digging the sand around the river. As discussion of pastoralists revealed, the main seasons which they face sever feed and water shortage during December to March due to absence of grasses on natural grazing land and drying of rivers. There is hay making practices from crop residues during crop harvesting period. There is no practice of crop residue treatment with urea in the area. They provide mostly crop residues for ploughing oxen, for weak animals and for milking cows. Supplementation is practiced during pre-weaning for the calves by giving crop residues. Supplementation activities starts after weaning for weak calves, kids and lambs supplementary feeds locally named as “gojo”, “bereza”, “ara”, “aregeniya” etc . Although all family members are responsible for feeding and grazing of small and large animals in Alduba PA but, males are mostly responsible. There is improved forages usage and sources in the area such as elephant grass, lucinea and desho grass. They use those improved forages for ploughing oxen, for weak animals and for milking cows. There is no habit of purchasing livestock feed in the area when they face feed shortage, they take from their neighbors those who have enough animal feed.

#### **Decision making**

Informants are asked to prioritize the decision on the use and disposal of livestock and their products. According to discussion male house hold headed make decision in disposal of large and small animals but, females are responsible for disposal of their products such as egg and butter.

#### **Housing**

The pastoralists are asked to describe housing system of large and small ruminants. Accordingly, there is no special house constructed for their large and small animals. They make fences without roof around their house for their small ruminants and calves and around the grazing site for large ruminants.

#### **Animal production constraints and opportunities**

According to discussion with informants the major constraints for dairy, meat and equine production of the area in order of importance are mentioned as follows.

- Shortage of feed
- Shortage of water
- Animal diseases
- Poor genetic makeup of the breed
- High environmental temperature

The informants suggested that introduction of improved livestock production technologies to solve the above mentioned constraints in the PA.

#### **Poultry production**

Local chicken breeds are pre- dominant and have more resistance to disease. There are also some exotic breeds in the area, but they are susceptible to disease and harsh environmental conditions. The local chicken lay up to 7-12 eggs at sexual maturity and the number of hatches per a year is 3-4 times. According to the informants the number of chicken that survive to adulthood depends on the management the owner and the mothering property of the hen.

The purpose of rearing poultry and poultry products is for income generation and for home consumption and especially egg for a medical purpose/for anemia in children, for wound treatment, for common cold treatment/. Most of the time females have highest role in production, marketing and use of poultry and their products. The extension service such as provision of improved breeds, provision of technical assistance on production system and veterinary services are available.

#### **Housing and feeding**

The house is constructed only for night time from locally available materials. chicken feeding is in extensive way of scavenging and the owners offer for their chicken some grains of maize, sorghum and sunflower in the morning and water in the afternoon.

#### **Poultry production constraints**

Main poultry production constraints in the area are categorized in the order of their importance as follows

- poultry disease/bacterial, viral and parasite/
- predators
- postharvest handling problem due to high temperature/egg/

#### **Apiculture**

There are both blackish and reddish types of honey bee races in the area. Mainly, blackish honey bee races have aggressive behavior in active season than reddish honey bee races. The size of blackish honey bee races is

smaller than reddish one. The swarming tendency of honey bee races in the area is medium. But, the reddish honey bee races swarm frequently as compared to blackish honey bee races. When the absconding behavior is assessed, the informants said all honey bee races abscond medium when the weather condition is unfavorable.

#### Honey bee management and productivity

There is no colony multiplication, queen rearing and supplementary bee feeding practice in the area. There is no improved honey production technologies most pastoralists use traditional hives and there is no honey bee hunting practices and bee wax collection exercise.

Most of the time honey bee rearing, honey processing and storage are performed by male and sometimes selling of honey is by women. Their cultural harvesting tools for honey is locally called "kuisi/qill" and plastic material/bath/.

There is no cultivated honey bee forages in Alduba PA, but natural forests and shrubs locally named as "Dile", Ara", Busunta,"Rodo, "Zergo and Turna", are the major sources of honey bee forages.

Different extension services such as training, new technologies/improved hive/are available but, the dwellers of the PA didn't use the service.

Productivity of blackish honey bee race is higher than reddish honey bee races. They harvest honey two times a year and average honey yield is 8-10 kg per hive per year.

#### Honey bee production constraints

- Honey quality problem/the operation is performed during night/
- Toxic plants locally "kera", arke" dumi"/
- Pest and predators/monkey/
- Storage material problem/Gourd is easily broken/
- Shortage of materials to make traditional hives/grass, appropriate wood/

#### Livestock health

##### Major diseases of large and small ruminants

There are a number of diseases and parasites that cause reduction in productivity and death of live animals.

**The main diseases of livestock that occur in the Alduba PA related to season, spp, age and sex are the following table4.**

Disease type	Spp affected	season	age	sex	Vaccination program	Prevalence	
Common diseases and parasites	CCPP	Caprine	Mostly rainy season	All groups	age	Both	
	Mange	Caprine, ovine and bovine	Both dry & rainy	All groups	aged	Both	-
	Diarrhea	Shoat	Both dry & rainy	All groups	age	Both	-
	Tick	Caprine, ovine and bovine	Both dry & rainy	All groups	age	Both	-
Outbreaks	Black leg	Bovine	Rainy	All age		Both	When the outbreak happen
	Anthrax	Bovine	Both dry and rainy	All groups	age	Both	When the outbreak happen Two times a year/rare/ Two times a year/rare/

#### Livestock health services and ethno veterinary practices

According to the informants there is an animal health post and technician for the treatments of their livestock but it is far away from the pastoralists' residence. Sometimes there is also shortage of veterinary drugs, vaccine and biological.

In the Alduba PA livestock diseases are treated traditionally by the pastoralists. Some of traditional treatments are:-

- ✓ Black leg- by branding with hot metal and slitting the infected part of the sick animals using knife and also by drenching the mixture of choko/local tree/ and water .
- ✓ Eye disease – by drenching the mixture of grinded ginger
- ✓ Fever – by drenching the mixture of local tree known as "gedek" and water

#### Poultry disease control methods

The main poultry diseases in the Alduba PA are cholera, Diarrhea and external parasites/lice/. Traditional treatment techniques that are functional to kill some of the above cases are by ointing butter, food oil and kerosene on the infested area of the chicken especially for lice infestation. They also use modern disease control

methods like treating with tetracycline for cholera.

#### **Apiculture diseases and control mechanisms**

According to the informants, there is no disease associated with honey bees in the area. But the following problems associated with pests, predators and toxic plants/chemicals/are encountered.

- Pests and predators- lizards, monkey, ant, small hive beetle
- Toxic plants- /"kera", arke" dumi"/

The degree of infestation and damaged by toxic plants especially "kera" /local name/ is very high. There is some means of control and prevention method for the above pests which is -\*smoking bee hives frequently.

#### **Marketing of live stock**

Pastoralists of Alduba PA sell their live animals to both primary and secondary market at Alduba, kako and keyafer, the capital town of Benatsemay woreda. They also sell livestock products to both consumers and secondary sellers in the local market. Livestock products such as butter, honey, egg, are mainly sold in the local market of the area. Unlike others, milk and hide and skin are not sold. They use milk for home consumption and hides and skins for bed and dressing respectively. The major actors in the market chain are traders, pastoralists of the PA, retailers, and whole sellers. Marketing of apicultural products/honey/ mostly performed by male and females are rarely participate. Male has also major role in selling of live animals and disposal of income but females have roles in marketing of poultry and their products. The price of livestock and their products vary from season to season. Accordingly, during dry season the price of honey/crude honey/ and butter are increased. Also the price of poultry and their products and butter are increased during festivity. Whereas, during dry season the price of live animals are decreased.

According to the informants, there is available marketing infrastructure and services as well as they get market information from different traders and neighbors. There is some marketing practice of non-stinging bees' honey in the area but it is currently rare.

#### **Livestock marketing constraints**

The major constraints in livestock marketing in the area are:

- quality problem/honey/
- lack of awareness
- seasonal price fluctuation
- brokers problem

#### **General constraints and challenges in livestock production, management and marketing in Alduba PA**

The major constraints and challenges in livestock production, management and marketing in accordance of their importance are listed as follows:

- ✓ Livestock diseases
- ✓ Shortage of water
- ✓ Shortage of feeds and grazing land
- ✓ Lack of awareness

According to the focus group discussion, they suggested possible solutions for the above constraints. These are:-

- ✓ Long distance traveling for search of water and digging of sand to get water.
- ✓ Taking their animals to the place where grazing land is available and by preparing hay
- ✓ Treating their animals at health center and traditional disease treatment practice
- ✓ Getting awareness creation

#### **Animal production**

##### **Beneta kebele**

##### **Herd composition**

The types of animals found in Beneta PA of Benatsemay woreda are cattle, sheep, goat and donkey. The local livestock breeds are dominant in the study area which are not crossed with any other improved breeds but, there are some Boran breeds are found in the area. According to the group discussion there is difference in production and productivity and in size between local and Boran breeds. The type of goat breed in the area is Woito Guji and local sheep breeds are found. The milk productivity of local breeds are very low but, they can able to resist shortage of feed and diseases than improved breeds. Although the breed preference of the dairy cattle is exotic, but they hesitate the adaptability and productivity in their local environment due to harsh environmental condition and their susceptibility to different diseases.

#### **Purpose of keeping livestock**

Animals of the PA are kept for multipurpose. The reasons of animals raising are for consumption at house hold level, to generate income through selling the products and live animals. The main livestock products include milk, meat, butter, hide and skin. Among those butter and live animals are for income generation, milk for home consumption and there is also selling practice in hide and skin. Oxen mainly used for ploughing purpose.

### **Breeding management**

The mating system in the area is bull service that means locally selected bull for mating purpose and Artificial insemination that started recently. The average age of heifer that give birth for the first time ranges from 3-6 years and the calving interval is 1 years. Also the lactation length ranges from 8-12 months.

### **Livestock husbandry practices**

#### **Feeds and feeding**

The major sources livestock feed in Beneta PA are mainly natural pasture, grazing/paddock and tethering, browses and crop residues. They get sources of water for their animals from spring and river. As discussion of pastoralists revealed, the main seasons which they face sever feed shortage during dry season. due to absence of grasses on natural grazing land. There is hay making practices from crop residues during crop harvesting period. There is no practice of crop residue treatment with urea in the area. They provide mostly crop residues for ploughing oxen, and for milking cows. There is no supplement feeding practice during weaning period but they allow to go grazing area with their mothers. Although all family members are responsible for feeding and grazing of small and large animals in Beneta PA but, males are mostly responsible. There is no improved forages usage in the area. There is no habit of purchasing livestock feed in the area when they face feed shortage.

#### **Decision making**

Informants are asked to prioritize the decision on the use and disposal of livestock and their products. According to discussion male house hold headed make decision in disposal of large animals, small animals, butter and honey but, females are responsible for disposal only for poultry and their products such as egg.

#### **Housing**

The pastorals are asked to describe housing system of large and small ruminants. Accordingly, there is no special house constructed for their large and small animals. They make fences without roof around their house for their small and large ruminants.

#### **Animal production constraints and opportunities**

According to discussion with informants the major constraints for dairy, meat and equine production of the area in order of importance are mentioned as follows.

- Shortage of feed/for fattening/
- Shortage of water
- Animal diseases
- Poor genetic makeup of the breed
- High environmental temperature
- Post-harvest handling and storage problem
- Management problem/equine/

The informants suggested that preparing excess amount of feed before fattening practice started and tethering their animals in some shelter area and providing water. Providing some soil that used as amole salt to solve the above mentioned constraints in the PA.

#### **2. Poultry production**

Local chicken breeds are pre- dominant and have more resistance to disease. There are also some exotic breeds in the area, but they are susceptible to disease and harsh environmental conditions. The local chicken lay up to 7-10 eggs at sexual maturity and the number of hatches per a year is 4 times. According to the informant the number of chicken that survive to adulthood is not known but, it depends on the management the owner and the mothering property of the hen.

The purpose of rearing poultry and poultry products are for income generation and for home consumption. Most of the time females have highest role in production, marketing and use of poultry and their products. The extension service such as provision of improved breeds, provision of technical assistance on production system and veterinary services are available.

#### **Housing and feeding**

The house is constructed only for night time from locally available materials. when the sick hen found in the flock they keep out of the house. chicken feeding is in extensive way of scavenging and the owners offer for their chicken some grains of maize, sorghum and sunflower in the morning and water in the afternoon.

#### **Poultry production constraints**

Main poultry production constraints in the area are categorized in the order of their importance as follows

- poultry disease/bacterial, viral and parasite/
- predators
- postharvest handling problem due to high temperature/egg/
- market price fluctuation

#### **Apiculture**

There are both blackish and reddish types of honey bee races in the area, but blackish is more. Mainly, blackish

honey bee races have aggressive behavior in active season than reddish honey bee races. The size of blackish honey bee races is smaller than reddish one. The swarming tendency of honey bee races in the area is medium. When the absconding behavior is assessed, the informants said all honey bee races abscond medium when the weather condition is unfavorable.

**Honey bee management and productivity**

There is no colony multiplication, queen rearing and supplementary bee feeding practice in the area. There is some improved honey production technologies which are used by some agro pastoralists. But most pastoralists use traditional hives and there is no honey bee hunting and bee wax collection practices in the area.

Most of the time honey bee rearing, honey processing and storage are performed by male. There cultural harvesting tools for honey is locally called "kuisi/qill", plastic material/bath/ and oil container/USA korkoro/. There is no cultivated honey bee forages in Beneta PA, but natural forests and some crop types locally named as "Girar", kakayo", lemo,"turo, "paro, gero, maize, sorghum, and sunflower", are the major sources of honey bee forages.

Different extension services such as training, new technologies/improved hive/are available.

Productivity of blackish honey bee race is higher than reddish honey bee races. They harvest honey two times a year and average hone yield is 20 kg per hive per ayear depends on the size of hive.

**Honey bee production constraints**

- Honey quality problem/when honey mix with bee brood during harvesting /
- Toxic plants locally /"Nim", foreze"/
- Pest and predators/kemecha/
- Storage material problem/Gourd is easily broken/
- Death of honey bee when they harvest using excessive fire
- Hanging of bee hives on long tree which is difficult to harvest easily.

**Livestock health**

**major diseases of large and small ruminants**

There are a number of diseases and parasites that cause reduction in productivity and death of live animals.

**The main diseases of livestock that occur in the Alduba PA related to season, spp, age and sex are the following table5.**

	Disease type	Spp affected	season	age	sex	Vaccination program	Prevalence
Common diseases and parasites	CCPP	Caprine	Mostly rainy season	All groups	age Both		
	Mange	Caprine, ovine and bovine	Both dry & rainy	All groups	aged Both	-	
	Diarrhea	Shoat	Both dry & rainy	All groups	age Both	-	
Outbreaks	Tick	Caprine, ovine and bovine	Both dry & rainy	All groups	age Both	-	
	Black leg	Bovine	Rainy	All age	Both	When the outbreak happen	Two times a year/rare/
	Anthrax	Bovine	Both dry and rainy	All groups	age Both	When the outbreak happen	Two times a year/rare/
	PPR	Goat	Rainy season	All groups	age both	Depends on provision	
	FMD	Bovine	Both rainy and dry	All group	aged both	If outbreak occurs	

**Livestock health services and ethno-veterinary practices**

According to the informants there is an animal health post and technician for the treatments of their livestock. There is shortage of veterinary drugs, vaccine and biologicals.

In the Beneta PA livestock diseases are treated traditionally by the agro- pastoralists. Some of traditional treatments are:-

- ✓ Black leg- by branding with hot metal and slitting the infected part of the sick animals

- using knife and also by drenching the mixture of choko/local tree/ and water .
- ✓ Eye disease – by drenching the mixture of grinded ginger
  - ✓ Fever – by drenching the mixture of local tree known as “gedek” and water
  - ✓ Mastitis- “gushungulo” smoking with Powdered black material from the roof of house.
  - ✓ Black leg- by drenching the mixture of “chorahe” with hot water and honey
  - ✓ Tick- spraying the mixture of “bangze”

#### **Poultry disease control methods**

The main poultry diseases in the Beneta PA are cholera, Diarrhea, new castle and external parasites/lice/. Traditional treatment techniques that are functional to hill some of the above cases are by ointing butter, food oil and kerosene on the infested area of the chicken especially for lice infestation, by drenching the mixture of locally known as “Morea” with water and also use lemon to prevent lung disease . They also use modern disease control methods like treating with tetracycline for cholera.

#### **Apiculture diseases and control mechanisms**

According to the informants, there is no disease associated with honey bees in the area. But the following problems associated with pests, predators and toxic plants/chemicals/are encountered.

- Pests and predators- ant, “Kemecha”
- Toxic plants- /Nim/

The degree of infestation and damaged by toxic plants especially ”Nim” /local name/ is very high. There is some means of control and prevention method for the above pests and toxic plants which is smoking bee hives frequently and suspended the hives fire away from Nim trees.

#### **Marketing of live stock**

Agro pastoralists of Beneta PA sell their live animals to both primary and secondary market at Beneta, kako and Bala. They also sell livestock products to both consumers and secondary sellers in the local market. Livestock products such as butter, honey,egg, hide and skin are mainly sold in the local market of the area. Unlike, are not sold. They use milk for home consumption. The major actors in the market chain are traders, agro pastoralists of the PA, retailers, whole sellers. Marketing of apicultural products/honey/ mostly performed by male and females are rarely participate. Male has also major role in selling of live animals and disposal of income but females have roles in marketing of poultry and their products. The price of livestock and their products vary from season to season. Accordingly, during dry season the price of honey/crude honey/ and butter are increased. Also the price of poultry and their products and butter are increased during festivity. Whereas, the price of goat is mostly increase atdry seasons because the selling practice is through measuring of their weight.

According to the informants, there is some marketing infrastructure and services as well as they get market information from different traders and neighbors. There is some marketing practice of none-stinging bees’ honey in the area but it is currently rare.

#### **Livestock marketing constraints**

The major constraints in livestock marketing in the area are:

- quality problem/honey/
- lack of awareness
- seasonal price fluctuation
- brokers problem
- lack of road access – due to this some fatten animals death on the journey

#### **General constraints and challenges in livestock production, management and marketing in Beneta PA**

The major constraints and challenges in livestock production, management and marketing in accordance of their importance are listed as follows:

- ✓ Livestock diseases
- ✓ Shortage of feeds and grazing land
- ✓ Low market price
- ✓ Shortage of water

According to the focus group discussion, they suggested possible solutions for the above constraints. These are:-

- ✓ Treating their animals at health center and traditional disease treatment practice
- ✓ Reserved grazing land privately and use paddocking with tethering and collecting crop residues when crop harvesting season come up
- ✓ Digging spring

#### **Conclusion and Recommendations**

The current problem identification and technology need assessment study indicate that in all the study agro ecology key informants conclude that there are very serious problems which are related to all livestock production sub-sectors leads to low production and productivity of the pastoralist and agro pastoralists income. Production and productivity of livestock production system in the study area reduced due to poor management system such as feeding, watering, housing, health caring, etc. The availability and quality of feed, disease and

parasites, lack of improved dairy breed, recurrent drought due to variability in rainfall, poor veterinary service delivery, pests and predators, toxic plants, lack of awareness, brokers problem on market aspects, lack of milk and milk product market channel and lack of skill in processing of milk and milk product are most important constraints to the livestock production systems even if the diversified opportunities for livestock production system to the study area. From the current study it recommended that, the sustainable, participatory and practical trainings shall be provided for pastoral communities and agricultural extension workers should be capacitated to solve the problems through modifying their indigenous knowledge. There is poor livestock and their product marketing channel in the study area therefore, government and NGO give in attention in formal livestock and their product market channel and introduction in marketing value chain system. Introduction of different feed improvement interventions, modern veterinary service delivery system and dry cattle breed improvement through introducing appropriate strategies to the study area, improved breed bulls center establishment and cross heifer distribution need also attention to the study area for better productivity and to improve reproductive performance of locally existing livestock.

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