



Characterization of Farming and Agricultural Production Systems, Production Constraints and Need Identification In Debub Ari and Benatsemay Districts of Southern Ethiopia

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Abstract

The study was conducted in two districts of South Omo zone namely, Benatsemay and Debub ri districts. The study was implemented through a multidisciplinary team of livestock researchers, which comprising of socio-economist, veterinarians, animal breeders and development workers. The objectives of the survey were: to describe the nature of the livestock farming system and production practices; analyze and priorities the major constraints that hinder the development of livestock production; identify the opportunities and constraints of livestock production in the study area; collect the socio-economic characteristics and to use the information as a baseline data for future intervention. Data were collected by semi-structured interview, focus group discussion and secondary data was collected from different sources. Livestock has a multi-function in the study areas and helping as a source of draft power, income generation, and milk and meat production. Although there are accesses to vast fertile land for feed and forage development, huge livestock number and presence of enough family labour force in the areas, there are several constraints in livestock husbandry such as shortage of grazing land/feed, disease, market problem, water problem, lack of technological supply. However, little attention has been given to identify and characterize these livestock production constraints in the districts. It is with this understanding that the present study was initiated and conducted.

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1. Introduction

Ethiopia has one of the largest livestock resources in Africa as per the survey results of 2016/17 indicated that, there are about 59.5 million Cattle, 30.7 million Sheep, 30.2 million Goat, 2.16 million Horses, 8.44 million Donkeys, 0.41 million Mules, and about 1.21 million Camels in the sedentary areas of the country [1]. The livestock in the country are adapted to varying agro ecologies from the highlands of the country (primarily under mixed livestock farming system) to, the lowlands (where they are raised under extensive /transhumance/ nomadic farming system [2].

Livestock adapted to a particular agro climate usually can perform better provided the basic amenities related to the management are made available to them, understanding the agro climate also provides an insight of the realistic developments that can be achieved through crossbreeding programs [3].

In the lowlands of Ethiopia, livestock is comprised of large flocks/herds of sheep, goats and cattle [4]. Extensive livestock keeping is the backbone of the economies of the lowlands. The traditional pastoral strategies of keeping a mixture of animals' nevertheless represent an attempt to maximize production and productivity of the animals with the means of available. Different species have different environmental tolerance and have different production and work capacities. Although their performance has been poor the productivity potential of pastoral livestock is promising [4].

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Concerning that of large and small ruminants, their fertility could be increased, their mortality reduced, their maturity brought about earlier and their production (milk and meat) increased if health control and nutrition are improved [4].

Over the last five decades, researchers and extension have put much effort to generate improved agricultural production technologies and deliver to the users [5].

Despite that several technologies have been developed, the conventional agricultural research and innovation pursued in the past have not been very successful to deliver appropriate technologies to the end users [5]. Livestock reared at South Omo of Southern Ethiopia play important roles in the livelihood of the people residing in the area. However, due to the remoteness of the area very few scientific studies have taken place and most of the cattle in the region are yet to be studied [6]. Hence, this study was conducted in Benatsemay and Dehub Ari districts with the following objectives.

- To describe the nature of the livestock farming system, and production practices,
- To analyze and priorities the major constraints that hinders the development of livestock production,
- To assessing the status of agricultural production, identify constraints,
- To identify the opportunities of livestock production in the study area,
- To collect the socio-economic characteristics.

2.1. Description of the Study Areas

2.1.1. Benatsemay District

Benatsemay District is located in Southern Nations, Nationalities and People's Region (SNNPR), south Ethiopia. The district is situated between 5°01' and 5°73' North latitude & 36°38' and 37°07' East longitude. The climate of the district varies from warm to hot semi-arid with altitudinal variation ranges between 500 and 1800 meters above sea level. Rainfall in the district is bimodal, the main rain from March to May and the short rain from September to October. The ten years (2000 to 2010) mean annual rainfall in the upper part of Benatsemay district was 1400 mm and the average daily temperature ranges from 15.6°C to 26.5°C.

The vegetation of the district is dominated by varying densities of *Acacia* (*Acacia* spp), *Grawa* (*Vernonia amygdalina*) and *Solanum* woody species (eg. *Solanum dulcamara*) and over 35 herbaceous species of grasses and legumes. Over 48% of the total land area of the district is used for grazing or browsing by cattle, sheep and goats [7].

2.1.2. South Ari District

South Ari district is one of the eight districts found in South Omo Zone located around 17kms west of zonal town, Jinka. The district covers an area of 1520 km² and has a human population estimated at 219,708 and population density of 144.4 persons per km². The district is divided into 48 rural and 3 urban peasant associations (PAs). Generally, the altitude of the district ranges between 850 - 2800m above sea level. The district is divided in to three agro- ecologies; dega, woina dega and kola which cover 25, 39 and 36 percent of the total area respectively. Rainfall pattern in the area is bimodal. The mean annual rainfall and temperature ranges between 100-1600 mm and 15 and 35 oc respectively.

The district has an animal resource with an estimate of about 199,765 cattle (local 189,021, cross breed 10744), 95,186 sheep, 25,814 goats, 104,272 chickens (local 88,700, cross breed 104,272) 19,221 equines and 18,706 traditional bee hives ('chefeka kefo') and 318 modern bee hives. Sorghum, maize, teff, wheat, barley and haricot bean are the major crops in the area. Regarding the land use of the district, the proportion of cultivated land, grazing land, forest area, degraded and others covers an area of 63, 4.24, 18.36, 8 and 4 percent respectively [8].

2.1.3. Sampling Procedures and Methods of Data Collection

The study was conducted by a multidisciplinary team of livestock researchers, which comprising of, socio-economist, veterinarians, animal breeders and development workers. Selections of districts and PAs has done by Jinka Agricultural Research Center (JARC) livestock department team, AGP center coordinator and office of agriculture experts based on the criteria forwarded by AGP project. Accordingly, Dehub Ari district was selected as a representative of high to mid-land agro ecology and Benatsemay district was selected as a representative of low to mid-land agroecology. Before assessing the status of agricultural production, detail orientation about the program was provided for research team. After short discussions, each district selected PAs based on agro ecology. A total of 25-30 key-informant farmers/pastoral from each PA with the mix of variable ages and sexes was selected in collaboration with the PA's administration and development agents. Discussion was made by using participatory rural appraisal system.

The approach used in the observation involved both primary and secondary sources. The primary data were collected from each targeted clustered PA's through focus group discussions. The key informants were also interviewed individually through the guidance of the checklist. Basic secondary data's were collected from Agricultural and Rural development office.

Accordingly, the following respondents were involved: representative of smallholder farmers/pastoralist, representative of smallholder women farmers/pastoralist and representative of youth farmers (male and female) /pastoralist. During focus group discussion, each identified agricultural production problems were combined and prioritize. This discussion was guided by the check list. Up on completion of group discussion, information related to livestock production constraints were summarized and ranked. Then, all the summarized constraints had been briefed to them and then they ranked the problems by consensus in order of their importance.



Figure.1. Photographed during group discussion

3. Data Presentation and Findings

3.1 Status of Livestock Production in Benatsemay District (Mid and low-land Agro-ecology)

3.1.1 Herd Composition, Production System and Trend

Majority of the district is dominated by mid and low-land agro ecology and production system of the area is almost dominantly pastoralist. Livestock has a great role in the livelihood of the area. Pastoralist and agro-pastoralist kept only local breeds/types of all species except some introduced improved Boran cattle breed and Boer goat breed. The types of livestock found in the district are cattle, sheep, goat and equines (camel and donkey). The livestock husbandry in this system is dominated by goats, cattle, sheep and camels. Since the main source of food is milk, pastoralists tend to keep large herds mainly to ensure sufficient milk supply and generate income. Equines are found in the lowland parts of the district. The types of goat breed in the area are locally named as *Woyito Guji*. The black head Somali sheep breed reared and kept by some pastoralist in the lowland part (Tsemay) of the areas. Although the improved breeds' are preferred by pastoralist and agro pastoralist, the adaptability and productivity of this breeds are too low due to harsh environmental condition and their susceptibility to different diseases.

According to respondents, trend of livestock number particularly goat, cattle and donkey increased due to accessibility of animal health clinic but trained man

power are limited. Because of their simple management requirement and low susceptibility to disease, the number of donkey increased in the lowland area of the district. The livestock production and productivity in the pastoral and agro-pastoral areas are too low not only followed of traditional production system they focused on number and renowned.

3.1.2 Purpose of Keeping and Productivity of Livestock

Livestock are an important component of nearly all pastoral and agro-pastoral production systems in Ethiopia and provide draught power, milk, meat, manure, hides, skins and other products. In addition, they serve as source of cash income, playing a significant role in the social and cultural values of the society. Livestock play an important role in ensuring food security and alleviating poverty [9]. The purposes of keeping cattle vary with production systems. Traction ranked highest, followed by milk and reproduction/breeding (males and females) in both crop-livestock and agro pastoral systems [10]. Main livestock products include milk, cheese, butter, and beef which used as home consumption and marketing. Hide and skin are used as a bedding material and dressing purpose. They have not any selling practice of hide and skin for market.

Pastoralism and agro-pastoralism are the dominant livestock production-based, land-use systems in the arid agro-ecologies of Ethiopia and account for 50% of the total 114 million livestock numbers, out of which 40% of cattle are originated from this area [11]. Cattle which are characterized by varying production and reproduction performance are primarily kept for milk production in the lowland area, where as they are kept for traction on the top of milk in the mid-highland area.

3.1.3 Breeding Management

Reproductive technologies that help to improve the local breeds of the community are not introduced yet, so the pastoral community faces great challenge with the low production and productivity of the local breeds. Mating was practiced naturally through local available bull without control. The community has some knowledge and interest related to the boran breed. But, the pastoral community is still limited to access of reproductive technologies like bull service, artificial insemination, selection and introduction of exotic animals. Age at first calving of heifers is affected by different factors like availability of feed, water and genetic difference but they widely accepted it is from 3.5- 4 years. The calving interval is ranges from 1-1.5 years and the lactation length ranges from 5-7 months which is comparable with report [12]. Lactating period lasts about 4-5 months. Age at first kidding and lambing is one year. The milk productivity

of local breeds is very low (1.5-2L/day). The average weaning age of cattle, sheep and goat were 6-7, 4 and 6 months respectively. The pastoral community is still limited to reproductive technologies like bull service, artificial insemination, selection and introduction of exotic animals.

3.1.4 Poultry Production Chicken Breeds

Chicken have important value as a source of egg and meat for home consumption and to generate income after selling eggs and live chicken. Local chicken breeds are pre- dominant and have more resistance to diseases. There are also some exotic and cross breeds in the area in limited access. Pastoralist preferred to red exotic chicken than whites color chicken because they are not easily attacked by predators and higher market priced. The local chicken laid up to 12 eggs/clutch at sexual maturity and the number of hatches per a year is 3-4 times. From cross chicken breed 19 to 25 eggs/ clutch laid, as the informants indicate that not well feeding and watering management. Extension services related to poultry production and productivity, provision of improved breeds, provision of technical assistance on production method and veterinary has not been delivered much. The livestock is housed for only during night time which constructed from locally available materials. Chicken feeding is semi-intensive 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. The main problems of poultry production in the PAs are diseases, predators and low productivity of local chickens. The main post-harvest product handling and storage constraints are poor storage, hot weather condition which lead to spoilage of the eggs and reduce the quality. Due to the increasing of demand and prices of poultry and its product, the trend of poultry production and breeding is also increasing.

3.1.5 Apiculture production

3.1.5.1 Honey Bee Management and Trend of Bee Rearing

Benatsemay are a home for natural growing plant and it is a great potential for apiculture. However apiculture production is very poor. Lack of pastoral community knowledge/skill about beekeeping is the main reasons that hinder the potential. Technologies like improved bee hive; improved equipment's (for honey harvesting) are not accessible. In the area, only traditional hive is available and honey bee management is not well under operation. Average honey yield (hive) per annum for one hive was 6 kg. Access to extension services was too low, from districts agricultural office and other NGO; therefore, there was no material support. Major honeybee forage the proximity natural forest, shrubs, and cultivated, etc.

During harvesting, smoking kills high number of bees, traditional harvesting materials affect the honey quality, most products sold at the farm gate and no well-organized market chain. The post-harvest product handlings are also the main constraints in the areas. Beekeeping trend decreased from year to year due to deforestation of flowering plant, expansion of poisons plant, hive predator and swarming.

3.1.6 Livestock Husbandry Practices

3.1.6.1. Feed and Feeding

Feed is very crucial raw materials to keep animals alive and productive. The main source of feed in the area is rangeland grazing and browsing thought traveling long distance to search of feed. Some pastoralists' use crop residues to fulfill animals feed requirements in very rare circumstances; hay making is not practiced and unknown in the area. Shortage of feed becomes severe between Januarys to March. In these months the pastoralist travels long distance seeking feed for their animals.

Major natural browsing trees and shrubs in the area locally named as *girar*, *girawa*, *woyba*, *tselko*, *hatsero*, *abalo*, *bereza*, *gerketa*, *shoal*, *turna*, *tanta*, *zergo*, and *dongo* were practiced. They have poor awareness to prepare ranch for animal grazing. In the area communal and private grazing lands have been practiced. Majority of pastoralist have communal grazing land that use for cattle keeping in both season. Both dry season and wet season animal management system (feeding, watering, and housing) are almost similar in all area. But, in some instance during rainy season, feed resources like weeds, natural grass grazing and cut and carry system, green maize Stover and browses were provided.

Feeding with tethering is not practiced in all area but, cut and carry feeding were done without trough. Some farmer but not all, have been practiced supplementary feeding during pre-weaning and lactation period they supply feeds like maize Stover and *atela* with feed trough. Except in some midland part of the area, does not introduced to any species of improved forage. So, it needs extra effort to introduce improved forage species. In the area industrial by product feed like wheat brain, oil seedcake and molasses were unknown.

3.1.6.2. Watering

They get the sources of water for their animals by digging the sand around the river locally named as '*chirosh*', river stream, pond, river and pipe water, but as discussion of pastoralists revealed, the main seasons which they face sever feed and water shortage during dry season (January-march) when the river streams get shrink and dry.

3.1.6.3. Housing

Majority Pastoralists/agro-pastoralist are not construct permanent house for their animals because of that all livestock species are remain in the field/outdoor though out the year without any properly constructed shelter. They move from place to place, season to season that in search of available feed and water for their animals.

But, small numbers of pastoralist construct housing for their animals traditionally with separately, cattle confine in one house whereas shoaat were in other house. So, provision of suitable shelter during the adverse environmental conditions will buffer the extremes of climatic conditions and reduce the peak stress on the animals that possibly helps the production and productivity.

3.1.6.4. Livestock Health

The most economically important cattle diseases that occur frequently in the area in order of importance are Trypanosomiasis, Blackleg, Anthrax, Bovine and ovine pasturelosis, CBPP and FMD and. Ecto-parasites such as tick, mange mite, lice, biting fly, *Aleket*, ant are common parasites in the area. Internal parasite fashola, heamoncus, and intestinal worms are the most prevalent parasitic disease. Mastitis, is also affect the health dairy cow in the area. On the other hand there were technical constraints such as lack of veterinary service and medication. When animals get sick owner always prefer going to animal health posts to be treated and cured after treating their animals in a traditional way.

Ethno-veterinary practice was practiced only for few diseases. They don't want to mention it, but they prepare though grinding leaf and root then drenching through mixing with water to treat anthrax, Blackleg and FMD. Traditionally common management practices for disease were, like giving different medicinal plant root, leaf, and stem such as *Dekolo plant*, *Bereza plant* and branding. In addition *berebire*, *senefeche*, *zingibel*, *lala kitel* and butter were giving for sick animal. For parasite like tick *ersho*, *eshok* used to treat traditionally. For bloat problem home oil and gas were given.

Common poultry diseases that are dominant in the area in order of importance are bacterial, viral and parasite/ such as coccidiosis, NCD and cholera (fowl typhoid). Chicken lice were the most prevalent chicken parasite. Predator and Postharvest handling due to high temperature/egg/ is another main challenging problem in some area. Predators that attack chicken in the PA are wild cat, skunks, and larger scavenging birds. Traditionally common management practices (treatment method) for poultry disease and parasite are done. Such as hot maize used to treat NCD, *yekinkin* leaf used to treat lice.

Most dominant sheep and goat diseases in the area are ovine pasturlosis, fluke (qezen), cenorois (Azurit), Orf, FMD and anthrax. Lice and tick were common parasite for shoats. Traditionally common management practices (treatment method) for Shoats disease and parasite were Cuz plant for goat eye disease, kulale plant fruit for stomach disease, fermented sorghum for retain placenta.

3.1.7. Constraints of Livestock Husbandry

There are several constraints in livestock husbandry in Ethiopia; largely they are related to the prevailing agro climate of the region. Livestock production in various production system of the developing counties like Ethiopia, is constrained by technical and biological, and socio economic and institutional factors: such as availability of quality and quantity feed resources, low producing cattle genotype, disease susceptibility, reproduction wastage, inadequate health service, management, and market access are some of the constraint. In specific regions quality and quantity of water, housing, predatory losses and theft too become serious problems [13]

According to the study carried out [14], Ethiopia has an immense potential for increasing livestock production, both for local use and for export purposes. However, expansion and productivity was constrained by quantitatively and qualitatively inadequate and imbalanced nutrition, sporadic disease outbreak, scarcity of water, lack of appropriate livestock extension services, insufficient and unreliable data to plan the services, and inadequate information to improve animal performance, marketing, processing and integration with crop and natural resources for sustainable productivity and environmental health.

3.1.8 Marketing Constraints in Benatsemay District

Livestock marketing too are by and large unorganized and therefore it is the middlemen who rule the market at the expense of the producers and consumers. Marketing constraints were one of the livestock production constraints in different areas of the district. Studies conducted [15], poor infrastructure leads to shrinkage losses in live animals and also livestock products. Accordingly, the major marketing constraints that indicated during group discussion were:

- Absence of marketing place in their own areas
- Price decline and lack of market information
- Lack of market access and awareness
- Market price fluctuation
- Brokers and traders problem
- Absence of receivers for the product
- Traders and brokers problem
- Existence of illegal traders
- Price setting problem
- Barriers to new traders that enter into the market

- Problem of tax i.e. when tax payment is made per live cattle giving receipt without any sign and amount of birr is also not mentioned.

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- Barriers to new traders that enter into the market
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3.1.10 General Constraints and Challenges in livestock Production, Management and Marketing

The constraints which they perceive to be important for livestock production and their attitudes to risk, particularly with respect to the adoption of new livestock technologies skill technology, poor awareness and access.

3.1.11 Opportunity for Livestock Production/Potential Resource in Benatsemay District

- Enough fertile and vast land for feed and forage development
- Enough livestock number
- Presence of enough family labor force.

3.2 Status of livestock production in Dehub Ari district (High and Mid-land Agro-ecology)

3.2.1 Purpose of Keeping and Productivity of Livestock in Dehub Ari District

Majority of the district is dominated by high and mid-land agro ecology and production system of the area is crop livestock mixed farming. Farmers of the PAs only kept and breed local breeds of all species except some introduced boran, HF and their crosses. Livestock production plays an important role in day to day life of

farmers in Dehub Ari district. Livestock are used as source of food and income generation for household purposes by selling live animals and their products. Main livestock products include milk, cheese, butter, and beef which used as home conception and marketing.

Hide is used as only as a bedding material apart this purpose hides is not selling out for marketing. Donkeys, Horse and Mule are used to carry heavy loads of crop and other materials to transport from place to place, but the community does not have any knowledge about animal welfare they loaded with extra lode.

The milk production performances of the local cows are very low in average 2lit/day/cow for indigenous cow, and 6 liter for crossbreed cow. The average weaning age of cattle, sheep and goat were 6-7, 4 and 6 months respectively. Trends in numbers and production of livestock have been decreased. Due to many reasons, high population growth, land shortage, deforestation of browsing trees and poor management practices of livestock, seasonal fluctuation, expansion of disease and knowledge gap regarding to the management are listed among regarding it.

3.2.2 Breeding Management

Reproductive technologies that help to improve the local breeds of the community are not introduced yet, so the farmer's faces grate challenge with the low production and productivity of the local breeds. AI technology was not fruitful in the district due to inseminated cow fail to conceive, however the demand and interest of farmers was very high for improved bull service rather than AI. *Some* farmers practiced and used selected bulls for control mating system/methods. Improved bull service was available in some selected kebeles through provision of the governmental and non-governmental organization.

The majority communities have preference and interest for exotic breeds but the access to get the breed or bull service is so far limited. Age at first calving of heifers is affected by different factors like availability of feed, water and genetic difference but they widely accepted it is 4-5 years. Lactating length lasts about 8 months and calving interval is 1 year. Age at first kidding and lambing is 18 months.

Table 1. Major prevalent livestock diseases, parasites and their method of management

Livestock type	Major Diseases	Prioritize	Major Parasites	Prioritize	Traditional Management		Modern	
					Disease	Parasite	Disease	Parasite
Cattle	Trypanosomiasis							
	Blackleg	1 st						
	Anthrax	2 nd						
	Bovine pasturelosis	3 rd	Ticks	1 st	sealing		Drugs,	
	Lumpy skin disease	4 th	Mange	2 nd	cattle body		vaccination	Spring
	FMD	5 th			by metal		treatment,	Dipping
	Mastitis							
Poultry	NCD	1 st	Chicken					
	Foul typhoid (cholera)	2 nd	lice					
		3 rd						
Sheep / Goat	1.ovine pasturelosis		Ticks					
	2.Azurite(cenorosis)		Lung worm,					
	3.Anthrax		Fasciola,					
	4.Orf		roundworms					
Apiculture	Unknown		Ant	1 st				
			shinkit	2 nd				

Source: Own survey.

Table: 2 General constraints and challenges in ruminant animals, poultry production and apiculture management and marketing in order of importance are listed as follows:

Major Constraints in ruminant animals	Priority/rank	Major Constraints in poultry production	Priority/rank	Major Constraints in apiculture	Priority/rank
Feed/forage/	1 st	Disease prevalence	1 st	Swarming/deforestation	1 st
Animal health	2 nd	Breed/ variety	2 nd	Season fluctuation	2 nd
Breed/Variety	3 rd	Feed shortage	3 rd	Predator	3 rd
Market fluctuation	4 th	Predator	4 th	Technological constraint	4 th
Technological constraint	5 th	Market	5 th	Market	5 th

Source: Own survey

Table: 3. General prioritizing livestock production constraints, screening options and interventions

Parameter	Major Constraints	Cattle Priority / rank/	Poultry Priority/ rank/	Suggested research options/technological interventions in priority
Lack of improved Breed/Variety	Problem Access to breed	2	2	Introduction of improved animal breed which suits the area
	Knowledge gap	3	4	Create awareness to the peoples to enter modified production system
	Adaptability	1	1	Introduction of improved animal breed which suits the area and develop good management system -provision of suitable shelter during the adverse environmental conditions
	Institutional	4	3	Developing infrastructural facilities especially transportation and networking
	Productivity	5	5	-Provision of suitable shelter during the adverse environmental conditions
Shortage of Feed	Access	1	1	Prepared feed storage and stored when feed is available
	Knowledge gap	2	2	Create awareness to prepare hay making and crop-residue treatment
	Institutional	5	No problem	Developing infrastructural facilities especially transportation and networking
	Productivity	4	No problem	Using different feed treatment method
	Quality	3	3	Pasture improvement practice
	Price	6	4	-
Lack of Forage	Access	2	NA	Introduction of improved forages and animal breed which suits the area
	Management	3	NA	Feeding system should be improved, improved forages need to be introduced
	Knowledge gap	4	NA	Awareness creation
	Adaptability	1	NA	-
	Productivity	No problem	NA	-
	Quality	No problem	NA	-
	Institutions	5	NA	-
Animal health	Access	1	1	Identify type of diseases occurred in the area and Designing possible prevention and control system Annual vaccination program for identified disease Ectoparasite control program should be implemented
	Knowledge gap	3	2	Provision of suitable shelter during the adverse environmental conditions and good housing system can prevents night predators
	Institutional	2	3	Developing infrastructural facilities especially transportation and networking

Table: 4 General prioritizing livestock production constraints, screening options and interventions

Parameter	Major Constraints		Priority/Rank		Suggested research options/technological interventions in priority	
			Cattle	Poultry		
Technological constraint	Processing	Yoghurt	NA	NA	Technologies related to processing Dairy products need to be introduced	
		Cheese	NA	NA		
		Butter	NA	NA		
		Hachary	NA	NA		Need to sell out as fast as possible in short period of time
	Transportation materials	Egg box	NA	NA		
		Milk container	NA	NA		
	Feed management	Pasture improvement	NA	NA	Technologies related to feed and feeding need to be introduced	
Crop-residue treatment		NA	NA			
Market constraint	Market access to products		3	1	Common and permanent market place need to be constructed, market outlets need to be increased in number	
	Agro processing		8	8		
	Institutions		6	5		Developing infrastructural facilities especially transportation and networking
	Information		1	3		
	Quality		4	7		Product quality control and quality improvement need to be enhanced
	Pricing		5	4		
	Transportation		7	6		Using alternative market outlet
	Seasonal demand		2	2		Producing seasonal product if possible
	Credit	Credit access	2	2		Build up good awareness
		Knowledge gap	1	1		Build up good awareness

Source: own survey, NA=Not available

3.2.3 Poultry production

3.2.3.1 Chicken Breeds

Chicken have important value as a source of egg and meat for home consumption and to generate income after selling eggs and live chicken. There are local and exotic chicken breeds in the area and, the exotic breeds are very susceptible to different diseases. Red exotic chicken have high preference by farmers due to their high market price and less attacked by predators. Farmers providing feed for their chicken from locally available crops such as maize and haricot bean and it is gridding in to small particles and provided to chicken as supplementation. The main problems of poultry production in the areas are diseases, predators and poor genetic potential of local chickens. The major diseases

occurred in the areas in order of importance are Newcastle, fowl pox and coccidiosis. Predators that attack chicken in the PA are wild cat, skunks, and larger scavenging birds. Age at sexual maturity of local breed chicken is 5-6 month, the number of times the hen hatches in a year in average estimated to be 4-5 times. A local chicken lays in average 10-12 eggs in one clutch and less than half of the total number will survive and grow to adulthood because of disease and predators. From exotic/cross chicken 25-35 eggs lays in average per clutch. However exotic/cross poultry breeds didn't stop to lay egg if there full management (feeding, housing and watering). Extension services related to poultry production and productivity has not been delivered too much.

Table: 5 General constraints and challenges in ruminant animals, poultry production and apiculture management and marketing in order of importance

Major Constraints in ruminant animals	Priority/ rank	Major Constraints in poultry production	Priority/ rank	Major Constraints in apiculture	Priority/ rank
Feed/forage/	1 st	Disease prevalence	1 st	Deforestation of bee flora	1 st
Animal health	2 nd	Breed/ variety	2 nd	Spread of toxic plant	2 nd
Breed/Variety	3 rd	Feed shortage	3 rd	Predator	3 rd
Market constraint	4 th	Predator	4 th	Poor awareness	4 th
Technological constraint	5 th	Market	5 th	Technological constraint	5 th

Source: Own survey

Table: 6 General prioritizing Livestock production constraints, screening options and interventions

Parameter	Major Constraints	Cattle	Poultry	Suggested research options/technological interventions in priority
		Priority / rank/	Priority/ rank/	
Lack of improved Breed/Variety	Problem Access to breed	1	3	- introduction of improved animal breed which suits the area
	Knowledge gap	2	2	create awareness to the peoples to enter modified production system
	Adaptability	4	1	- introduction of improved animal breed which suits the area and develop good management system
	Institutional	3	4	- provision of suitable shelter during the adverse environmental conditions
	Productivity	5	5	Developing infrastructural facilities especially transportation and networking
Shortage of Feed	Access	1	2	- provision of suitable shelter during the adverse environmental conditions
	Knowledge gap	2	1	Prepared feed storage and stored when feed is available
	Institutional	5	No problem	create awareness to prepare hay making and crop-residue treatment
	Productivity	4	No problem	Developing infrastructural facilities especially transportation and networking
	Quality	3	No problem	Using different feed treatment method
	Price	No problem	No problem	Pasture improvement practice
				-

Parameter	Major Constraints	Cattle	Poultry	Suggested research options/technological interventions in priority	
		Priority / rank/	Priority/ rank/		
Lack of Forage	Access	1	NA	-introduction of improved forages and animal breed which suits the area	
	Management	3	NA	-Feeding system should be improved, improved forages need to be introduced	
	Knowledge gap	2	NA	Awareness creation	
	Adaptability	No problem	NA	-	
	Productivity	No problem	NA	-	
	Quality	No problem	NA	-	
	Institutions	No problem	No problem	-	
Animal health	Access	1	1	- Identify type of diseases occurred in the area and designing possible prevention and control system - Annual vaccination program for identified disease - Ectoparasite control program should be implemented	
	Knowledge gap	3	2	provision of suitable shelter during the adverse environmental conditions and good housing system can prevent night predators	
	Institutional	2	3	Developing infrastructural facilities especially transportation and networking	
Technological constraint	Processing	Yoghurt	NA	NA	Technologies related to processing Dairy products need to be introduced
		Cheese	NA	NA	
		Butter	NA	NA	
	Transportation materials	Hatchery	NA	NA	- Need to sell out as fast as possible in short period of time
		Egg box	NA	NA	
	Feed management	Milk container	NA	NA	Technologies related to feed and feeding need to be introduced
		Pasture improvement	NA	NA	
	Crop-residue treatment	NA	NA	Technologies related to feed and feeding need to be introduced	

Parameter	Major Constraints	Cattle	Poultry	Suggested research options/technological interventions in priority
		Priority / rank/	Priority/ rank/	
Market constraint	Market access to products	4	4	Common and permanent market place need to be constructed, market outlets need to be increased in number
	Agro processing	8	8	-
	Institutions	5	5	- Developing infrastructural facilities especially transportation and networking
	Information	1	3	- permanent market place and time schedule should be known - Total market chain need to be improved
	Quality	6	6	Product quality control and quality improvement need to be enhanced illegal traders and broker should be band and control system need to be implemented
	Pricing	2	2	
	Transportation	7	7	Using alternative market outlet
	Seasonal demand	3	1	Producing seasonal product if possible
	Credit	Credit access Knowledge gap	2 1	2 1

Source: Own survey, NA: not available



3.2.4 Apiculture Production

Beekeeper's of these area follow traditional production system by hanging their hive in forests. In this area, both transitional and modern hive is not introduced yet. As the respondents said that, trend of keeping bees is decreasing from time to time because of deforestation of bee floras. As a result, unwanted vegetation and toxic plants speared over there. Ants and honey baggers are some of enemies that hinder the production. Absence of training; awareness creation and modern technology interventions are the main constraint of this sector.

3.2.5. Livestock Husbandry Practices

3.2.5.1 Feed and Feeding

Feed is very crucial raw materials to keep animals alive and productive. The main source of feed in the area is natural pasture and grazing. Crop residues like maize Stover, haricot been, sorghum and Stover help to fulfill animals feed requirements in very rare circumstances. Local trees and shrubs in the area such as Girar, Girawa, Banana leaf, Gumza and Geda are also used as feed. Even though, in the areas grazing on communal and private land has been practiced majority kebeles have not communal grazing land that farmer use for cattle keeping commonly in both season. In both dry and wet season animal management system (feeding, watering, and housing) are almost similar. Animal feeding systems are mainly free grazing/browsing. Tether feeding system also practiced especially in cropping season. In addition hay making is not practiced and known in the area. Farmers have been practiced supplementary feeding during pre-weaning and lactation period. Majority of farmers have private land that naturally grazing and browsing and for grass/forage development for their livestock with area coverage of 0.125 to 1 ha especially in low-land and mid-land part of the area.

Farmers of the PAs does not introduced to any species of improved forage so, it needs extra effort to introduce improved forage species. However, in some kebeles improved forages like elephant grass and desho grass have been accessed and planted on kebeles FTC level. These improved forage seed were offered from agricultural office and from neighbor farmers but the supply was insufficient however the demand has been increasing. Especially in lowland area except elephant grass noting were developed. In the area industrial by product feed like wheat brain, oil seedcake and molasses were unknown. The main water source of the area is river, stream and pond, but the farmers face challenge of water shortage in dry season (January-march) when the river streams get shrink and dry.

3.2.5.2. Housing

Majority Farmers are not construct formal and permanent house for their animals because of that all livestock species are remain in the field/outdoor without any properly constructed shelter. However, some farmers are housing their animals separately for sma5l and large ruminants.

3.2.5.3. Livestock Health

Livestock diseases are the main problems which hamper production and productivity by causing high morbidity and mortality in the area. The existing health problems are very wide and too diversified. Inadequate health posts with poor internal facilities to provide basic services. Inadequate number of trained human resources, Poor supply of drugs and vaccines. Poor annual vaccination programs leads to disease out breaks which causes high mortality.

The main cattle diseases that occur frequently in the area in order of importance are trypanosomiasis, anthrax, blackleg, FMD, CBPP, and fasciolosis. When animals get sick owner always prefer going to animal health posts to be treated and cured rather than treating their animals in a traditional way. Disease out breaks occurs every year following the starting of the rainy season (March- June).

Ecto-parasites such as tick, mange mite, lice, biting fly, Aleket and ant are the most prevalent and common parasites in the area. Internal parasite fashola, heamoncus, and intestinal worms were most prevalent parasitic diseases. Common poultry diseases that are dominant in the area were bacterial, viral and parasite/ such as coccidiosis, Newcastle (NCD), Fowl fox and cholera (fowl typhoid). Chicken lice are the most prevalent chicken parasite. Predator and postharvest handling is another main challenging problem in some low land area. Predators that attack chicken in the area are wild cat, skunks, and larger scavenging birds. Most dominant sheep and goat diseases in the area are ovine pasturlosis, fluke (qezen), cenorois (Azurit), Orf, FMD and anthrax. Lice and tick are the common parasite for sheep and goats.

3.2.6. Marketing of Livestock

The primary market for live animals and livestock products is jinka market, and then traders and hotel owners are purchased the animals and byproducts. Therefore the major actors in the market chain are merchants, brokers and customers. Products like milk, butter and cheese are marketed only in rainy season where the amount of milk production is high, so that in dry season where milk production is very small in quantity even not sufficient to full fills the demand for house consumption animal products are rare to sell. Hide and skin was not sold because of there is not any available hide and skin market and they simply used

for bedding. Access to market information is poor. Generally the system lacks market orientation which is an important driving force for increased production. Marketing of live animals is taking place in villages and in jinka market. There have enough outlets and channels to sell their livestock products. Livestock and livestock products price has varied from season to season seasonal i.e. animal products get cheaper during rainy season where the availability of feed and water is much excess (march– June). Live animals also sold with high price during Festive holidays.

Accordingly, the major marketing constraints that raised during group discussion were as follows:

- Traders and brokers problem
- Barriers to new traders that enter into the market from other area such as traders from Wolaita, Gamgofa and others.
- Price decline and lack of market information
- Lack of market access and infrastructure
- Quality problem and shortages of supply
- Lack of credit access and awareness
- Double taxation problem per live cattle
- Market price fluctuation, low price of livestock products and live cattle
- Absence of receivers for livestock products and live cattle
- Shortages of supply and existence of few traders in the area

3.2.7 Milk processing

The main milk products are butter, cheese. Better is produced in the following steps. Milk is collected and stored in gourd for two days before processing in to butter. Then milk is shuddered for hours; butter separated from the liquid milk by pouring it in wider bowl and cleans hand. Butter is washed with clean water to remove the milk. Local cheese is prepared by using milk left after butter is taken. The butter milk is heated on fire with dish and cooled for some minutes near the fire. Then heated milk is filtered to separate solid residues from the liquid. This solid residue locally named '*Ayib*' is stored in pot as cheese. Local cheese is favorite food of the pastoralist like other milk products. It is not sold to the market because it is produced in a very small amount. *Yellowish* butter gives more value than *white* butter in local /village market due to its appetizing and tasty nature after it is fermented.

3.2.8 Gender role

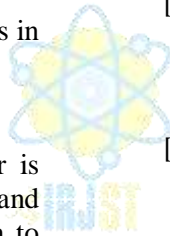
Men are mainly responsible for keeping and feeding livestock, make decisions on the use and disposal of live animals. Whereas women is responsible to sold animal byproduct (milk, butter and yoghurt, egg) and chickens.

3.2.9 Opportunity for livestock production/ Potential resource / in Debub-ari District

- Availability of land to be irrigate / in some high land area/ water fed land
- Good Community team sprit to change
- Accessibility of Road
- Enough livestock number
- Good awareness
- Presence of enough family labor force
- Good environmental condition (especially highland and mid-land area)
- Motivation of farmer and worda agricultural office for change

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