Journal of Economics and Sustainable Development
ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online)
Vol.7, No.23, 2016

Evaluate Perception of Crossbred and Indigenous Dairy Cow Managed Under Smallholder Farmer in Endamehoni District, Southern Zone, Tigray, Ethiopia

Mebrahtom Bisrat
Department of Animal Science, Maichew ATVET College, Tigray, Ethiopia
Corresponding Author: Mebrahtom Bisrat, Department of Animal Science, Maichew ATVET College, P.O.Box 67, Maichew, Ethiopia

Abstract
The study was conducted in Endamehoni District Sothern zone of Tigray region, Ethiopia. Objective of this study was to investigating perception of indigenous and crossbred Dairy cow Managed under smallholder farmers in Endamohoni District. The total sampled numbers of household's was 180 dairy cow owners, 90 each from indigenous and crossbred dairy cow owners respectively. The primary data was collected using semi-structured questionnaire and interview. For the analysis descriptive statistics such as frequency, percentage, mean, and standard deviation was used. The study was carried out in Endamehoni District Sothern zone of Tigray region, Ethiopia. Objective of this study was to evaluate perception of indigenous and crossbred Dairy cow Managed under smallholder farmers in Endamohoni District. The total sampled numbers of household's was 180 dairy cow owners, 90 each from indigenous and crossbred dairy cow owners respectively. The primary data was collected using semi-structured questionnaire and interview. For the analysis descriptive statistics such as frequency, percentage, mean, and standard deviation was used. Secondary data was collected from different sources to proportion the data obtained from the survey. Before conducting formal survey, pre-test was carried out on the sample of respondents undertaken by using interview with households and key informants. For the analysis descriptive statistics such as frequency, percentage, mean, and standard deviation was used. Indigenous breeds were highly preferred by farmers for their excellent attributes of low feed requirements, high disease resistance, easily availability at the market and good drought resistance ability. Adopters of crossbred Dairy cow were preferred on productive, reproductive performance and income from sale of crossbred cows. The result shows that, significant difference at ($P<0.01$) level of the non-adopter and adopters of indigenous and crossbred Dairy cow. The farmer's perception on the preferences of indigenous and crossbred cows based on those parameters had shown significant at ($p<0.01$) differences. Accordingly the smallholder farmer cattle breed preference perception measurement characteristics; the indigenous breeds were highly preferred by farmers for their excelling attributes of low feed requirements, high disease resistance, easily availability at the market and good drought resistance ability. Whereas, the major constraints of Dairy cow production in the study area were feed shortage, disease problem and lack of supplementary feed with technological constraints.
Keywords: perception, breed preference, age at first calving, lactation yield, income

Introduction

Agricultural growth is realized as a best of bet strategy for attaining food security because of the fact that, agriculture is central to the livelihood of more than half of the world's population According to (Adekambi *etal.* 2009). Growth in agricultural production can reduce food insecurity by increasing the amount of food available for consumption. This is particularly important for rural consumers whose food right is mainly based on own production.

Introducing of new agricultural technologies and improved practices play a key role in improving agricultural production as well as the national food security in developing countries. Anywhere, successful adoption of improved agricultural technologies could motivate overall economic growth through inter-sectoral linkage while conserving natural resources (Sanchez*et al.,* 2009).

In the majority of the rural areas of Ethiopia, livestock production plays important role in the provision of draft power, food, cash, transportation, fuel and especially in pastoral areas of social prestige. In the highlands, oxen provided draft power in crop production. In addition, dairy production plays significant role as a source of additional income to the farming community through sale of raw milk, processed milk products and live animals (EEA, 2002).

The dairy sector in Ethiopia is characterized by a small-scale subsistence milk production system and constrained mainly by low genetic potential of indigenous cows, disease prevalence and feed shortage. Therefore, strategies designed to develop the dairy sector should take into account the existing production characteristics of the area and should focus on a systematic approach to improve the identified limitations by involving all stakeholders in the formulation and implementation of improvement approaches (Asaminew and Eyassu, 2009).

Therefore, this study aims to comparatively evaluate productivity, reproductive performance and income

contribution of indigenous and crossbred Dairy cow on smallholder farmers in Endamehoni District.

Materials and methods

The study was conducted in Endamehoni district, southern zone of Tigray regional state of Ethiopia. Most of the population of the district depends on mixed farming system of crop and livestock production.

The crop-livestock mixed farming system is the prevailing agricultural practice in all the study districts in which livestock is considered as an important component. Smallholder farmers of the study districts owned various livestock species such as; cattle, sheep, goat, chicken, honey bee and equines. The major livestock feed resources in the districts are natural pasture, crop residues (wheat, barley, maize and Teff straws) and cactus pear. The main crops in the Belg season are barley, wheat and peas. Similarly, barley, wheat, maize, Teff, peas, lentils and Faba beans are the main crops cultivated during main rainy season of (June –September) Wheat, and barley are the main food crops while pulses are the main cash crop in the study area (BoARD, 2013).

The study was conducted in Endamehoni woreda with the adopter and non-adopter of cross breed dairy cows on small holder farmer. The District is potential in crossbred dairy cattle. In order to know the characteristic of indigenous and crossbred dairy cows in the District, proportional sample size of 90 indigenous and 90crossbred dairy cow household owners leading to a total sample size of 180 dairy cattle owners were selected. Sampling method was purposively considering the availability of indigenous and crossbred dairy cattle on the smallholder farmers prior to the data collection method. The proportions of the sample were 60 dairy cows 'owners. The data were collected using primary data collection method. During the survey study, data were collected from the selected households who have indigenous and crossbred dairy cow of District Endamehoni using questionnaire.

The data were collected using primary data collection method. During the survey study, data were collected from the selected households who have indigenous and crossbred dairy cow of district Endamehoni using questionnaire.

The questionnaire consisted information such as**;** household head characteristics, reared breed types, income source, system, extension service, credit service, breeding system, veterinary service, farmer's perception on indigenous and crossbred cattle and major constraint of dairy cattle production system. Productive and reproductive performance parameters of indigenous and crossbred dairy cows considered as the main components of the study. The productive performance parameters of cows were, the average daily milk yield (liter), lactation length (months), and lactation yield (liter). The studied reproductive performance parameters of cows included: age at first services (month), age at first calving (months), calving interval (months) and service per conception (number). Dairy cows were selected producing of calf at least from 2-3 calves. This is to show all the parameter in milk production in different calving time, to compare successive calving interval of each dairy breeds to show the full comparison method of these breeds on the smallholder farmers in the study area.

The secondary source of data such as total livestock population, human population, major crop type planted by smallholder farmers and location and physical characteristics of the district were collected from the district Bureau of Agriculture and Rural Development.

Data Analysis

Descriptive statistics such as tables (cross tabulation) to compare the proportion of indigenous cows owners and crossbred cows owners in respect of a particular household characteristics, livestock holding using measure of dispersion tools such as minimum, maximum, mean, frequency, percentage, standard deviation , to compare indigenous cows owners and crossbred cows owners.

Ranking method was used to rank the variables that prioritize by the small holder farmers like purpose of keeping cattle, major crop type and major constraints of indigenous and crossbred dairy cattle production in the study area of Endamohoni District. Majority of agro ecology study area was 60 percent highland, 35 percent mid land and 5 percent low land (BoARD, 2013). The agro ecological condition of the selected Tabia for the study was similar.

Perception evaluation on rearing of indigenous and crossbred cows

Smallholder farmers' perception on indigenous and crossbred dairy cows was conducted based on the evaluation criteria including: feed requirement, disease resistance, drought tolerance, adaptation ability, productivity performance, reproductive performance, easily availability and good price to sale. Attitude of adopters and non-adopters on indigenous and crossbred dairy cows were measured by simple descriptive statistics on reason of adopting and non-adopting of the crossbreds dairy cows. Attitude responses of sample respondents on crossbred dairy cows were collected using the following parameters. Those parameters area like low, poor, good, high, true, might be true, right, sometimes right, agree, disagree, no important, most important, correct, incorrect, less, high were using frequency distribution of the sample respondents on smallholder farmers in the study area.

Result

Table 1. Purpose of keeping cattle

Purpose keeping cattle	N	%	Rank
Milk	126	70	2
Milk product	111	61.7	3
Reproductive	104	57.8	4
Work/draft power	130	72.6	1
Meat	61	33.6	8
Breeding	88	48.6	6
Manure	82	45.6	7
Income	91	50.6	5

Source: own survey, 2014. N=Respondents

Table 2. Livestock holding on the smallholder farmers (TLU)

Livestock	Non-adopters (N=90)		Adopters (N=90)		Total(N=180)		t-test (p-value)
	Mean	SD.	Mean	SD.	Mean	SD	
Cattle	3.07	1.03	3.40	0.91	3.24	0.98	0.024**
Sheep	0.29	0.38	0.38	0.42	0.34	0.40	$0.139^{(ns)}$
Goat	0.05	0.16	0.04	0.16	0.05	0.16	$0.71^{(ns)}$
Chicken	0.03	0.03	0.04	0.05	0.30	0.04	$0.209^{(ns)}$
Donkey	0.47	0.46	0.51	0.4	0.49	0.42	$0.49^{(ns)}$
Horse	0.04	0.18	0.02	0.14	0.03	0.16	$0.47^{(ns)}$
Mule	0.03	0.14	0.007	0.07	0.02	0.12	$0.176^{(ns)}$
Camel	0.00	0.00	0.03	0.32	0.02	0.22	$0.31^{(ns)}$
Total livestock (TLU)	4.01	1.60	4.46	1.46	4.23	1.54	0.05**

Significant level: ** = P<0.05; ns=non-significant; N= Number of respondents; SD= Standard deviation

Table 3. Landholding and use patterns

Land holding and uses	Non-adopter (N=90)			Adopters(N=90)			Total		
	N	Mean	SD.	N	Mean	SD.	Mean	SD.	t-test (p-value)
Own land	90	0.60	0.28	90	0.57	0.25	0.58	0.27	0.576
Rent land	90	0.19	0.24	90	0.23	0.23	0.21	0.23	0.307
Total land	90	0.79	0.36	90	0.81	0.34	0.80	0.34	0.791
Total land for crop	90	0.69	0.31	90	0.77	0.36	0.73	0.34	0.103
Total land for irrigation	90	0.03	0.08	90	0.04	0.11	0.04	0.11	0.368

N=Respondents, SD=Standard deviation

Table 4. Major crop type grown in the study area

Crop type	N	%	Rank
Teff	62	34.4	6
Barley	150	83.3	2
Wheat	168	93.3	1
Maize	106	58.9	3
Pea	91	50.6	4
Bean	58	32.2	7
Chick pea	50	27.8	8
Lentil	66	36.7	5

N=number of respondents

Table 5. Access to different Institutional Services in the study area

Role of institution		Non-adopters		Adopters		Total		
		N	%	N	%	N	%	X^2(p-value)
Extension services	No	16	17.8	0	0.0	16	8.9	0.000***
	Yes	74	82.2	90	100.0	164	91.1	
Type of extension	Training	13	14.4	25	27.8	38	21	
	Awareness Creation	33	36.7	40	44.4	73	40,6	0.000***
	Input supply	5	5.6	24	26.7	29	16.1	
AI service	No	72	80	13	14.4	85	47.2	0.000***
	Yes	18	20	77	85.5	95	51.5	
Veterinary access	No	8	8.9	6	6.7	14	7.8	0.388
	Yes	82	91.1	85	94.4	167	92.8	
Credit services	No	29	32.2	24	26.7	53	29.4	0.005***
	Yes	61	67.8	66	73.3	127	70.6	

Significant level: ***= P<0.01, N=Respondents

Table 6. Marketing system of the study area

Marketing system	Non-adopter		Adopters		Total		
	N	%	N	%	N	%	X^2(p-value)
Market	27	30	25	27.8	52	28.9	
Rural consumer	19	21.1	14	15.6	33	18.3	
Market and cafeteria	3	3.3	15	16.7	18	10	0.038**
Market and rural consumer	17	18.9	15	16.7	18	10	
Market and seed collector center	24	26.7	25	27.8	49	15.6	

Significant level: **= P<0.05, N=respondent

Table 7. Perception of smallholder farmers on indigenous and crossbred dairy cow

Breed characteristics		Indigenous		Cross		Total		
		N	%	N	%	N	%	X^2(p-value)
Feed requirement	Very low	47	52.2	0.0	0.0	26	14.4	
	Low	37	41.1	0.0	0.0	29	16.1	
	Medium	6	6.7	12	13.3	47	26.1	0.000***
	High	0.0	0.0	44	48.9	44	24.4	
	Very high	0.0	0.0	34	37.8	34	18.9	
Disease resistance	Very poor	0.0	0.0	17	18.9	17	9.4	
	Poor	1	1.1	38	42.2	39	21.7	
	Medium	31	34.4	35	38.9	66	36.7	0.000***
	Good	35	38.9	0.0	0.0	35	19.4	
	Very good	23	25.6	0.0	0.0	23	12.8	
Drought tolerance	Always true	13	14.4	0.0	0.0	13	7.2	
	Sometimes true	15	16.7	1	1.1	16	8.9	
	Undecided	58	64.4	11	12.2	69	38.3	0.000***
	Mostly true	4	4.4	26	28.9	30	16.7	
	Not at all	0.0	0.0	52	57.8	52	28.9	
Adaptation Ability	Always right	10	11.1	6	6.7	16	8.9	
	Sometimes right	3	3.3	11	12.2	14	7.8	
	Un decided	8	8.9	13	14.4	21	11.7	0.109(ns)
	Almost right	23	25.6	18	20.0	41	22.8	
	Right	46	51	42	46.7	88	48.9	
Productivity	Agree	29	32.2	52	57.8	81	45.0	
	Disagree	18	20.0	0.0	0.0	18	10.0	
	Strongly agree	35	38.9	38	42.2	73	40.6	0.000***
	Most important	6	6.7	0.0	0.0	6	3.3	
	Not decided	2	2.2	0.0	0.0	2	1.1	
Reproductive	No importance	34	37.8	2	2.2	36	20.0	
	Least importance	39	43.3	7	7.8	25.6	46	
	Important	12	13.3	47	52.2	59	32.8	0.000***
	Most important	1	1.1	28	31.1	29	16.1	
	Undecided	4	4.4	6	6.7	10	5.6	
Easily accessibility	Less	1	1.1	36	40.0	37	20.6	
	Very less	0.0	0.0	47	52.2	47	26.1	
	Medium	20	22.2	7	7.8	27	15.0	0.000***
	High	58	64.4	0.0	0.0	58	32.2	
	Very high	11	12.2	0.0	0.0	11	6.1	
Good price to sale	Always correct	1	1.1	50	55.6	51	28.3	
	Sometimes correct	28	31.1	4	4.4	32	17.8	
	mostly incorrect	46	51.1	0.0	0.0	46	25.6	0.000***
	Not always correct	46	51	0.0	0.0	46	25.6	
	Not at all	46	51	4	4.4	7	9.4	

Significant level: *** = P<0.01;ns=non-significant N=respondent

Table 8. Major Constraints of dairy cattle production

Constraints	N	%	Rank
Feed Resource	156	87.6	1
Disease and parasite	131	72.8	2
Supplementary feed	89	49.4	4
Drought problem	109	60.6	3
Low breed performance	76	40.6	6
Technological awareness problem	80	44.4	5
Breeding problem	67	37.2	7
Veterinary services access problem	50	27.8	8

N=number of respondents

Purpose of rearing/keeping cattle

Cattle were reared in study area for different purposes (Table 1). The main farming system in the study area was mixed crop-livestock farming system. Therefore, the role of cattle in the study area is for work /draft power, for milk, milk product and for reproductive purpose as indicated by the response of the smallholder farmers. Male cattle were used as draught power source for crop production, cows also used as source of milk and stock replacement; therefore cattle were dominant in the study area. The relative proportion of oxen from the total cattle holding indicates, their major importance in draught power in the study area was (72.6%) and female cattle were used as source of raw milk (70%), processed milk products (61.7 %) and reproductive purposes (57.8%), respectively. This might be due to smallholder farmers were dependent on agriculture and using of mixed types of farming system to produce crop production by using oxen and livestock product and by- products for household consumption and income generation.

Livestock holding on the smallholder farmers (TLU)

The total TLU holding of a household in the study area was used as a substitute measure of household capital status. The study area was characterized by mainly mixed crop-livestock farming system. The average TLU of non-adopters and adopters were 4.01 and 4.46, respectively (Table 2). As it can be seen there, was statistically significant at ($P<0.05$) difference between non-adopters and adopters in cattle and total livestock holding in the study area. The variation of cattle holding in the study area between adopters and non-adopters may be due to the adopters are keeping indigenous breeds and the crossbred, whereas, non-adopters reared only indigenous cattle.

Land holding and use patters

Land ownership between non-adopters and adopters were mainly gained through inheritance from their ancestors or distributed land by the government. The average own land holding for the non-adopters and adopters group was 0.60 and 0.58 ha, respectively. Non-adopters and adopters groups have both rented and owned land in the study area to use for crop production and irrigation activities. In the study area the land use system for crop production and irrigation was 0.69 and 0.03 ha for non-adopters. Similarly, adopters use 0.78 and 0.04 ha land for crop and irrigation activities (Table 3).In the present findings, land uses system for crop production and irrigation activities between non-adopters and adopters was found to show non-significant ($P>0.05$) difference. Both non-adopters and adopters rented land for crop production in order to get additional income source. Similarly, non-significant differences were observed on the land holding of non-adopters and adopters. This could be attributed due to shortage of land access for expansion of agronomic practice in the study area.

Crop Production

The crop types grown and the priority for growing crops are presented (Table 4). Out of total 180 farmers, about 93.3% of the farmers cultivated wheat as their first priority crop followed by barley (83.3%) as the second priority crop, maize also cultivated as the third crop (58.9%). The present result showed that the major dominant crop grown by the smallholder farmers were wheat and barley as compared to other crops. This may be due to where agro ecology for the production of these crops better than the others. In irrigated area the respondents grow maize as main source of income and as animal feeds. In addition to scarcity of water in the irrigation systems, farmers preferred to cultivate maize which has low water requirements for their growth as compared to cultivation of different varieties of vegetables which consume more water.

Role of different institutions in the dairy sector

In the study area there are different governmental and non- governmental institutions (NGOS) which are operating in supporting of the dairy farming sector. These institutions play a vital role in terms of changing the livelihood of smallholder farmers through introduction of improved livestock to enhance the productivity and profitability of smallholder dairy farms. The governmental institutions are bureau of agriculture and rural development,

Agricultural research center which focus on agricultural service, veterinary services, introducing of new and improved technologies and experience sharing by using demonstration activities for model farmers. The non-governmental institutions are food for work, Relief Society of Tigray (REST) with corporation of small and micro finance enterprise to facilitate financial credit services. The types of new technologies that introduced in to the smallholder farmers in order to increase production and to alleviate poverty in the study area was distribution of crossbred dairy cow, improved chicken and improved forage seeds for animal feeds, improved seed varieties and fertilizers.

1. Agricultural extension services

Smallholder farmers' awareness for the existence of dairy production technology extension services in their district is shown (Table 5). Among the respondents, 82.2 % of non-adopters and 100 % adopters were getting extension services about dairy production technology, while 17.8 % of non- adopters and 0% of adopters confirmed that they were not getting of extension services. It was also seen in the study area, there existed statistically significant difference between non-adopters and adopters in extension service ($p<0.01$) probability level. The way of transmitting information about extension service from the extension agents and experts to the non-adopters and adopters in the study area were through training 14.4 % and 27.8%, awareness creation 36.7% and 44.4% in the study area. Availability of input supply like improved forage seed, crossbred dairy in the form of credit access 5.6% and 26.7% for non-adopters and adopters of the smallholder farmer in the study area. The majority of the extension service given for the non-adopters and adopters were 36.7% and 44.4 % in the form of awareness creation. This way of getting extension service on non-adopters and adopters were significance ($p<0.01$) probability level. The result shown non-adopters and adopters were variation due to the acceptance and resistance of technology on smallholder farmers in the study area. This to show that extension service varies between the non-adopter and adopters. This finding is in line with Zelalem, (2007) who reported that 22.64 % of non-adopters and 61.2 % adopters were aware of reality on small ruminant extension package. But the present result was lower than Getahun, (2012) who reported that the farmers' access to extension visits through the extension contact was 98% for participant and 97% for non-participant. This variation could be varying because of access of extension service for non- adopters and adopters in the study area were low. Awareness level of dairy production extension services of non- adopters are lower than adopters. Adopters have better exposure with extension agents to acquire the updated information in relation to agricultural technologies. This variation was due to the variation between adopters and non- adopters in actively accepting of improved technologies on their farm.

2. Artificial insemination services

As indicated in (Table 6), smallholder farmers of the study area had access for AI services of 20 % and 85.5 % for non- adopters and adopters, respectively. Adopters are more beneficiary of AI service than non- adopters. This result showed that significant ($p<0.01$) differences was noted on AI service access between adopters and non-adopters in the study area. This is one way of extension approaches to expand improved agricultural technologies among smallholder farmers. Few of the non–adopters were using AI services to improve the low genetic performance of indigenous dairy cow to get crossbred instead of purchasing of improved breed. The major reasons for low adoption rate of crossbred cows on smallholder farmers of the study area was associated with inadequate quality and quantity of feed resources, poor disease resistance and low drought tolerance capacities. The major problems pinpointed for the dairy package were irregular insect pests and disease, shortage of feed, inadequate veterinary service, occasional drought and shortage of grazing land. Farmers in the study area also suggest to improve the current participation level and constraints for improved dairy technology package, timely delivery of the packages based on farmer's needs, improve farmers access to veterinary services and alleviation of grazing land shortcoming.

3. Access of veterinary services

Veterinary service is one of the key issues to be addressed under the packages of improved livestock technologies especially in disease prevention and their control. Diseases prevalence at the smallholder farmer affects the productivity and reproductive performance of dairy cows, especially the crossbred cattle are more susceptible to diseases and this has resulted for low level of adoption rate of crossbred cattle by the farmers. Access of veterinary service in the study area showed non-significant difference between non-adopters and adopters (Table 6). This indicated that the veterinary services has well progressed to the required level along with the introduction of other improved livestock technologies. The respondent who got access of the veterinary services were 91.1 % and 94.4 % for non-adopters and adopters, respectively, while 8.9% and 6.7 % of the non–adopters and adopters had no access of veterinary services in the study area. The present finding was inconsistence with Getahun, (2012) who found that the availability to veterinary service is more, for participants (88%) than non-participant (81%) and found to be reasonable at the current situations. The result indicates that the awareness of smallholder have an interest to prevent and control of animal disease and the service given at Tabia level in order to reduce the mortality problem of the livestock in the district by the strategy of government policy.

4. Credit service

Availability of credit access for smallholder farmer in the study area is presented in Table 6. This is 32.2 % and

26.7 % had not access of credit service for non-adopters and adopters, while 67.8% non-adopters and 73.3 % adopters had access of credit service. From this finding there was significance ($p<0.01$) difference between non-adopters and adopters in credit access for purchasing of crossbred and improved agricultural technologies. The current finding was in line with Getahun, (2012) who reported that the availability of credit access for livestock extension packages for non-participants and participants was 18% and 28%, respectively. The major institutions which provide credit services in the study area for smallholder farmer were small and micro finance enterprise and save and credit unions. According to the respondents there was access of credit service to buy inputs like supplementary feed sources and crossbred for smallholder farmers in the study area.

Marketing

Smallholder farmers were interviewed about market access for their product and consumers to buy their product in the study area. This is related to the product of smallholder farmers producing crop product, live animal and livestock products and by-products on which they involved in marketing or not. All of the respondents pointed out that the market access and customers for non-adopters and adopters in the study area sold their product to different customers (Table 7), after subtracting their consumption share in year round. The majority of the market areas of the smallholder's farmers were in local market for 30% and 27.8 % followed by market and rural consumers for 26.7% and 27.8 % of non-adopters and adopters, respectively. This result showed that there was significant difference between non-adopters and adopters in marketing system of their product at ($p<0.05$) in the study area of the smallholder farmers. Smallholder farmers sold different types of product in order to gain additional income from crop, livestock sale; livestock product and by-product of the smallholder farmers are presented Table 8). This is due to non-adopters having lower income from livestock than adopters because of the low breed performance than high breed performance of indigenous and crossbred dairy cows.

Perception of farmers on indigenous and crossbred dairy cows

Farmers perception regarding the preferences indigenous and crossbred cows were evaluated on attributes such as availability of feed requirement, ability of disease resistance, ability of drought tolerance, ability of adaptation, productivity performance, reproductive performance and income from sale of these breed are presented (Table 8). The farmer's perception on the preferences of indigenous and crossbred cows based on those parameters had shown significant at ($p<0.01$) differences. Accordingly the smallholder farmer cattle breed preference perception measurement characteristics; the indigenous breeds were highly preferred by farmers for their excelling attributes of low feed requirements, high disease resistance, easily availability at the market and good drought resistance ability. Whereas, in terms of attributes like productive performance, reproductive performance and high income contribution from sale of live breeds, the crossbred cows were highly preferred by the smallholder farmers. The current result is in conformity with Quddus, (2012) who reported the main reasons for rejecting crossbred cows adoption was associated with high cost of inputs (86%), management complexity and high price of quality feeds and high cost of animal price (62.4%).

According to the overview of the smallholder farmers, non-adopters and adopters of with respect to the challenges of rearing of crossbred dairy cows were inadequate availability of feed in terms of quality and quantity, disease resistance problem, high price and not easily availability at the market. Even if the above mentioned problems were exist, adopters were adopting crossbred dairy cow due to the benefit gained with high milk productivity and the high demand better selling price crossbred cows/heifer gained farmers by adopt crossbred dairy cows.

Social acceptance of the indigenous and crossbred dairy cows in the study area

Small holder farmers have different source of income in the study area. The types of income source in the study area were income from crop sale, income from livestock sale income from off-farm activities are the major one of income source in the study area. From those income sources, livestock production especially adoption of cross breed have great contribution in the income variation of the small holder farmer's. According to the overview of the respondent's adoption of cross bred dairy cows were significance difference on productivity, productivity and sale of live animal in the market (Table 7). This way of response by the small holder farmers on adopting of cross bred dairy cows have a great contribution on income difference of crossbred rather than indigenous dairy cattle. While, the parameters of feed requirement, disease resistance and drought tolerance were, significance difference in the Table 7. Therefore the non- adopters of crossbred dairy cows resist in adoption of the improved breed due feed shortage, disease problem and drought resistance.

Adaptation performance of crossbred dairy cows

Throughout the world there are two types of cattle bred. Those are Tropical breed and temperate breed. Tropical breeds are types of breed which area found in Africa and temperate breeds are found in Europe. Those breed are adapted in different agro ecological zone of the world. Africa is in the tropics which is classification of different climatic conditions. Those breed that are found most of them are low production and reproduction traits and having

high disease resistance traits of those breed. Temperate breeds are found in temperate region which have high productive and reproductive traits but low disease and drought tolerance ability than tropical breeds. Therefore now days most of African counties are trying to introduce improved exotic breed through crossing of tropical breeds with temperate breeds. The aim of introducing exotic breed or crossing of tropical breeds with temperate breeds in improving of milk production, reproductive performance, adaptation ability of the crossbred in tropical countries and combination of both gene of the tropical and temperate breeds. From this finding the adaptation ability of cross bred in the study area was non- significance difference in Table7. This could be the combination of different genes; local gene with exotic gene, similar agro ecology was suitable for the better adaptation ability of crossbred in the study area.

Major constraints of indigenous and crossbred dairy cattle production

Smallholder farmers face a number of problems. The challenge has been to identify various constraints faced by both types of dairy farmers (crossbred keeper and non-keeper) in dairy production. Among the major constraints feed shortage in terms of quality and quantity was ranked as first problem by 87.6% respondents followed by diseases (72.8 %) as second problem and drought (60.6%) as third problem of the respondents in the study area. Breeding problem (37.2%) and veterinary services (27.8 %) were ranked as seventh and eighth constraints by the respondents (Table 8). In the study areas animals feed sources are entirely dependent on pasture grazing land and crop residues. However, the practice of improved forage cultivation remained low and this has motivated the supply of low quality feed resources. In addition, the grazing land areas has shrinked in the recent years because most of the grazing lands are substituted for crop cultivation purpose and this resulted in the shortage of feed supply. Similarly feed processing industries are absent in the study area. Most of the concentrate comes from Mekelle and Alamata wheat flour processing factories and the by-product of wheat used as animal feeds. The current finding was in line with Azage *et al*., (2013), Asaminew and Eyassu, (2009) and Belay, (2012) who reported that the major constraint of dairy cow production are shortage of feed resource, disease outbreak, lack of supplementary feed and problem of extension services (credit access, AI services, veterinary services, new technologies) and other related problems to affect the dairy production system on smallholder farmers. Those types of constraints might happen due to shortage of irrigation, grazing land, awareness and knowledge of the non-adopters and adopters, lack of industries to process animal.

ACKNOWLEDGMENTS

I am grateful to the Sweden International Development Agency in collaboration with Mekelle University College of Dry land Agriculture for fully sponsoring for my study and research work. Many thanks also go to the college of maichew agriculture and the school of graduate studies of Mekelle University for their contribution in the process of developing the research proposal and provision of various services. I greatly thank Endamehoni Woreda Office of Agriculture and Rural Development and all staff for providing necessary baseline data required for this study. I am also sincerely grateful to the farmers who participated in the study as they provide us their time without any incentive.

REFFERENCE

Adekambi, S. A., Diagne, A., Simtowe, F. P. and Biaou,G. (2009). The Impact of AgriculturalTechnology Adoption on Poverty: The Case Of, NERICA Rice Varieties in Benin. Contributed paper prepared for presentation at the International Association of Agricultural Economists' conference, Beijing, China, August 16.-22, 2009.

Asaminew Tassew and Eyassu Seifu *(*2009). Smallholder Dairy Production System and Emergence of Dairy Cooperatives in Bahir-Dar Zuria and Mecha Woredas.*World Journal of dairy and Food science,* 4 (2), 185-192.

Azage Tegegne, Berhanu Gebremedhin, Dirk Hoekstra, Berhanu Belay and Yoseph Mekasha 2013 Smallholder dairy production and marketing systems in Ethiopia: IPMS experiences and opportunities for market-oriented development Improving Productivity and Market Success (IPMS) of Ethiopian Farmers Project - International Livestock Research Institute (ILRI), Addis Ababa, Ethiopia. Working Paper No. 31

Belay Duguma 2012 Productive and reproductive performance and management practices of crossbred Dairy cow at Jimma College of agriculture and veterinary medicine dairy farm. International Journal of Current Research, 4, (1), 87-92

BoARD (Bureau of Agriculture and Rural Development)(2013).Annual report on Endamehoni District, Southern zone of Tigray, Ethiopia.

Ethiopian Economic Association - EEA (2002).A research report on land tenure and agricultural development in Ethiopia, October 2002, Addis Ababa, Ethiopia.

Getahun Degu (2012). Assessment of the Livestock Extension Service in Ethiopia: The Case of Southern Region. *International journal of scientific & technology research,* 1, 24-30. journal of D*airy Science*, 41,185-

187

Sanchez, P. A., Denning,G. L. and Nziguheba, G. (2009).The African Green Revolution MovesForward.*Food Security,* 1, 37-44.

Zelalem Tamrat (2007). Adoption of small ruminants' fattening package in agro pastoral areas, Mieso wereda, Eastern Oromia.MSc. Thesis, School of graduate studies, Haramaya University, Haramaya, Ethiopia