

Assessment of Problems Associated with Artificial Insemination Service in Selected Districts of Jimma Zone

Nuraddis Ibrahim, Reta Hailu and Abidu Mohammed

Jimma University College of Agriculture and Veterinary Medicine, Ethiopia

Abstract: Artificial insemination is recognized as the best biotechnological technique for increasing reproductive capacity and has received widespread application in farm animals. A cross sectional study was conducted from October 2013 to March 2014 with the objective of assessing the problems associated with artificial insemination service in three districts of Jimma zone. In this study, a structured questionnaire was used and 176 respondents (122 smallholder dairy farmers, 48 animal health and production professionals and 6 artificial insemination technicians were interviewed. Retrospective data study was also included in the study to evaluate the status of artificial insemination services in the study site. According to the study result, 41% of the smallholder dairy farmers have got artificial insemination services regularly and without interruption while 59% of them do not due to unavailability of artificial insemination technicians (27%), discontinuation of service on weekends and holidays 30 (24.6%) and lack of inputs 9(7.4%) with statistical significance between districts ($P<0.05$). Conception failure (18%), unavailability of artificial insemination technicians (9.8%), disease (15.6%) and both conception failure and unavailability of artificial insemination technicians (17.2%) were the major identified constraints of artificial insemination delivery system. From 72 nonsatisfied dairy farmers 45(62.5%) passed the date without breeding cows by artificial insemination and natural mating and also 27(37.5%) used natural mating and waiting the next time to use artificial insemination services and statistically significant difference was found among dairy farmers. Similarly from 50 satisfied dairy farmers 5(10%) passed the date without breeding the cow with Artificial insemination and natural mating and waiting the next cycle to use artificial insemination services. The awareness of the respondents toward inbreeding problem was 88.2% in Jimma, 76.2% in Seka and 66.7% in Kersa districts. As possible solutions, 8.3% of the respondents suggested providing of semen and necessary materials on time, 6.3% allocate adequate budget, 25% providing supports from the concerned body, 8.3% awareness creation to small holders about AI service, 10.4% expanding artificial insemination center in the country and 41.7% training artificial insemination technicians. Generally, the questionnaire surveys indicated that artificial insemination is not doing well in all the three districts of the zone. Therefore, artificial insemination service requires urgent measures to change the situation to achieve success.

Key words: Jimma • Artificial Insemination • Problems • Dairy Cattle

INTRODUCTION

Agriculture (Mainly crop and livestock production) is the mainstay of the Ethiopian economy employing approximately 85% of the total population. Livestock production accounts for approximately 30% of the total agricultural GDP and 16% of national foreign currency earnings [1]. The total cattle population for the rural sedentary areas of Ethiopia is estimated at

43.12 million, of which 55.41% are females [2]. Out of the total female cattle population, only 151,344 (0.35%) and 19,263 (0.04%) heads are hybrid and exotic breeds, respectively. This suggests that the total number of both exotic and hybrid female cattle produced through the crossbreeding work for more than four decades in the country is quite insignificant indicating unsuccessful crossbreeding through AI [3].

Corresponding Author: Nuraddis Ibrahim, Jimma University, School of Veterinary Medicine, P.O. Box: 307, Jimma, Ethiopia.
Tel: +251-0471116778, Cell: +251917808966, Fax: +251471110934.

In spite the presence of large diverse animal genetic resources, the productivity (Milk and meat) of livestock remains low in Ethiopia due to poor management program, poor genetic potential, in adequate animal health service and others [4].

In order to improve the low productivity of local cattle, selection of the most promising breeds and cross breeding of this indigenous breed with highly productive exotic cattle has been considered a practical solution [5]. Thus, the need for clear strategies for improvement and maintenance of indigenous cattle genetic resources is required along with clear breeding programs for sustainable genetic improvement. Artificial insemination, the most commonly used and valuable biotechnology [6], has been in operation in Ethiopia for over 30 years.

It has been described that the technology of AI for cattle has been introduced at the farm level in the country over 35 years ago as a tool of genetic improvement [7]. Thus, AI has become one of the most important techniques ever devised for the genetic improvement of farm animals. It has been most widely used for breeding dairy cattle and has made bulls of high genetic merit available to all [1].

The success rate of artificial insemination in Ethiopia is still low owing to a number of technical, financial, infrastructural and managerial and heat detection problems. And therefore the objective of this research work is to assess and identify problems and constraints associated with the artificial insemination service in selected districts of Jimma zone and to come up with pertinent and workable recommendations that could call upon decision makers and stakeholders to give the outmost attention to the AI service.

MATERIALS AND METHODS

Study Area: Jimma Zone, found in South Western Ethiopia, lies between 360 10' E longitudes and 70 40' N latitude at an elevation ranging from 880 m to 3360 meters above sea level [9]. Very currently Jimma Zone is divided in to 17 districts (hosting a total population of over 2.4 million, CSA[2] an agro-ecological setting of highlands (15%), midlands (67%) and lowlands (18%) [8]. Farmers in the area practices mixed crop-livestock agriculture. The zone is one of the major coffee growing areas of southwest Ethiopia; cultivated and wild coffee is a main cash crop of the area. Jimma zone is well endowed with natural resources contributing significantly to the national economy of the country. Major crops grown, other than coffee, are maize, teff (*Eragrostisteff*), sorghum,

barley, pulses (Beans and peas), root crops (Enset-false banana and potato) and fruits. Teff and honey production are another sources of cash after coffee. Enset (*Enseteentricosum*) is a strategic crop substantially contributing to the food security of the zone and is especially important in Setema and Sigimo districts (Highlands) [2]. According to JZMSR [9], the climate is humid tropical with bimodal heavy annual rain fall, ranging from 1200 to 2800 mm. In normal years, the rainy season extends from February to early October. The thirteen years mean annual minimum and maximum temperature of the area was 11.3° C and 26.2° C, respectively. The soil type of the study area is characterized with black to red soils. The total livestock population of Jimma zone is estimated to constitute, 2.02 million cattle, 288,411 goats, 942,908 sheep, 152434 equines, 1,139,735 poultry and 418,831 beehives [2].

Study Population: Artificial insemination (AI) personnel, animal health and production professionals (AHPPs) in Jimma University College of Agriculture and Veterinary Medicine, zone and district agriculture and rural development offices, dairy farmers in districts were represented in the study population.

Study Design and Methodology: A cross-sectional type of study supported by questionnaire survey was carried out in urban and rural smallholder dairy farms in selected site of Jimma zone to evaluate problems associated with Artificial Insemination (AI) in the study site. In the sampling procedure, the three major districts, which are major users of AI service in the zone, were purposively selected to conduct the study. Moreover, the specific study areas (Kebeles) were also purposively selected considering the same reason. Smallholder dairy farmers were selected randomly.

In questionnaire survey, 176 respondents (122 dairy farmers, 48 animal health and production professionals (AHPPs) and 6 artificial insemination technicians) were interviewed, accordingly. Hence, problems they faced were identified and evaluated after they are provided with questionnaire survey format and interviewed. In addition to this retrospective data was obtained from AI certificates and from inseminators recording books.

Data Management and Statistical Analysis: All data were entered in to Ms-Excel after the completion of data collection work from the study areas. Then the analysis work was done using SPSS version 16. The data was

summarized using descriptive statistics and chi square(X^2) in order to assess the association between different comparable variables.

RESULTS

From 122 dairy farmers 17 (25.0%) in Jimma, 25 (59.5%) in Seka and 8 (66.7%) in Kersa districts have got the AI service regularly and without interruption while 72 (59%) of the respondents couldn't get the AI service regularly due to shortage of AI Technicians 33(27%), discontinuation of service on weekends and holidays 30 (24.6%) and lack of inputs 9(7.4%) with statistical significant difference between districts ($P<0.05$) (Table 1).

The dairy farmers also indicated that 50(41%) of them satisfied while 72 (59%) of them were unsatisfied with the overall AI service due to varies reasons. From 72 non-satisfied dairy farmers 45(62.5%) passed the date without breeding the cow from AI and natural mating and also 27(37.5%) used natural mating and waiting the next time to use AI service and statistically significant difference was found among dairy farmers. Similarly from 50 satisfied dairy farmers 5(10%) passed the date without breeding the cow from AI and natural mating and waiting the next cycle to use AI service (Table 2).

Oestrus Detection and Time of Insemination in the Study Site:

The dairy farmers detect oestrus of their dairy cows by observing mounting of the cow on other animals (32.8%), vulva discharge (28.7%), bellowing (16.4%), swelling, redness and mucus discharge of the vulva (9%), restlessness and nervousness (6.6%), both restlessness and loss of appetite (4.9%) and decreased milk production (1.6%). They take their cows to the AI station for insemination.

When cows and heifers show heat at afternoon 4.1% of respondents inseminate their animals as heat is seen on it, 74.6% of them in the next day morning and 21.3% as AI technicians ordered them. When cows and heifers show heat at morning 4.1% of respondents inseminate their animals as heat is seen on it, 21.3% of them as AI technicians ordered them and 74.6% inseminate the same day in the after noon (Table 3).

The study has clearly confirmed that 88 (72.1%) of smallholder respondents indicated that they usually have herd health problems, which directly and indirectly have impacts on the efficiency of the AI service. Conception failure confirmed to be of major problem in the study area (Table 4). In relation to this, 29.5 percent of the farmers said that they do not have easy access to animal health services while 70.5 percent said they more or less get the service.

Table 1: Artificial insemination service in the study site

Location	weekends and holidays services		Shortage of AI Technicians		Shortage of In put	
	Total	No	Total	Yes	Total	Yes
Jimma	68	20(29.4%)	68	25(36.8%)	68	6(8.8%)
Seka	42	8(19%)	42	6(14.3%)	42	3(7.1%)
Kersa	12	2(16.7%)	12	2(16.7%)	12	0(0%)
Total	122	30(24.6%)	122	33(27%)	122	9(7.4%)
X2	p-value=		X2=35.9	P- value=0.000	X2=7.7	p-value=0.02

Table 2: Cows pass without breeding from AI and natural mating

Satisfaction	Pass without breeding from AI and Natural mating			x2	P-value
	No	Yes	Total		
Non-satisfied	27(37.5%)	45(62.5%)	72	11.533	.001
Satisfied	45(90%)	5(10%)	50		
Total	72(59%)	50(41%)	122		

Table 3: Awareness of time of insemination in the study site

Time of insemination	When cows and heifers show heat at afternoon	When cows and heifers show heat at morning
	No. of respondents (%)	No. of respondents (%)
As heat sign is seen on it	5(4.1%)	5(4.1%)
Morning of the next day	91(74.6%)	-
As the technician ordered	26 (21.3%)	26(21.3%)
The same day afternoon	-	91(74.6%)
Total	122(100%)	122(100%)

Table 4: Major AI service problems identified in the study site.

Variables	No. of respondents in each districts			Total No. of respondents (%)
	Jimma	Seka	Kersa	
Conception failure	10(14.7%)	11(26.2%)	1(8.3%)	22(18%)
In availability of AITs	9(13.2%)	2(4.8%)	1(8.3%)	12(9.8%)
Diseases	11(16.2%)	8(19%)	0(0%)	19(15.6%)
Both conception failure and unavailability of AITs	15(22%)	5(11.9%)	1(8.3%)	21(17.2%)
Total	45(36.9%)	26(21.3%)	3(2.5%)	74(60.7%)

Table 5: Inbreeding problem in the study area

Problems	Number of respondents			Total (%)
	Jimma	Seka	Kersa	
Low genetic improvement	15(22%)	9(21.4%)	2(16.7%)	26(21.3%)
Low milk production	20(29.4%)	8(19%)	2(16.7%)	30(24.6%)
Low adaptability	8(11.8%)	3(7.1%)	3(25%)	14(11.5%)
Low genetic improvement and milk production	8(11.8%)	11(26.2%)	0(0%)	19(15.6%)
All of the above	9(13.2%)	1(2.4%)	1(8.3%)	11(9%)
Total	60(49.2%)	64(26.2%)	16(6.6%)	100(82%)

Table 6: Dairy cattle diseases in the study area

Animal health problems	Number of respondents			Total No. of respondents (%)
	Jimma	Seka	Kersa	
Mastitis	22(32.4%)	4(9.5%)	2(16.7%)	28(23%)
Heart water and mastitis	18(26.5%)	4(9.5%)	0(0%)	22(18%)
GIT parasite and bloating Mastitis and problems associated with calving	3(4.4%)5(7.4%)	12(28.6%)7(16.7%)	2(16.7%)3(25%)	17(13.9%)15(12.3%)
Respiratory disease and mastitis	0(0%)	5(11.9%)	1(8.3%)	6(4.9%)

Table 7: Number of dairy cows inseminated and calves born between 2009/10-2013/14.

	Year of insemination				Total
	2010/11	2011/12	2012/13	2013/14	
No. of animals inseminated	130	237	405	549	1321
No. of calves born					
Female	35	69	95	180	379
Male	20	36	80	88	224
Total	55	105	175	268	603

Eighty two percent (82%) of the respondents identified the problems of inbreeding. The maximum perception of the respondents toward inbreeding problem was recorded in Jimma town 60 (88.2%) followed by Seka 32 (76.2%) and the least is recorded in Kersa district 8 (66.7%) (Table 5).

The major diseases reported in the study area were mastitis, heart water, gastrointestinal parasite and bloating, respiratory diseases and problems associated with reproduction (Table 6). In addition to the above problems, the way of communication systems and long distance travelling to the AI stations area were make the AI service challenge full for some farmers particularly those living in Seka districts. 73.8% of the AI users

contacted the AI-technician by cell phone, 23% of them took their cows to the AI station and 3.3% of dairy farm owners used to be visited by the AITs daily.

Retrospective data obtained from AIT recording book covering from year 2010/11- 2013/14 indicates an increment number of inseminated dairy cows from year to year. Similarly, as the numbers of dairy cows inseminated are increasing from year to year, the numbers of calves born are also increasing in relation to numbers of inseminated cows. The numbers of female calves born in every year is greater than the numbers of male calves born (Table 7). From January to April, 2014, 200 dairy cows inseminated and 130 of them become pregnant and 70 of them didn't conceive due to conception failure and heat

detection problem. In general, the result of this retrospective data revealed that the AI service at this study area is still at its infant stage and it requires urgent measures to change the situation and to achieve a success.

Almost all of the respondents (85.2%) isolated their cows from the male animals and 14.8% of them live the cows with male animals. When they face the repeat breeding problem, they use AI service repeatedly (62.3%) and natural mating (37.7%). In case of repeat breeding, the maximum perception of AI users toward using of AI again and again is recorded in Seka district 36(85.7%) followed by Kersa district 10(83.3%) and the least is recorded in Jimma 30 (44.1%) districts.

About 88.5% of the dairy farmers had an idea in the selection of the type of semen they use and 84 (68.9%) of them use milk production factors, 4 (3.3%) breed type and 34 (27.9%) of them use both milk production and breed type factors to select the type of semen. The results of the questionnaire surveys indicated that all farmers (100%) participated in the study confirmed their willingness to pay more fees for the service provided they get reliable, efficient and effective services. Majority of the dairy farmers were evaluating the efficiency of AITs in giving the service for them noncooperatively (65.6%) while 13.1% of the dairy farmers evaluate cooperatively and 21.3% of them didn't give any information how to evaluate the efficiency of AITs giving the service for them.

Results of questionnaires survey of the AITs revealed that 66.7% of the AITs evaluated the quality of training as good and 33.3% of them evaluated as very good. About 5(83.3%) of them responded that they never got on job trainings and no incentives at all. Two third (66.7%) of them were giving service on the weekend and holidays on personal agreements while 33.3% didn't give service. One third (33.3%) of the AI technicians complained that material inputs including liquid nitrogen is not readily available and the rest 66.7% disagreed with them.

Most of the AI technicians (83.3%) believed that there is a risk of indiscriminate insemination while 16.7% did not have any idea about the problem or believed it can be controlled. Two third of them said that they do believe that National Artificial Insemination Center (NAIC) is doing its responsibilities properly. 66.7% of AI technicians revealed that they don't get necessary supports by the respective district and regional bureaus of agriculture to perform their duties appropriately. Similarly, 66.7% said that AI service delivery is not consistent in their respective areas.

All of the AITs provide both stationed and mobile service delivery by using motor bike and they cover a maximum of 1-20 Km (66.7%) and 20-30 Km (33.3%) which is convenient for the service they deliver. The average numbers of cows being covered by AITs were ranged from 1-10 per day. However all of them thought that the number of services varied between seasons. All of them have no other job which affects their work.

The most obvious heat sign that have practical importance used by AITs is mucus discharge from the vulva 5(83.3%) followed by reddening and swelling of the vulva 1(16.7%). Four of the technicians said that they checked for heat before they inseminated and three also checked for pregnancy. All of them said that they wouldn't perform the insemination if the cow didn't show any signs of heat. Two third of the AITs (66.7%) revealed that cows that come to heat early in the morning should be inseminated on the same day afternoon and other respondents indicated that the cow should be inseminated after she is checked for estrus sign (33.3%). All of them said that they selected the type of semen or bull to be used. 83.3 percent of the AITs revealed that they are not satisfied and neither are they happy with their jobs as AITs because of the very little attention given to it by all responsible bodies.

From 48 respondents, 40(83.3%) of the Animal Health and Production Professionals (AHPPs) said that there are no functionally effective responsible bodies at zonal and district levels to coordinate the AI services and 20(41.7%) of them confirmed that no proper mechanisms of controlling indiscriminate inseminating. Moreover, it was found that there are problems associated with the AI service as regards to properly carrying out responsibilities by the NAIC (4.2%) and the zone/ district agriculture bureaus (70.8%). More than three fourth of the AHPPs confirmed that there are no appropriate collaborations and communications between the NAIC, zonal, district and other stakeholders at all. In relation to this, 29.2 percent of them didn't have any information about the semen obtained from NAIC is believed to be the desired quality or not. Almost all of the participants revealed that having a national responsible body (95.8%) and a national breeding policy in place soon (91.7%) is important to coordinate and assist the AI service, respectively. 87.5% of them said, AI service is not a success at national level in general and in study area in particular. Similarly, one fourth of the respondents explained there is no any control mechanism employed in region, zone or district to evaluate semen for quality in terms of health, reproduction, etc.

Animal health and production professionals raised inadequate budget allocation (8.3%), deficiency and irregular supply of inputs (liquid nitrogen and semen) (10.4%), shortage of AITs (31.3%), insufficient AI center (16.7%), insufficiency of concerned body support (12.8%) and poor awareness creation in dairy farmers about the AI service (16.7%) is the major problems associated with AI services in the study area. Similarly, 91.7 percent of them confirmed that lack of breeding policy, less nitrogen plant center, lack of attention and incentives to AI technicians, limitation of inputs and facilities, shortage of AITs and poor collaboration of government bodies with NGO's, community and other concerned bodies are the major problems associated with AI in the country in general.

DISCUSSION

Assessment of problems associated with artificial insemination services in Jimma zone was conducted on 122 smallholder dairy farmers, 48 animals' health and production professionals (AHPPs) and 6 artificial insemination technicians (AITs) supported by questionnaire survey in 3 districts. The present study revealed that 41% of the smallholder dairy farmers have got AI service regularly and without interruption while 59% of them do not due to unavailability of AITs (27%), discontinuation of service on weekends and holidays 30 (24.6%) and lack of inputs 9(7.4%) with statistical significance between districts ($P < 0.05$) which is higher than the result reported by Desalegn [3] (27.7 % and 72.3%) and Ephrem [10] (3.2% and 96.8%), at Kaliti and Wolaita Sodo towns, respectively. In this study, there was statistically significant difference in shortage of AIT ($P < 0.05$) among the districts, this might be due to uneven distribution of AITs and the number of dairy cattle owners in which in line with the findings of Desalegn [3] and Zerihun *et al.* [11]. Among the study districts, in Kersa district better AI service is given. The current study revealed that the AI beneficiaries use natural mating (22.1%) when the service discontinued due to different factors and postpone time of insemination for the next cycle of insemination (77.9%). These were the possible solutions of AI users when the service discontinuous due to holiday and absence of AITs during time of onset of heat which is comparable with the result reported by Milkessa [12] (20% and 78.6%), respectively at Ambo town.

From 122 cattle owners 72 (59%) were not satisfied in AI service and the cow and heifers were passing without breeding from AI and natural mating (62.5%) and used

natural mating (37.5%). There was difference among the study districts in pass without breeding and natural mating and used natural mating because, the assessment indicated that there were shortage of AITs and inputs and less service were given in weekends and holidays. This finding is in agreement with Zewdie *et al.* [7], Zerihun *et al.* [11] and IAEA [13]. On the other hand, 50 (41%) dairy farmers were satisfied with AI service that is in contrast with reports of Desalegn [3] (27.7%) and Zerihun *et al.* [11] (30.83%). The most outstanding problems of AI delivery system were conception failure (18%), unavailability of AITs (9.8%), disease (15.6%) and both conception failure and unavailability of AITs (17.2%).

The problem of repeat breeding was also mentioned by farmers and hence needs to be seriously addressed. High numbers of services per conception are the results of problems associated with poor semen quality, poor semen handling practices, discontinuation of incentives to AI technician, season of breeding, management factors in relation to oestrus detection, timing of insemination and skill of pregnancy diagnoses and poor insemination practices. Way of communication systems and long distance travelling to AI beneficiary area make the AI service challenge full for some farmers. As a result transportation, telephone, infrastructure and other agricultural practice need further attention for the development of AI activity. Efficiency of AITs and input for AI activity were also serious problems for AI delivery system [14].

Among the study districts in estrus detection about 32.8% of the dairy farmers detect their dairy cows by observing mounting of the cow on other animals, vulva discharge (28.7%), bellowing (16.4%), swelling, redness and mucus discharge of the vulva (9%), restlessness and nervousness (6.6%), both restlessness and loss of appetite (4.9%) and decreased milk production (1.6%). Our result is higher than that reported by Milkessa [12] with 16.9% for mounting of the cow on other animals, 10% for vulva discharge, 4.6% for bellowing and 3.1% for restlessness.

About 74.6% of AI beneficiaries inseminate their cows and heifers at the right time of insemination. Thus, when the cow shows heat sign in the afternoon of the day and morning, they allow their cow to be inseminated at early morning of the next day and late afternoon of that day, respectively. This result shows that one fourth of AI users inseminate their cows at the incorrect time of insemination which is lower than the finding of Milkessa [12]. This difference could be due to the awareness of the community to AI service. Due to

poor perception about time of insemination, the AI beneficiaries exposed to loss of time, money and energy to perform AI at the allocated center repeatedly. Having profound knowledge and skill on aforementioned points the best recommendable insemination time to achieve maximum conception rate was at standing heat (more specifically, from the middle of standing heat to 6 hrs after standing heat) [15]. The maximum perception of the respondents towards inbreeding problem was recorded in Jimma town 60(88.2%) followed by Seka district 32(76.2%) and the least is recorded in Kersa 8(66.7%) district.

The outcome of the assessment of AI technicians regarding to the evaluation of the quality of training, (66.7%) of them evaluated as good and (33.3%) of them evaluated as very good. Five (83.3%) of them responded that they never got on job trainings and no incentives at all. The study has found an alarming result with motivations of the AI technicians in which 83.3% of them have indicated that they are not motivated to work as AI technicians due to very little attention given to it by all responsible bodies. The situation is closely associated to the discontinuation of in-service trainings and incentive mechanisms. This is fully supported by the reports of the [16] that indicated a very high turn over of AI technicians all over the country.

Again, it was revealed that all responsible bodies is not giving proper attention to the AI service indicating that decision makers need to work hard to change the current situation of the AI operation at national level. It was found that 95.8% of the AHPPs and 100% of AI technicians supported the necessity of a national responsible body to coordinate the AI service. This result is in line with GebreMedhin [4]. Furthermore, the outcome of the study revealed that absence of appropriate collaboration and communications between the NAIC, zonal, district and other stakeholders consequently contributed to the unsuccessfulness of the service.

The retrospective data result covering from year 2010/14 to 2013/14 indicates that, as number of AI users increasing from year to year, the numbers of calves born also increasing in relation to numbers of inseminated cows. Even the numbers of AI users and calves born is increasing; the AI service at this study area is not at good stage. This might be due to poor heat detection, the farmers want to inseminate too young animals, poor semen quality, cows are in poor condition, management problem, diseases, efficiency of AITs and no record keeping by farmers.

The overall most outstanding constraints of AI service identified in this study area were deficiency of inputs (10.4%), insufficiency of concerned body support (12.8%), conception failure (18%), shortage of AITs (31.3%), poor awareness creation in dairy farmers about the AI service (16.7%), insufficient distribution of AI center in the country (16.7%), inadequate budget allocation (8.3%), disease (15.6%), problem of repeat breeding and ways of communication of dairy cattle owners with AITs. Moreover, according to this study result three fourth of the AHPPs confirmed there is no appropriate collaboration and communications between the NAIC, zonal, district and other stakeholders at all and 91.7 percent of them and 100% of the AI technicians indicated that lack of attention and incentives to AI technicians, limitation of inputs and facilities, poor collaboration of government bodies with NGO's, community and other concerned bodies and lack of breeding policy were identified as major problems. These findings are in agreement with the report of Gebremedhin [4], Zewde [17] and Zerihun *et al.* [11].

Regarding the possible solutions, providing of semen and necessary materials on time (8.3%), allocate adequate budget (6.3%), providing supports from the concerned body (25%), awareness creation to small holders about AI service (8.3%), expanding AI center in the country (10.4%) and training AITs (41.7%) were the possible solutions suggested by AITs and AHPPs.

CONCLUSION

Based on assessment of problems associated with artificial insemination service in three districts of Jimma zone; less than half of smallholder respondents have got the AI service regularly and without interruption. The most important constraints associated with AI service in the study site include conception failure, AITs problem, insufficiency of concerned body support, loss of structural linkage between AI center and service giving units, absence of collaboration and regular communication between NAIC, zonal, district and other stakeholders, lack of breeding policy, inadequate resource in terms of inputs and facilities and absence of incentives and rewards to motivate AI technicians. We recommend that AI service provision should be improved and functional breeding policy and strategy should be given at most priority.

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