

# Improving private AI services to dairy farmers through AI refresher training: lessons from Ethiopia

Asaah Ndambi, Jan van der Lee, Gamessa G. Ulfina, Tinsae Berhanu and Karin Andeweg



**WAGENINGEN**  
UNIVERSITY & RESEARCH



Ethiopian cattle are predominantly the indigenous Zebu breed, having advantages for local circumstances, but limitation in terms of low productivity. Genetic improvement has been recommended as a means of increasing the productivity of Ethiopian dairy animals along with management<sup>1,2</sup>. Artificial insemination (AI) is the most widespread and economical means of genetic improvement globally, be it for selection of indigenous breeds or for crossbreeding with exotic breeds<sup>3</sup>. However, the use of AI practices in Ethiopia is very low, as are availability of professional AI services. This Practice Brief assesses the work of recently trained private AI technicians and provides recommendations on how AI services and training in Ethiopia can be further improved to support the Ethiopian dairy sector.

## AI in Ethiopia

The indigenous Zebu breed accounts for about 98.56% of the total Ethiopian cattle population, while exotic breeds (mainly HF) and their crosses account for about 1.44% of the total cattle population<sup>4</sup>. The indigenous breeds have advantages of resisting high temperatures, drought conditions and diseases, as well as producing milk of higher fat content compared to exotic breeds. However, indigenous breeds also have some limitations. A study in 2014 revealed indigenous cows have a lower productivity of 403 litres compared to 2123 litres of milk per lactation for crossbreeds, a shorter lactation duration of 204 days compared to 325 days<sup>5</sup>; and later maturation, experiencing a late first calving at 54 months compared to 37 months for crossbred cattle<sup>2</sup>. Hence, crossbreeds have a substantial advantage for increasing productivity in the commercial dairy sector.

Despite the advantages, the Ethiopian artificial insemination (AI) sector has been found to be very limited in coverage and is estimated to cover less than 1% of all dairy animals<sup>3,4</sup>. The practice of AI in Ethiopia is constrained by several bottlenecks. A survey<sup>5</sup> conducted in 2015 showed that more than one fifth of farmers were not aware about the merits of AI and availability of such services, which was the major hindrance to AI use. Other reasons for reduced use of AI include poor conception rate, poor cattle management and poor timing of insemination which are closely linked to the lack of AI technicians in the neighbourhood and low skill levels of technicians<sup>6,7</sup>. For example, it was reported that in Tigray region, only 56% of inseminated cows became pregnant and only 37% of them calved of all registered inseminations in the region between 1992 and 2002<sup>8</sup>.

## Key messages:

- Artificial Insemination (AI) has great potential to improve productivity and profitability of dairy cattle in Ethiopia. However, the practice is very limited due to several reasons including the low skill levels and low density of AI technicians in dairy areas.
- Private AI technicians stand a great chance to provide more business oriented and efficient services to complement public AI service providers whose services are often cheaper but very limited in coverage.
- The AGP-LMD program has trained 356 practicing technicians and 13 new ones in order to boost the AI services provision potential in Ethiopia.
- Trained technicians indicated that trainings were very useful and strengthened their abilities in detecting heat, diagnosing pregnancy and handling semen which lead to improved conception rates, better communication with farmers, more demand for AI services and more income for AI technicians.
- Some limitations such as the availability of liquid nitrogen, availability of flexible transportation means for AI technicians, higher costs of private AI services compared to public providers still pose challenges to private AI service provision and need to be addressed.

## Training for private AI services

Artificial insemination service provision in Ethiopia is largely dominated by the public sector. It is predicted that the sector will achieve tremendous growth if the private sector would become more involved in providing these services. The Agricultural Growth Program – Livestock Market Development (AGP-LMD), in a bid to support genetic improvement in the dairy sector of Ethiopia, designed and offered two AI training courses; one for beginning AI technicians and another as a refresher course for practicing AI technicians. The trainings covered four regions; Amhara, Oromia, SNPP and Tigray. A total of 356 technicians attended the refresher training and 13 new AI technicians were trained by AGP-LMD between 2013 and 2017.

For this Practice Brief, 12 trainees from the refresher AI training and 20 farmers were interviewed one year after their training in order to assess the impact of the training on their work. Each of the interviewed technicians had many years of experience. They were working with between 50 – 2000 dairy farmers and carried out an average of between 50 and 120 inseminations per month.

The cost per insemination varied hugely among the technicians with the lowest charge for the service including transportation being 12 ETB (0.5 USD) and the highest being 270 ETB (12 USD).

The Practice Brief will discuss:

- 1) Impact of refresher training on the AI technicians
- 2) Impact of refresher training on dairy farmers
- 3) Discussion with a major AI service provider

The results are complemented with individual short stories of the trainees/AI service providers.



**Pictures:** Trainees of the AI refresher course

## Part 1: Impact of refresher training on the AI technicians

The interviewed trainees mentioned six main impacts of the refresher training on their work and AI technician. These impacts show the improvements that are needed to further develop the AI service provision in Ethiopia.

### 1. Better heat detection

Timely heat detection is a very important component of successful AI. The heat duration only lasts about 15 - 20 hours, with the standing heat only lasting 6-12 hrs on average depending on the breed. Once this is missed, it will take another three weeks to reach the next heat leading to increased costs mainly from feed during this period when they are not producing. The trainees were exposed to different methods of detecting heat in cows, especially for first heifers and cows that sometimes undergo silent heat. A rough calculation on an assumption of 30 ETB as feed costs per cow shows that the farmer can lose 650 ETB on feeding alone if he misses one heat period. In addition to extra feeding, there is lost production during this period since the cow stays dry. Therefore the importance of a proper and timely heat detection is vital for AI practitioners.

### 2. Better semen handling during insemination

Cattle semen is usually stored in liquid nitrogen at  $-196^{\circ}\text{C}$ , and before insemination it has to be thawed. Most technicians did not master the thawing process properly, which led to some unsuccessful inseminations. They were trained to thaw the semen to  $32^{\circ}\text{C}$ - $35^{\circ}\text{C}$  for a minimum of 40 seconds by immersing the straw in warm water. All of the interviewed technicians confirmed that this was quite a useful technique to them to follow. They also testified that the training greatly helped them in determining the right spot to deposit the semen during insemination, depending on the stage of heat.

### 3. Better pregnancy diagnosis

Once inseminated, a pregnancy diagnosis is recommended within two months for highly experienced and 3 months for AI technicians, to confirm that the insemination was successful. The insemination is repeated in the following heat cycle if pregnancy is not confirmed. Because of the small size of the embryo during the early weeks of pregnancy, technicians require special skills to rightly diagnose pregnancy of less than 2 months. Hence the technicians were also trained on how to properly diagnose early pregnancy.

### 4. Improved conception rates and increased demand for AI services

As a result of better heat detection, better semen handling during insemination and better management of the AI process in general, the trained technicians affirmed that after the training they attained higher conception rates

than before the training. This built the confidence of the AI technicians and led to increased trust between the technicians and farmers, which in turn led to an increase in demand for AI services from these technicians.

### 5. Better communication with farmers

Some of the skills gained by the AI technicians were passed onto farmers during farm visits. The AI technicians trained farmers especially on heat detection, which helped them determine the best time to call the technician. The technicians also gained skills in improving the reproductive performance of cattle through nutrition, which helped them in their discussions with farmers.

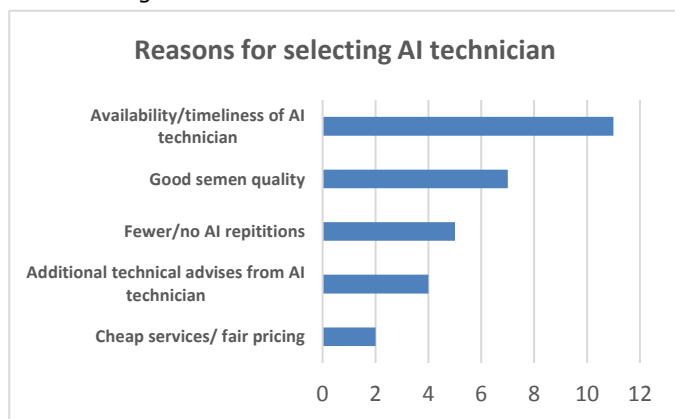
### 6. More income generation through training of other AI technicians

Some of the trained technicians made additional income from training other AI technicians.

## Part 2: Impact of refresher training on dairy farmers

### What influences the farmers' choice for services from trained technicians?

Discussions with twenty farmers receiving services from the twelve trained technicians showed that the technicians stand out from other technicians. The reasons for this are shown in Figure 1.



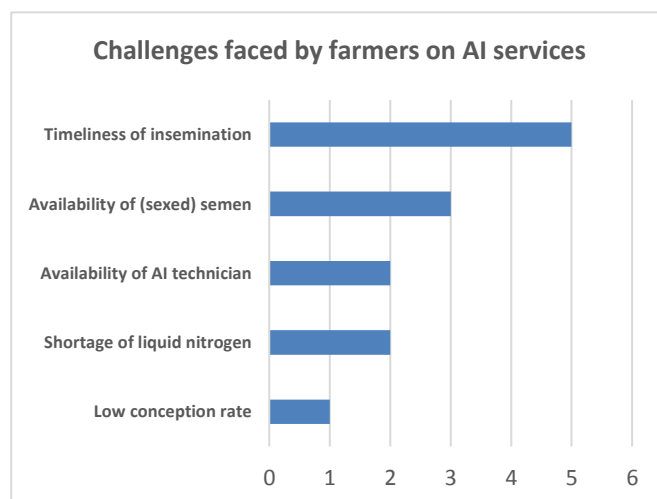
**Figure 1:** Frequency of reasons mentioned by interviewed farmers for selecting trained technicians.

Figure 1 shows that the main reason why farmers select a certain AI technicians is because the selected technician is available and arrives timely when called for AI services. Some farmers mentioned that these technicians could respond to calls very late in the night, which was very helpful to the farmers. It was also more convenient to use their services rather than covering long distances with the cow in search of a bull. The good quality of semen used by the AI technicians was the second reason why farmers took up their services, followed by fewer or no AI repetitions.

Farmers find AI services very costly and were more satisfied if the AI technician was skilled enough to need only one service to get the cow pregnant. Provision of other services besides AI was attractive to farmers as they considered this in selecting their AI technicians. Finally, a few farmers also considered the price of AI services when selecting technicians.

### Limitations to AI service provision

Despite the improved achievements of these interviewed technicians, AI technicians still face a number of challenges. They complained of the lack of semen during some times of the year, insufficient supply of nitrogen for storing semen, low conception rate and difficulties of transportation, especially to very remote areas where public transportation coverage is absent. The use of motorbikes would be a suitable option for transportation. However, some of the respondents alleged that their income from AI would not allow them to buy a motor bike.



The interviews with farmers receiving services from these technicians confirmed some of these challenges.

**Figure 2:** Frequency of various challenges with AI services faced by interviewed farmers.

Figure 2 shows that the major challenge of farmers regarding AI services is the timeliness of insemination. This is interestingly also the first reason they consider while selecting their AI technicians (Figure 1). Some farmers complained that they had more difficulties with timeliness of inseminations in the past than at present. The second most important challenge faced by farmers was the availability of semen - some wanted sexed semen in particular. The availability of AI technician and liquid nitrogen were the next most important challenges and finally, a low conception rate was the lowest ranked challenge. It should be noted that these results were obtained only from farmers who were already using AI services and the nature and frequency of the challenges could differ if dairy farmers were selected randomly.



**Picture:** Mr Worku Getachew from Debre Zeit was particularly impressed by learning the new way of thawing, traditionally he had practiced thawing within 15 seconds after removing the straw from the liquid nitrogen container. After the training he now keeps the semen in warm water for 45 seconds. He was also glad to have learned about the retained placenta treatment and removal techniques.



**Picture:** Mr. Mengistu from Sendafa highlighted that the training was very helpful, as it was very practical. By refreshing his knowledge on the reproductive organs, he could better practice insemination and attained higher conception rates. Through this, he has successfully increased the number of clients requesting his services.



**Picture:** Mr. Yalew from Sululta said that, in addition to thawing to the right temperature and for the right duration, he also learnt to deposit the semen at the right spot. Before the training, Mr. Yalew used to put the semen in uterus; after the training he now checks the stage of the heat before depositing the semen. If the cow is in early heat he would put the semen at the cervix gate, from it will flow into the uterus; if the cow is in proper heat, he would put the semen into the body of the uterus.



**Picture:** Mr. Abayneh from Addis recounts that he is able to give advice to farmers on how to follow up cows and on knowing the exact time to call the AI technician. He recounted that there are four phases in the oestrus cycle (proestrus, oestrus, metoestrus and dioestrus); the insemination time range is only during the oestrus phase, which lasts less than a day. He has trained his farmers to follow these stages and to call to him timely. With this, he has not only increased his number of clients, but he is able to get almost all of their cows pregnant without a repeat insemination.



**Picture:** Jibril from Adama said that the training had a significant impact on his ability to diagnose pregnancy in cows. This further increased the number of clients he was attending to, with some coming from other areas, e.g. from around Adama. Jibril, who also provides veterinary and farm advisory services, confirms that the pregnancy tests have helped him to gain trust from his clients.



**Picture:** Mr. Adugna from Holeta has improved his capacity through the training and the satisfaction of his clients also increased. He now works with 20% more clients than he did before the training. In addition, he organised trainings for other AI technicians.



**Picture:** Beyene, an AI technician from Sebeta town believes that due to different setbacks, such as unavailability of semen and nitrogen and inaccessibility of AI due to transportation issues, dairy farmers are not satisfied about AI service provision. He thinks that private AI technicians are in a better position to alleviate these problems.

### Part 3: Discussion with a major AI service provider (ALPPIS)

The opinions of Dr. Emiru Zewdie, manager of the first private genetic improvement company in Ethiopia were also sought. Dr. Emiru founded ALPPIS (Addis Livestock Production and Productivity Information Services) in 2009 and the company is now selling over 5000 doses of semen per year. He said that AI alone is not sufficient for a full time employment because private technicians have to compete with subsidised government AI technicians who inseminate almost for free.

Additionally, AI service provision would benefit from encouragement of the private sector by the government. He also reiterated that the insufficient supply of liquid nitrogen in the country is a major bottleneck to the provision of AI services in Ethiopia.



**Picture:** Dr. Emiru of ALPISS finds that the AI sector is not sufficiently monitored; farmers do not know what kind of semen is used for their cows, they leave these in the hands of the AI technicians whom they get to trust after seeing their outputs.

## Conclusions

AI has a good potential to improve productivity in Ethiopia. However, its use is limited in due to a few challenges related to infrastructure and the availability and skills of AI technicians. This study examined the impact of a refresher course on AI technicians. Generally, it was noticed that, attending the course increased the availability and skills of AI technicians in the following ways:

- They got more clients and spent more time performing AI services.
- They attained higher conception rates through better skills
- They made more income from providing AI services

Farmers using services from these technicians also confirmed their satisfaction on the quality of services they received. Despite this progress, other challenges still persist regarding AI service provision. These are: availability of liquid nitrogen, transportation of AI technicians, cost of AI services and the sex of calves. AI service are claimed to result in more male calves. However, this can be managed by use of sexed semen, which is even more expensive.

## Recommendations

For a better functioning AI sector it is recommended to train more AI technicians, facilitate private service providers, encourage/support breeding centres and companies that produce AI support material such as liquid nitrogen, AI kits etc. On the other hand farmers also need to be aware or the importance and benefits of using AI services so that they can use more of these services. It is also recommendable for the government to put in place a record keeping system for genetic material and control mechanism for AI services including a quality based pricing system for such services.

## Methodology of interviews:

### *General profile of AI technicians interviewed*

A total of twelve AI technicians from Oromia region were interviewed during the months of May – July 2017 using a semi-structured questionnaire with open-ended responses. Respondents were purposively selected and comprised of trained and practicing AI technicians who had received the seven-day refresher course in AI sponsored by the AGP-LMD project.

All interviewed technicians had at least a Diploma in veterinary sciences with a few of them having a university degree. Ten out of twelve respondents had over ten years of experience of practicing AI with the highest having 48 years of experience. Half the respondents practiced AI services (sometimes combined with veterinary services) as a full time job, most being private (self-employed) technicians. Each of the interviewed technicians was working with between 50 – 2000 farmers and carried out an average of between 50 and 120 inseminations per month.

## References

1. Alberto, M. and Haile-Mariam, S., 1982. *The indigenous cattle of Ethiopia*. Part II. World Animal Review 42:27-34
2. Chebo, C. and Alemayehu, K., 2012. *Trends of cattle genetic improvement programs in Ethiopia: Challenges and opportunities*. Livestock Research for Rural Development. Volume 24, Article 109.
3. Samre, M., Alemayehu, T. and Sisay Weldegebrie, S., 2015. *Major Constraints of Artificial Insemination in and Around Alamata District, Tigray, Ethiopia*. African Journal of Basic & Applied Sciences 7 (5): 287-290, 2015.
4. CSA (Central Statistics Authority), 2016. *Agricultural sample survey 2015/16*. Vol. II. Report on livestock and livestock characteristics. Addis Ababa, Ethiopia.
5. Kumar, N., Eshetie, A., Abreha, T. and Yizengaw, H.A., 2014. *Productive performance of indigenous and HF crossbred dairy cows in Gondar, Ethiopia*. Veterinary World 7(3): 177-181.
6. Bisrat, M. and Nigussie, H., 2016. *Comparative Evaluation on Productive and Reproductive Performance of Indigenous and Crossbred Dairy Cow Managed under Smallholder Farmers in Endamehoni District, Tigray, Ethiopia*. Journal of Biology, Agriculture and Healthcare. ISSN 2224-3208 (Paper) / ISSN 2225-093X (Online) Vol.6, No.17, 2016.
7. Yitayih, T.T., Moges, T.M. and Kebeto, U.L., 2017. *Review on Status and Constraints of Artificial Insemination in Dairy Cattle in Developing Countries: The Case of Ethiopia*. Journal of Biology, Agriculture and Healthcare. Vol.7, No.5, 2017
8. Ashebir, G., Birhanu, A. and Gugsa, T., 2016. *Status of Artificial Insemination in Tigray Regional State, "Constraints and Acceptability under Field Condition"*. J Dairy Vet Anim Res 3(3): 00078. DOI: 10.15406/jdvar.2016.03.00078

## Acknowledgements

We are grateful to Mesert Dugasa and Temesgen Ayele for supporting in conducting interviews and collecting data for this practice brief. We also acknowledge the contributions from Dr. Emiru Zewdie in preparing this brief. This practice brief has been written under the DairyBISS (Dairy Business Information Service and Support) project of Wageningen Livestock Research with financial support of the Embassy of the Kingdom of the Netherlands in Ethiopia. The brief has been written in collaboration with AGP-LMD. AGP-LMD also organised the AI trainings for all the respondents.

## Please cite as:

Ndambi OA, Van der Lee J, Ulfina GG, Berhanu T and Andeweg K (2017) *Improving private AI services to dairy farmers through AI technician refresher training: lessons from Ethiopia*. Practice Brief DairyBISS project. Wageningen Livestock Research, Wageningen University & Research, Wageningen.

**Photos:** Asaah Ndambi, Mesert Dugasa, Temesgen

## Contact

Wageningen Livestock Research  
Postbus 338,  
6700 AB Wageningen  
The Netherlands

Asaah Ndambi  
asaah.ndambi@wur.nl

[www.wur.nl/livestock-research](http://www.wur.nl/livestock-research)

Jan van der Lee  
jan.vanderlee@wur.nl