



Mass artificial insemination interventions to enhance dairy and beef production in Ethiopia

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The 'Improving the Productivity and Market Success of Ethiopian farmers' (IPMS) project was established in 2004 to help improve agricultural productivity and production in the country through market-oriented agricultural development.

A key intervention for dairy and meat value chains in Ethiopia is the use of genetically improved cows. According to the Ministry of Agriculture, there are about 30,000 crossbred dairy cows in Ethiopia. In contrast, Kenya has around 3 million crossbred dairy cows. It was therefore not surprising to find that stakeholders in the IPMS project districts identified the lack of genetically improved animals as a key constraint in dairy and meat value chains.

To address this bottleneck, the project partners initially experimented with private artificial insemination (AI) service providers, private bull stations and facilitating the purchase of crossbred heifers. Although some improvements could be observed, large scale impact would take a long time.



In discussions among project scientists, the use of mass insemination in targeted production areas using hormones to regulate the estrus cycle was discussed as an alternative option. In recent months therefore, the IPMS project with its partners tried and gained experience with mass insemination of cows in different milk sheds in various parts of the country.

Results are promising and the project will continue to assist the national and regional research and development partners in developing programs aimed at a more effective and efficient AI service delivery system. However other production, input supply and processing/marketing interventions (following the value chain approach) should complement the mass insemination intervention to reap the full benefits.

While the approach was first tested in fluid milk sheds in urban and peri-urban areas, it may also be used in rural areas where butter is the main dairy product and in areas where beef/live animals are the main production outputs¹.

Existing AI system in Ethiopia

Currently AI is undertaken by one or two AI technicians based in each District. They mainly provide services for dairy cows in urban and/or peri-urban areas – hence little or no AI services are available for the meat and butter value chains in rural areas. Cows which are in heat are reported to the AI technicians by the owners. Technicians usually visit the farm to inseminate the cow, or in some cases the farmer brings the cow to the District offices for insemination.

Based on studies/national statistics, each AI technician inseminates about 300 cows each year; the pregnancy rate after first insemination is around 27%. Considering that only half of the pregnant cows will deliver female calves, the annual output of an AI technician is estimated at about 41 female calves. Given the shortage of AI technicians, and the low output per technician, the impact of AI on the number of genetically improved dairy animals for fluid milk in and around urban areas is limited, and genetic improvement of dairy and meat animals in rural areas is almost negligible.

Mass artificial insemination

The mass AI intervention consists of technological, organizational and institutional changes.

1. The same approach may also be used to quickly multiply and rehabilitate breeds or breeds with specific genetic characteristics (trypano-tolerant Sheko breed)

Technologically, hormones are introduced to regulate the heat cycle of a cow. The use of hormones to regulate the heat cycles of animals is known and ILCA (among others) conducted research on this technology in the late 1980s and early 1990s. Some of the most common uses for the hormones in the Ethiopian context were to match calving rates with feed availability and to avoid high milk production during fasting periods. Another was to control heat period and allow more accurate AI services.

Organizationally, a highly qualified mobile team is introduced instead of static AI technicians and livestock staff in one location. Each mobile team should comprise two highly trained AI technicians and two extension specialists with livestock expertise, veterinarian, and a livestock researcher. Since, presently, no AI staff members are employed at regional and zonal levels, staff should be recruited from districts and assigned by the regional or zonal office of agriculture or the research institution.

Institutionally, the major change is the insemination of several cows at the same time in one location. This replaces the traditional approach of inseminating individual cows in different locations. The technological intervention linked to this institutional change is hormonal synchronization of the heat cycle of the cows to be inseminated.

To support this institutional change, extension needs to create awareness, understanding and interest on the purpose of the mass insemination in selected Districts and PAs (with the help of AI technicians). Once this has been accomplished, farmers are informed about the type of animals to bring for mass insemination, using technical criteria, including body condition score. Appropriate dates for mass treatment with hormones and subsequent insemination are set, as well as a location for the insemination. Appropriate animal handling facilities for the mass insemination have to be established or erected. All logistical arrangements for the hormone treatment and insemination have to be spelled out, including the responsibilities of the different partners, other than the mobile teams.

Veterinarians and AI technicians carry out the hormone treatment and inseminations on the planned

dates; including all the diagnostic work on the animals. For action research purposes, records for all cows offered for hormonal treatment and AI are kept by the livestock researcher; tags should be used to mark all 'treated' cows. Also, for action research purposes, pregnancy tests should be carried out two months after insemination.

Initial results

This mass AI intervention aims to improve the effectiveness of the insemination process (increasing pregnancy rate/first insemination) and the efficiency of the AI service delivery (more inseminations per AI technician).

Initial results indicate that pregnancy rates after first insemination can be improved from 27% to 62%, mainly due to the timely availability of well trained AI technicians at the time of planned heat period.

Efficiency results of mass insemination in two milk sheds showed that 200 and 175 animals could be treated with hormones and inseminated over a 2 week period, by 2 AI technicians per milk shed. This results in about 45 inseminations per AI technician per week – as compared to 6 inseminations per AI technician per week in the existing system.

A new round of action research on mass insemination took place in the past months with 1,400 animals based on i) an assessment of the initial results and lessons learned by the stakeholders (workshop); and ii) new knowledge and technology including the use of sex fixer to increase the probability of birth of female calves.



Regional governments are developing plans to scale out this new AI approach for both dairy and beef production.

Further improvement in the AI system's effectiveness and efficiency can be tested including: i) use of selected semen (local as well as exotic) of different breeds for the butter, milk and meat system; ii) use of sexed semen or sex fixer to increase the proportion of female calves born in the dairy system; iii) testing different organizational and institutional models for mass insemination including commercial mobile AI teams.

On 9 and 10 November 2011, the ILRI Board of Trustees hosted a 2-day 'liveSTOCK Exchange' to discuss and reflect on livestock research for development.