Capitalisation of Experiences in Implementing Genetic Improvement Programs in India – Role of Training and Education

A. Sudhakar[*], M. Kunju[*], G. Suresh[†] and G. Kishore[*]
[*]National Dairy Development Board, Anand, Gujarat, India,
[†] Vellore-Tiruvannamalai District Co-operative Milk Producers' Union, Vellore, Tamilnadu, India.

ABSTRACT: India is the largest producer of milk in the world. Before the launch of National Dairy Plan (NDP), there was felt need for better coordination among implementing agencies in genetic improvement. Intensive training programs, which focused mainly on technical skill development and need for dynamic animal records database with Management Information System (MIS) was identified as very essential for successful implementation of genetic improvement programs. National Dairy Development Board (NDDB) established an online animal performance database- Information Network for Animal Productivity and Health (INAPH). Farmers' were educated and intensive training was provided to AI technicians, milk recorders and the Veterinarians involved for successful implementation of genetic improvement program. The present results show higher conception rates in cattle (44.54%) and buffaloes (50.52%) were achievable in small holder production systems with resource poor farmers' through farmers' education, intensive trainings and proper utilisation of dynamic MIS.

Keywords : genetic improvement; training; INAPH

Introduction.

India is endowed with 72.95 million adult female cattle and 54.47 million adult female buffalo producing an estimated 132.4 million metric tonnes of milk in 2012-13 (Anon. (2013)), enabling India to be largest producer of milk in the world. These bovines are reared under different agro-climatic conditions by about 101.8 million households (Anon. (2006)). Though domestication of *Bos indicus* and Riverine Buffalo (*Bubalus bubalis*) happened in South Asia and instances of genetic improvement has been mentioned in early Indian literature, systematic recorded genetic improvement program started in 1870's with the development of Taylor breed in Patna. Under Indo-Swiss project, first frozen semen station was established in Kerala in 1966. The use of AI as tool for genetic improvement and concerted efforts in promoting AI for crossbreeding provided enabling environment for initiating field based Progeny Testing (PT) programs. Simultaneously under the "Operation Flood" program dairy co-operative societies were established at village level for providing access to market for milk and to provide various input services including AI. First field based young sire PT program was launched in Kerala for small holder production systems in 1977, which evolved the Sunandini breed. In 1987, NDDB initiated field PT programs under Dairy Herd Improvement Program Actions (DIPA) for Murrah, Surti and Mehsana breeds in Punjab,Tamilnadu and Gujarat, respectively through co-operative milk producers' institutions. Subsequently NDDB led the efforts in popularizing embryo transfer (ET) in cattle and buffalo from 1986 in India and by 1992 world's first buffalo calf was produced from transfer of frozen embryo (Kasiraj et al. (1993)). Simultaneoulsy Indian Council for Agricultural Research in collaboration with military dairy farms developed "Frieswal", a composite breed of cattle. But for such isolated developments, animal husbandry being a state subject, there was a need for better coordination among implementing agencies on genetic improvement.

Learnings from implementation of genetic improvement. Progeny testing programs implemented by co-operative milk unions were relatively more successful in testing the bulls as single agency coordinated breeding, milk recording, procuring and marketing of milk (Trivedi (1998)). But successful implementation of field PT was marred by factors like lack of exclusive field force for follow-up of animals for breeding and milk recording activities; minimal interest of farmers' in ear tagging and milk recording due to lack of effective extension services which could not properly communicate the additional returns the farmer might get with better animal management and need for participation in genetic improvement programs; non-availability of suitable software for verifying data quality. Lack of a dynamic Management Information System (MIS) suited to specific requirements for ensuring higher follow-up of daughters of bulls under progeny testing, till the completion of milk recording was another major impediment. Intensive training programs, which

focused mainly on technical skill development was identified as one of the main component for success and achieving sustainable impact in implementation of livestock component of Indo-Swiss projects (Wieser, Schneider and Walty (2000)).

Establishment of national dairy cattle database.
Collecting, collating and analyzing data from millions of farmers with few animals located far and wide apart was posing a challenge in implementing genetic improvement programs. NDDB initiated a robust online data capturing and analysis system for improving dairy cattle productivity through the establishment of a national dairy cattle database - Information Network for Animal Productivity and Health (INAPH) with capabilities for both online and offline capturing of data and INAPH-MIS in 2008. Data is recorded online using Personal Digital Assistant (PDA) and netbooks provided to AI Technicians (AITs) and milk recorders. In new projects, initially centralised data entry is done through desktop computers. This database is used for generating reports that are used for implementation and monitoring of animal breeding, ration balancing and animal health projects. INAPH is used for data capturing in National Dairy Plan (NDP). So far, 24,62,204 animals has been registered in the database.

National Dairy Plan. Considering the need for sustained genetic improvement, a holistic approach for production of high genetic merit bull calves, testing of bulls and production of high quality frozen semen doses, Government of India launched NDP in 2012 with International Development Association (IDA) credit to be implemented by NDDB. To ensure synergy in productivity enhancement programs, NDP has components on ration balancing and animal health activities also. These activities are strengthened by efforts in village based milk procurement and marketing.

Materials and methods.

Training and capacity building for genetic improvement. The successful implementation of any genetic improvement program depends on the providing sufficient training to the farmers, (AITs), milk recorders and the Veterinarians involved.

Increasing the awareness levels of farmers'. Access to information regarding animal performance is key to successful livestock production. But in small holder production systems, often farmers' do not maintain records of individual animals. Realizing the need for education and training, co-opting the farmers is ensured by providing door step extension services. Further, discussion on farmers' animal using individual animal reports from INAPH with specific information and informative milk recording cards elicits better cooperation and to implement immediate management interventions..

Training of technical personnel. Technical & behavioural competency assessments of officers and other technical personnel involved with implementation of genetic improvement programs are done prior to the initiation of such programs. Accordingly, orientation and refresher trainings are conducted to fill the knowledge and competency gaps necessary for each role. Though certified training programs are available for the AITs, opportunities for refresher programs and professional evaluation and recognition is usually very minimal in the dairy industry. The need for trainings can be gauged from the fact that cow conception rate vary from 25 to 70% between AITs in similar environmental conditions. Milk recording is a new activity in most of the areas where genetic improvement programs have been initiated since the launch of NDP. For all category of personnel involved, the trainings include both - on job training and theory classes. Since, all breeding transactions and milk recording activities need to be captured online into the national database – INAPH, all personnel involved with data generation and coordination of the activities in field are provided with netbooks and datacards with 2G internet connectivity. Most of the AITs and milk recorders possess minimal school knowledge, usually in their regional Indian language. Separate intensive training programs are conducted for recording data in INAPH and interpret the reports which require the technicians to get adapted to the forms and reports in English.

Provision of feedback. The AI delivery system in India has only recently started using the IT application for its monitoring and follow-up. Before introduction of IT, there was limited feedback to the personnel involved with data generation. Because of the dynamic nature of INAPH database and INAPH-MIS, a report on progress of any activity is generated on a real-time basis enabling the project personnel to identify and rectify issues immediately. Good feedbacks received from technicians were incorporated to develop new reports that help them in making better decisions.

Statistical analysis : Impact of training of managers, technicians and farmer education on conception rate and daughter registration was analysed by Pearson chisquare test.

Results and Discussion :

Case study report. Improved conception rate and higher female calves registered

The introduction of INAPH has helped the managers of AI service providers to give regular feedback to AITs regarding their conception rate, use of doses per AI etc. The case of Jersey crossbred progeny testing project implementation in Vellore and Tiruvannamalai districts of Tamil Nadu, India having 35 mobile AITs is discussed. The program started in October 2010 and INAPH implementation from January 2011. On analysis of reports, discussion in monthly meetings and random field checks, it was identified that many AITs were not properly thawing the frozen semen doses before AI. The thermometers provided to AITs were not being used regularly due to concerns of breakage and convenience. So, plastic card type thaw monitors was introduced and were provided sufficient training which was well accepted by AITs due to its convenience of use and utility. These feedbacks, regular field demonstrations and discussions with farmers' and AITs over a period of time have helped them make required correction in their practices and animal management. These guided interventions has resulted in increased conception of cows which was verified by per rectal examination of cows after three months and higher proportion of female calves registered (Table 1) indicating better coordination among the stakeholders. Similar efforts in a PT program for Holstein Friesian crossbreds (HFCB) and Murrah in Surat, Gujarat with same team of technical personnel for HFCB and Murrah, reported increased conception rates in HFCB from 43.66% (6953 AI) in 2008 to 43.86% (4884 AI) 2013(till February) and Murrah buffaloes from 48.08% (5205 AI) in 2008 to 50.52% (11925 AI) by 2012. Consecutively female calves registered in the PT program increased from 14.55% (2008) to 16.58% (2013) in HF crossbred and from 13.39% (2008) to 17.68% (2012) in Murrah. Project in Surat started in 2008 but INAPH was implemented from August 2009. Statistically significant ($P \leq 0.01$) increase in conception rate and daughter registration was observed over first year of project in Jersey crossbred and Murrah. In HFCB daughter registration significantly increased from 2008 but increased conception rate in HF crossbreds was not significantly ($P \leq 0.01$) higher.

The present results indicate that in better managed breeding programs increased conception rates and higher registrations of female calves were achievable in small holder production systems with resource poor farmers' through provision of timely input services, awareness camps, intensive trainings, adequate monitoring and proper use of dynamic MIS by all stakeholders. The results also showed that conception rates were higher in buffaloes than HFCB cattle. Higher increase in conception in buffaloes than HFCB cattle in well managed AI network indicated higher reproduction potential in buffaloes which was realized through thorough training of managers and AITs in proper use of MIS and farmers' education programs especially in identification of oestrus symptoms in buffaloes which is a seasonal breeder.

Table 1. Year-wise performance in Jersey crossbred Project

Parameter	2010	2011	2012	2013 (till February)
Number of AI	3944	21220	27454	2997
Number of Pregnancy	1484	8497	11772	1335
Overall conception rate, %	37.63	40.04	42.88	44.54
Female calves registered	402	2672	3623	413
Female calves registered, %	10.19	12.59	13.20	13.78

Conclusions. A dynamic management information system is highly essential for evaluating the progress of field level programs and to make necessary corrective measures. Further, achieving continued success in implementing genetic improvement programs requires intensive training and education of technicians and farmers'.

References.

Anon. (2006). NSS report no. 493. Government of India. P. 23-24

Anon. (2013). BAHS, Government of India. Part 2

Kasiraj, R., Misra, A.K., Rao, M., et al. (1993). *Theriogenology*. 39 : 1167-92

Trivedi, K.R. (2000). *ICAR technical series*. 3 : 455-467

Wieser, M., Schneider, F., and Walty, S. (2000). CAPEX. Interco-operation. P.59