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CONVERGENCE OF MULTI-STAKEHOLDERS FOR PREVENTION AND CONTROL OF SUB-CLINICAL MASTITIS (SCM) IN DAIRY ANIMALS


The convergence of multi-stakeholders, aimed at promoting integrated and participatory extension approaches, can achieve prevention and control of sub-clinical mastitis in dairy animals. Dr Prakashkumar Rathod and Dr K C Veeranna, share their experiences with convergence based on the Sujala-III project implementation in Karnataka (India).

CONTEXT

India is blessed with the highest cattle and buffalo population, but the productivity *per se* is very poor (Chander *et al.*, 2010) which might be due to factors like poor availability of improved breeds and breeding services, targeted preventive animal health care, better feeding strategies and access to formal credit facilities. Among all these factors, poor health of livestock (with innumerable diseases) causes considerably high economic losses to the predominantly poor, marginal and landless farmers. Among various diseases affecting the dairy industry in India, mastitis is one of the most important diseases affecting the dairy cattle and impacting the economic returns of the dairy farms (Chanda *et al.,* 1989) (Box 1). However, the dairy farmers lack information about the disease, and its prevention and control at farm level causing heavy economic losses.

Although, various extension services are delivered by multifarious agencies, viz., Directorate of Extension (Ministry of Agriculture), Indian Council of Agricultural Research, National Dairy Development Board, *Krishi Vigyan Kendra* (Farm Science Centre), State Agricultural and Veterinary Universities and State Department of Animal Husbandry, private agencies, Dairy Cooperatives and NGOs, the farmers still lack information about scientific technologies and practices. Further, due to lack of convergence among different agencies involved in dairy development, the scientific technologies and practices developed in the research institutes do not reach the end-users (Rathod and Chander, 2015). It has to be noted that, without convergence of efforts by varied public, private and other agencies, it is difficult to reach a large number of dairy farmers with new and improved knowledge of dairying (Dixit *et. al*., 2016).

Box 1. Mastitis and Subclinical Mastitis (SCM) in Dairy Animals

Among the animal diseases which affect the profitability of rearing animals, mastitis is considered to be one of the expensive diseases in terms of production losses (Bardhan, 2013). It is characterized by inflammation of udder tissue, causing pathological changes in udder parenchyma and characterized by physical, chemical and microbiological changes in milk (Radostitis *et al.,* 2000). Further, the mastitis milk is unsuitable for consumption and is one of sources of communicable diseases such as tuberculosis, brucellosis, staphylococcal toxemia, septic sore throat, gastroenteritis, etc. The magnitude of these changes in individual animals varies with the severity and duration of the infection and the causative microorganisms. These microorganisms directly damage milk-producing tissue of the mammary gland and contribute to decreased milk production and unhygienic or poor quality milk.

Scant literature is available on quantification of region-specific economic effects of subclinical form of mastitis (SCM) where visible abnormalities such as udder swelling, hardness of the affected quarter, pain and watery milk remain absent. SCM is of great economic importance to dairy farmers because it results in milk yield reduction and undesirable changes in the milk's composition (Halasa *et al.,* 2009), as well as increased costs associated with control strategies. In subclinical mastitis (SCM) there are no visible abnormalities in the udder tissues, except an elevated Somatic Cell Count (SCC).

We therefore emphasized on convergence of multi-stakeholders for enhancing the knowledge level of dairy farmers about mastitis and addressing the constraints faced by them in adoption of preventive and control practices of mastitis.

THE INITIATIVE

Sujala is a Watershed Development Project designed by the Government of Karnataka (http://watershed.kar.nic.in/website_dec2006/suj_hompg.htm) and implemented by the Watershed Development Department of Government of Karnataka, with tripartite cost-sharing arrangements. The World Bank, through the International Development Association, provided a major portion of the plan outlay as a loan to the Government of India, for further lending to the Government of Karnataka.

The key development objective of Sujala is to improve the productive potential of selected watersheds and their associated natural resource base, and strengthen community and institutional arrangements for natural resource management. An associated objective is to strengthen the capacity of communities in the project districts for participatory involvement in planning, implementation, social and environmental management and maintenance. The

implementing department operates in a more socially inclusive manner, within the framework of a convergent watershed development plan.

The project development objective of Sujala-III is to demonstrate more effective watershed management through greater integration of programs related to rainfed agriculture, innovative and science based approaches and strengthened institutions and capacities. The project is implemented in Bidar, Gulbarga, Yadgiri, Koppal, Gadag, Davanagere, Tumkur, Shivamogga and Chamarajanagar districts of Karnataka, identified by the Watershed Development Department based on water and socio-economic conditions.

The good practices discussed in this note are from the project villages of the World Bank funded, Karnataka Watershed Development Department sponsored - Sujala III project, implemented by the Veterinary College, Bidar which is under the aegis of the Karnataka Veterinary, Animal and Fisheries Sciences University (KVAFSU), Bidar (Karnataka) during last two years viz. 2015-16 and 2016-17. Further, the individual farmers and member farmers of producer organizations (for example: Karnataka Milk federation, Private milk societies etc.) were also part of this initiative. We undertook a study on this initiative to mainly understand the process and impact of this initiative (Box 2).

Box 2. Methodology of the Study

- Purposive sampling technique was used for selecting Bidar district since Sujala-III project was implemented in this district by Veterinary College, Bidar. A total of about 480 farmers from 10 project villages as identified by the Government of Karnataka were selected for this study. It was also noted that these farmers had milking animals during the study period and majority of them poured milk to the primary milk societies in their villages.
- Awareness programmes, trainings and demonstrations were conducted by the multi-disciplinary teams for the beneficiaries. A before-after research design was followed for the study to know the impact of these programmes on the knowledge level of the farmers.
- Pre-exposure and post-exposure knowledge tests were conducted for the beneficiaries, focusing on the objectives of the scheme, before and after conducting the awareness and demonstration programme. Further, retention level was tested 30 days after the training programme.

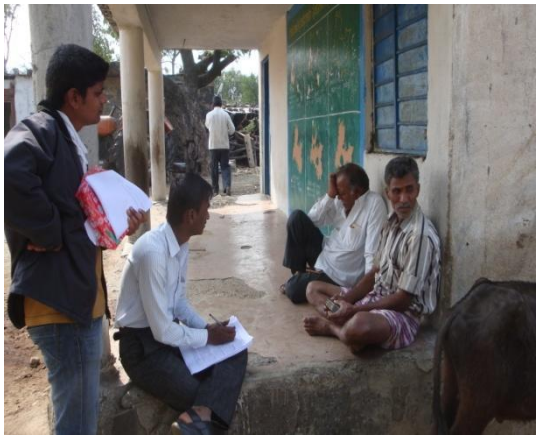
GOOD PRACTICES

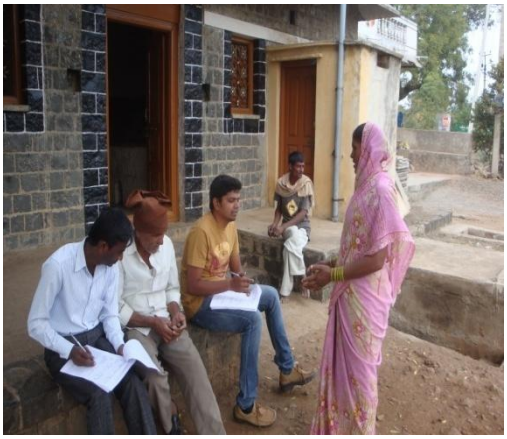
Convergence of multi-stakeholders: As discussed earlier, multifarious agencies viz. World Bank, Karnataka Watershed Development Department, Veterinary College, Bidar, Institute of Animal Health and Veterinary Biologicals Laboratory under Karnataka Veterinary, Animal and Fisheries Sciences University, Bidar, individual farmers and member farmers of producer organizations were involved in the project.

Technical staff/Human resource: The project involved technical staff of various stakeholders and a secretary of milk society or a local leader was nominated in the village to follow-up the activities. The secretary also guided the farmers as per the instructions of the experts in prevention and control of SCM.

Awareness programmes, trainings and demonstrations: Multi-disciplinary teams conducted awareness programmes and trainings for the beneficiaries on identified practices. Demonstrations

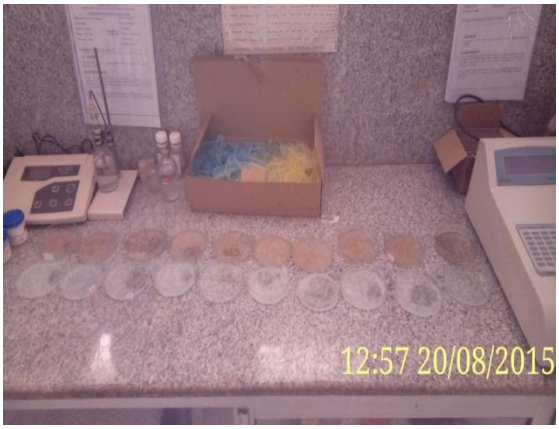
on washing of dairy cattle, disinfection and sanitation of shed, milking methods, cleaning of udder, wiping of udder, strip cup test-mastitis detection and teat dipping were also conducted. Further the beneficiaries also participated in focus group discussions under the guidance of experts or project staff.



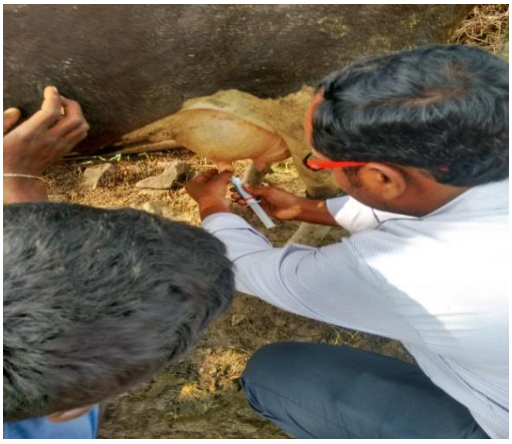


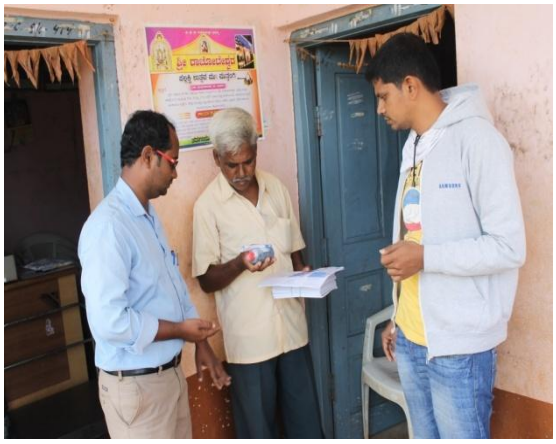
Access to inputs: Inputs like mastitis detection Kit (California Mastitis Test reagent), strip cups, post dip container, povidone iodine, plastic hand sprayer, potassium permanganate, plastic bottles, test tubes for milk sample collection were distributed to all the beneficiaries. They were informed to perform the test on alternate days in the first week after calving, then weekly once and whenever there is a doubt about mastitis infection.

On-farm trials: A team comprising of local veterinarian and college faculty, conducted the on farm trials for the milk samples of the beneficiaries and performed the platform tests. The clinical/subclinical mastitis in milch cows/buffaloes were diagnosed by mixing two ml of milk and two ml of Californian Mastitis Test (CMT) reagent and shaking gently for 20 seconds in the strip cup provided and observed for coagulation. If there is a thin layer of slow flowing viscid mass, it indicates a mild form of subclinical mastitis. If the coagulation has clear viscid material, it indicates a severe form of clinical mastitis. Further, Antibiotic sensitivity test (ABST) was performed for such positive samples.

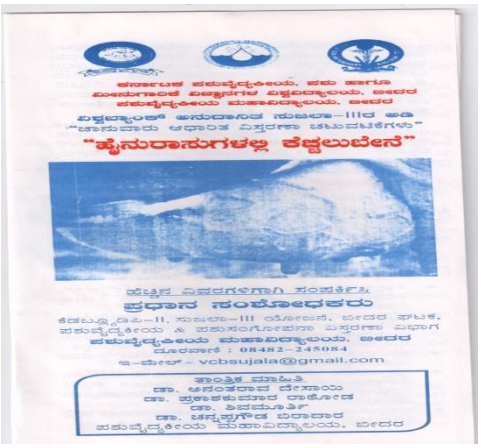


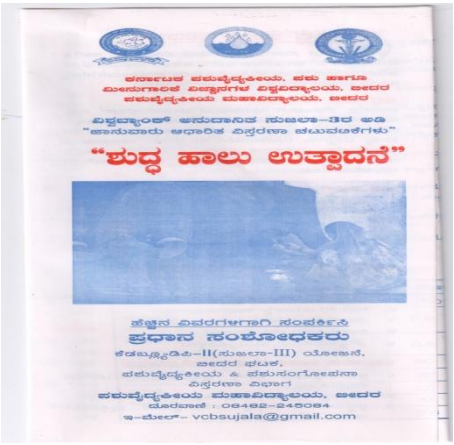
Animal health care and treatment: Based on the Antibiotic sensitivity test (ABST) results, the positive animals were treated by the project staff with the help of veterinarians at the earliest to prevent economic loss due to the disease. Further follow-up of the treated animals were also conducted and the samples screened again after the treatment, in second and third rounds as well.





Farm literatures and video: The farm literatures and reading materials were distributed to all the beneficiaries. Further, a video was developed in vernacular language and screened for the benefit of the farmers. This video is available at https://www.youtube.com/watch?v=RRdHgHkQz54





Advisory and technical support: Apart from trainings and demonstrations and distribution of farm literature, the farmers were advised about various scientific practices like feeding, housing, management practices, clean milk production, health care etc., as demanded by the beneficiaries. This support has helped farmers know the scientific practices and improve their knowledge.

BENEFITS AND IMPACT

- **Change in perception of beneficiaries:** There was a positive change in the perception of beneficiaries about subclinical mastitis detection and prevention. Initially the farmers thought that this practice was not relevant to follow at field condition, but later they perceived it as relevant to follow and practice after on-farm trials and awareness programmes. With regards to profitability, the respondents perceived the practice as profitable since it could avoid economic losses due to this disease.

- **Improved knowledge level of dairy farmers:** Overall knowledge level of the beneficiaries had increased after imparting trainings on various practices through the project. Further, the retention level was found to be about 71 per cent after 30 days of the trainings and demonstrations.

- **Improved management practices:** Since the farmers have realized that incidence of SCM was more in animals maintained in animal house with *Kuchcha* floor than concrete floor, the farmers have modified their sheds accordingly. Further, the beneficiary farmers have switched over to animal shed hygienic practices and milk-man's hygiene in terms of normal health condition and free from zoonotic diseases, wearing clean cloth, proper hand washing before and after milking with antiseptic solution. With regards to method of milking, farmers have realized that full hand method was better than other methods and have adopted the practice accordingly.

- **OFT on subclinical mastitis detection and prevention:** There has been a reduction in the occurrence of SCM cases both in crossbred cows and buffaloes, after the adoption of the SCM detection, prevention and control methods. Interestingly, the keeping quality of milk has also improved by increase in the Methylene blue dye reduction time (MBRT) for both cow and buffalo milk. On an average, the keeping quality time improved by about two to four times after the adoption of the practices. The microscopic examination of milk samples, revealed a significant reduction in the somatic cell count (one lakh) in the milk. This indicates that the mastitis prevention and control practice in dairy cattle and project activities through participatory OFT methodology was highly effective.

- **Prevention of economic losses:** Although, it is very difficult to generalize and compare the losses across farms, the economic consequences of losses due to SCM were assessed to be in the range of INR 21,677 to INR 88,340 for one lactation period, depending on the condition of the animal. This was a notable loss for the farming community and hence the farmers responded by following the practice continuously in dairy farming.

LESSONS LEARNT

The project initiative was unique since it has witnessed the convergence of multi-stakeholders for achieving a common objective of prevention and control of sub-clinical mastitis in dairy animals. Further, the project clearly revealed that an integrated approach of extension activities viz. training, demonstration, OFT, farm literature etc., can improve the knowledge level of farmers and promote adoption of scientific practices by sensitization. The concept of seeing is believing and learning by doing, holds good in this case, since farmers experienced the field level problems and found the solutions in collaboration with multi-stakeholders. This experience of convergence can be applied at a larger scale to prevent and control various animal diseases.

POLICY IMPLICATIONS

Though the project received poor response from farmers initially, several extension interventions in the same area by different stakeholders resulted in better response and adoption of control measures after a few months. The convergence of stakeholders and the integrated extension approaches are likely to continue even after the termination of the project as farmers currently have adequate knowledge and a positive attitude to taking up control measures. The milk societies are also encouraging farmers to adopt this practice with very negligible financial and technical support from the government. The leanings from this initiative may be followed in prevention and control of other diseases which cause economic losses to farmers. A policy shift emphasising convergence of multiple stakeholders for carrying out an integrated extension approach is critical to enhance livestock production and productivity.

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References:

- Bardhan D (2013) Estimates of economic losses due to clinical mastitis in organized dairy farms. *Indian Journal of Dairy Science*, 66 (2):168–172
- Chanda A, Roy C.R, Bannerjee P.K, and Guha, C. (1989). Studies on incidence of bovine mastitis, its diagnosis, etiology and in-vitro sensitivity of the isolated pathogens. Indian Vet. J. 66: 277-282.
- Chander M., Dutt T, Ravikumar R and Subrahmanyeswari B. (2010). Livestock technology transfer service in India: A review. *The Indian J. Anim. Sci*., **80,** 1115–25.
- Dixit V.B, Tripathi H, Duhan A and Singh I. J. (2016) Convergence for Synergistic Effect in Dairy Development. AESA Blog-62. Available at http://aesa-gfras.net/Resources/file/Blog%2062.pdf
- Halasa T, Nielen M, De Roos APW, et al. (2009) Production loss due to new subclinical mastitis in Dutch dairy cows estimated with a test-day model. *J Dairy Sci.*:599–606.

- Radostitis O.M, Gay C.C, Blood D.C, Funchcliff K.W. (2000). Veterinary medicine : A text book of the disease of cattle, sheep, goat, horse and pigs. 9th edition W.B.Saunders, London.
- Rathod P.K and Chander. M (2015). Are we generating need based and relevant livestock technologies?. AESA Blog No-51. Available at http://aesa-gfras.net/admin/kcfinder/upload/files/BLOG%2051.pdf

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