



# An inclusive and participatory approach to changing policies and practices for improved milk safety in Assam, northeast India

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## ABSTRACT

Animal products are highly nutritious, but also highly perishable. In India milk is an important source of animal protein, but problems with low quality of the milk, high degrees of adulterated milk on the market, high bacterial loads, and sometimes presence of zoonotic pathogens persist. Most dairy farmers in India are resource-poor small-holders, often with limited knowledge about the importance of food safety and hygiene. Milk quality problems including adulteration and bacterial contamination is common in the country.

This paper describes a training intervention for improved food safety in Guwahati, Assam, India, conducted in 2009–2013. The training was designed to be short, simple and customized, cheap to deliver, easily accessible, and accompanied by incentives to bring change in knowledge, attitude and practices (KAP). In 2014 three outcomes were assessed: changed KAP; milk production; and, mastitis prevalence. Selected food safety hazards were also assessed, although their management had not been included in training. We found evidence of improved KAP among trained farmers, 14% higher milk production, and a tendency towards less mastitis, but no effects on food safety hazard levels.

This study shows that a training intervention can have a medium-term impact, while the issue of food safety is more complex and cannot be assumed to automatically follow from even successful training.

## 1. Introduction

Throughout the developing world, milk consumption is increasing due to population growth, urbanization and increasing wealth. India has a population of more than one billion people, and has been the world's leading milk producer since 2001. There are estimates that around 70 million Indian households are engaged in dairy production. The dairy sector is an important source of income for the 75% of the Indian population that lives in rural areas, of which 38% are poor (Doughrati et al., 2013).

The dairy sector in Assam, northeast India, is developing slower than other parts of India and the per capita availability of milk in Assam has also been low; only 69 g/day compared to the Indian average, 307 g/day in 2013–14 (NDDB, 2017). The informal market dominates and only about three per cent of the milk goes through the formal pasteurized milk and dairy product market. Dairy production is also a significant contributor to livelihood of other actors including traders

and the traditional sweet makers.

Milk is a nutritious substrate for bacteria, highly perishable and prone to contamination (Chambers, 2005). Moreover, important zoonotic diseases such as brucellosis and tuberculosis can be transmitted by milk. Milk-borne pathogens have been reported in India states including Assam (Kumar et al., 2001; Lingathurai and Vellathurai, 2010; Smits and Kadri, 2005; Thomas et al., 2006). Presence of antibiotic residues in milk may contribute to development of resistance, an emerging threat to global health (Stolker and Brinkmann, 2005). Consuming milk with aflatoxins, carcinogenic metabolites that can be produced by molds, can potentially cause reduced growth and cancer (Kiarie et al., 2016; Liu and Wu, 2010), and also have negative effects on animal productivity (Atherstone et al., 2016). One common health challenge affecting dairy production is occurrence of mastitis, a costly disease to manage and often linked to production losses (Heikkilä et al., 2012; Radostits et al., 2007).

In this paper, we describe a training intervention to improve milk

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safety in Assam, and provide results from an evaluation study to assess the effect of the training on KAP, productivity and food safety.

## 2. Material and methods

### 2.1. Customized training manual development

At the beginning of the project, substantial efforts were made to understand existing knowledge, attitude and practices (KAP) of informal milk market actors and their training needs through ten focus group discussions (FGD) in 4 districts of Assam involving a total of 162 participants. The FGDs were conducted in the districts of Kamrup, Barpeta, Sonitpur and Jorhat. These districts are located in 4 different agro-climatic zones of Assam and are representative to the dairy sector of Assam. It was conducted in 2009 before starting the training manuals drafting process. FGDs were organized and facilitated by an experienced NGO called FARMER. FGDs were facilitated in local language—Assamese & Hindi based on the convenience of the target groups. There were separate FGDs for farmers and traders. Farmers' FGDs were attended by local dairy farmers in the area while milk traders' FGD were attended by milk vendors. In addition, NGO's and ILRI's representative were there to facilitate, record and to control the quality. Based on this, as well as previous material developed in Kenya by the Smallholder Dairy Project (<http://www.smallholderdairy.org/>), training manuals for milk producers and traders were drafted. In drafting the training manuals all relevant stakeholders including the farmers, traders, veterinarians, dairy technologist, NGO representative, university professor and ILRI scientists were involved. In addition, one person from print media was also used to review the language of the training course so that it become easily understandable to the common people. NGO representative and ILRI scientists were involved in pre-testing. The observations of pre-testing was referred back to the group were involved in finalization of the content for review and final editing. Translation were done by technical person who has command on the language. Translated versions were reviewed by ILRI scientist and couple of resource persons and referred back to the translators for making necessary changes. This involved relevant stakeholders were involved, including representatives of the Dairy Development Department (DDD), Animal Husbandry and Veterinary Department (AHVD), Guwahati Municipal Corporation (GMC), Department of Health Services (DHS), Assam Agricultural University (AAU), non-governmental organizations (NGO), journalists, traders' and farmers' associations. Participation of all stakeholders helped make the manuals need-based, user-friendly and acceptable to all the relevant stakeholders. Finally, manuals were field tested and translated to local language (Hindi & Assamese) before printing.

### 2.2. Implementation of training

The training intervention was conducted in the district of Kamrup, encompassing the urban and peri-urban of the state capital Guwahati in 2009–2011. Trainings were conducted at the target groups' preferred place and time. Most suitable time for traders and producers were from 11.00 a.m. to 2.30 p.m. (after morning milking, cleaning, feeding and selling and before the start of afternoon work). Local club, community hall, school building, temple etc. were used as venue for the training as desired by the local target group. Target groups were sensitized by Farmers Organisation, Traders' Organisation, NGO representative, DDD officials and ILRI scientist. In each area, initially a meeting was organized to explain the target group about the programme by ILRI scientist and govt. officials. Thereafter, farmers and traders organisation took the responsibility of sensitizing and enrolling the trainees. Trainers were trained initially by ILRI scientists. Mode of delivery was participatory discussion with the help of manuals and handouts, role play, practical demonstration of milk test and farm visit. Producers and traders were trained separately. A second round of training was conducted

in 2013, following requests from milk producers.

Training focused on increasing knowledge about food safety and hygiene, but also included components on business management, dairy production, and client satisfaction. More specifically, the initiative sought to improve the hygiene and quality of milk produced and marketed by informal dairy market actors. The training was open to attend for everyone that wanted to participate, but participants had to volunteer time to attend. The local farmers' association informed all farmers about the training, and as soon as 25–30 farmers signed up, training was provided. For milk producers, the program consisted of a 5-day course. The first day included an introduction focusing on information on the importance of safe milk and hygiene practices in milk production. The second day handled information regarding bacteria: its sources, how it spreads, how it can get into the milk and the importance of hand hygiene. The third day consisted of practical information on how to clean the cowshed and proper drainage and waste disposal. The fourth day involved hygiene practices during milking (e.g. teat dipping, disinfection of teats) as well as cleaning routines regarding milking utensils. The last day focused on information regarding the most common cattle diseases, predisposing factors of disease as well as preventive measures. In addition to the training intervention, there were also general awareness campaigns on public media, in order to reach an overall improvement of awareness and the hygienic standards.

Training was delivered through participatory discussion with the help of training manuals. Besides the group discussions, practical exercises, role-play, milk quality test etc. were conducted to make the topics self-explaining and interesting. Dairy producers' and traders' association were an important part of project implementation process and exerted social pressure to convince their members to join. After the training, all participants answered the same training evaluation form that was used before the training to state the difference of knowledge before and after the training.

### 2.3. Monitoring and certification

A participatory monitoring approach with active involvement of the trainees was used. Two levels of monitoring were implemented: first by trainees (peer-monitoring) and then by the Joint Coordination and Monitoring Committee (JCMC), a committee of all the relevant government departments and ILRI. A local Hygienic Milk Monitoring committee (HMMC) comprising of trainers producers and traders was formed at the end of each training in each area. The objective of the group was to monitor adoption of improved practices by its members. The group was further issued with a simple monitoring tool for use in capturing adoption parameters to assess the level of adoption. After completion of each monitoring by the local HMMC, completed monitoring tools were submitted to the project implementation team and JCMC. Thereafter, JCMC monitored the same group of people using the same monitoring tool to see if there were any disparities between the peer-monitoring & JCMC monitoring. Monitoring by HMMC was done once in a month. JCMC representative supposed to monitor the trained actors in every month but could not be materialized and therefore monitored only once in three months. JCMC met quarterly and reviewed the progress of the project. Monitoring did not focus on fault finding but provided an opportunity for additional training. It was anticipated that once the trained producers and traders had adopted good practices for six months, they would see the benefits of it, commit to the new practices and be less likely to revert to old ones. This would be reinforced by new norms and social capital.

Training certificates were issued to only after completion of monitoring for at least six months. Local HMMC prepared the list of qualified trainees which was then forwarded to JCMC for validation and issuance of the certificates at a larger ceremony. A new policy initiative requiring milk traders to obtain training certificates as a prerequisite to obtaining trade licenses from the municipal corporation (GMC) and to register under Food Safety and Standard Act (2006) was effected. This

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