Technology Package for Prevention & Control of Mastitis in Dairy Animals

Research Team & Methods

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Lead Implementing Institution: Agriculture Development Nepal

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Research Team:
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- Dr. Rima Shrestha (Co-PI - Himalayan College of Agricultural Sciences, Nepal)
- Dr. Praveen Karki (Project Coordinator - AIE International Nepal)

Research Location:
- Mid-western region of Nepal
- Surkhet, Barisal, Banka, and Dang districts

Research Methods:
- Control and intervention groups
- Participating community organizations: 4 dairy cooperatives and 8 self-help groups
- More than 200 participating dairy farmer cooperative members
- 15 animal health workers and technicians in charge of field monitoring and milk sample collection
- Microbiology analysis and capacity building at the Surkhet Regional Veterinary Laboratory

Technology Package Components:
- Increased knowledge of mastitis prevention
- Developing good husbandry practices (GHP), including mastitis detection (California Mastitis Test (CMT); milk conductivity test) and mastitis control (post milking teat dipping (PMTD); dry cow therapy (DCT)) technologies
- Training livestock technicians and dairy farmers
- Intended End Users: Primary – household members in charge of farm management; Secondary – second household member; Tertiary – producer cooperatives; Quaternary – technicians

Short-term
- Increased knowledge of sub-clinical mastitis prevention
- Farmers acquire mastitis technologies
- Increased producer knowledge of good husbandry practices (teating, cleaning stall, sun drying, making cows stand, etc.) as a means to increase production
- Sustainable farmer’s feedback mechanism established

Long-term
- Improved milk safety and quality
- Increased production and farmer income
- Sub-clinical mastitis prevention

Problem Addressed

Globally, increases in milk demand are projected for Africa (17%) and Asia (12%) by 2030 relative to those in 2000. In Nepal, dairy is the most important livestock activity. Nevertheless, dairy animal productivity is markedly low. Nepali governmental policy documents, and multi-stakeholder meetings in Africa and Asia of livestock industry representatives from the government, private, development, and academic sectors, identified improving milk yield, quality, and safety as top livestock priorities.

Mastitis in one of the most significant and prevalent diseases of dairy animals. Studies show that the prevalence rate of sub-clinical mastitis in Africa and Asia exceeds 50% of cases, threatening farmers, dairy processors, and consumers. In Nepal, mastitis can be nine times higher on farms and 104 times higher in wild animals, and of sub-clinical detection (e.g., CMT) and control (e.g., PMTD) techniques. Participating farmers acquired knowledge (86% increase of PMTD; 47% of DCT). This led to behavior change with more than 50% practicing the control strategies in just six months and 74% adoption six months after the training. The package reduced sub-clinical mastitis prevalence (from 53% at baseline to 28% at end line in dairy cows [n=432]; from 78% to 18% in buffaloes [n=216], six months after implementation.

Innovation Description

Innovation Name: Technology Package for Prevention & Control of Mastitis in Dairy Animals

Innovation Description: The innovation is a package of technologies and practices to prevent and control mastitis, a potentially fatal disease severely reducing livestock milk production, reducing incomes of smallholder farmers and food security.

Key Drivers for Scaling

- Growing market demand for quality milk
- Ability to disseminate knowledge
- Improved scale of delivery

Enabling Condition for Scaling Success

- Involvement of stakeholders (government, private, development, and research organizations, milk producers, and consumers)
- Effectiveness of the intervention
- Accessibility and availability of the technology package

Drivers & Enabling Conditions

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Credibility of the Innovation

Qualitative and quantitative data obtained by comparing baseline (n=654) and end line (n=403) farmers showed that smallholder farmers who were unaware of mastitis detection techniques were also unaware of PMTD and DCT techniques. Participating farmers acquired knowledge (86% increase of PMTD; 47% of DCT). This led to behavior change with more than 50% practicing the control strategies in just six months and 74% adoption six months after the training. The package reduced sub-clinical mastitis prevalence (from 53% at baseline to 28% at end line in dairy cows [n=432]; from 78% to 18% in buffaloes [n=216], six months after implementation.

Prevalence of Sub-clinical Mastitis in Dairy Animals

<table>
<thead>
<tr>
<th>COW</th>
<th>BUFFALO</th>
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<tbody>
<tr>
<td>KNOWLEDGE ON CMT</td>
<td>28%</td>
</tr>
<tr>
<td>KNOWLEDGE ON PMTD</td>
<td>23%</td>
</tr>
<tr>
<td>PRACTICED PMTD</td>
<td>64%</td>
</tr>
<tr>
<td>KNOWLEDGE ON DCT</td>
<td>30%</td>
</tr>
<tr>
<td>PRACTICED DCT</td>
<td>78%</td>
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Mastitis Control Technologies: Knowledge and Adoption

Key Technologies:
- California Mastitis Test (CMT)
- Milk conductivity test
- Post-milking teat dipping (PMTD)
- Dry cow therapy (DCT)

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Scaling the mastitis control package will target women at established dairy cooperatives. Other scaling partners will include the livestock division of governments, local bio-economic cooperatives, development organizations, private actors/milk collection centers, and processors who will incentivize farmers to supply higher quality milk.

Financial Sustainability

Scaling up the package would require about US $15 per dairy animal to adopt mastitis control practices when targeting 10,000 dairy animals. This covers costs of technicians and/or model farmers and supplies milk testing technologies (CMT kit; milk checker). Costs for cooperatives are around $2,000, mainly to implement and adopt the mastitis control package empowers them by increasing their knowledge and skills related to mastitis control and prevention, animal and cooperative management, and, ultimately, income. The mastitis control package can be widely scaled through integration and adoption by female and male farmers, depending on gender roles and the distribution of livestock management in the scaling regions.

References


Mastitis prevention and control involves adoption of GHP such as clean and ventilated animal sheds, hygiene practices, complete removal of milk in udders, and use of early detection (e.g., CMT) and control (e.g., PMTD) techniques. The mastitis control package can be tailored to different production settings and geographies, and the prevention and control measures are simple, easily adoptable, and economically rewarding for dairy farmers and cooperatives. Consequently, high adoption rates are anticipated – as neighboring farmers and cooperatives see the benefits, they will in turn adopt the technologies. Some support by livestock technicians, for example, to provide GHP training and involvement of dairy cooperatives will be needed to enhance adoption and scaling of the technology package. The package will first be scaled in Nepal before expanding its reach to other countries.

The mastitis control and prevention project conducted exposure visits to dairy cooperatives in Nepal.

Women are significant actors in livestock systems, particularly in the dairy sector. Targeting women to implement and adopt the mastitis control package empowers them by increasing their knowledge and skills related to mastitis control and prevention, animal and cooperative management, and, ultimately, income. The mastitis control package can be widely scaled through integration and adoption by female and male farmers, depending on gender roles and the distribution of livestock management in the scaling regions.

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