



FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative

Feed the Future Innovation Lab for Livestock Systems

INNOVATION SUMMARIES: ETHIOPIA, RWANDA & NEPAL

*Sustainably intensifying smallholder livestock systems by
generating evidence-based innovations and
improved management strategies*



Feed the Future Innovation Lab for Livestock Systems

INNOVATION SUMMARY:

PATHASURE® KITS FOR DIAGNOSING PATHOGENS CAUSING DIARRHEA IN CALVES

The innovation is a user-friendly calf diarrhea diagnostic kit, called Pathasure® Enteritis 4¹ produced by BioVet (St. Hyacinthe, Quebec, Canada). Calf diarrhea is an important cause of morbidity and mortality that can severely reduce the incomes of smallholder producers through treatment costs, ill-thrift, poor weight gain, and calf deaths. Better understanding of the underlying causes of calf diarrhea will help to prevent and control the disease and improve incomes of small to large cattle producers.



INNOVATION QUICK FACTS

Lead Implementing Institution: University of California – Davis



Category: Disease Management



Applied in: Ethiopia



Innovation Type: Technology



New/Adapted: Adapted



Created for: Women & Men

THE PROBLEM & ITS IMPORTANCE

Diarrhea and respiratory disorders are causes of morbidity and mortality in young calves less than three months old in Ethiopia. Diarrhea can lead to poor weight gain, decreased performance, and in severe cases, death. In addition, some pathogens that cause calf diarrhea are zoonotic and pose a health risk to humans handling those animals. Applying this innovation allows producers to know the exact cause of diarrhea to implement improved prevention strategies, such as vaccination, provide more specific treatment of sick animals, and develop appropriate measures that prevent disease outbreaks. As a result, livestock health and productivity will improve.

POTENTIAL BENEFITS

Pathasure® Enteritis 4 kit is a highly sensitive and specific enzyme-linked immunosorbent assay (ELISA), that is intended for the detection of *Escherichia coli* K99, Rotavirus, Coronavirus, and *Cryptosporidium parvum* in calf feces. This indirect ELISA enables rapid, qualitative detection of antigens to these pathogens through binding to highly specific antibodies coated on a 96-well plate. A positive reaction is indicated by a blue color change in the well that can be detected by eye, without the need for an ELISA reader. By using the Pathasure® Enteritis 4 kit, researchers can estimate infection levels due to these four pathogens that play a role in neonatal diarrhea in young calves.

APPLICATION OF THE INNOVATION

The innovation can be applied to calves in all production systems in Ethiopia and elsewhere. Fecal samples can be tested for pathogens in a nearby laboratory. Calves displaying signs of diarrhea are sampled and those fecal samples are tested using the Pathasure® Enteritis 4 kit. This test is applicable for use in very small farms with few animals as well as larger peri-urban farms. This assay can increase the capacity of veterinarians and regional laboratories to accurately and rapidly diagnose common causes of calf diarrhea, thereby improving appropriate treatment of affected calves through supportive therapy and judicious use of antibiotics for bacterial causes of diarrhea. This will save producers money and will reduce the potential for creation of antimicrobial resistance through the inappropriate use of antibiotics.

¹ <https://www.bioveter-inc.com/en/product/pathasure-enteritis-4/>

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P.O. Box 110910 | Gainesville, Florida | Livestock-lab@ufl.edu | Website: <http://livestocklab.ifas.ufl.edu/>

Photo credit: ILRI/
Camille Hanotte

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INNOVATION SUMMARY: SORGHUM GENOTYPES FOR LIVESTOCK FEEDING

The innovation consists of two promising dual-purpose sorghum genotypes selected from a large number of sorghum varieties through on-station research. In addition to the crop varieties, the innovation includes a package of production management practices and recommendations. The improved sorghum genotypes and practices will increase the performance of livestock in semi-arid regions where access to quality feeds and forages can be challenging.



INNOVATION QUICK FACTS

Lead Implementing Institution: Kansas State University



Category: Crop Improvement



Applied in: Ethiopia



Innovation Type: Technology



New/Adapted: Adapted



Created for: Women & Men

THE PROBLEM & ITS IMPORTANCE

In Ethiopia and many developing countries, shortage of quality livestock feed limits animal productivity and the problem is compounded by conversion of traditional grazing areas to croplands. Sorghum is one of the most widely grown staple food crops in Ethiopia on which the lives of many depend. Sorghum also grows well in a wide range of agroecologies, including those that face drought or prolonged dry seasons. Two high performing dual-purpose sorghum genotypes were selected from a large number of varieties based on high forage dry matter yield, in vitro organic matter digestibility, and crude protein yield.

POTENTIAL BENEFITS

Producing high yielding forages like sorghum can enable year-round supply of quality feed that improves livestock performance. Smallholder and commercial medium and large scale producers in areas where sorghum can flourish will especially benefit from this innovation. Identifying best performing forage sorghum varieties, their management practices, and how they can be intercropped with leguminous crops can foster sustainable improved livestock production in Ethiopia and beyond.

APPLICATION OF THE INNOVATION

In order to use the innovation, extension and outreach efforts are needed to disseminate knowledge of how the optimal sorghum genotypes can be grown alone or intercropped. Additionally, information regarding the innovation's potential benefits on smallholder livestock systems needs to be communicated. Planting materials will need to be made available to potential adopters in target areas through public and private extension and advisory services. Due to the versatile nature of sorghum, the innovation can be applied to various geographies and production systems but in particular, the semi-arid agro-ecological zones. Disseminating the innovation with producer associations via extension and development organizations can facilitate uptake.

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P.O. Box 110910 | Gainesville, Florida | Livestock-lab@ufl.edu | Website: <http://livestocklab.ifas.ufl.edu/>

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INNOVATION SUMMARY:

BEST PRACTICES TO ENHANCE THE MICROBIOLOGICAL QUALITY & SAFETY OF MILK & YOGHURT

The innovation entails best practices for storing milk or yoghurt to safeguard food safety. It was developed by comparing food-borne pathogen loads associated with various traditional and alternative milk storage containers and methods of cleaning them. It combines best types of and cleaning practices for milk storage containers to improve milk quality and safety and safeguard the health of livestock keepers and consumers.



INNOVATION QUICK FACTS

Lead Implementing Institution: Addis Ababa University/ILRI



Category: Cultural Practice



Applied in: Ethiopia



Innovation Type: Practice



New/Adapted: New



Created for: Mainly Women



Nutrition Linkage: Food Safety

THE PROBLEM & ITS IMPORTANCE

Milk production in Ethiopia and other East African countries is a large and growing industry due to the nutritional benefits. Pastoral women in Ethiopia are typically in charge of yoghurt production from milk, and they store milk in traditional wooden containers and use smoke to clean them, but little is known about the safety of the yoghurt. Unhygienic milk can harbor a variety of foodborne pathogens and consequently cause diseases in humans pasteurization.

POTENTIAL BENEFITS

This innovation combines information on ideal milk storage and cleaning practices that minimize foodborne-disease risks while contributing to food security and improved nutrition for livestock keepers and consumers. To develop the innovation effects of smoking method, smoke source (wood type) and container type (traditional versus stainless steel) on coliform bacteria counts significantly in yoghurt were compared. The innovation can be used to improve awareness about the need for hygienic milk and to promote behavior change to improve milk safety.

APPLICATION OF THE INNOVATION

The resources needed to apply this innovation are training and knowledge dissemination on safe milk production and handling practices. While this research was conducted in the Borana region of Ethiopia, the innovation can be adopted by other regions and production systems. An important consideration is the roles women and men play in the production of milk and milk products. In Borana, women were mainly targeted as they manage the production of milk and milk products. Before applying the innovation an in-depth gender analysis is recommended to ensure implementation of the innovation in a gender-sensitive manner.

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Photo credit: K. Amenu

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INNOVATION SUMMARY: TRAINING APPROACH TO STRENGTHEN DETECTION OF PUBLIC GOOD LIVESTOCK DISEASES

The innovation is an adult learning training approach that improves the capacity and awareness of farmers and veterinarians to identify, realize the economic implications of, treat, and report public and private good livestock diseases. The training is coupled with a field manual to help recognize and control diseases. Ultimately, diffusion of the training will lead to increased community involvement in disease reporting, which will help prevent and control public and private good livestock diseases.



INNOVATION QUICK FACTS

Lead Implementing Institution: University of Georgia



Category: Disease Management



Innovation Type: Approach



Created for: Women & Men



Applied in: Ethiopia



New/Adapted: Adapted



Nutrition Linkage: Dietary Quality

APPLICATION OF THE INNOVATION

This innovation can be applied within and beyond target countries by training farmers and veterinarians to identify and report public and private good livestock disease syndromes. Trainings should include biosecurity measures to reduce the spread of livestock diseases and they can be adapted and tailored to different production settings and geographies. The measures taught are easy to use and require few inputs. The involvement of farmers and public and private veterinarians in disease reporting will benefit local, regional, and national economies and improve food security. Adopters can use the Livestock Production Disease field manual developed during the initial research project to help livestock producers identify the presence of livestock disease and assess the need for veterinary assistance.

THE PROBLEM & ITS IMPORTANCE

Disease surveillance systems in low and middle income countries are often underdeveloped, constraining livestock production and decreasing income for farmers. Governments are responsible for controlling the “public good diseases”, which have socioeconomic impacts on the country due to their rapid spread, necessitating trade restrictions. Early notification of these serious diseases is important, to allow government services to provide early mitigation. Ensuring farmers and veterinarians understand the functioning of the government animal disease reporting system and how they can contribute to it will ultimately help reduce the livestock disease burden in the country.

POTENTIAL BENEFITS

Training of smallholder farmers and veterinarians (civil servants and private practitioners) on public good livestock disease identification and reporting is important to prevent losses in livestock productivity, decrease disease outbreaks, and mortality, while allowing for more targeted responses by the veterinary services to disease incidences. This will allow more effective use of the limited resources available for disease surveillance in low and middle income countries, thereby ultimately improving the health of livestock populations, producer incomes, and food safety through consumption of safer livestock products.

Feed the Future Innovation Lab for Livestock Systems

INNOVATION SUMMARY: TEST FOR ANALYSING MYCOTOXINS IN LIVESTOCK FEEDS

The innovation is a cost-effective and user-friendly mycotoxin testing method involving lateral flow technology known as CHARM-EZ-M. Feed regulatory agencies and analytical labs were given hands-on training on how to use the method to analyse livestock feeds for mycotoxins. Monitoring feeds for mycotoxins will safeguard the quality and safety of the national feed and food supply, optimize livestock production and health, and, ultimately, improve animal and human health.



INNOVATION QUICK FACTS

Lead Implementing Institution: Kansas State University

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|------------------------------------------------------------------------------------|------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|
|  | Category: Diagnostic Tool |  | Applied in: Ethiopia |
|  | Innovation Type: Technology |  | New/Adapted: Adapted |
|  | Created for: Women & Men |  | Nutrition Linkage: Food Safety |

THE PROBLEM & ITS IMPORTANCE

Mycotoxins are naturally occurring toxins produced by molds in livestock feed and food. They threaten livestock health, reduce feed safety and quality, and could compromise human health and nutrition through consumption of contaminated animal-source foods. Determinants of mycotoxin production include environmental, climatic, crop management, and storage conditions, making the likelihood of mycotoxin contamination particularly hard to predict. This necessitates active mycotoxin monitoring and mitigation programs that use precise analytical methods and strategies to safeguard the quality and safety of the feed and food supply.

POTENTIAL BENEFITS

This innovation allows cost-effective and accurate quantification of aflatoxin contamination in livestock feed and certain animal-source foods. Combining lateral flow testing, which is a fraction of the cost of traditional methods, and strengthening the technical capacity of local partners, will increase testing for the toxins and ensure the safety of feed and food. Understanding contamination levels will allow development of prevention and control strategies that reduce the risk posed by mycotoxins to livestock and consumers of livestock products.

APPLICATION OF THE INNOVATION

Combining the cost-effective mycotoxin CHARM-EZ-M test with building the capacity of local partners to administer the test can improve mycotoxin detection in Ethiopia as well as other countries. The quantification method used in lateral flow technology relies on color changes on indicator strips that reflect competitive antigen binding. The technology is affordable and relatively easy to use in laboratories that cannot afford high-end analytical equipment. It is also a relatively versatile method suitable for analyzing a wide range of feeds and food from researchers, government officials and the private sector. The technology requires relatively low cost inputs (e.g., reagents and kits) for routine and continuous operation.

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INNOVATION SUMMARY: SOCIAL & BEHAVIOR CHANGE COMMUNICATION STRATEGY FOR IMPROVING ASF CONSUMPTION

The innovation is a strategy aimed at changing behaviors to increase consumption of animal-source food (ASF) by children aged 12-42 months and pregnant and lactating women. Behavior change messaging targeted to mothers and caregivers is a key way to increase ASF consumption, especially milk. Communicating compelling ASF messages through various channels (interpersonal and print) will result in behavior change that will increase dietary diversity and reduce stunting.



INNOVATION QUICK FACTS

Lead Implementing Institution: International Livestock Research Institute



Category: Cultural Practice



Applied in: Rwanda



Innovation Type: Practice



New/Adapted: Adapted



Created for: Women & Men



Nutrition Linkage: Consumption

THE PROBLEM & ITS IMPORTANCE

In Rwanda, chronic malnutrition among young children remains high. Only 29% of children meet the minimum dietary diversity requirements and only 21% consume fresh, powdered, or tinned milk. After conducting formative research on barriers and facilitators to proper maternal and child feeding practices, especially dietary diversity and consumption of milk, a social and behavior change communication (SBCC) strategy was developed. It aims to (1) increase knowledge and awareness about milk and animal-source foods and (2) promote optimal behaviours related to the consumption of ASF, especially milk, by children aged 12-42 months and their mothers.

POTENTIAL BENEFITS

Social and behavior change communication (SBCC) related to ASF consumption in households that received a cow through the Government of Rwanda's Girinka program may boost consumption of milk and other ASF. Alongside SBCC, ASF value chain actors should work toward improving the quality, availability, and accessibility of ASF. Stronger ASF value chains together with SBCC to increase consumption of and demand for ASF will lead to reductions in childhood malnutrition and improvements in maternal and child health, ultimately improving national workforce health and productivity.

APPLICATION OF THE INNOVATION

Social and behavior change communication strategies should be context specific and they should include different communication channels; target audiences; barriers, facilitators, and desired changes; positioning and key messages; and implementation and monitoring and evaluation plans.

The strategy developed for this study can be implemented throughout Rwanda among families participating in the Government of Rwanda's Girinka ("One Cow per Poor Family") program. Community health workers, health clinic staff and non-governmental organizations can implement the strategy in families with young children to achieve the desired outcomes.

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P.O. Box 110910 | Gainesville, Florida | Livestock-lab@ufl.edu | Website: <http://livestocklab.ifas.ufl.edu/>

Photo credit: E. Ouma

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INNOVATION SUMMARY: ANALYTICAL METHOD FOR QUANTIFYING MYCOTOXINS IN FEED

The innovation consists of technologies for the quantification of mycotoxins (aflatoxin and fumonisin) in animal feeds. This includes use of an enzyme-linked immunosorbent assay (ELISA) and fluorometry mycotoxin quantification and detection technique, which can make the routine testing of animal feeds more affordable, ultimately resulting in higher quality and cheaper feeds. Better quality feed will result in better quality animal-source foods benefitting human nutrition.



INNOVATION QUICK FACTS

Lead Implementing Institution: Iowa State University

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|------------------------------------------------------------------------------------|------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|
|  | Category: Diagnostic Tool |  | Applied in: Rwanda |
|  | Innovation Type: Technology |  | New/Adapted: Adapted |
|  | Created for: Women & Men |  | Nutrition Linkage: Food Safety |

THE PROBLEM & ITS IMPORTANCE

Aflatoxin and fumonisin are types of mycotoxins, naturally produced by molds, which can contaminate crops and end up in animal feeds. Aflatoxins can be passed from feeds to humans through consumption of animal-source foods, potentially posing a public health risk. Data on the presence of mycotoxins in animal feed are not available in several countries, nor is awareness on the presence of aflatoxin and fumonisin in the feed and food value chains. Therefore, generating objective information on the presence of mycotoxins, introducing affordable analytical methods, and creating awareness among the public are of paramount importance to allow for its control.

POTENTIAL BENEFITS

Sampling and analysis of feed for mycotoxins through the use of ELISA and fluorometry quantification and detection techniques together with improved and more affordable laboratory capacities can lead to improved livestock feed safety throughout Rwanda and other countries. Understanding where the mycotoxin contamination problem is along the feed value chain will help target mitigation measures to reduce the issue. As a result, livestock productivity and animal-source food safety will both improve.

APPLICATION OF THE INNOVATION

The mycotoxin assessment and mitigation innovation can be applied at different stages of the livestock feed value chain (production, transportation, processing, storing, or trading). This application can be used to creating awareness on risks associated with contaminated feeds and understanding what mitigation measures can be taken in the event that samples test positive. The application can be used by researchers, government agencies, feed mills, and feed companies. Building the capacity of possible adopters through training on the ELISA and fluorometry techniques will allow for production of safer feeds. Additionally, creating awareness sensitively will encourage animal-source food producers to take appropriate precautions to prevent or reduce contamination of their feeds with mycotoxins.

Feed the Future Innovation Lab for Livestock Systems

INNOVATION SUMMARY: BEST MANAGEMENT PRACTICES FOR MILK PRODUCTION & HANDLING

The innovation is a package of best practices for the prevention and control of udder inflammation (mastitis) by smallholder dairy producers and Milk Collection Centers. At the farm level this includes: testing of cows with the California Mastitis Test; optimal milking routines including post-milking teat dipping; and dry cow management routines. Producers also implement improved milk handling practices including use of stainless-steel containers. Milk Collection Centers regularly test milk for increased somatic cell counts; a sign of mastitis.



INNOVATION QUICK FACTS

Lead Implementing Institution: University of Rwanda



Category: Livestock Management



Applied in: Rwanda



Innovation Type: Practice



New/Adapted: Adapted



Created for: Women & Men



Nutrition Linkage: Food Safety

THE PROBLEM & ITS IMPORTANCE

Udder inflammation (mastitis) is one of the most important and prevalent diseases of dairy animals. Studies show that the prevalence of sub-clinical mastitis (udder inflammation without visible symptoms) in Africa and Asia exceeds 50% of cases, threatening milk production, quality, and suitability for processing, thus lowering profit along the value chain. Lack of quality milk hampers human nutrition and can lead to public health hazards when zoonotic pathogens (bacteria transmitted from animals to humans) or antimicrobial residues are present in milk. Safe milk is needed for increasing the competitiveness of Rwandan milk in local, regional, and international market.

POTENTIAL BENEFITS

Prevention of risk factors that lead to bovine mastitis and monitoring disease occurrence, combined with behavioral changes of producers, will lead to improved quantity and quality of milk produced. Given their key role in the milk value chain, Milk Collection Centers can use the innovative solutions to reduce mastitis in the milk they supply to market. Improved knowledge of mastitis and its mitigation among Milk Collection Center personnel and producers will improve milk safety and, therefore, human nutrition through reducing risks of foodborne diseases.

APPLICATION OF THE INNOVATION

These mastitis control and prevention best practices can be effectively applied by training milk value chain actors including smallholder dairy producers, veterinarians, community animal health workers, middle men, Milk Collection Center personnel, and milk processors, among others. Simple tests to identify cows with udder inflammation (e.g., the California Mastitis Test), sanitary milking procedures, and use of proper and affordable milk handling equipment should be applied to improve milk quality sold at market. Milk quality tests at Milk Collection and Milk Processing Centers will motivate producers to apply preventive measures against mastitis and further improve milk quality by rejecting low quality milk. Additionally, chemicals, testing tools, and refresher trainings are needed to apply the innovation.

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P.O. Box 110910 | Gainesville, Florida | Livestock-lab@ufl.edu | Website: <http://livestocklab.ifas.ufl.edu/>

Photo credit: B. Pfluger

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INNOVATION SUMMARY: SMS “VIRTUAL COLLECTION CENTER” SMARTPHONE APP

The Virtual Collection Center (VCC) is an innovative short message service (SMS) mobile application (app) for improved goat marketing. Through the use of the VCC app, inventory updates flow from cooperative members to leaders, while cooperative leaders use the VCC app to share price information with members and fill orders from traders by inviting members to sales events. The VCC app improves the goat value chain by reducing transaction costs, which should strengthen cooperatives and benefit small livestock producers by increasing trade volumes.



INNOVATION QUICK FACTS

Lead Implementing Institution: University of Florida



Category: Marketing & Distribution



Applied in: Nepal



Innovation Type: Technology



New/Adapted: New



Created for: Mainly Women



Nutrition Linkage: Dietary Quality

THE PROBLEM & ITS IMPORTANCE

In Nepal, goats are an essential source of income and nearly every rural Nepali household owns at least a few goats. To buy goats, traders often travel over large areas characterized by rugged terrain and poor infrastructure, making multiple visits to individual households necessary to complete sales. The resulting high transaction costs can stifle the value chain. Cooperatives can reduce transaction costs by allowing for bulk purchases of animals. But cooperatives may struggle to coordinate sales by members spread out over large areas of rugged terrain, possibly failing to solve the transaction cost problem. Technologies that improve coordination of marketing activities could therefore strengthen cooperatives while raising farmer incomes and developing the goat value chain.

POTENTIAL BENEFITS

The VCC app replaces a marketing coordination system based on infrequent face-to-face meetings between cooperative members, leaders, and traders. The VCC app should reduce the time and uncertainty associated with goat marketing, thereby increasing goat sales and revenue. Inventory provided through the app lets cooperative leaders know instantly whether they can meet the demands of traders. By including agreed-upon prices, dates, and locations in sales event invitations, the VCC app will remove much of the uncertainty faced by cooperative producers when marketing goats. Traders will feel more confident that their quantity and quality needs will be met in advance of a sale.

APPLICATION OF THE INNOVATION

The VCC app is implemented by Heifer International Nepal whose field personnel assist cooperative members in downloading the app while providing training and monitoring in the initial stages. The app is designed to be intuitive, eliminating the need for intensive training. Within cooperatives, the app is accessed by “VCC managers”, who are members of cooperative self-help groups (subgroups within the cooperatives), and cooperative leaders. All data transmitted by the app are captured by a server housed at Heifer International Nepal offices. The VCC app is currently being evaluated through a randomized trial involving 92 producer cooperatives.

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P.O. Box 110910 | Gainesville, Florida | Livestock-lab@ufl.edu | Website: <http://livestocklab.ifas.ufl.edu/>

Photo credit: B. Thapa

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INNOVATION SUMMARY: SMARTPHONE APP FOR LIVESTOCK DISEASE REPORTING

The innovation is a mobile phone-based application (app) to report livestock diseases through participation of women in rural villages with difficult access to animal health services. Members of remote communities report livestock diseases to a lead woman “sentry” who uses the app to upload disease symptoms and an image of the sick animal and GPS location to a server. A veterinarian reviews them, diagnoses the disease and, if needed, notifies local authorities to act. This innovation allows rapid detection and control of livestock diseases in Nepal.



INNOVATION QUICK FACTS

Lead Implementing Institution: Colorado State University



Category: Disease Management



Applied in: Nepal



Innovation Type: Technology



New/Adapted: New



Created for: Mainly Women



Nutrition Linkage: Dietary Quality

THE PROBLEM & ITS IMPORTANCE

Livestock diseases and their spread cause significant economic loss in Nepal. This is mainly due to lack of awareness of outbreaks, limited capacity to implement disease control and mitigation measures, and poor road conditions that make it challenging for animal health workers to reach remote areas. These problems hinder livestock productivity and profitability for smallholder producers living in remote locations and can also negatively impact human health through consumption of unsafe foods and products from diseased animals. Livestock producers are often forced to either leave the animals untreated or travel long distances to veterinary clinics, resulting in time away from their production-related tasks.

POTENTIAL BENEFITS

Due to rapid reporting by a woman sentry, veterinary services were able to respond in a timely manner, which prevented an outbreak of haemorrhagic septicaemia, a deadly disease of cattle and water buffalo, from becoming an epidemic. This approach also significantly improved disease reporting during the two months it was tested, generating 1042 reports. However, many of the disease event reports submitted through the app were production-related diseases that did not require an immediate response from the veterinary services. Nevertheless, improving grass-roots level disease surveillance is important as it can help detect disease outbreaks early when they are easy to control.

APPLICATION OF THE INNOVATION

The resources needed to apply this innovation are training and availability of a smartphone. To apply the innovation, first designated lead village women (“sentries”) need to be trained in animal disease recognition, particularly on diseases of special interest to the Veterinary Services. In addition, sentries, epidemiologists, and others may need to be trained to learn how to use the app, navigate the reporting system, and manage data. As cell phones are already widely available in Nepal and the app is free, the main investment is to support capacity building activities. This reporting system and app will be most appropriate in rural areas where veterinary services are not readily available or accessible.

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P.O. Box 110910 | Gainesville, Florida | Livestock-lab@ufl.edu | Website: <http://livestocklab.ifas.ufl.edu/>

Photo credit: S. Bajracharya

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INNOVATION SUMMARY: TECHNOLOGY PACKAGE FOR PREVENTION & CONTROL OF MASTITIS IN DAIRY ANIMALS

The innovation is a package of best practices to prevent and control mastitis or livestock udder inflammation, which reduces milk production, producer incomes, and food safety. The package consists of good husbandry practices, including mastitis detection and prevention techniques such as the California Mastitis and milk conductivity tests, and post milking teat dipping and dry cow therapy, respectively.



INNOVATION QUICK FACTS

Lead Implementing Institution: Heifer International Nepal



Category: Livestock Management



Applied in: Nepal



Innovation Type: Technology



New/Adapted: Adapted



Created for: Women & Men



Nutrition Linkage: Food Safety

THE PROBLEM & ITS IMPORTANCE

Various studies on small and large farms in different parts of Nepal show that the prevalence of mastitis ranges from 14% to 60% in dairy animals (cattle and buffaloes). The resulting economic loss of US \$70/month/animal arises from a reduction in milk production (1.56 liters/day), unsuitability of milk for consumption due to contamination (blood or flakes), treatment expenses, extra labor required, and animal replacement costs in severe cases. There is a higher incidence (78%) of sub-clinical versus clinical mastitis due to poor husbandry and inadequate use of mastitis prevention technologies.

POTENTIAL BENEFITS

Adopting the package of best practices will reduce or prevent economic loss due to mastitis and result in higher yields of higher quality, safer milk. Qualitative and quantitative data from farmer surveys show that the innovation reduced sub-clinical mastitis prevalence from 55% at baseline to 28% at endline in dairy cows and from 78% to 18% in buffaloes within six months. The innovation increased awareness and adoption of good husbandry practices by farmers resulting in no reports of clinical mastitis since project inception.

APPLICATION OF THE INNOVATION

The mastitis reduction technology package can be tailored to different production settings and geographies. The prevention and control measures are simple, easily adoptable, and economically rewarding for dairy producers and cooperatives. Adopting the package would require about US \$15 per dairy animal when targeting 10,000 dairy animals. Costs for cooperatives (about US \$2,000) are needed mainly to establish milk testing and information feedback systems. Farmers will also need to purchase some small items such as povidone iodine and antibiotics, as needed. Once these inputs are secured, use of the innovation can be financially self-sustainable. Producers can use increased income through sales of higher quality milk to procure supplies needed to implement the best practices.

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Photo credit: Heifer International Nepal

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INNOVATION SUMMARY: MOBILE APP-BASED FEEDING SUPPORT TOOL TO OPTIMIZE DAIRY ANIMAL PRODUCTIVITY

The innovation is a smartphone Feeding Support Tool application (app) that is used on Android smartphones for formulating least cost, nutritionally balanced rations for dairy cattle and buffalo with locally available feed ingredients. Feeding balanced rations, to meet the nutritional requirements of dairy animals in various production stages, increases milk yields and incomes of smallholder producers and decreases feed wastage and environmental pollution.



INNOVATION QUICK FACTS

Lead Implementing Institution: Heifer International Nepal



Category: Livestock Management



Applied in: Nepal



Innovation Type: Technology



New/Adapted: New



Created for: Women & Men



Nutrition Linkage: Food Safety

THE PROBLEM & ITS IMPORTANCE

The Nepal dairy sector contributes 8% to the Gross Domestic Product, but average dairy animal milk yield is only a third of that of many developing countries, mainly due to inadequate feeding. In the Terai belt of Nepal, dairy animal feeding is largely based on crop residues such as rice straw and grasses, the availability of which varies with season and land use pattern. The government of Nepal has identified dairy as one of the most promising agriculture sub-sectors due to the potential to increase yields from about 900 (current) to 3,000 liters/year.

POTENTIAL BENEFITS

An animal feeding trial with rations balanced with the app showed that using the Feeding Support Tool increased milk yield by cows and buffalo by 15% in just one month of use. Of farmers who tried the app, 94% reported an increase in milk yield and agreed that the balancing rations helps reduce costs associated with livestock feeding. The app can be used to balance rations of dairy cattle and buffalo, and it is also being adapted for goats. Use of this balancing rations through this app can result in more income generation from improved livestock and animal-source food sales.

APPLICATION OF THE INNOVATION

The free Android mobile application can be downloaded from [Google Play](https://play.google.com/store/apps/details?id=com.heiferintl.fst) (search “Heifer-LFST”). To apply the innovation, potential users need to be trained for one day on dairy animal feeding management, as well as on the use of the app in general. The application can be used to prepare balanced rations that will meet nutrient needs of dairy animals at various stages of production. As Android smartphones are widely available and used in Nepal, the financial requirement is limited to training users. The application can be used as part of extension services to improve the profitability and environmental stewardship of dairy production, by dairy producers and cooperatives, and/or by feed manufacturers or agro-veterinary dealers, among others.

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Photo credit: Livestock Systems Innovation Lab

Feed the Future Innovation Lab for Livestock Systems

University of Florida | P.O. Box 110910
Gainesville, Florida | 32611-0910 | Livestock-lab@ufl.edu
<http://livestocklab.ifas.ufl.edu/>

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