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

Integrating Gender and Nutrition within Agricultural Extension Services

Technology Profile

Type of Technology: Physical

Digital Fat Tester

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The **Integrating Gender and Nutrition within Agricultural Extension Services (INGENAES)** project works to improve agricultural livelihoods focusing on strengthening extension and advisory services to empower and engage smallholder farmers, men and women. The technology profiles support INGENAES's goal of improving the dissemination of gender-appropriate and nutrition-enhancing technologies and inputs to improve women's agricultural productivity and enhance household nutrition. The technology profiles identify issues and opportunities to make technologies more attractive for men and women farmers, to increase men's and women's benefits from using technologies, and to design distribution models for extension agents, input suppliers, and mobile devices to get the technologies into men's and women's hands.

Bangladesh is one of the world's most densely populated nations. It is located in South Asia, bordered by India and Myanmar (Burma). Independent since 1971, the country's agricultural sector provides 18.6% of the country's GDP and employment to 45% of the total labor force. In recent years, the country's positive economic growth has helped to achieve national food security and some reduction in poverty levels. Both the proportion of underweight children and children with severe stunting have seen rapid and dramatic declines in recent years (Bhagowalia, Menon, Quisumbing, and Soundararajan 2012: 1). However, poverty and malnutrition remain a serious problem for one-fourth of the population who have few assets and are often vulnerable to shocks from disease, economic crises, and extreme weather. Gender disparities are significant. Although 78% of employed women work in agriculture (compared to 53% of men), their contributions are not fully recognized because of cultural norms that value female seclusion and undervalue female labor. These norms also limit women's ownership of land in their own names (3.5%) and restrict access to and control over other productive assets. The Bangladesh national baseline survey of the Women's Empowerment in Agriculture Index in 2011 found that the domains contributing most to low levels of empowerment were weak leadership and influence in the community (33.8 percent), lack of control over resources (23.6 percent) and lack of control over income (15.0 percent) (Sraboni et al. 2013; Scalise 2009). In this context, providing women income-earning opportunities that are not tied to land or which require geographic mobility could be promising avenues for strengthening women's empowerment.

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INGENAES Integrating Gender and Nutrition within Agricultural Extension Services

Technology Design and Dissemination

The digital fat tester (DFT) is designed to measure the fat percentage of milk. There are four components to the DFT: the machine testing the fat, the receipt printer, the scale to weigh the milk, and the electrical supply. The machine requires a small sample of milk to test and produces a receipt in English that displays the fat percent, liters, weight, and solids-not-fat. Solids-not-fat measures all solids in the milk other than fat: including vitamins, minerals, and protein. Previously, lactometers were used for testing at village collection centers, while the Garber method was used at chilling plants. These test the specific gravity of the milk but are easily manipulated and influenced by factors such as weather.

The use of a digital measurement system allows for more transparent pricing in the dairy chain. The price of the milk reflects the quality of the milk based on the fat content; as the milk fat percentage increases, the price increases. When milk fat is the price determinant for milk, the producers are encouraged to provide quality feed to the animals as well as appropriate medical care. This results in improved milk quality for the consumer and higher and more predictable prices for the producer.

BOX 1 DATA COLLECTION

Data collection for this technology assessment occurred in Bogra and Shirajganj, Bangladesh and surrounding villages from August 2-5, 2015. Staff from CARE's SDVC project played a key role in organizing the interviews.

Users of the DFT are classified as men and women dairy farmers who sell to collection points where the DFT was introduced. Two men users and three women users were individually interviewed. A group of men and a group of women users were also interviewed. Non-users are farmers that sold to collection points that were not using the DFT. Two groups of men and one group of women were interviewed as non-users. One male non-user was individually interviewed. One woman farmer that was selling in the informal market was interviewed as a non-user.

Additionally, the following individuals were interviewed:

- Collection point managers using the DFT
- A field facilitator and the manager of livestock services for the project as extension officers
- Two project managers of the SDVC project
- The current technical advisor and past project manager, Nurul Siddiquee

CARE introduced the DFT in Bangladesh as part of its Strengthening the Dairy Value Chain (SDVC) project funded by the Bill and Melinda Gates foundation. The SDVC project aims to improve the formal dairy value chain by working with farmers, processors, traders, and others to add value to and improve returns from participation in the formal dairy market.

Gender Analysis

The DFT is introduced at milk collection points managed by BRAC Dairy and Food and is operated by the collection point manager. These collection centers are located, per the recommendation of the SDVC's gender specialist, near the community and within access of homesteads, in part to encourage women's participation in marketing. DFT operators are hired to test milk that is delivered to the collection points and provide farmers with information about the quality of their milk. Information about how to care for dairy cows is provided at the collection centers. Although farmers are not the direct users of the DFT, the findings outlined below describe the impact of the DFT and the complementary interventions on men's and women's dairy activities.

Food Availability and Quality

Producers report that milk production has increased since they began working with SDVC. One woman said she increased her production from 25-30 liters per day to 40 liters per day. Another

producer responded that her production increased from 3.5 liters to 5 liters, and another said she increased her production from 3-4 liters per day to 6-7 liters per day.

Milk provides many essential fats, vitamins, and minerals that the body needs to function correctly. It is especially important for children to receive this nutrition as they are growing and developing. The SDVC program is also working to increase the demand for milk by delivering important messages about its nutritional value. Nutritional messages target women via women's groups, because women are the predominant decision makers surrounding the consumption of milk within the household (Quisumbing 2003). **Among the individuals interviewed, many report that their families are increasing their consumption of milk.** For example, three report that they doubled their weekly consumption of milk, and one woman stated that while her family members used to consume 1-2 liters per week in total, they now consume 1.5 liters per day.

A Bangladeshi woman stands next to her dairy cow.
© C. Eisenmann 2015

However, not all families are increasing their consumption. Some producers choose to consume the same or a lesser amount of milk in order to sell the increased supply. One woman stated how her household chooses not to consume more milk but rather sell the additional milk that is produced. Another producer explained that she understands the importance of providing children with milk, and does so, but chooses to consume little to no milk as an adult. This way she can maintain her income while increasing her children's nutrition.

Time and Labor

The DFT itself is not a labor- or time-saving device, but it was introduced to communities in ways that have had an impact on how men and women dairy farmers spend their time in the dairy value chain. **Bringing the milk collection centers closer to the community decreased the time men spent selling milk and increased opportunities for women farmers to sell milk.** Previously, farmers had to travel longer distances to sell the milk, which some men reported could take up to five (5) hours. With closer collection centers, men reported that marketing the milk can take less than twenty minutes. The transparent pricing introduced with the DFT has also reduced the need for negotiating prices, which has had an impact on the time spent marketing the milk.

Women were rarely involved in marketing the milk if it was necessary to be away from home for long periods of time because of restrictions on their time and mobility. However many reported becoming involved in milk marketing when the collection centers became more accessible. The task became one that both men and women could undertake. For example, one man explained that he sells to the collection point 2-3 times a week and his wife sells the rest of the time. SDVC made additional accommodations to encourage women's participation in milk marketing. Collection points are required to have two lines for depositing milk: one for men and one for women. Collection point managers explained that the women's line is attended to first.

Farmers must be able to achieve at least 3.0 percent milk fat to be able to sell to the collection point. Boosting milk fat content can be achieved with improved breeding methods and feeding of the cows. The improved practices, as well as the resulting rise in milk production, increases the time farmers, more often women, spend on dairy related activities. Women expressed being willing to adopt these practices even if it increases the time they dedicate to dairy activities, possibly because they can receive more income for the milk they sell. Additionally, according to project staff, women have a strong willingness to move

to more productive breeds. Two women reported spending more time with their cows after the collection center adopted the DFT. One of them noted that she saves time overall since she spent more time selling to a different milk processor, while the other indicated that she has simply learned to manage her time better.

Income and Assets

The increase in the quality and quantity of milk results in higher incomes for farmers. With the information provided by the DFT about improved practices, farmers understand how to produce higher quality milk and increase their income.

A woman sells milk at the collection point. © C. Eisenmann 2015

Although women typically have little control over the income of dairy related activities (Quisumbing 2003), the women and men interviewed reported that they manage the household income jointly with their spouse. **Some women reported that they control the money independently from their husbands and delegate the milk income to their husband and children, as needed, for items at the market, schooling expenses, and other living costs.**

SDVC dairy producers are paid weekly for the milk they have sold during the week. When producers sell their milk to the BRAC Dairy collection point, the individual who is registered with the collection point is paid. SDVC encourages women to become registered producers so that they can receive the income from milk sales. This is in contrast to the informal milk market where men transport the milk to the market and sell it. Not only does this require more time, but men generally control the income when milk is sold in this way. Despite the establishment of paying only the registered producers through SDVC, some husbands reported that they are also able to collect the money at the collection point even when only their wives are registered.

Additional Considerations: New Employment Opportunities

Each center requires a DFT operator for testing the milk, which is collected twice daily. This is either the collection point manager or a DFT operator. Women are not generally hired as collection point managers, though under the project several women have acquired this position and have also been hired as DFT operators (McKague and Siddiquee 2014). The women DFT operators reported that they faced some initial resistance from the community when they first began. One woman collection point manager reported that, initially, the community thought she might not be able to operate the machine well, while another reported that children teased her. These initial challenges have been overcome and women report that the position has had benefits for them. Although SDVC has encouraged women to become DFT operators, the majority of operators remain men.

Being hired as a collection point manager or DFT operator creates an income stream for these individuals. In some cases, the income is higher than similar jobs in the dairy value chain. For example, one woman collection point manager previously worked as a sub-collector and was receiving .5 taka per liter of milk, but now is receiving BRAC Dairy's standard 1 taka per liter. The more milk that is sold to the collection point, the more income the operator or manager will receive. This increases the operator or manager's incentive to provide information to farmers on how to improve the quality of their milk and to build trust with them. Both men and women who serve as DFT operators explained that their status improved in the community after starting the job. Collection point managers and DFT operators are responsible for providing farmers with information about improved dairy practices, vaccinations, and deworming tablets. As resources to the farmers, collection point managers and DFT operators feel a sense of responsibility to them. A woman collection point manager identified this responsibility as a source of satisfaction for her

and another recognized that these additional services build trust between him and the farmers, which encourages farmers to sell to him.

Issues and Opportunities

The DFT aims to improve the price transparency in the dairy value chain. Farmers themselves do not use the DFT; instead it is operated by staff at milk collection centers. However, once introduced, the DFT is changing dairy farming for men and women involved in the chain.

The assessment highlighted how the DFT led to an increase in milk production. This increase means that men and women dairy farmers are able to sell larger quantities of milk. It also allows them to increase their consumption of milk, which can improve some nutritional outcomes.

Men's and women's roles are changing as the milk value chain formalizes. Moving the collection points closer to the communities facilitates women's participation in the marketing of milk and increases their access to income from milks sales. This increases their incentives to invest in improving the quantity and quality of milk, which means they are increasing the time they spend caring for their cows. This is not necessarily a negative trade-off as women's increased access to and control over income has other benefits for her and for children.

The SDVC has faced some challenges in supporting women's entry into the milk chain as DFT operators. It remains an opportunity for creating new employment opportunities for women if the constraints and barriers to women's participation as operators can be addressed.

A collection point manager tests the fat content of milk. © C. Eisenmann 2015

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