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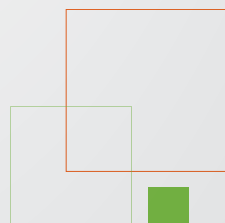
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CARE BANGLADESH
STRENGTHENING THE DAIRY VALUE CHAIN
PROJECT: STORIES OF IMPACT

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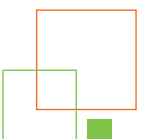


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EXECUTIVE SUMMARY

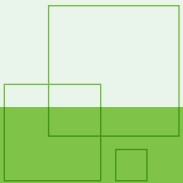
CARE’s ‘Strengthening the Dairy Value Chain Project (SDVC)

A poor small-holding dairy producer in Bangladesh typically holds an average of one to three cows; this often characterizes the most central, valuable and potentially profitable assets that are owned by rural poor households, especially the female members. However, the dairy industry is plagued by poor production quality and volume, fragmentation of supply, animal health service along with lack of access to quality based input and distrust between producers and buyers. CARE’s ‘Strengthening the Dairy Value Chain Project (SDVC) worked towards maximizing the value of assets and support the evolution of a competitive national dairy industry which resulted in a very high impact program for social development, technology transfer and poverty reduction. Key strategies that paved the pathways for this success are: Development of community-based farmers’ organizations; linking small scale producers with formal and informal market; ownership of Investments by private sector (both formal and informal; cattle health and information services to farmers through ‘livestock health worker; training on artificial insemination; and introduction of game changing Digital Fat Testing (DFT) replacing old chemical method for better transparency of business and quality of milk .

The project was designed and implemented in consecutive two phases: SDVC I (2007 to 2012) and SDVCII (2013 to 2016) concomitantly starting from 2008 to 2015 in North-Western districts of Bangladesh.

SDVC I was the first dairy project in CARE Bangladesh to embrace a value chain approach, which observed the entire dairy sector for sustainable pro-poor growth. Over the course of SDVC I, CARE documented the most successful interventions and its approach was refined in anticipation of significant scaling up in the future. The initiation involved 36,400 dairy farmers, yielding a noteworthy 50% increase in average daily milk production and 97% change in income from sales on milk. The innovation was the game changing approach for Digital Fat Testing mechanism ensuring transparency and trust among the processors, collectors and more importantly the producers. This digital fat testing initiative brought unprecedented transparency and fairness to the milk collection process.

CARE had been successful in Phase 1 of the SDVC project in advancing the potential for small-scale producers in the formalization process, despite a complex, disorganized, and inefficient dairy sector in Bangladesh, influenced by the lack of processor organization and tensions between formal and informal sectors, as well as productivity and profitability, and political and economic issues. CARE has built a network of producers and partners for supporting, in SDVC Phase 2, a profitable and sustainable dairy sector, reducing rural poverty and empowering women.



Impacts of the SDVC project

The SDVC project has a very high impacts on poverty reduction, women empowerment in entering milk production and market, increase in hard valuation, over all milk production.

The project felt needs of technology transfer to grass-root level such as Artificial Insemination for better breed of cattle through training local livestock health workers and supported availability of dairy back up services and inputs through establishing and training input shops. The knowledge and practice of the farmers in adopting appropriate technology has improved dramatically. The project had a goal of gender sensitive development of women participation in production and marketing of milk in a country like Bangladesh where women participation in business and overall mobility is limited particularly in remote rural areas. 85% of the SDVC project direct beneficiary was women. The project created enabling environment for women participation in dairy value chain and supported business capacity development. This led to increased leadership skills for women, dairy farm management capacity, and contributions to family income, resulting in more respect for women's decision-making, and men sharing the household workload. The project has successfully overcome mobility and social challenges for women entrepreneurship.

Linking LHWs with Artificial Insemination (AI) training lead to sustainable AI accessibility for the farmers and also contributed to the rise in incomes of LHWs. Further linkage of the AI workers with BRAC will ensure their sustainability in the long run.

The DFT initiative has played a crucial role in the development of a formal structure in the remote community which is attractive for other producers to get involved in the market. Additionally the transparency, consistent market and pricing results in sustainability in the system. There are 3 million dairy farmers in Bangladesh and successful expansion of such a model would mean a complete transformation of the sector and its buyers and sellers.

The SDVC has a very high impacts over all development of dairy chain value in the selected districts in Bangladesh. The project achieved commendable successes in technology transfer, development of market linkage, establishing fair pricing and social development in the gender dimension. The learning can be used in other region in Bangladesh and elsewhere in a developing country.

INTRODUCTION

A poor small-holding dairy producer in Bangladesh typically holds an average of one to three cows; this often characterizes the most central, valuable and potentially profitable assets that are owned by rural households, especially the female members. However, the dairy industry is plagued by poor production quality and volume, fragmentation of supply, animal health service along with lack of access to quality based input and distrust between producers and buyers. CARE's 'Strengthening the Dairy Value Chain Project (SDVC)' worked towards maximizing the value of assets and support the evolution of a competitive national dairy industry which resulted in a very high impact program for social development, technology transfer and poverty reduction.



OVERVIEW OF SDVC I

CARE Bangladesh implemented the project “Strengthening the Dairy Value Chain (SDVC) I” in the period 2007-2012.

CARE Bangladesh has the mission to amplify the voices of the poor and marginalized in ways that influence public opinion, development practice, and policy at all levels. The SDVC projects are an ideal platform to cultivate the capability to gather direct experience from the grassroots level and transform that experience into meaningful evidence and understanding to be communicated to a broad and diverse audience.

SDVC I was the first dairy project in CARE Bangladesh to embrace a value chain approach, which observed the entire dairy sector for sustainable pro-poor growth. Over the course of SDVC I, CARE documented the most successful interventions and its approach was refined in anticipation of significant scaling up in the future. The initiation involved 36,400 dairy farmers, yielding a noteworthy 50% increase in average daily milk production and 97% change in income from sales on milk.

Milk production and marketing before the sdvc project initiation in 2007

- Average milk production per cow was very low (.75 liters)
- Poor housing and animal management practices
- Lack of access to quality inputs and high price
- Poor breed and broken Artificial Insemination network
- Unstructured milk collection, transportation and marketing system
- Poor integration of milk processor/chilling plant with small-scale



Key strategies for SDVC I

- Development of Community-based farmers' organizations
- Linking small scale producers with formal and informal market
- Ownership of Investments by private sector (both formal and informal)
- Cattle health and information services to farmers through 'Livestock health worker' in addition to Parapet
- Ensuring better access to quality Input through a network of Microfranchise input shops.
- Address policy barriers improving the national policy environment
- Relevant research e.g. on dairy feed and fodder in the country context
- Training on Artificial Insemination (AI) services in order to ensure an access and efficient use of the service
- Facilitating cooperation and coordination between all actors in the value chain

Development of Community-based farmers' organizations

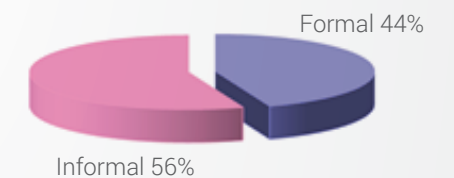
Farmers who reside in close proximity to formal and informal processors' chilling plant and collection points were selected. Farmers formed around 1162 groups (30 members in each group). These groups were assisted through the government registration process. Priority has been given to groups that are highly involved in savings reinvestment practices. The groups have been registered with different government departments like Department of Cooperatives, Women's Affairs, and the Department of Social Affairs. These groups have emerged as model groups. The project has successfully reached and surpassed its target of 35,000 producers, with a total of 36,400 producers. This has facilitated strong market linkages with the groups and participating farmers.

Participatory Performance Tracking (PPT) was developed by the project management for tracking performances and evaluate graduation status. Producer have benefited from Participatory Performance Tracking (PPT) Matrix as it has real time feedback on the individual and collective practices by the group. The approach helped understanding performance status, causes behind the lagged performance and helped identifying remedies. According annual report of 2012, 92 percent of 1,162 groups in the SDVC project have graduated to "A" category by the end of year 5 of SDVC I project

Linking small scale producers with formal and informal market

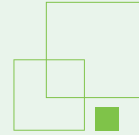
Informal sector for milk industry is as vast as almost any business in Bangladesh. The project has successfully developed a strong linkage with the informal sector to support the convenient and reasonable selling of milk by the producers. Market options also helped the farmers to negotiate a better price and survive in the market even in a crisis situation. Geographical structures do not always permit farmers to connect with the formal markets, which limits their access to a convenient source of demand for their product.

Amount of Milk (In%) sold to Market SDVC (Apr 2012)



Ownership of Investments by private sector (both formal and informal)

SDVC project's success was built on the collaboration with private companies like BRAC Dairy, Grameen Danone, Milk Vita and Pran Dairy, and veterinarian medicine companies. BRAC Dairy and Grameen Danone is buyer of milk from SDVC producer groups for their chilling plants. The majority of formal market milk is acquired by Milk Vita.



Formal sector

Milk Vita was developed based on the Indian Amul model with the objectives of raising incomes of marginal farmers by purchasing their milk at a reasonable price through a guaranteed co-operative market, and of ensuring reasonably priced, hygienic and nutritious milk and milk products to city dwellers. DANONE of France is affiliated, through a yogurt production venture in a local milk processing plant, with the Grameen Motsho Foundation. The Foundation is a subsidiary of the Grameen Bank, in a crop-livestock-fish farming integrated project with landless and marginal farmers. PRAN Dairy Ltd. is a subsidiary of the PRAN-RFL Group, a food processing company based in Dhaka, Bangladesh, which serves South Asia, Africa, North America, Europe and the Middle East. PRAN Dairy Ltd., which collects milk from both large and small farmers in Bangladesh, is involved in setting up dairy hubs as a way to improve the dairy value chain in terms of better pricing, guaranteed market, and to ensure the growth and survival of micro entrepreneurship.

Informal sector

Local informal market played a key role as alternative source of milk marketing helping to deal with milk rejection risks from chilling plants during crisis periods and in case of lower fat percentage than the benchmark. The major informal market players were local producers of milk products like DhanShiri, Aristrocat, Asia Sweets and Moharrom Doi Ghar and other bigger sweet shops

Input supply companies

SDVC collaborated with privately operated veterinarian medicine and feed companies such as Square, Reneta, Acme, Novartis and Tamim Agro for production necessary medicines and supply to project designated input shops. The project organized workshops regularly to share knowledge with vet medicine producers.

Cattle health and information services to farmers through 'Livestock Health worker' in addition to Paravet

Selected community members were given training as 'Livestock Health Worker (LHW)' given the limited availability of Paravets in the country. The LHWs are performing a key role of maintaining primary cattle health services like scheduled vaccinations, de-worming, primary treatment, using improved feed, quality medicine, information, AI, and maintaining Cattle Health Care.

Ensuring better access to Quality Input through a network of Microfranchise input shops

Microfranchise is a social enterprise of CARE Bangladesh named Krishi Utsho which is a network of a number of input shops operated under CARE. These shops are bridging the gap of country renowned input supply companies with the rural level farmers.

The purpose of the franchise network was to ensure timely and better distribution of quality agro inputs to the community farmers. In the microfranchise network, CARE SDVC project played the role of the franchisor. This microfranchise model helped overcome the challenges such as having no standard for quality service, no scalable marketing system, no standards for inventory management, and prevalence of fraudulent and counterfeit products, which compromises the quality of the products sold.

Address policy barriers improving the national policy environment

SDVC project had a component to review policy and develop supportive strategies and guidelines at national level. The key activities under this objective included advocating government policies relating to the dairy sector, the importation duties on powdered milk, the level of investments in dairy by the private sector.

The key activities under this objective are associated with project success include advocating government policies relating to the dairy sector, the importation duties on powdered milk, the level of investments in dairy by the private sector, the preference of some parts of the private sector to purchase milk from farmers with more than three cows who fall outside of the project's target group, and the low level of per capita milk consumption in rural areas. The project was successful in the following actions to formulate and implement policy.

Advocated the government to adopt favorable national dairy policies for small holder farmers, especially access to quality dairy genetics;

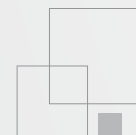
Involved FAO, ILRI, the government, BRAC and AU to facilitate research with practical applications within the project boundary;

Tracked down the impact of reduced duties on imported powdered milk on the growth of the domestic dairy sector;

Followed up investment flowing into dairy from the private sector;

Collaborate with private sector actors who expressed an interest in making new or additional investments in dairy like BRAC and DANONE;

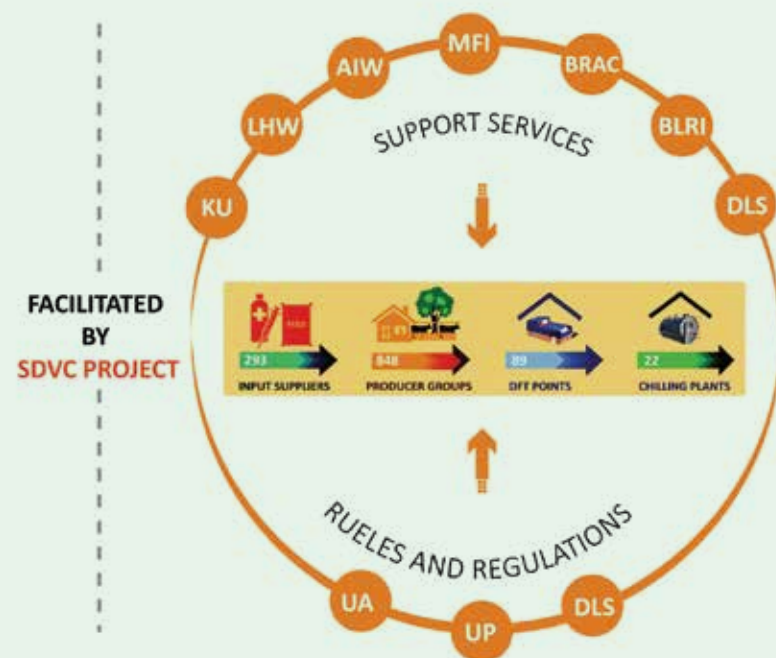
Organized campaigns and events to encourage more milk consumption in rural areas



Training on Artificial Insemination (AI) services in order to ensure an access and efficient use of the service

The project played a key role in implementing artificial insemination services with a view to develop the cow breed as an alternative option for increasing milk yield. The project developed linkages with AI networks to ensure the service at community level in order to ensure an efficient AI service delivery system. The SDVC project provided training and refresher training to selected AI workers in partnership with BRAC AI. SDVC worked with the Department of Livestock Services (DLS), Ministry of Fisheries and Livestock (MoFL), Bangladesh Livestock Research Institute (BLRI) and other private sector AI service providers to strengthen the overall breed development initiatives in Bangladesh. The project recently collaborated with BLRI to organize an international breeding conference and presented project data on breed assessment and future needs.

STRENGTHENING THE DAIRY VALUE CHAIN (SDVC-II) MODEL CARE BANGLADESH



Overview of SDVC II

CARE implemented the Strengthening the Dairy Value Chain I Project for 2007 to 2012. The effort worked with 36,400 dairy farmers, yielding a significant 50 percent increase in average daily milk production and 97 percent change in income from milk sales. Daily productivity of milking cows increased from 1.73 liters to 2.28 liters (a 32 percent change). Building on these successes, CARE's SDVC II project (2013-2016) focused on overcoming additional challenges in the dairy sector such as unstructured milk collection and marketing systems, and an unavailability of and steep prices for inputs. Working in partnership with BRAC Dairy, CARE aimed via SDVC II to further redefine the way milk is produced, collected and marketed in rural Bangladesh.

Country milk production and demand situation

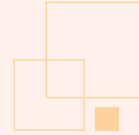
In 2015 according to the FAO, Bangladesh produced nearly 6.1 million MT of milk annually, but can only meet about half of the growing domestic demand for dairy products, driven by population growth and changes in consumer purchasing power. Smallholder farmers (in Bangladesh this is a very small farmer with around 2-3 cows) represent over 80% of the 3 million farmers in the dairy subsector of Bangladesh and the largest aggregate in milk-production base.

The dairy and beef industry in Bangladesh has in the past depended heavily on imports. With declining imports of cheap cattle, and increasing incomes of consumers, there is a considerable opportunity for developing the dairy sector in Bangladesh. Raising dairy cattle has also proven to be far better for very small land-less farmers relative to other agricultural initiatives. Development of the dairy sector positively impacts the life of the poor through stabilization and generation of income, employment opportunities, nutrition, providing draft animals and manure for agricultural productivity, and intra-household allocation of resources and division of labor. Various studies, including those by the International Food Policy Research Institute (IFPRI), document that preschool children and pregnant and lactating women are at highest risk for malnutrition and have highest benefit from having dairy cattle, due to the nutrition in the milk as well as the potential for income production.

Barriers in Milk Industry in Bangladesh

Milk industry has a huge growth potential but there are some barriers that hinders the growth. The IFPRI found a number of constraints that not only prevent growth of the industry, but also prevent the small farmer from participating in the dairy industry. These barriers for the small farmer along the value chain include:

- ❑ Lack of a concerted national effort nor organized producer groups that could help with economies of scale, reduce transaction costs, boost milk production and collection,



- ❑ The increasing cost of feed and land, while grazing land diminishes,
- ❑ Decreasing profitability in having less than 4 cows (which encompasses the majority of the producers) due to low milk production per cow,
- ❑ Lack of a breed-improvement program and low quality breed stock,
- ❑ Inadequate animal health services,
- ❑ Lack of adequate financing, and difficulty for the small farmer in bearing risks,
- ❑ Perishability, quality, and food safety issues.

CARE Bangladesh designed and implemented SDVC Project II (2013-2016 based on experiences and best practices learned through CARE's SDVCI (2007-2012) in the North-western districts in Bangladesh. Significant results from SDVC I include training hundreds of service providers and effectively integrating them in the value chain, more than 50% increase in average household-level milk production, 97% increase in milk sales income for participating farmers and consistent sales growth for dairy input shops, 40% increase in milk collection for 75% of the trained milk collectors, 46% increase in household-level milk consumption, and greater than 95% increase in income of Livestock Health Workers (LHW) against the original project goal.

“Hub” Model for Pro-Poor Inclusive Dairy Development in Bangladesh

SDVC II enrolled 26,138 individual producers involved in the project – divided into 848 groups across 7 Districts. 45% of the SDVC II groups are groups that were formed during the Phase 1 of the SDVC project. The other 55% of the groups are newly formed during SDVC II. Within those groups, 33% of the producers joined the project during Phase 1 and 67% of the producers are new to the SDVC during SDVC II.

Funded by Bill and Melinda Gates Foundation, the SDVC II project aimed to leverage the developments, innovations and drives generated through the SDVC I project. In combination of these factors with a limited yet effective set of new activities, SDVC II tested the additional requirements to reach a tipping point in the sector that lead them to an industry-wide replication. This was anchored through a network of input supply shops and dairy collection points, applying game-changing Digital Fat Testing technology. The Dairy Hub Model of SDVC II brought significant changes to BRAC Dairy's value chain model and the entire dairy sector of Bangladesh.

Supply side

Low small-holding production system. The existing average volume for small-holding production was about one liter of milk per cow/day. This falls significantly below production potential, leaving a considerable gap between production and demand. Barriers within increase of production includes input shortage, poor housing and animal management practice, sub-optimal cattle nutrition, producer's inability to afford artificial insemination & productive cattle, limited access to veterinary care and insufficient access to information.

Market side

On the marketing side - poor infrastructure, inconsistent business practices by processors and lack of transparency often discourages the producer to invest in further upgrading and constraining the growth and productivity. In response to deal with such issues,

CARE and BRAC collaborated to establish integrated dairy hubs which could overcome the barriers for small-holding producers and processors equally and ineffective opaque output market linkage.

Strategies for SDVC II to improve the value chain

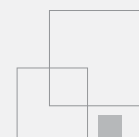
Engaging Small-Holding Farmers

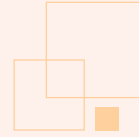
SDVC II worked with the farmers to develop their knowledge of dairy farming, incorporating them to a transparent market system and ensuring their access to quality inputs and information.

- Building capacity, linkages and integrations of farmers into the dairy hubs
- Introducing/improving transparency in milk collection process and pricing through installing Digital Fat Testing facility
- Consolidating supply chain system that would allow farmers to attract/interest commercial buyers and improve/increase their bargaining power
- Expanding small-holding farmers' access to productivity enhancing quality inputs and services

Engaging Other Market Actors

- Training and linking the milk collectors, ensuring transparency between the collectors and the producers
- Expanding the network of Krishi Utsho shops to confirm easy access of quality inputs and services
- Fostering the development of Livestock Health Workers (LHW) on a Fee-For-Service basis, to ensure sustainability
- Working with both the government and private artificial insemination service providers, to build a commercial linkage with farmers that will confirm better breeding facilities





Improvement in transparency of milk collection process and pricing: Digital Fat Testing Facility

The traditional milk collection system in Bangladesh lacks transparency and fairness. It puts power in the hands of dishonest milk collectors who aggregate and dilute milk, distorting prices paid to farmers. Further, the milk-fat percentage analysis performed by dairy processing companies is performed at a chilling plant far away from the dairy farmers and is based on the milk aggregated from a number of farmers rather than on the milk each individual supplies. Given that milk-fat percentage is the main factor in determining the price of milk in Bangladesh, the traditional process of testing aggregated milk clearly provides strong disincentives for honest small holding farmers and favors those who adulterate their milk. CARE Bangladesh introduced the use of digital milk fat testing machines at village-level collection points as a means by which to improve milk collection fairness and transparency, improving farmer incomes and increasing the supply of good quality milk to the formal market. The DFT piloting initiative was taken aiming to:

- ❑ Improve transparency and fairness to the milk collection process
- ❑ Increase milk-selling income of the dairy producer through individual pricing and fairer purchasing systems.
- ❑ Individual and fair pricing structure would encourage greater uptake of improved cow nutrition and management practices
- ❑ Reduce corruption and collusion that occurs between milk collectors and chilling plant milk receivers

In Bangladesh the formal sector milk procurement system provides disincentives to producers to invest in improvements in milk quality and to supply to formal markets. Furthermore, chilling plants continue to rely upon inaccurate, chemical methods to ascertain milk fat quantity (the Gerber method), meaning that farmers are frequently underpaid for their milk. Furthermore, traditional milk collection systems aggregate milk, meaning that farmers' efforts to improve milk quality are not reflected in price. In order to improve this situation, BRAC Dairy and CARE BD SDVC project implemented a piloting of Digital Fat Testing (DFT) Initiative in 89 collection points around chilling plants. DFT devices have been proven to increase transparency and accuracy of how prices are set, and reduce the risk of arbitrary milk pricing or buyers taking advantage of farmers in pricing their milk, giving farmers more information and greater decision-making power, improving accountability and trust between producers and buyers.

Increase access to and quality of dairy farming inputs and services

SDVC II took initiatives to increase access to dairy inputs and services through expanding its input shops, LHW, AI services in the project area. Training was provided to 50 input supply shops that have sprung up in response to perceived demand are to be trained, supported, and linked to the Dairy Hub in Phase II, to meet challenges faced by entrepreneurs and dairy farmers. b. Since the start of the SDVC project, farmers report significant increases in milk production and of their income as a result of using inputs, services, and information from dairy input shops supported by the project. The SDVC project assured availability of that 1 LHW and 1 AI Technician for every 300 households (found to be the ideal. A 3-way credit system was piloted that connects BRAC Dairy, dairy input shops, and smallholder farmers, with CARE continuing to encourage savings and savings groups as the primary means for growing business.

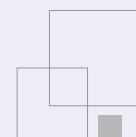
Input Shops played key role in sustainable supply of commodities

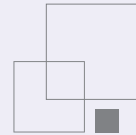
The project has made substantial progress toward establishing a financially sustainable input shop network capable of delivering high-quality, affordable and timely agricultural inputs to Bangladesh's rural smallholder producers. The network of input shops enabled agro input companies producing feeds, seeds, veterinary medicine and breeding services to profitably reach a BoP consumer segment while ensuring the rural poor have access to the high quality, affordable agricultural inputs that they need to increase productivity, production and incremental incomes to make progress towards escaping poverty.

IMPACT EVALUATION

The SDVC II tracking tools and sampling plans draw largely from the lessons learned in SDVC I, research into best practices in value chain analysis and dairy analysis in other programs. The foundational element of the impact assessment is longitudinal panel data collection of several unique SDVC intervention and Non-SDVC (control) groups that was analyzed using mixed-effects modeling.

To better understand the nuances of how the SDVC project has impacted the Bangladesh dairy sector, CARE gathered data from separate groups. These are SDVC intervention group (SDVC Area) and Control area (Non-SDVC area). The SDVC intervention groups are producers who were in SDVC I and are continuing in SDVC II. Non-SDVC groups are producers who own dairy cows and live in areas outside of where the SDVC project is working.

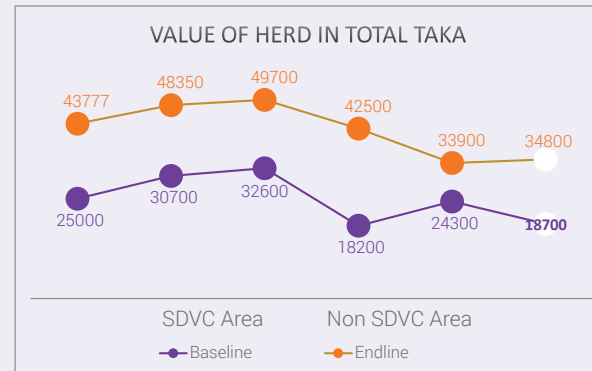




Increased in Herd Valuation

The value of a herd has been self-assessed over time by the farmers. The value of the cattle within the herds of both the SDVC producers and the control producers has been increasing over time. However, the value of SDVC herds have increased at a higher rate than the control producer herds. Part of the SDVC increases are driven by the fact that the value of the cross breed cattle has increased quite dramatically for SDVC

Figur 01: Value of herd in BD taka



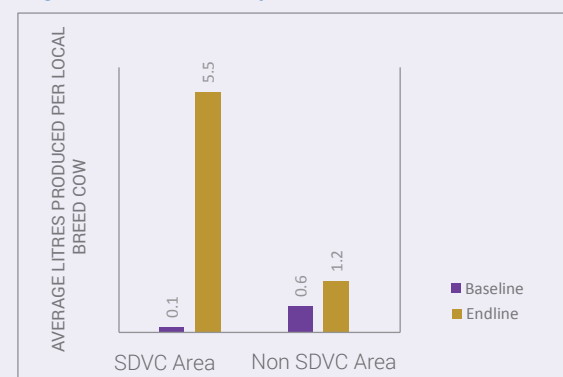
Increased Milk Production

SDVC I interventions saw a 50 percent increase in average daily milk production when compared to the baseline data from August 2008. Average income from milk sales have achieved a significant (97 percent increase). Daily productivity of milking cows increase from 1.73 liters to 2.28 liters (a 32 percent change). Cross-bred cows have also seen a 37 percent rise in production.

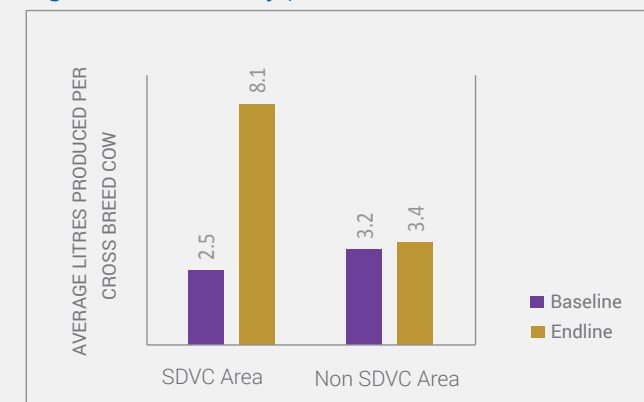
The overall productivity per cow has increased faster for SDVC producers than it has for control producers. This is a sign of significant success for a core goal of the SDVC project. The increase in production has occurred for both types of farmers, but the SDVC producers have seen a faster increase in productivity. SDVC producers have seen a very significant increase in productivity within cross breed cows.

The increase in productivity has been higher fastest for female SDVC producers. These female farmers started off at the lowest levels of production per cow. However, their increase in productivity has been the fastest.

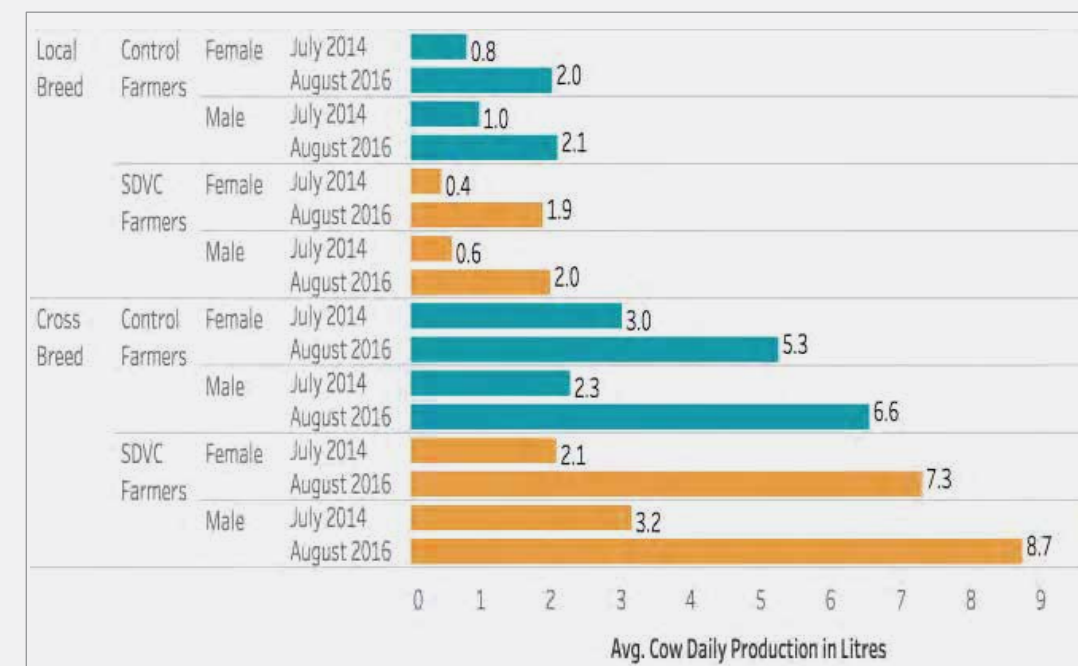
Figur 2: Productivity per in milk local cow



Figur 3: Productivity per in milk cross breed cow

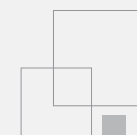


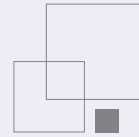
Figur 4: The average daily production per cow broken out by breed and gender



Increased farmers' Income from Milk

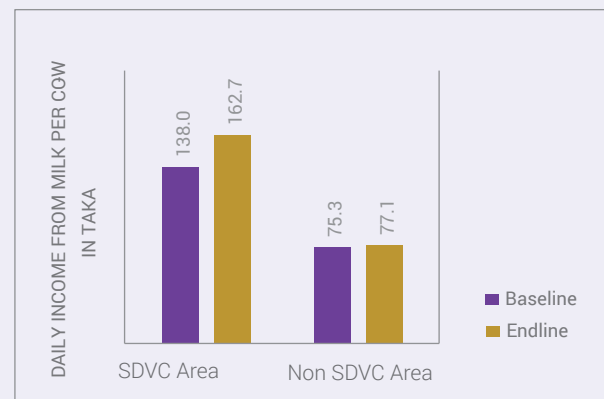
Both the SDVC producers and the control producers are earning increased incomes from milk sales. These increases have a much higher rate for the SDVC producers than for the control producers. It is important to note that among the control producers who did see an increase in their income from milk, it was among those producers who live in areas that are affected by the SDVC trainings and project initiatives.



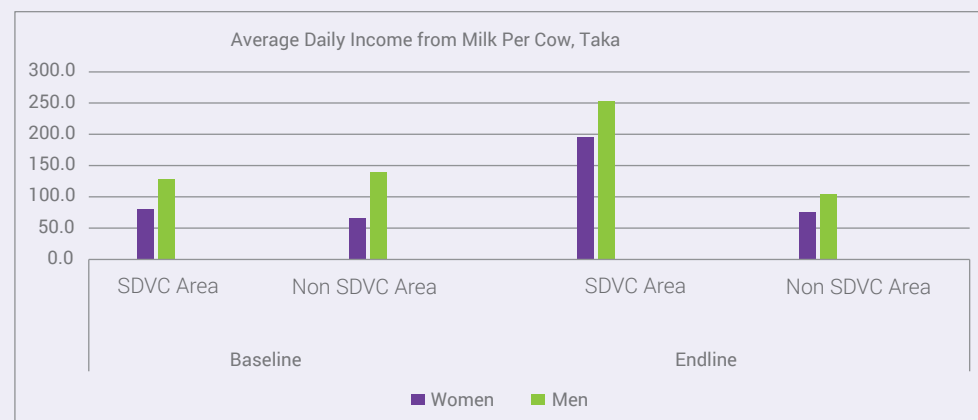


This is a positive sign of splatter impact of the SDVC project on the farmers that are not directly involved but who are positively impacted nonetheless. Display 11 also illustrates that these positive gains are happening at higher rates for SDVC women than for any other subgroup. This is even more signs of positive impact of the SDVC project towards their intended goals.

Figur 5: Income from Milk



Figur 6: Income from Milk by gender



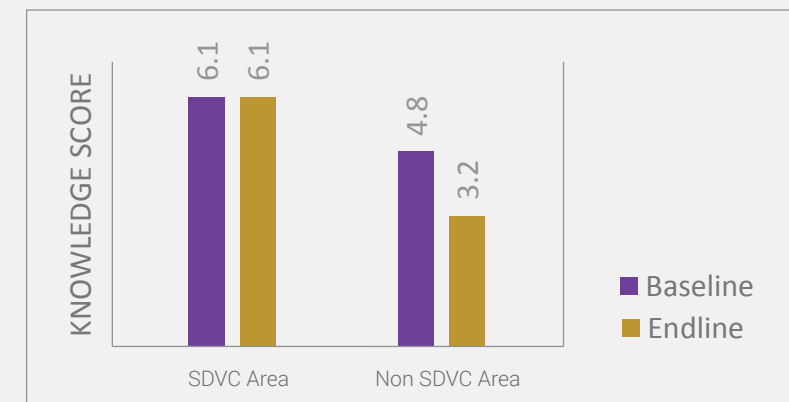
High use of Artificial Insemination

The use of artificial insemination has been a key focus of the project. The proportion of SDVC producers using AI has dropped slightly from 2014 to 2016. At the same time, the proportion of control producers using AI has increased. Among the SDVC producers who do use AI, most now use the services of NGOs and most of the control producers use private AI. This may be an indication that private AI service providers have been more successful at marketing their services than NGO providers have been.

Knowledge and Practice of Farmers Changed

The SDVC Phase 2 has been tracking the general dairy knowledge score and practice score for individual households. This is an indicator of general awareness of best practices and optimal choices and their applications. Interestingly, the knowledge score for the SDVC farms has remained steady at 6 on a scale of 1 to 10. This is above average. The average non-SDVC farmer has a knowledge score of 4. A full two points lower than the average SDVC farmer. This is a good sign of success on a key aim of the project.

Figur 7: Knowledge Scores

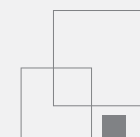


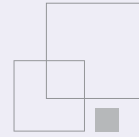
Impacts on Women Empowerment and Gender Agriculture and Assets

SDVC has focused on women, due to almost 85% of the participants being women dairy farmers. This has led to increased leadership skills for women, dairy farm management capacity, and contributions to family income, resulting in more respect for women's decision-making, and men sharing the household workload.

Overall, 89.6% of the SDVC producers are women and 10.4 are men. Ten percent (10%) of the women producers are group leaders while twelve percent (12%) of the male producers are group leaders

SDVC had some noteworthy success in exploring the impact of the project on women and men's asset acquisition, asset ownership, and related impacts on household and community gender dynamics of the dairy value chain. SDVC seeks to use the Gender Agriculture and Assets Project Initiative to investigate the needs, barriers, and responsibilities of the beneficiaries so that the project can develop effective intervention strategies that incorporate women as active collaborators. The SDVC end-line data shows that incomes are increasing both for men and women farmers. In March 2009, the income per cow was less than BDT 300 for both of men and women. This increased to approximately BDT 1,000 for men and more than BDT 600 for women dairy producers in March 2012



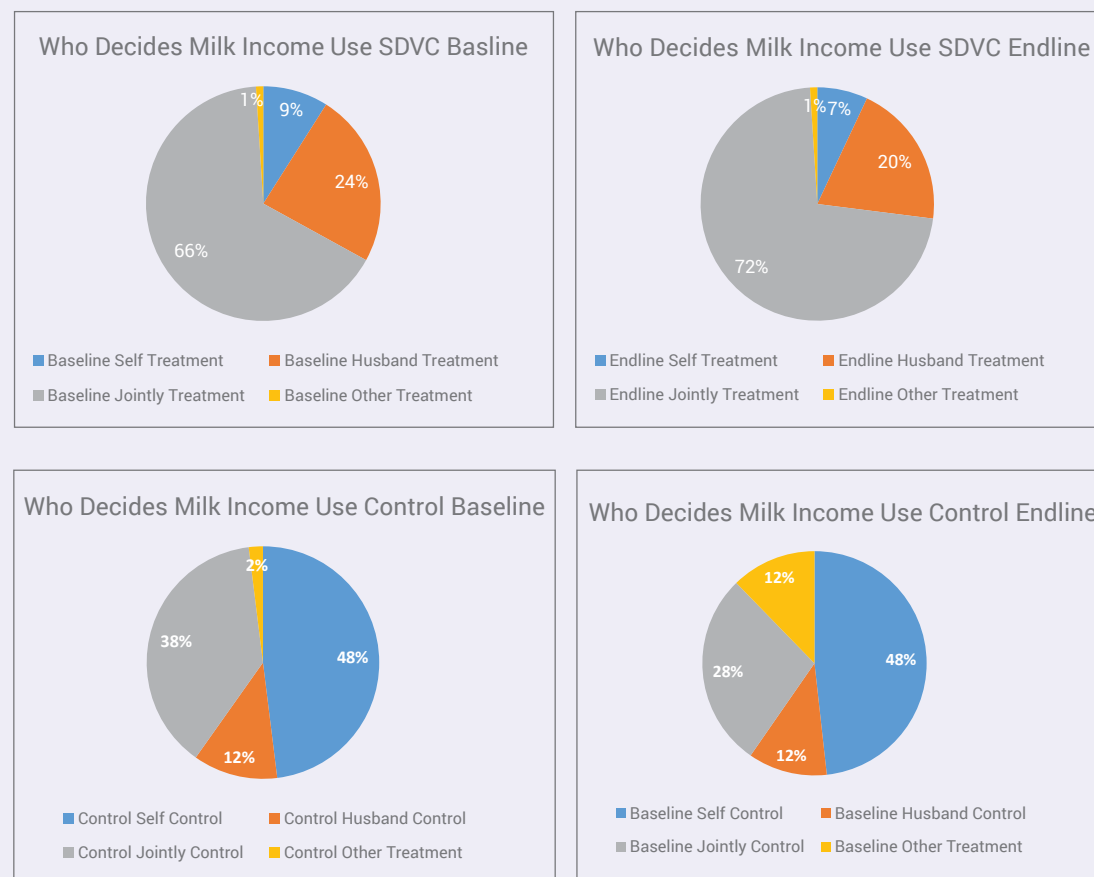


The incorporation of women in value-chain initiatives of the SDVC project has been exceptionally successful. The 82 percent of farmers and 71 percent of farmer leaders are women, which is significantly higher than the target of 50 percent. The project has successfully overcome mobility and social challenges for women entrepreneurship.

When looking closely at the trends in decision making every six months within the SDVC producers, the project saw that more women started making decisions on their own. And once that empowerment had been established, the family started making decisions jointly. Given the preferences of most Bangladeshi households, this is an extremely good sign.

How the household decides to spend money earned from the sales of milk are similar to the trends on how households decide to spend money in general. Between 2014 and 2016 a significantly higher percentage of treatment households are making the spending decisions together. And fewer of the decisions are being made by the husbands alone. The control producers also experienced this trend – to a larger degree than the SDVC producers. So these changes may not be attributed to the SDVC project alone.

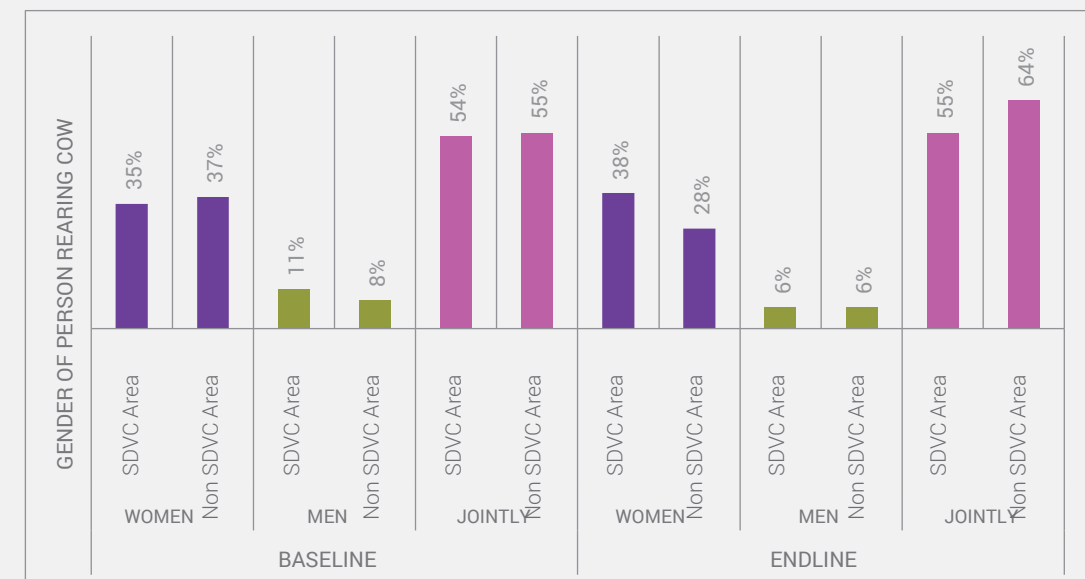
Figur 8: a,b,c,d Decision maker on how to use milk sales income



SDVC impacts on gender raising cattle

The gender of the person rearing the household's cattle has been shown to have an effect on the success of the dairy value chain. The final round of SDVC experienced that more women were caring for the household's cattle. This trend is reversed within the treatment households. Both types of household have the majority of cattle being cared for jointly.

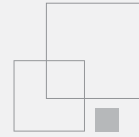
Figur 9: Gender of person rearing cattle



However, the project experienced a very little change in mobility of women. The majority of women in both treatment and control types of households needed permission to attend group meetings.

Livestock Health Workers increased income

Livestock Health Worker (LHW) is semiskilled paravets with seven-day foundation training given by SDVC project to serve 600-800 households' needs of basic livestock technical supports. It is another innovation of the project. The project has experienced the remarkable success in LHW development in terms of their skill and business development. Remarkable growth of LHWs income was reported by the end of the project. From the beginning of the SDVC I project to August 2012, LHWs increased their income by 291 percent. Specifically, women LHWs made a growth of 477 percent in their monthly income and men LHW saw a 271 percent increase. All of 201 LHWs are performing the key role of maintaining primary cattle health services like scheduled vaccinations, de-worming, primary treatment, using improved feed, quality medicine, information, AI, and maintaining Cattle Health Card.



SUSTAINABILITY:

The DFT initiative has played a crucial role in the development of a formal structure in the remote community which is attractive for other producers to get involved in the market. Through this type of initiative, employment opportunities were created and new entrepreneurs were developed. Producers enjoyed their return on investment thus adopting high quality farm management practices within the community illustrating a long term impact. CARE piloted each system with time and dedication and gave sufficient time to the system to get matured which also ensures sustainability. Integration of input shop services with DFT collection points allowed producers to access both the output and input market in the same place. It directly vitalized the businesses of shop entrepreneurs and collection point managers. Farmers will enjoy the benefits of a series of quality products in a convenient location. Furthermore, integration of input shops at DFT collection points will enable women farmers to make purchases themselves directly upon selling their milk at the collection point, giving them more authority over the distribution and spending of their profits.

To integrate the output and input markets, the project implemented the Dairy Hub Model in SDVC to effectively bridge rural small-holder dairy producers with the growing formal dairy market and a well-organized input services network. This created a “win-win” scenario for vendors, producers and all actors involved in the dairy value chain. The all components were linked and synchronized to result in synergies leading to a sustainable dairy development in North-Western Bangladesh. Linking LHWs with AI training would lead to sustainable AI accessibility for the farmers and also contributed to the rise in incomes of LHWs. Finally the formal handover process in the community gathering representing all the value chain stakeholders helped to develop a sustainable relationships among the stakeholders and this type of gathering helped develop the commitment level of both BRAC and milk producers.

SCALABILITY:

In particular SDVC I's Digital Fat Testing (DFT) initiative expanded from 6 to 22 chilling plants and 16 to 89 collection points during the three year phase. The network of retail input shops is ensuring that farmers have timely and adequate access to necessary inputs such as quality feeds, tools, medicines, training and provides them with an opportunity to compete in fast-growing and ever changing markets. The initiative has been able to serve the majority of the project beneficiaries and is also extending its services to other marginal farmers of the community.

The DFT pilot results were shared with other big processors like MilkVita, PRAN, Grameen, and DANONE to create a better market portfolio and tap them into a systemized milk supply system, starting at the bottom of the pyramid. Impressive results have been observed as BRAC, the 2nd largest dairy processor, is already initiating the replication of the model and till dates installed 48 of their 60 machines imported by their own initiative. The project also had a project exit meeting with PRAN and they are very much enthusiastic about the replication of the model and seeking for CARE's assistance in this regard. MilkVita, the largest dairy processor of Bangladesh, already imported few DFT systems to test the possibility of such.

The project had a very successful national level roundtable workshop with all the major dairy stakeholders starting with farmer level representatives to minister of the parliament. A good discussion on the opportunities and challenges took place during the roundtable. Few quotes are worth mentioning below:

“The dairy industry of Bangladesh holds great potential for sustainable development of the country. The government alone cannot ensure growth of this industry. We need support from all the operators (farmers, collectors, milk traders, dairy processors) and supporters (livestock health workers, input suppliers, and government and non-government institutions) of the dairy value chain. We have to create an ecosystem where all the stakeholders can smoothly interact and support each other. I believe that the Strengthening the Dairy Value Chains (SDVC) project of CARE Bangladesh is a valuable initiative in this regard. This type of project should be expanded all over the country.” – State Minister for Fisheries and Livestock, Government of Bangladesh.

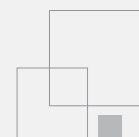
“Our farmers mostly suffer from lack of proper marketing facility. We want to build an organized milk marketing system to address this problem. Private sector has a big role to play in this regard. Currently, we are planning a project with the World Bank on strengthening the value chain system in the dairy sector. Soon we will finalize the dairy policy. A dairy board is going to be established where representatives of milk producers and processing industry will be included.”-Director General, Department of Livestock Services.

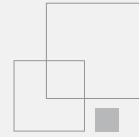
More reading around the roundtable is here: goo.gl/gNvPF4

Finally, there are 3 million dairy farmers in Bangladesh and successful expansion of such a model would mean a complete transformation of the sector and its buyers and sellers.

LEARNINGS:

1. The testing, implementation and handover of sustainable and replicable technology required a well-focused iterative approach with private sector's partners. At the beginning, investing into testing the right prototype of fat testing technologies was a concern for the private sectors. A series of successful piloting of the different technology prototypes helped build the confidence of the private sector to understand the benefit and reduced uncertainty. The process also helps to build the confidence of the associated teams to move forward. The successful implementation and shared value process developed the inner confidence and organizational strength of the private sector partner to finally carry over and to play a more proactive role to run the technology smoothly in an independent manner. A formal handover process between CARE and BRAC has also built trust and confidence between private sector and technology user and it also made the private sector more accountable for their commitment. To speed up adoption it was necessary to have equipment, materials, as well as market and entrepreneurship development capacities available along with the transfer of knowledge and technology on improved practice. Absence of lab and testing facilities is still a major obstacle for ensuring service quality as well as service market development. Determining the causes of specific diseases, checking feed ingredient quality, and determining semen quality are still areas of interest for the producers and service providers to receive and offer improved service.
2. Three components of the dairy hub model are the dairy producers and their communities, digital milk collection points and input shops. Businesses of mentioned three parties are interdependent. Producers need to use the services of input shops to keep their cows healthy and to improve the quality of milk so that they can get a better price from the DFT collection points. Meanwhile, input shops need more farmers' access to grow their business and the DFT collection point needs more quality milk to make more profit. So each associated party has their own interest of benefit in this model. The interconnectedness of the three pillars were key to the success of the project deliverables. The project also needed to take specific attention to adopt the technology by producers as well.





Producer's communities have to be well oriented regarding the technology and its benefit. Then they needed to be well trained on production technology to produce and supply good quality product to attract the processors attention. To maintain continuous production flow convenient access to quality inputs and services must be ensured for farmers. Finally progress tracking and experience sharing with both parties can strengthen the adoption process.

3. To understand how international market affects national milk market in relation to pricing and market saturation is a core trend to make the dairy farmers resilient. The first step of increasing resiliency is to analyze the market and orient the producers about the previous and possible upcoming trends and develop their capacity on alternative market linkage, smart and climate adaptive farm management practices, better negotiation and so on and how to handle each of those crisis in any given situation. From the first phase the project collected huge number of market data which helped the project to understand the market dynamics to orient the producers accordingly. In addition from the earlier stage project introduced savings to the producers groups and that was an advantage for them to run their farm during any unbalance market situation or overcome shocks. Fresh milk campaign posters, leaflets, dramas, rallies discussing milk consumption related topics and awareness on nutritional value of milk insist that producers maintain the minimum requirement of household demand as well as increase the household consumption with the increase of productivity. SDVC producers especially women are very much market aware and anxious about meeting the nutritional needs of their children and family members.

Community saving is instrumental for group cohesion and transformation

Although savings initiatives were experimental in the first year group, after observing positive results, the initiative was continued throughout the formation of the groups that followed. From the first year group's experience, it was observed that if savings can be implemented from the group's formation, the amount, understanding, and use of savings management becomes stronger and easier for the groups to handle. Use and reinvestment of savings is vital for group motivation and savings continuation. This was one of the SDVC activities where each and every member of the group was involved regularly and the outcome is visible to all group members. Savings money is becoming useful for ensuring important services like vaccinations and de-worming. The more advanced and stronger savings groups are undertaking ventures such as dairy entrepreneurship development and breed transformation.

Use existing networks

Rather than investing in and developing new businesses to run chilling plants and chilling networks, CARE has seen that using the existing network of cold rooms that currently exist in the country appears to be a better investment and also seems to work best in this context.

Market buyer behavior change is key to dairy sector development in Bangladesh

As the processors are not behaving progressively and the market itself remains volatile due to various reasons, a significant number of groups or collectors had to depend on both the formal and informal market. In fluctuating market situations when formal processors reduced their collection, stopped milk collection, or did not collect milk to its' highest plant capacity, producers and collectors found alternative flows to channel the milk to the informal sector, where demand continues to remain high. The situation has improved in the sense that the processors are now notifying the producers and collector before a change in demand. In some cases, the plants are even.

Livestock can be an entry point to work with women

Findings demonstrate that cattle are a vital asset to women as they have easier access to cattle ownership in comparison to land or other big assets, and they can use milk sales for income. Dairying can be an entry point to work for increasing access to asset and more control over income by women within their present territory.

Women's engagement in dairy group mobilization can bring better results

For projects like SDVC findings demonstrate women groups have better performance than male-only and mixed groups.

Primary support should be ensured from family

The baseline FGD of the GAAP project shows that the women are active and more successful when men are engaged and more supportive in women's participation, but if men are not supportive then women seldom can be succeed.

CONCLUSION

The SDVC-II project is in the process of establishing a complex Dairy Hub that includes effective and efficient connections between producers, milk sales points, input shops and livestock health workers. We can see from the available data that the level and quality of the milk being produced by these groups is more steady, stable and high quality than producers who are not benefitting from these networks.

In the area of increased volume, the producers that were involved in the SDVC project tend to have more cross breed cows than the average dairy farmer, and these cows tend to have a higher value than comparable farmers, even among those with cross breed cows. The average cross breed cow of the SDVC-II farmers is also producing more milk on a daily basis than the average non-SDVC farmers'. The earnings per cow for SDVC farmers was also significantly higher than comparable farmers.

In terms of improving fair pricing through DFT testing, SDVC farmers are using the DFT collection points than comparable farmers. The farmers who are using the DFT points are reporting an increased trust of the milk sales process and are getting more money for their milk. However, this level of satisfaction is not steady and has decreased.

The SDVC has a very high impacts over all development of dairy chain value in the selected districts in Bangladesh. The project achieved commendable success in technology transfer, development of market linkage, establishing fair pricing and social development in the gender dimension. The learning can be used elsewhere in a developing country.

