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Energy for Resilience of Small Producers in the Milk Value Chain in Senegal

GRÜNE BÜRGERENERGIE
(GREEN PEOPLE'S ENERGY)
RESULTS CASE STUDY

Country	Senegal
Implementer	NGO ENDA Energie (Energie-Environnement-Développement)
Target groups	Cattle breeders, milk companies, local communities (particularly women and youth), households
Other stakeholders	Ministry of Energy, Ministry of Women, Ministry of Agriculture, Groupement d'Intérêt Économique (GIE) "Téourou Boulal"
Project duration	05/2021 – ongoing

PROJECT APPROACH

In Senegal, livestock farming is practiced by 30 % of households. The sector contributes a quarter to the total agricultural value added and more than 4 % to the national Gross Domestic Product (GDP). Dairy production is an important part of this agricultural sector. However, the seasonal nature of milk production does not allow for the development of a stable local milk market. On average, milk in the production basins is available three months of the year due to the seasonality of feed availability and its strong dependence on rainfall.

To address this challenge, the GBE "Milk Value Chain" project supports two large communal cooperatives "Mbar" and "Colobane" that bring together the interests of livestock farmers in the department of Mabr. The aim of the intervention is to prepare two irrigated areas for fodder production by providing solar powered irrigation systems (SPIS) to enable fodder crops to be grown outside the rainy season. This would allow for additional dairy production, as cows give more milk if they are well fed. Furthermore, the GBE-project intends to transform livestock farmers from traditional farmers to entrepreneurs, changing their mindset so that they see their livestock as a productive business rather than a source of savings. To this end, it provides training and capacity building for livestock farmers on organisational dynamics and supports the introduction of new management and administrative procedures. Farmers are also trained in the maintenance of the SPIS.

In addition, the project facilitates dialogue among the livestock farmers on current challenges and promotes cooperation among them.

Apart from this focus on livestock farmers, the GBE project provides technical assistance to diversify incomes through the creation of a village business centre where community members practice sewing, multimedia services, milk and local cereals processing and the sale of ice and fresh produce and beverages. This includes the provision of a solar system with a capacity of 20 KWp including batteries to power the business centre as well as the purchase of dozens of solar powered sewing machines and a refrigerator to preserve and cool milk and other drinks, and to produce ice water.

Finally, the intervention also supports the promotion of solar kits (20-60 W) or GIE members' households by setting up a revolving credit mechanism to finance these systems. Initially, GBE provides the GIE with a total of twenty solar kits, consisting of a mini-solar panel and a light bulb, free of charge. The GIE sells them to households, offering the costumers to pay for the solar kits in several instalments. Once the solar kits are fully paid for, the GIE uses this money to buy new solar kits to sell to its members through the same mechanism, thus multiplying access to electricity.

The intervention takes on a social inclusion dimension by involving women and young people in the various project activities, particularly in income diversification and in solar sewing.

METHODOLOGY OF DATA COLLECTION

The data for this case study report was collected through a review of project documents and six qualitative interviews with representatives of GIZ, solar companies, a microfinance institution, ENDA Energie, GIE "Téourou Boulal", and a representative of the National Agency for Renewable Energy (ANER). A quantitative survey was also carried out among four households that had received solar kits.

The case study was conducted between February and May 2023. At that time, some project activities were still underway, and their impact could not yet be fully captured.

KEY FINDINGS

Project Achievements

The intervention has prepared two irrigation areas of 5 hectares each for the members of the GIE. Each of the two areas has been equipped with an SPIS, which has resulted in the supply of irrigation water for fodder production beyond the rainy season, thereby extending the period of milk production from previously three months to nine to twelve months per year. This has led to an increase in milk production from tens of litres per day to 100 litres per day for the GIE.

In addition, the intervention has also initiated a dialogue among farmers on how to strengthen their cooperation and create synergies. This has led to the centralised purchase of additional animal feed, which is needed to diversify the diet beyond their own production. This leads to greater collective negotiation power with suppliers, thereby reducing the cost of animal feed.

The project has also created a village business centre, equipped with a solar system powering solar sewing machines, a multimedia area, a solar refrigerator, and a processing unit for milk and local cereals, which are used for income-generating activities by the local community, such as textile production and the sale of ice water and fresh produce.

Finally, the installed solar kits lead to an increase in household electrification. Three out of four households surveyed state that the solar kits provided access to electricity for the first time.

In total, the GBE project has led to the installation of solar systems with an aggregated capacity of 20.8 kWp.

Pictures 1: Training women in fodder farming

Intermediate Impact

The intervention has initiated a change in the attitude and mind-set of the participating livestock farmers towards the dairy value chain and cattle breeding. Whereas they used to consider cattle as a savings capital or collateral, they are increasingly aware of the opportunities to turn this activity into a productive and lucrative business and have acquired important skills to manage it accordingly.

By increasing milk production, the intervention has also increased the income of most farmers, as indicated by the GIE. In addition, by extending milk production beyond the rainy season, incomes are now much more stable throughout the year. In fact, the price of the milk during the dry season is the double of the price during the rainy season.

Access to irrigation water has enabled women to start vegetable production, which they sell on the local market as a cash crop. According to ENDA and GIE, this has empowered women and reduced unemployment and poverty. However, this activity remains seasonal, as it is only practised during the dry season, and could lead to conflicts over water use with other members of the GIE, who are mainly interested in fodder production.

Furthermore, interviewees reported that the intervention has created employment opportunities for youth in solar sewing activities, helping to reduce youth unemployment in rural areas. An estimated 15 people started working on solar sewing, preparing clothes, and selling them in the local market and to residents in the village.

The solar kits have given households access to a clean source of lighting, allowing housework to be done and students and school-children to study and do their homework after sunset.

Climate Impacts

Following the calculation methodology of the United Nations Framework Convention on Climate Change (UNFCCC), the installations described above are estimated to mitigate 25.04 t CO_2e/a in the year of installation by avoiding and/or replacing the use of fossil fuels.

This is roughly equivalent to the annual CO_2 emissions of more than 18 medium-sized cars in Germany.

Challenges in Project Implementation

The GBE-project has faced several challenges during its implementation:

First, the availability of groundwater to be used for irrigation to produce animal fodder was a challenge. Although a hydrogeological study had been conducted to identify suitable drilling points, the project only found water in a depth of 100 metres instead of 60 metres anticipated in the study. Nevertheless, the project was able to cover the additional costs incurred.

Second, the prepared irrigated land is considered by the farmers to be insufficient to ensure a substantial production of animal fodder. However, the project has succeeded to convince beneficiaries that this is a pilot project to demonstrate the use of SPIS to produce fodder and ensure milk production beyond the rainy season, which could be replicated by them in other areas. Through increased productivity and income, investments in irrigated land for fodder production, would pay off for the farmers involved.

Third, replicating the farmer training provided to reach all members of the GIE has been challenging due to limited access to trainers and funding for such training. Nevertheless, several trainings have been organized, and participants of the first trainings have been able to share their knowledge with other members.

Finally, creating village business centres is a good concept in theory, but it is recommended that they provide a larger range of possibilities for income generation. While the current business model focuses on the sale of ice water, it should be considered, for example, to add possibilities for the sale of preserved meat and fish, as pointed out by one of the institutional interview partners.

Picture 2: Solar pumping system for irrigating fodder

Lessons Learned

The project design builds on a previous development cooperation project "PROGRES Lait", funded by the EU, and implemented by ENDA, the implementing partner of the intervention. Lessons learned from the PROGRES project have been incorporated into the design of this project, such as the measures to ensure the sustainability of the solar appliances and the project's focus on training beneficiaries in entrepreneurship and management.

These capacity building activities are considered a key success factor, as they have contributed to a strong motivation and ownership on the part of the cattle farmers. Seeing themselves now more as agricultural entrepreneurs, they feel ready to face challenges in the milk value chain and to seize business opportunities in milk production, processing, and sales. This includes a willingness to take risks and invest in new and sustainable approaches to increase their production and income.

In addition, the intervention has demonstrated that a business village centre is a suitable concept, as it was already shown in the previous GIZ project in Senegal "Sustainable Energy Program". Nevertheless, the stakeholders of the village business centre should be accompanied and prepared to make full use of these centres.

Sustainability of the Intervention

The project has highlighted the importance of information, knowledge, and business skills in cattle farming and has demonstrated how milk production can be transformed in Senegal.

Having initiated the transformation of the milk value chain from traditional to entrepreneurial activities, this is likely to encourage farmers to ensure the continuation and the sustainability of the project outcomes for their own economic interests. This is also driven by the growing demand for dairy products, which contributes to increased incomes.

However, there will be a need to provide further training for farmers and funding to invest in farm expansion and GIE capacities.

The intervention has been followed by the national strategic orientation committee which met every six months and brings together the private sector, civil society and the ministries in charge of energy, livestock, women and agriculture. The Ministry of Livestock drew on learned lessons to use and capitalise on for the dairy value chain development programmes financed by the Senegalese Stabilisation Fund. In particular, the need to produce fodder and to regroup cattle farmers in GIEs or cooperatives, and to support them with training covering both management and production skills, is being considered. Moreover, the Ministry now sees the importance of transforming the view of farmers towards cattle farming a as commercial business and not only as mean for capital saving.

In terms of the sustainability of the solar systems themselves, interviewees stated that the solar system at the business centre as well as the SPIS is functioning properly, which can also be attributed to the GBE's project training on the proper use and maintenance of the solar systems. However, there are some concerns about the functioning of the solar kits. Although the sample is small and therefore not necessarily representative, it is striking that out of four households surveyed, one reported that the system was not working at all and two reported that it was only working partially.

Picture 3: Training farmers in organisational dynamics and entrepreneurship

CONCLUSION AND OUTLOOK

The project activities responded to real needs of cattle farmers and showed the way to a sustainable transformation of the milk value chain into a lucrative and productive business in Senegal.

In particular, the capacity building and training provided to cattle farmers to equip them with the necessary skills to transform traditional farmers into entrepreneurs is considered appropriate and highly relevant.

In addition, the project has demonstrated the feasibility to use solar energy for productive purposes, not only to produce animal fodder, but also for other activities, thus contributing to the creation of new sources of income. The involvement of public institutions such as ANER and the Ministry of Livestock is very opportune and will serve to scale up and replicate the project approach and activities.

Picture 4: The Village Business Centre with the solar power plant and the technical room

MORE INFORMATION

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