WFP
World Food Programme

SAVING LIVES
CHANGING LIVES

Empowering Smallholder farmers

A Case Study in Armenia

June 2021

In Berd, Tavush province, Armenia, WFP supports a community characterised by a sparse and aging population where women are the major contributor to agriculture while many men emigrate for work. A large percentage of pulses and beans, a commodity broadly consumed, are imported from Russia even though conditions for growing in the area are strong.
In addition, due to lack of modern food handling systems, and therefore absence of food safety standards certification, farmers sell their products through informal channels for lower profit. The Berd Cooperative have achieved food safety standard certification that permits them access to the national market and to participate in official tenders. In 2021, WFP has been supporting the cooperative with the development of packaging that will allow the farmers to sell their product in national level supermarkets and beyond.

Packaging equipment

MECHANISING AGRICULTURE

WFP has invested in developing sustainable and nutrition-sensitive food value chains in the community by strengthening farmers' economic capacity to grow nutritious foods and preserve them for longer. A study in collaboration with the Armenian National Agrarian University highlighted opportunities to improve food production and reduce post-harvest losses by mechanising activities such as greenhouse harvest (cleaning and cutting) and processing (collection and sorting) for the value chains of pulses and beans.

In 2019, WFP established the “Berd cooperative” aggregating local farmers into a formal partnership to build capacity, with a total of 30 members. The cooperative is led by a chairman who is responsible for the overall management and accounting. Due to the high rate of migration toward cities and abroad, many among the farmers are women for whom labour mechanisation is particularly important. Of the farmers engaged in the project, 40 percent are currently women, and WFP is taking proactive measures to increase the role those women play in the cooperative.

The project has invested to equip the cooperative with a greenhouse and processing centre.

Other 47 farmers from neighbouring villages have since accessed food processing equipment on a ‘fee for service’ basis and participated in trainings. Membership is based on a one-off fee of USD 350 and ensures a 30 percent discount for the use of machinery compared to prices for other community members.

Green energy was identified as a desirable solution, to mitigate the increased reliance on energy that the intervention would cause due to the mechanization of food processing and its associated costs.

This is in line with the Government’s strategy to increase the share of solar energy produced in the country, which has also led to the introduction of a favourable loan scheme with low interest rates. Additionally, surplus energy is sold back into the network at the same price of purchase.

A 20 kW-sized solar station was necessary to power the processing centre and the greenhouse, reducing the labour needed to process a greater amount of harvest. Importantly, efficient processing also reduces post-harvest losses and therefore production costs overall. The processing equipment includes machines for cleaning and sorting, heating, ventilation, a fridge for the greenhouse, and a packaging line.

A suite of supporting services was provided to the cooperative, including mentoring on branding and packaging and trainings on accounting, business management and agriculture. Seeds were also distributed at the start of the project cycle but are now generated in-house. Importantly, the cooperative has adopted food safety standards and acquired certifications that allow participation in national tender processes.

At the same time, headteachers of WFP’s school feeding programmes were trained on quality standards for procurement processes which will encourage local sourcing from cooperatives such as Berd.

Mechanisation makes local production of pulses and beans more efficient, making it possible to compete with imports from Russia

The Berd Cooperative's revenues are secured through the initial one-off membership fee and rental of the machinery to member and non-member farmers.

PRELIMINARY RESULTS

The new harvest period in 2020 has seen a 315 percent increase of collective yield for legumes, beans and pulses compared to the start of the project, amounting to a total of 123 metric tons in legumes produced.

A 327 percent increase in land cultivated since the beginning of the project was made possible by the processing centre that allowed farmers to process an larger amount of harvest and make part of it available for sale. Importantly for this increasingly sparsely populated area, the workload has lowered, benefitting females and elderly people.

WFP is closely monitoring the solar PV system output. Only part of the energy produced is used by the cooperative-owned equipment, while the rest is sold to the electricity utility. By December 2020, the energy output from the solar PV system was of 17,600 kW, of which 1,100 kW was sold to the national grid with a gross profit of 50,000 AMD or USD 100.

Based on the results obtained for the current harvest year, a net profit of USD 41,200 is projected for 2021 for all cooperative members combined. The division by member is then made based on the contributed harvest.

The 400 square metre hydroponic greenhouse, currently under construction, will be producing about 6,000 kg of fresh vegetables (strawberries and non-traditional vegetables such as broccoli and kale) per year, adding to the nutritional intake of the local population and providing an additional net profit for the cooperative of almost USD 7,000 per year. From the cooperative members, two salaried workers have been selected to be responsible for the greenhouse. The profits will go directly to the cooperative account and the funds will be used for the cooperatives' needs.

The produce is currently sold to the retail and hospitality industry (food shops and restaurants). However, having completed the quality certification application process, the cooperative is now registered as a WFP vendor, with the opportunity to participate in the procurement calls for school feeding programmes.

BUSINESS MODEL

315 % **increase of collective harvest yield for legumes, beans and pulses compared to the project start**

327 % **increase in land cultivated since the beginning of the project thanks to the processing centre**

The scale-up potential for this intervention is considerable. Given the unmet market demand for staples and vegetables, several other communities could set up cooperatives to improve food production as well as the quality of the produce.

These types of projects have a component of capital investment to purchase the photovoltaic panel system

and the machinery, but also require accompanying supporting services to strengthen the business model with clear ownership structures and payment / revenue systems.

This means fostering aggregation, strengthening administrative capacity, providing training in business development and agricultural practices, as well as helping to develop market linkages.

WFP and the agrarian university inspect a field for seed production for the grain value chain project

The cost of the solar panel installation was USD 10,000.

Collection centre powered by solar energy

The total cost of all equipment for agricultural activities, including the rehabilitation of the building, and the machinery and greenhouse, was a further USD 300,000. The expected lifespan for the energy generation equipment is 25 years (12 years under warranty), during which one can assume that a further expense of USD 6,500 would be necessary for maintenance, repair and operation.

The table below represents a rough estimation of costs and revenues to determine the payback period which is of 6 years.

COSTS AND REVENUES OF A 6 YEAR PAYBACK PERIOD

Cooperative balance	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
COSTS (USD)	**-314,800**	**-289,030**	**-228,328**	**-163,355**	**-88,038**	**-245**
CAPEX Solar PV system	10,000	0	0	0	0	0
CAPEX Rehabilitation	95,000	0	0	1,000	1,000	1,000
CAPEX equipment	155,000	0	0	3,000	3,000	3,000
CAPEX greenhouse, Cooling Storage	50,000	0	0	300	300	300
OPEX Solar PV system & equipment	0	500	500	500	500	500
OPEX Administrative and other costs	4,800	5,280	5,808	6,389	7,028	7,730
REVENUES (USD)	**31,550**	**67,010**	**76,162**	**87,144**	**100,323**	**116,138**
Membership (30 members)	2,450	2,450	2,450	2,450	2,450	2,450
Machinery rental (cumulative)	3,800	4,560	5,472	6,566	7,880	9,456