

Processing and value addition of agricultural produce

for enhancing farmers income and employment in production catchment

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Location and selection of area

The project was initiated in District Shahid Bhagat Singh Nagar, Punjab with six villages (Rahon, Mahalon, Nurpur, Aur, Mirpur Jattan, Balachour). It is one of the smallest district of Punjab and having an area of 1267 sq. km. The land of district is fertile due to the presence of river Sutlej and irrigated through tube wells and canals except some part of the Balachaur sub-division. The area was selected due to good production of major cereal crops i.e. paddy and wheat. The other crops of the district are maize, sugarcane, gram, lentil, arhar, moong, mustard, sunflower, radish, cauliflower, onion, okra, chilli, tomato and mentha. About 10% of the total sown area comes under fruit and vegetables

crops. Pulses and oil seeds occupies a reasonable good area in the district. The farmers are doing bee farming in this area to a large extent.

Number of farm families

50 farm families were covered per module.

OBJECTIVES

- To design agro processing models for processing, handling and value addition of cereals, pulses, sugarcane, honey and horticultural produce.
- To establish different model agro processing centres at selected cluster.
- To develop skill on processing and value addition of selected crops and commodities.

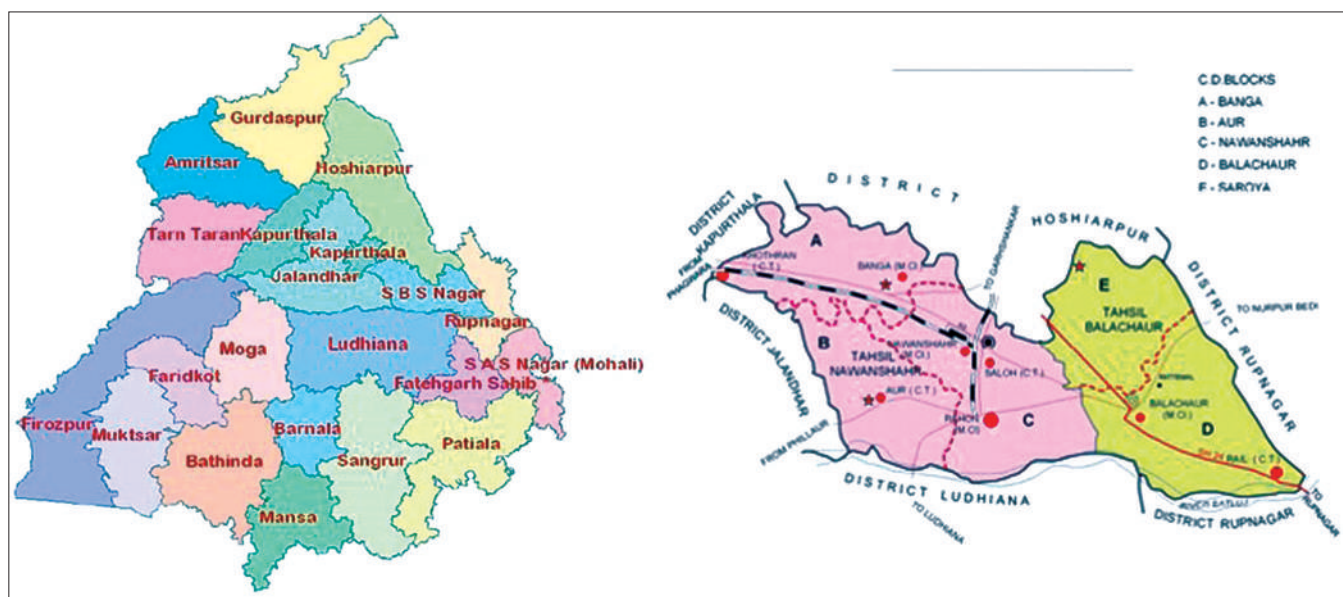
- To assess the impact of agro processing models in selected cluster.

Enterprise based module

Agro-processing centre (APC) module: Establishment of APC for processing of cereals, pulses and oilseeds in production catchment

Agro-processing centre (Pabla Brothers) at Bharta Khurd, Rahon, SBS Nagar.

Rationale of the intervention: On-farm primary processing of agricultural produce has now become a very important tool to boost our economy through scientific conservation of food, appropriate use of wastes and by-products of agriculture, development of rural



processing industries etc. Agro-processing centre can bridge the gap between producer and consumer by ensuring the availability of food products at proper time and low cost.

Mr. Jaswant Singh (farmer) from Bharta Khurd, Rahon, SBS Nagar, Punjab was doing farming on 2.5 acres of land. He used to do cultivation of paddy, wheat and maize and was selling his produce to middlemen and traders in mandis. However, being a need based farmer for processing of cereals, he was always interested in getting scientific knowledge of processing of his agro-commodities. During the visits of project staff at village, he was identified with the help of local key persons of panchayat. He was motivated to take technical advice, training and knowledge along with details of cereal processing machineries. He also took training from ICAR-CIPHET, Ludhiana and established an agro-processing centre (Pabla Brothers) under the FFP. He started processing of wheat, maize, chickpea etc. and was selling his produce in local market, retail shops and to wholesalers in bulk. After one year due to increase in income, he wanted to expand his unit. For this he again contacted, ICAR-CIPHET, Ludhiana and took another training on processing of spices. On the behalf of his keen interest in processing, ICAR-CIPHET, Ludhiana has installed a pulverizer of capacity (70–80 kg/hr) under Farmer FIRST Project for processing of spices. Now, he has started processing of different spices like turmeric, red chilli, coriander, black pepper, etc. The installation of pulverizer helped



Name: Mr. Jaswant Singh
Age: 45 years
Farming: Paddy, wheat, maize

in strengthening of his agro-processing centre.

Outcome: Establishment of agro-processing centre has increased the income and employment opportunities to the farmers. The farmer has also registered his unit under FSSAI (Registration No. 22118690000136). He was also advised to market his products under the brand name “Prabjhot”. The raw turmeric was purchased at ₹ 98–100/kg and after milling, sieving and packaging; turmeric powder is sold at ₹ 130–140/kg. Similarly, he is selling wheat flour @ ₹ 24/kg and besan @ ₹ 70/kg. On monthly average, he is processing 50 quintals of wheat into flour, 350 kgs of gram (chickpea) into besan and 600 kg of turmeric into powder. With the help of this processing centre, he is earning money of ₹ 3,00,000–3,25,000 per year. The income of the farmer has been increased by 35%. Now, some other nearby farmers are also doing processing at this unit and shown

their interest to open their processing centre.

Agro-processing centre (Padan Atta Chakki) at Dharmkot, Rahon, SBS Nagar

Rationale of the intervention:

Mr. Tarsem Lal (entrepreneur) from Dharmkot, Rahon, SBS Nagar was doing processing of agricultural products through his unit (Padan Atta Chakki) at his village. He was processing crops, viz. wheat, paddy, mustard etc. The various processed product are wheat flour (atta), maize flour, mustard oil, polished rice, wheat and maize dalia etc. He was running his unit as custom hiring centre. After realizing good income through the unit he wanted to start processing of spices also. For this, he came to ICAR-CIPHET, Ludhiana to take guidance and knowledge about spices processing. ICAR-CIPHET imparts training on processing of various types of spice such as turmeric, red chilli, coriander, black pepper, etc. to the farmer. A pulverizer of small capacity (20–25 kg/hr) was handed over to the farmer by the ICAR-CIPHET, Ludhiana under Farmer FIRST Project in order to encourage him to put in step towards spice processing.

Outcome: This intervention helped in strengthening of the APC along with enhancing income of the farmer. As the farmer was doing bulk processing, ICAR-CIPHET encouraged the farmer for convenience packaging. He was also guided to develop his own brand and start selling of his products in retail market. The processed products from processing of spices in his APC are turmeric powder, red chilli powder,



Agro-processing centre



Installed pulverizer under FFP



Name: Mr. Tarsem Lal
Age: 50 years

coriander powder, black pepper powder, garam masala etc. On an average, he is processing about 75 quintals of wheat, 400 kgs of chickpea, 250 kgs of turmeric and 10 quintals of mustard seeds monthly. Mr. Tarsem Lal is earning good money with ₹ 4,00,000 per annum. With this intervention and convenience packaging, there was 15–20% increase in the income of the farmer. He had become the role model for the upcoming entrepreneurs. A number of farmers had visited the agro-processing centre and through practical exposure of the machines they are also encouraged to establish a processing centre in their respective villages.

Agro-processing centre (Khalsa Farm) at Balachour, SBS Nagar

Rationale of the intervention: Agricultural policy of the country is mostly designed by the Government for raising agricultural production, productivity and also for raising the level of income and standard of living of farmers within a definite time frame. Post-harvest processing is a crucial step in conversion, value addition and prevention of losses of agricultural produces. Introduction of APC (Agro processing centre), resulted in processing and value addition of food commodities at village level that not only decrease the post-harvest losses, but also provide additional employment to farmers and



Name: S. Paramjit Singh Khalsa
Age: 52 years
Farming: Turmeric, pulses, wheat, maize and vegetables

local people.

S. Paramjit Singh Khalsa (farmer) from Balachour, SBS Nagar, Punjab was doing farming by taking 8 acres land on lease. He was growing cereals (wheat and maize), pulses (moong, masur and chana), turmeric and vegetables like bottle gourd, bitter gourd, carrot, radish, cauliflower, turnip, onion, potato, tomato, spinach, coriander etc. He was selling his farm produce to middlemen and local mandis and earning around a profit of ₹ 3,00,000. He was interested in selling his produce with processing at farm level to enhance income. Under the Farmers FIRST project, ICAR-CIPHET, Ludhiana provided training to him on entrepreneurship development and processing technologies of some cereal grains, spices and oil seeds. After that, he established an agro-processing centre (Khalsa Farm) in 2017, with the technical guidance

and support from FFP, ICAR-CIPHET, Ludhiana. He started processing of wheat, maize, chickpea, and various spices. The various processed products are wheat flour, wheat dalia, maize flour, maize dalia, besan, traditional wadis, turmeric powder, chilli powder, coriander powder, garam masala, black pepper powder etc. To promote his sales, he setup a market outlet on his farm itself. After finding better results, he was also interested to start processing on different pulses. He was also given technical advice and training on pulse processing. On the behalf of his interest in processing, and as a farmer with a potential to venture in field of processing, ICAR-CIPHET, Ludhiana handed over a Mini dal mill (capacity 115-125 kg/hr) under Farmers FIRST Project for processing of different type of pulses. Installation of mini dal mill on his farm helped him in earning more profits and also strengthened his Agro-processing centre. At present, some other farmers from near about areas are selling raw pulses to him and some farmers are also processing raw pulses at minimal cost and getting more benefits.

Outcome: After formal training on processing and marketing from ICAR-CIPHET he also applied and got FSSAI Registration (Registration No. 22116038000012). The various processed products are sold under the brand name “Khalsa Farm”. On monthly average, he is processing 60 quintals of wheat, 100 quintals of gram (chickpea), 15 quintals of pulses (moong, masur and chana), 500 kgs of turmeric, 100 kgs of red chilli etc. By intervention of ICAR-CIPHET, S. Paramjit Singh Khalsa has become a role model for many other farmers who can increase their income by value addition of agricultural produce. This intervention helped in increasing his income with a profit of ₹ 5,00,000 per year. The farmer's income has been increased by 35–40%. The farmers were encouraged to start processing by connecting



Agro-processing



Installed Mini dal Mill



Name: Sh. Lakhbir Singh
Age: 51 years
Farming: Bee farming (300 boxes)

them under his brand. They have also realized by earning of more profits because the farmers who were selling their produce (raw dal) at just 60–65 ₹/kg are now selling the processed dal at around 90–95 ₹ kg.

Honey processing module

Intervention: Installation of honey processing unit for processing of quality honey.

Honey Processing unit at Rahon, SBS Nagar, Punjab.

Rationale of the intervention: Sh. Lakhbir Singh (bee farmer) was doing bee farming with 300 boxes from the last 23 years. Bee farmers keep their boxes in the apiaries from October–April every year to harvest honey from crops like mustard, sunflower, eucalyptus, sesame, rapeseed etc. The raw honey is heat processed after extracting it from the bee boxes. In traditional methods of processing, raw honey was heated by the use of wood fire thus heating temperature was not controlled, which leads to over-heating. Due to over-heating the colour of the honey get darker and crystallization takes place after bottling. The smoke from the wood also affects the colour and odour of honey. Due to this low quality, the farmers were forced to sell honey in bulk to the traders, brokers, processing companies etc. at ₹ 90–110/kg in plastic gallons and tin containers. During field visit of FFP staff, he was given technical advice and guidance about honey processing.

Sh. Lakhbir Singh along with a

group of associated farmers took training on modern honey processing methods. Farmers FIRST Project of ICAR-CIPHET, Ludhiana assisted him in gaining insights of maintaining quality of honey by scientific processing. FFP, ICAR-CIPHET, Ludhiana also installed a honey processing plant of capacity 50–60 kg/hr which consists of honey heating cum filtration unit, storage tank cum heating tank, moisture reduction unit and bottling unit. This honey processing unit is mechanized that helps in heating of honey with controlled temperature of (55–65°C). This unit also helps in processing honey with higher quality (Hydroxy

methyl furfural not exceeding the threshold level of 40 mg/kg) under hygienic conditions.

Outcome: With this intervention, the farmers are processing and selling the honey at the rate of ₹ 200–240/kg in glass/plastic bottles. The processing cost of honey is only ₹ 27/kg including the packaging cost. He was also guided to sell honey under the brand name “Fresh Honey”. Honey processed through this unit is selling at good prices in the market. On monthly average, the group of farmers are processing about 25–30 quintals of honey. This unit had helped to increase the income of the farmer to ₹ 3,00,000 per year. The



Modern honey processing after intervention. (Inset) Traditional honey processing before intervention

selling of packaged honey in retail market increased 40–45% in the income of the farmers. Now, more number of honey farmers from nearby areas are processing honey with this unit and some of them were interested to establish the unit in their villages also.

Chemical free jaggery production unit

Intervention: Establishment of modern jaggery unit for processing of sugarcane for juice and jaggery.

Chemical free jaggery unit at Uppal Farm, Bharta Khurd, Rahon, SBS Nagar.

Rationale of the intervention: S. Sohan Singh Uppal (farmer) from Bharta Khurd, Rahon, SBS Nagar, Punjab was doing farming of Paddy, wheat, sugarcane, maize, potato on 200 acres of land. He is cultivating sugarcane in 60–70 acres of land. He was selling the produced sugarcane to the nearby sugar mills and also producing some amount of jaggery by traditional method as per the need. He was dependent on the sugar mills for selling his sugarcane produce. The farmers were receiving late payment from the mills and also the price was not appropriate. On noticing these problems of farmers, FFP staff during field visit advised the sugarcane growing farmers to start processing of sugarcane at farm level rather than direct selling of sugarcane to the mills. They were guided to start their own jaggery processing venture through modern technology. The group of farmers also took hands on training and practical



Name: S. Sohan Singh Uppal
Age : 50 years
Farming: Paddy, wheat, sugarcane, maize, potato



Modern Horizontal crusher. (Inset) Traditional vertical crusher.

Table 1. Impact of intervention of sugarcane processing on the farmers income

Total quantity of solid jaggery produced in year 2019-20	300 quintals
Total quantity of granular jaggery produced in year 2019-20	100 quintals
Quantity of sugarcane used in processing	4,000 quintals
If Sugarcane is sold without processing then income of farmers (₹ 310 per quintal)	₹ 12,40,000
Income of farmers by processing of sugarcane into jaggery	₹ 17,90,000
Profit earned with the intervention	₹ 5,50,000

exposure in processing of solid and granular jaggery. ICAR-CIPHET, Ludhiana helped the group of farmers in establishing chemical free jaggery unit at Uppal Farm, Rahon, SBS Nagar under the Farmers FIRST Project. The unit is comprised of sugarcane crusher (Capacity 1 ton/h), juice collection tank (Capacity 750 litres), three open juice concentration pans, jaggery moulding frames and trays etc. With the help of frames, the concentrated jaggery can be moulded into cubical shapes (1"×1"×1"), which helps in increasing the market value.

Outcome: This intervention helped the group of farmers in processing sugarcane to solid and granular jaggery in large quantities with good quality. The jaggery made in the cube shaped enhanced selling of jaggery in the market at good prices and thus, earned good profits. The solid jaggery was sold at ₹ 50–60/kg and granular jaggery was sold at ₹ 60–70/kg by the farmers. This venture had created a lot of employment opportunities and also enhanced the

income of the farmers. As the unit was established in 2019, the farmer earned good profit of ₹ 5,50,000 lakh in the season of sugarcane (Table 1). The selling of jaggery besides canes helped in increasing income of the farmers by 30%. Shortly after establishment of the plant, 40–50 sugarcane farmers had come to visit this plant. After observing plant and processing of jaggery in cubes, they were keen to establish jaggery processing unit at their farms.

TRAINING

Various trainings were organised for the farmers and beneficiaries for skill and entrepreneurship



Training on honey processing



Jaggery cubes made after intervention. (Inset) Jaggery round blocks made before intervention pan.



Training organised on Horticultural crops handling and packaging



Modern method of jaggery concentration using three pans. (Inset) Traditional method of jaggery concentration using single pan.

- Due to establishment of honey, pulse and jaggery processing unit, the small and marginal farmers of nearby areas are selling their farm produce at these processing units with less efforts as compared to sale in wholesale market. They are also getting good prices. As a result, the entrepreneurs are easily getting raw material from these small farmers.
- The group of farmers associated with the interventions were also receiving fair prices of their produce and thus, the income has also been increased by 10–15%.
- The others farmers from nearby areas had also shown interest to start their own ventures in this field of processing and value addition.

LESSONS LEARNT

- With proper training and motivation, farmers are ready for on-farm processing.
- In order to provide nutritious agriculture produce, processing in production catchment may be increased.
- Migration of labour can be stopped by increasing agro-processing of production catchment.
- Farmers are interested in processing of their produce but

due to large initial investment and risk factor they are hesitating to start ventures.

- Opening of custom hiring centres and providing subsidies on entrepreneurship development enhance the level of agro-processing at village levels.
- Farmers can make more benefits through direct or retail marketing of their processed products.

WAY FORWARD

- Small scale agro-processing unit with storage facilities should be established.
- Government should provide subsidy and financial support to run the facility.
- These processing units can be attached with the FPOs at block/district level in order to achieve the marketing of their processed produce.
- The established units can be linked with Pradhan Mantri Kisan Sampada Yojana (PMKSY) and PM formalization of Micro food processing enterprises scheme (PM FME scheme).
- Established Agro-processing units can be presented as a role model for budding agri-entrepreneurs.

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development on Honey processing; Pulse processing; Spice Processing; Horticultural produce processing.

IMPACT

- With the technological interventions of ICAR-CIPHET, farmers are earning more profit ranges from 20% (Cleaning and grading operations) to 40% (Secondary processing, viz. pulse milling, wheat, rice, oil milling and spices grinding).

Know Krishi Unnati Yojana

The *Krishi Unnati Yojana*, a central sector scheme, is envisaged as umbrella programme for focusing on food security, by merging schemes on Soil-health Card, Integrated Scheme on Agricultural Co-operation and Agricultural Marketing, National Mission on Agriculture Extension, Horticulture Development, Price Stabilization Fund, National Mission on Sustainable Agriculture and other programmes.