

Project Design Document: Greening of Rural value chains for tomatoes

Project Background

Singrauli is one of the largest contributors to Madhya Pradesh's GDP, thanks to the income generated from mining activities. Approx. 43% of the district's GDP comes through the mining sector, while agriculture contributes 19%. The agriculture sector in Singrauli holds immense potential in the agriculture and allied sector, as there is an acute absence of processing facilities in the district, which leads to no value addition to the agricultural produce.

In addition to major cereals, millets and horticultural crops enjoy significant acreage in the district. The presence of major coal mining and power producing plants in the district results in the presence of a burgeoning middle- and upper-class population, which can afford to pay for a well-balanced diet, the result of which is that approximately all of the horticultural produce is consumed within the district. Tomato has also been chosen for the district under the One District One Product (ODOP) initiative. It can be used to produce processed products like juice, puree, paste, ketchup or powder, which have a wide variety of uses.

A Urjadhani Farmer Producer Company Limited is a Farmers' Producers organisation in Kumhiya, Shahdol, which was formed in 2022. It has currently been engaged in activities like procuring seeds and delivering them to farmers, mobilising the farmers to sell their produce collectively. Given the prevalence of tomato in the region, the FPO has been planning to set up an integrated plant for processing turmeric as well as packaging. They intend to procure tomatoes from farmers locally and conduct further processing to prepare secondary processed products like tomato sauce, powder, etc. The FPC is currently looking for financing options to set up the plant.

Project Description

This project aims at increasing the scale of operations of the processing unit, diversification of its products, decarbonisation of the energy vector with renewable energy assets and the electric vehicles included in the logistical requirements and support for market linkages by enabling the branding of the manufactured products. The project envisages the accomplishment of these objectives through following equipment:

1. **Solar photovoltaic panels systems and battery storage equipment** - Cumulative total savings on energy consumption amount to 26125 units annually, which equals to 21 tonnes of CO₂ emissions mitigated annually, assuming 6 hours of daily generation for 250 days in a year. The initial investment is compensated for by savings in electricity bills to be incurred regularly for the operation of the plant at an average variable electricity cost of INR 10/kWh, while also accommodating the operation of expanded activities like bakery, packaging and branding.

2. **Electric hauler for micro-logistical services** with a payload capacity of 500kg – cumulative total savings on using electric vehicle as compared to diesel-powered vehicle is INR 1,13,735 annually, along with 1 tonnes of CO₂ emissions mitigated.
3. **Extension of scope of operations with additional equipment** for further value addition to fetch better prices, including equipment for bakery unit, packaging unit for packaging and branding.
4. **Supporting the FPO in certification of their products** which would further improve the marketability of the product.
5. **Overall annual savings/benefits from the investments include:** INR 143688 from energy vector, INR 9,40,000 from sale of processed products in the first year itself, with increasing sales revenue in upcoming years and INR 115000 from fuel switch in good carriage.

Summary of Investments

Total project cost is expected to be close to INR 36 lakhs that includes design, engineering, procurement, installation, first year operations and support in packaging and branding. Table below summarizes the project components and the investment requirements.

Table 1: Capital Costs for the project

S · N o	Technology	Unit	Capa city	Qty (Nos.)	Cost (Rs/u nit)	Valu e (Rs.)	Cost sharing			Sharin g (%)	Relevant schemes
							FPO equi ty**	Go vt sub sid y	Loa n		
1	Electric Hauler (Mahindra Treo Zor)	kg	500		40000 0	4000 00	40,00 0	74,0 00	286, 000	10:18.5: 71.5	FAME II
2	Project cost*				4,765, 000	4,76 5,00 0	476,5 00	1000 000	3,28 8,50 0	10::21: :69	PMFME, point iii and iv
	Tomatoes Washer	kg/h r	100	1	15000 0						
	Blancher	kg/h r	15	1	15000 0						
	Fruit Pulper	kg/h r	100	1	20000 0						
	Pasteuriser with Boiler	lt/hr	500	1	50000 0						
	Mixing Tank	lt/hr	500	1	10000 0						
	Vacuum Pan/ Stem Kettle	lt/hr	500	1	50000 0						
	Solar dryer setup				38000 0	3800 00					
	Solar dryers	kg	80	4	70000						
	Tomato Grinder	kg/h r	100	1	10000 0						
	Branding and Packaging				22500 0	2250 00					

	Packaging machine			1	200000						
	Bar Coding Machine			1	25000						
	Solar photovoltaic panel system with battery	kW	19		960000	960000					
3	Land cost				250,000	250,000	0	0	250000	0::0::100	
	Total					5,415,000	516,500	1,074,000	3,824,500	9.5::19.8::70.6	

Source: MP Ensystems Research

*Project cost includes all costs (plant and machinery, solar photovoltaic panel costs, et al), excluding land cost

**Based on discussions held on ground and their financial conditions, equity share ranges from 5% to 15%, hence has been assumed at 10%

Barriers addressed in the project implementation:

The FPO has been aspiring to work for improving the income levels of farmers in the region through procurement of their produce locally at remunerative prices and distribute the profits generated through the operations of the plant as dividend at a later stage. It aims to achieve these targets through a low carbon pathway, which would further improve its sustainability in the long run and doesn't add to the widespread land and air pollution in Singrauli through its operations. The key barriers addressed through the proposed project implementation are listed below.

Table 2: Barriers addressed through the project

Barriers	How the proposed project will address barriers through net-zero carbon solutions
Frequent power outages, reliance on diesel generator sets as backup, high operation expenses	Installation of a rooftop solar panels which eliminates carbon emissions while ensuring continued power availability at minimal costs
High cost of fuel for transport and logistics	Use of electric hauler for local transportation to bring-in produce from the individual farms to the central processing facility
Limited scope of operations	Addition of bakery unit and further processing to produce more value-added products, which have greater visibility and fetch better prices
Market Access	The packaging machine helps shape the brand identity of the products which improves market access.

Source: MP Ensystems Research

Financial Analysis

A simple cash-flow analysis is below, with the conservative assumption that the equipment has a lifespan of 10 years.

Project Cost

The major components of a small-scale fruit processing unit are land, building and civil works. A project cost of **INR 54.15 Lakhs** has been estimated. The details of project cost are given in **Table 3**

Table 3: Total Project Cost

Project Cost					
S. No.	Particulars	Unit	Qty.	Rate (Rs.)	Amount (Rs. Lakh)
1	Land	acre	0.5	500000	2.5
2	Land Development				5
3	Civil Work				5
4	Storage Area	Sq ft	1000	200	2
5	Plant and Machinery				35.65
6	Miscellaneous fixed assets				2
7	Preliminary and Preoperative expenses				2
	Total				54.15

Source: MP Ensystems Research

Operational Expenses

The operational expenditure incurred under different heads is as specified in Table 4. The operational expenditure is expected to grow at an annual rate of 5%.

Table 4: Operational expenditure

Manpower Requirement				
S. no.	Personnel	Number	Salary (Per Month)	Total (Rs. Lakh/year)
1	Plant manager	1	20000	2.4
2	Workers	3	12000	4.32
3	Accountant	1	15000	1.8
	Total			8.52
Other Costs				
S. No.	Cost Head	Annual Cost(INR)		
1	Administrative Costs	50000		
2	Utility Costs	50000		
3	Marketing and advertising	50000		
	Annual Increase in wages, administrative and utility costs	5%	(Assumed)	

Means of Finance

Financing to food processing falls under priority sector lending. The loans to units meeting the criteria of MSME are classified under MSME sector. Such units can be financed by any scheduled commercial banks, Regional Rural Banks and Cooperative Banks. Important terms and conditions of financing such units are discussed in this section.

Table 5: Means of Financing

Means of Finance		
Total Financing required	INR lakhs	54.15
Equity	%	9.5%
Grant	%	19.8%
Debt	%	70.6%
Interest Rate (Per Annum)	%	12.00%
Moratorium	Years	1
Annual Installment	Years	9
Equity Component	INR lakhs	5.16
Grant Component	INR lakhs	10.74
Debt Component	INR lakhs	38.24

Source: MP Ensystems Research

Based on the assumptions on input and output parameters, an Income Expenditure statement (Cash Flow Statement) prepared. The financial indicators like Net Present Worth (NPW), Benefit Cost Ratio (BCR), Internal Rate of Return (IRR) etc. analysed by discounting cash flow @10% discounting rate are given in **Annexure II** and summary is presented in **Table 6**.

Table: 6 Estimated Financial Indicators

Financial Indicators	Estimated	Requirement
Net Present Worth	48.27	Should be +ve
IRR	33%	> 10%
BCR	1.14887	Should be >1.0
DSCR	2.46	Should be >1.5

Source: MP Ensystems Research

The repayment period has been drawn by considering net surplus available for repayment. The bank loan with interest is repayable within 9 years with a moratorium of one year. The debt service coverage ratio based on assumed techno economic parameters is found satisfactory.

The following specific attributes of ESG can further be achieved through the implementation of this project:

- There are a number of environmental opportunities including mitigation of carbon emissions, reduction of resource depletion. There are direct climate benefits to the project. The installation of roof-top solar results in the mitigation of 21 tonnes of CO₂ emissions every year, while the usage of EVs leads to the prevention of 1 tonne of CO₂ annually.
- There is a strong integration of gender-diverse leadership as most of the members of the FPO, including in decision-making positions, are women. The project will increase social opportunities and strengthen existing community relations by generating local employment and increasing income opportunities.

Annexure I: Catalogue of processed products

Types of processed Products	Selling Price (Rs/kg)	Packaging Cost (INR/kg)
Ketchup	75	1
Tomato Powder	200	1
Wastage of tomatoes during preparing ketchup	%	35%
Tomato Powder recovered from tomatoes	%	10%
Rate of tomatoes	INR/kg	10
Rate of other raw materials (Spices, preservatives, sugar & salts)	INR/kg	10

Annexure II: Calculation of financial indicators

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