Project Design Document: Greening of Rural value chains for millets

Project Background

Millets are a good source of protein, fibre, key vitamins and minerals. There are a multitude of health benefits associated with the consumption of millets, including cardiovascular health, prevention of diabetes, et al. The significance of millets has also been recognised globally as the United Nations has announced 2023 as the International Year of Millets. India too has been promoting millets at various international fora including G20 summits to enhance awareness of millets.

Millets are a predominant crop grown in the tribal belts. Millets are rainfed crops, require less water but their nutritional properties are superior as compared to traditional cereals. However, due to a lack of awareness about its properties, a large market for these grains couldn't develop and the production has traditionally been mainly used for self-consumption by the tribal population.

Mahan Mahila Farmer Producer Company is a Farmers' Producers organisation in Singrauli, which was formed in 2015. The FPO has 778 shareholders from nearby villages. It has currently been engaged in activities like procuring seeds and delivering them to farmers, mobilising the farmers to sell their produce collectively. The FPO has also been planning to set up an integrated plant for processing millets as well as pulses, which are some of the most dominant crops of the region in terms of acreage. The USP of millets grown in this region is that they are organic in nature, with a minimal use of chemicals, and hence the processed products can easily be sold as organic products. The FPO intends to procure millets from farmers locally and embark into secondary processing to prepare products like chips, bakery products, 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. **20 kW solar photovoltaic panels systems and battery storage equipment** - Cumulative total savings on energy consumption amount to 27500 units annually, which equals to 22 tonnes of CO_2 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 CO_2 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 1,50,000 from energy vector, INR 9,00,000 from sale of processed products in first year itself, with increasing sales revenue in upcoming years and INR 92,000 from fuel switch in goods carriage.

Summary of Investments

Total project cost is expected to be close to INR 30 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.No	Technology	Unit	Capacity	Qty (Nos.)	Cost (Rs/unit)	Value (Rs.)	Cost sharing			Sharing (%)	Relevant schemes
							FPO equity**	Govt subsidy	Loan		
1	Electric Hauler (Mahindra Treo Zor)	kg	500	1	4,00,000	4,00,000	40,000	74,000	286,000	10:18.5:71.5	FAME II
2	Project Cost*				40,56,000	40,56,000	4,05,600	14,19,600	22,30,800	10:35:55	PMFME, point iii and iv
	Solar photovoltaic panel system with battery	kW	20	1	10,00,000						
	Baby boiler	kg/hr	100	1	1,40,000						
	Kettle Multi Jacket (100 gallon)	kg/hr	100	1	80,000						
	Pulper	kg/hr	100	1	40,000						
	Pulvarisor	kg/hr	100	1	70,000						

	De-stoner	kg/hr	100	1	90,000						
	Roaster	kg/hr	100	1	75,000						
	Mini Dal Mill	kg/hr	100		56,000						
	Packaging unit (liquid and solid)				120000						
	Bar coding machine				20000						
	Electronic weighing machine (up to 100 Kg)				20000						
	Working Table				45000						
	Oven - Gas fired (36 tray)				750000						
	Dow mixture (3 phase)										
	Cream mixer										
	Cutter with mould										
	Trey and moulds										
	SS Working Table (4x10 ft)										
	Packaging machine										
	Weighing machine										
	Tools and rollers										
	Utensils										
3	Land and Buildings				2,50,000	2,50,000	0	0	2,50,000	0:0:100	
	Total					**47,06,000**	**4,45,600**	**14,93,600**	**27,66,800**	**9:32:59**	

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 47.06 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	Plant and Machinery				30.56
5	Miscellaneous fixed assets				2
6	Preliminary and Preoperative expenses				2
	Total				47.06

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	Manager – Technical	1	20000	2.4
3	Supervisors	2	18000	4.32
4	Accountant	1	15000	1.8
	Total			10.92
Other Costs				
S. No.	**Cost Head**	**Annual Cost(INR)**		
1	Administrative Costs	50000		
2	Utility Costs	50000		
3	Marketing and advertising	50000		

Source: MP Ensystems Research

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	47.06
Equity	%	9%
Grant	%	32%
Debt	%	59%
Interest Rate (Per Annum)	%	12.00%
Moratorium	Years	1
Annual Installment	Years	9
Equity Component	INR lakhs	4.706

Grant Component	INR lakhs	13.1768
Debt Component	INR lakhs	29.1772

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	51.03	Should be +ve
IRR	38%	> 10%
BCR	1.21	Should be >1.0
DSCR	3.21	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 22 tonnes of CO_2 emissions every year, while the usage of EVs leads to the prevention of 1 tonne of CO_2 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	**Proportion in sales**	**Selling Price (Rs/kg)**	**Packaging Cost (INR/kg)**
Rice	40%	40	1
Multi-grain Atta	40%	50	1
Chips	10%	100	5
Cookies/Bakery	10%	150	5
Wastage of millets during processing	%	20%	
Rate of Millets	INR/kg	25	
Weighted average cost of packing	INR/kg	1.8	

Annexure II: Calculation of financial indicators

Particulars	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10**	
Capital Cost	47.06	0	0	0	0	0	0	0	0	0	
Recurring Cost	35	40	44	49	53	54	55	56	57	57	
Total Cost	82	40	44	49	53	54	55	56	57	57	547
Benefits	43.92	51.24	58.56	65.88	73.2	73.2	73.2	73.2	73.2	73.2	659
Net Benefits	-38	11	14	17	20	19	18	18	17	16	
Discounting Factor	10%										
Net Present Worth	51.03										
IRR	38%										
BCR	1.21										