



BUSINESS MODEL DAIRY DEVELOPMENT

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BUSINESS MODEL
DAIRY DEVELOPMENT

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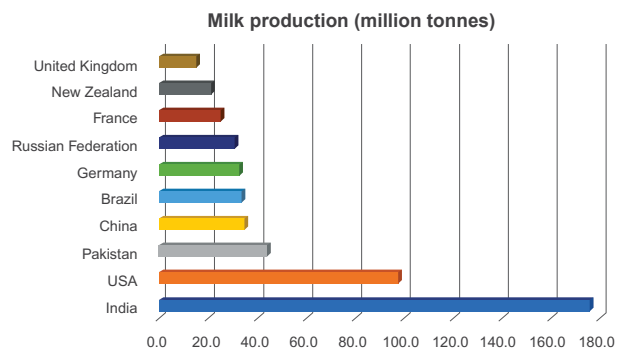
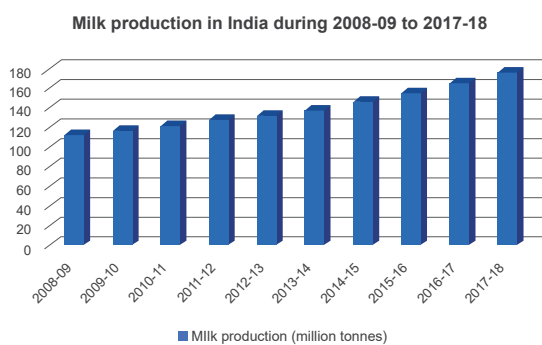
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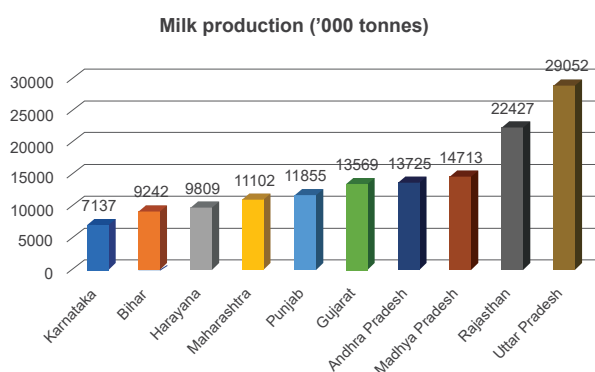
BACKGROUND

India has the world's largest dairy industry in terms of volume of milk production. The total milk production in the country stood at 176.3 million tonnes in 2017-18. In fact milk production in India has been steadily growing and the country has witnessed a growth rate of 57% from 2008-09 to 2017-18.



Apart from India, the other leading milk producers are USA, Pakistan, China, Brazil and Germany. However, the milk production in India is also double that of USA while it is several times higher than that for other major milk producers. The country has close to 18% of the world's bovine population (2015-16).

Government statistics indicate that there are close to 75 million women and 15 million men in the country who are engaged in dairy and that there is increasing participation of women in livestock development activities. However, a very high proportion of households engaged in dairy production are landless, small and marginal farmers. As far as the growth rate is concerned dairy sector in India is growing at a rate of around 10% per annum.



The major milk producing states in India are Uttar Pradesh, Rajasthan, Madhya Pradesh, Andhra Pradesh, Gujarat, Punjab and Maharashtra

Despite being ranked number one in milk production, the per animal productivity in India is 1,806 kg a year which is much lower than the world average of 2,310 kg an year. This is owing to issues related to livestock breeds, livestock feed and also veterinary health support.

It must also be mentioned that out of the total milk produced in India, a large proportion (about 48%) is retained by dairy farmers for their self-consumption while the remaining is marketable surplus.

¹Press Information Bureau, GOI (May 16, 2016)

02

CHALLENGES FOR DAIRY DEVELOPMENT IN INDIA

The following are some of the major challenges for the dairy sector in India:

Issue of aggregation:

Dairy sector in India faces a major issue relating to aggregation of milk. A majority of producers have one or two milch animals and hence their production levels are quite low. Consequently, aggregation of produce from a large number of such small producers is not only difficult but also cost-intensive. Moreover, due to high collection cost only about 20 to 30% of milk produced by small-holders is believed to be marketed through organised channels, while the rest remains in the ambit of unorganised supply chains.

Small and scattered supply chains:

The other issue facing small producer is establishing the supply chain and its efficient management. In fact, a large number of small vendors/middlemen are engaged in collecting small quantities of milk from individual producers.

High cost of milk production:

The average yield of cattle in India is low as compared to other countries. It has impact on higher cost of milk production in India. Lack of breed improvement, proper feed, water management and housing are some factors that contribute towards reducing the productivity of Indian cattle.

High cost of milk handling and marketing:

In India, milk passes through several small aggregators until it reaches a pasteurisation facility. Consequently, the added margins of various players in the milk distribution chain, lead to increase in the cost of milk.

Low quality of milk:

Unhygienic condition of animal farms and dairies, poor and unhygienic milk handling have contributed to deterioration in the quality of milk. In 2012, FSSAI (Food Safety and Standards Authority of India) pointed out in a survey that 70% of urban and 31% of rural milk supplies do not meet standards.

Poor veterinary support:

Another major issue in India is the lack of adequate veterinary services. This often results in poor cattle health, leading to low chances of breed improvement for small rural farmers.

03

PROJECT IDEA

This business idea aims to promote dairy through collectives of small-holder dairy farmers and support the farmers for improvement in livestock breeds, improved fodder and feed, improved bovine health ultimately leading towards enhanced milk production. The proposed model also seeks to provide financial services to dairy farmers in order to enable them to buy additional livestock.

Aggregation of milk produce of individual farmers and collective marketing of the same also forms an important component under this model. The purpose is to ensure better prices to the farmers in order to maximize their income levels.

This project idea promotes a cluster-based approach wherein a FPO will be formed at the cluster level that would support the dairy farmers. The FPO would support the farmers in livestock breed improvement, purchase of additional livestock, feed management, veterinary health and adoption of hygienic practices for milk handling. Subsequently, the FPO would facilitate the collection and marketing of milk while ensuring better milk prices for the farmers.

3.1 Intervention Strategies

It is being proposed that the interventions must be taken up with 500 dairy farmers for achieving economics of scale for the FPO. The target farmers would be organised into Producer Groups (PGs) at the village level with each PG having upto 20 members. At the cluster level, the PGs would be federated in the form of an FPO. FPO would assist the farmers in production and marketing of milk. The role of an NGO is critical in community organisation and formation of PGs and FPO along with capacity building of these community-based institutions.

Under this broad framework, the following interventions are proposed:

For farmers groups

- a. Farmer's mobilisation and sensitisation for adoption of dairy farming (Grant/subsidy).
- b. Training and extension services for the farmers on dairy (Grant/ subsidy).
- c. Financial linkages for farmers to purchase additional livestock (Loan).
- d. Facilitating insurance of livestock.
- e. Facilitate farmers to obtain financial benefits under different promotional schemes of concerned state and centre government.
- f. Facilitate farmers to adopt improved practices for dairy – including breed improvement, fodder, animal health and POPs for milk handling/quality control.
- g. Assistance to farmers in the setting up of biogas plants through convergence with government schemes.
- h. At the Producer Group level, assistance to establish azola units for feed improvement.
- i. Buy-back of milk through the FPO.

For FPOs

- a. Farmer mobilisation and sensitisation for adoption of dairy farming.
- b. Training and extension services for the farmers on package of practices (POPs) for improved dairy.
- c. Channelising credit to the members of PGs for purchase of livestock. The FPO may charge a small percentage of interest in order to recover facilitation costs. Linkages may be developed with financial institutions for providing loans to FPO.
- d. Procurement of quality feed material, vaccines and veterinary medicines and supplying them to farmers.
- e. Promote livestock insurance for farmers.
- f. Development of systems for aggregation and supply chain management.
- g. Creation of infrastructure for FPO namely; Bulk milk chiller, milk transport system and other equipment.
- h. Establishment of retail outlets in nearby towns for retail of milk.
- i. Linkages with bulk buyers for purchase of milk.
- j. Convergence with various enabling schemes.

The funds can either flow directly to the Farmers Producer Organisation or through an NGO, which will have the overall responsibility of achieving the project objectives.

3.2 Potential for upscaling

India is the world's largest milk producer with production of over 176 million tonnes in 2017 and the livestock industry (with majority contribution being of the dairy sector) contributes almost 4% to the country's GDP.

However, despite high production in the country, the dairy sector largely remains unorganised. In fact, more than 50% of the marketable surplus of milk is handled by the unorganised sector in the country. Moreover, with the growing population, the domestic demand for milk and milk products is constantly increasing in the country.

It is in this backdrop that a significant potential exists for upscaling the model for dairy development initiated by Matashree Gomati Jan Seva Nidhi (MSGD), Alwar. Dairy products not only have a high demand but also dairying is a traditional activity that is already being pursued by a large number of farmers (albeit at a small scale or for fulfilling household consumption demands). Moreover, dairy can be initiated in most parts of the country and does not require highly skilled labour while the investment cost is also small. Considering these factors, and also the fact that there is a need for organised sector to intervene in the handling of milk in order to increase the quality of milk and also enhance the prices available to dairy farmers.

An initiative to enhance household level milk production, build capacities of farmers as well as aggregation and marketing of milk has significant potential in the country.

3.3 Case example UPNRM

The project idea is based upon a model developed by MSGD in Alwar district of Rajasthan. MSGD has helped in developing buffalo units at the farmer level. The key highlights of the model are as follows.

- Establishment of 193 buffalo units (one buffalo per unit) to help small dairy producers increase their number of animals.
- Vermicomposting promoted and 100 compost pits set up.
- Household level biogas plants set up for utilising cow-dung – 36 units.
- Animal health camps organised.
- Feed improvement through green fodder promotion and use of hydroponic techniques.
- Establishment of azola units for improved cattle feed – 200 units.
- Capacity building of farmers in veterinary health, enterprise development, milk processing etc.
- Organic vegetable cultivation is also promoted amongst willing farmers.
- Convergence with existing government programmes/schemes.

3.4 Business model with flowchart representation

The following figure represents the business model for the FPOs to be promoted in the dairy sector.

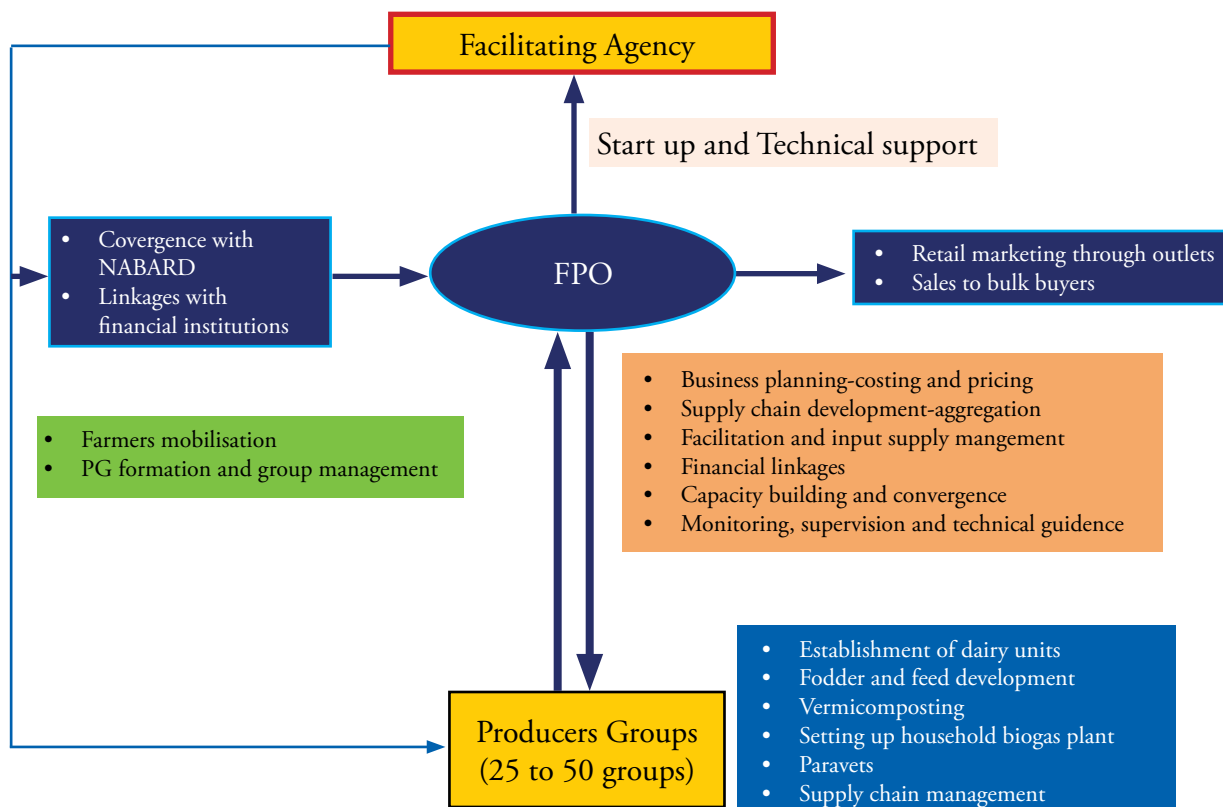


Figure 1: Diagrammatic representation of the proposed business model

04

IMPACTS AND SUSTAINABILITY

4.1 Impacts – Social, Economic and Environmental

Social impacts

- a. Building social capital and social cohesion through organisation of farmers.
- b. Building capacity of individual farmers and also farmer groups.
- c. Generating additional employment for a number of persons through the FPO and other business activities.
- d. Ensuring the development of sustainable community-based organisations at the village level (PGs) and at the cluster level (FPO).

Economic impacts

- a. Enhancing incomes of small-farmers through dairy activities.
- b. Vermicomposting developed as an alternate source of income for farmers.
- c. Organic cultivation promoted through use of vermicompost.
- d. Increase in farmers' income.

Environmental impacts

- a. Promotion of alternate fuel in the form of biogas.
- b. Reduction of soil, water and air pollution because of promotion of organic manures.
- c. Promotion of azola results in improved soil health, improved fertiliser use efficiency, nitrogen fixation and maintaining soil moisture.

4.2 Mainstreaming Options

This model has a potential to be widely replicated across the country as dairy activities are carried out widely by farmers. This model can be promoted through various schemes of state governments and NABARD. Financial support from other banks may be leveraged.

4.3 Sustainability

Milk has high demand and a ready market. It is expected that if backward and forward linkages are adequately established and proper marketing is done, this model would start generating profits from second year onwards and become self-sustaining within 2 to 3 years. In fact, small scale dairies have been successfully promoted by MSGD in Rajasthan and this model is based upon the work done in Rajasthan.

The major factors that are expected to contribute towards sustaining this model are:

1. Scope for provision of milk animals to the farmers through loan assistance.
2. Facilitating agency to provide support to farmers in dairy enterprise development, aggregation and marketing, livestock health, fodder development etc.
3. Capacity building of farmer groups and FPOs in governance, business planning and financial management.
4. Convergence with ongoing schemes.
5. The economics of this model indicate good returns from the farmers and the FPO from 2nd year onwards.
6. Adoption of biogas and vermicomposting by farmers, in addition to dairy enterprise, can enhance their income.

05

FINANCIAL DETAILS

5.1 Scope of financing and subsidy

It is assumed that in order to enhance milk production, the farmers would require financial assistance to purchase new livestock along with technical support for scientific cattle management practices. For this purpose, the NGO/ FPO would link the farmers with financial institutions.

Efforts for convergence with existing government programmes would be attempted in order to get farmers the benefits of existing schemes.

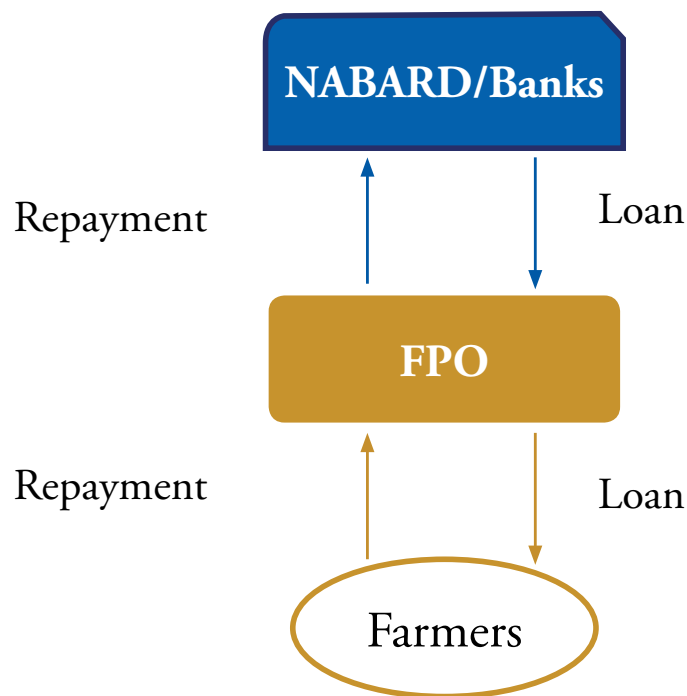


Figure 2: Flow of loan for FPO and farmers

The FPO itself would require loan for meeting capital costs as well as working capital requirement during the initial years. It is estimated that the FPO would require a loan of INR 54.40 lakhs for meeting capital costs and for meeting working capital requirements a loan of INR 148 lakhs. It is felt that working capital requirements can be sourced through loans from NABARD and other banks, while capital costs would be met through grants. However, in case any grant assistance from NABARD or other sources can be sourced by the FPO then it would be an added advantage.

Convergence with MGNREGS:

Financial assistance/subsidy to individual farmers for constructing cattle sheds can be availed through the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS).

NABARD:

NABARD provides financial grants of upto INR 10 lakhs per FPO to meet initial expenses. In addition to this, NABARD also provides loan to FPOs for upto INR 1 crore for meeting working capital requirements. These loans are provided directly by NABARD or routed through other banks.

In addition, NABARD has a number of schemes for promotion of small dairy units, rearing of calves, purchase of dairy equipment, milk marketing and cold chain establishment. The details are as follows:

Establishment of small dairy units upto 10 animals.

- » **Investment:** Rs 5.00 lakh for 10 animal unit – minimum unit size is 2 animals with an upper limit of 10 animals
- » **Subsidy:** 25% of the outlay (33.33% for SC / ST farmers) as back ended capital subsidy subject to a ceiling of Rs 1.25 lakh for a unit of 10 animals

Rearing of heifer calves upto 20 calves.

- » **Investment:** Rs 4.80 lakh for 20 calf unit – minimum unit size of 5 calves with an upper limit of 20 calves.
- » **Subsidy:** 25% of the outlay (33.33% for SC / ST farmers) as back ended capital subsidy subject to a ceiling of Rs 1.20 lakh for a unit of 20 calves

Purchase of milking machines /milk-testers/bulk milk cooling units

- » **Investment:** Rs 18 lakh
- » **Subsidy:** 25% of the outlay (33.33% for SC / ST farmers) as back ended capital subsidy subject to a ceiling of Rs 4.50 lakh

Purchase of dairy processing equipment for manufacture of indigenous milk products.

- » **Investment:** Rs 12 lakh
- » **Subsidy:** 25% of the outlay (33.33% for SC / ST farmers) as back ended capital subsidy subject to a ceiling of Rs 3.00 lakh (Rs 4.00 lakh for SC/ST farmers)

Establishment of dairy product transportation facilities and cold chain.

- » **Investment:** Rs 24 lakh
- » **Subsidy:** 25% of the outlay (33.33% for SC / ST farmers) as back ended capital subsidy subject to a ceiling of Rs 6.00 lakh (Rs 8.00 lakh for SC/ST farmers)

Cold storage facilities for milk and milk products.

- » **Investment:** Rs 30 lakh
- » **Subsidy:** 25% of the outlay (33.33% for SC / ST farmers) as back ended capital subsidy subject to a ceiling of Rs 7.50 lakh (Rs 10.00 lakh for SC/ST farmers)

Dairy marketing outlet / Dairy parlour.

- » **Investment:** Rs 56,000/-
- » **Subsidy:** 25% of the outlay (33.33% for SC / ST farmers) as back ended capital subsidy subject to a ceiling of Rs 14,000/- (Rs 18600/- for SC/ST farmers)

Table 1: Cost-benefits for individual farmers engaged in dairy farming (2 buffaloes)

S.No	Particulars	Unit	Quantity	Cost (Rs.)	Year 1	Year 2	Year 3	Year 4	Year 5
A	Costs								
A.1	Cost of milch animal								
	Purchase of milch animal (buffalo)	Nos	2	70000	140000	0	0	0	0
	Total (A.1)				140000				
A.2	Cost of maintenance of cattle								
A.2.1	Greed Fodder								
2.1.1	During lactation (barseem, rijka etc)	Kg	5400	2	10800	11340	11907	12502	13127
2.2.1	During dry period (barseem, rijka etc)	Kg	1260	2	2520	2646	2778	2917	3063
A.2.2	Dry fodder								
2.2.1	During lactation (wheat/bajra straw)	Kg	2920	6	17520	18396	19316	20282	21296
2.2.2	During dry period (wheat/bajra straw)	Kg	1080	6	6480	6804	7144	7501	7876
A.2.3	Feeding material								
2.3.1	During lactation period								
a	Maize oil cake	Kg	810	21	17010	17861	18754	19691	20676
b	Wheat Bran (choker)	Kg	810	22	17820	18711	19647	20629	21660
c	Ground Nut Cake (GNC)	Kg	185	40	7400	7770	8159	8566	8995
d	Mustard Oil Cake (MOC)	Kg	185	22	4070	4274	4487	4712	4947
e	Salt and mineral mixture	L/S			3240	3402	3572	3751	3938
2.3.2	During dry period								
a	Maize oil cake	Kg	360	21	7560	7938	8335	8752	9189
b	Wheat Bran (choker)	Kg	270	22	5940	6237	6549	6876	7220
c	Ground Nut Cake (GNC)	Kg	90	40	3600	3780	3969	4167	4376
d	Mustard Oil Cake (MOC)	Kg	180	22	3960	4158	4366	4584	4813
e	Salt and mineral mixture	L/S			1080	1134	1191	1250	1313
A.2.4	Vaccination, medication and treatment								
1	Cost of vaccination and medication (HS & BQ, FMD, rinderpest etc.)	L/S		1000	1000	1050	1102.5	1158	1216
	Total (A.2)				110000	115500	121275	127339	133706
A.3	Labour and other costs								
A.3.1	Labour cost	Mandays	120	250	30000	31500	33075	34729	36465
A.3.2	Buffalo Insurance	L/S	2	2800	5600	5880	6174	6483	6807
A.3.3	Interest on loan				16800	14016	10898	7406	3494
	Total (A.3)				52400	51396	50147	48617	46766
	Cost of milk production (excluding capital cost) (A.2+A.3)				162400	166896	171422	175956	180472
B	Revenues								
B.1	Sale of milk	Litres	5400	40	216000	226800	261954	275052	288804
B.2	Sale of calves (net return after feed cost)	L/S			7500	7875	8269	8682	9116
	Total Revenue				223500	234675	270223	283734	297921
	Net Returns (A-B)				61100	67779	98801	107778	117449

Assumptions

- Cost of constructing cattle shed may be sourced from MNREGP.
- For purchasing buffalo the FPO could arrange bank loan for the farmers.
- A lactation cycle of 9 months with daily milk yield of 10 litres is assumed for the above calculations.
- Inflation at the rate of 5% per annum has been factored in while calculating all costs as well as revenues.
- The labour costs are included while calculating the above costs but in-case farmers themselves engage in performing dairy operations then the cost of labour may be a saving for the farmers.
- This model is based on yield estimates from Alwar district of Rajasthan. In case of other regions, milk yields and costs may show slight variations.
- Farmers would be assisted in establishing household level biogas plants through convergence.
- Azola units at Producer Group level could be established for improved cattle feed.
- Manure would be utilized by the farmers in their own farm.
- While the market price of female calf is higher than that of a male calf an average price has been taken for the above calculations.

5.2 Cost Economics

The proposed business model provides estimates of cost-benefits at two levels i.e. at the level of individual farmer and at the level of the FPO for dairy enterprise.

5.2.1 Cost-benefit for farmers

The above Table 1 provides the estimated cost of milk production as well as the expected net revenue for individual farmers engaged in dairy farming with one buffalo.

Assumptions

- Cost of constructing cattle shed may be sourced from MGNREGA.
- For purchasing buffalo the FPO could arrange bank loan for the farmers.
- A lactation cycle of 9 months with daily milk yield of 10 litres is assumed for the above calculations.
- Inflation at the rate of 5% per annum has been factored in while calculating all costs as well as revenues.
- The labour costs are included while calculating the above costs but in-case farmers themselves engage in performing dairy operations then the cost of labour may be a saving for the farmers.
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- Azola units at Producer Group level could be established for improved cattle feed.
- Manure would be utilized by the farmers in their own farm.
- While the market price of female calf is higher than that of a male calf an average price has been taken for the above calculations.

Economic analysis

Under the proposed model, farmers are able to get a net return of around INR 3.12 lakhs (after deducting capital costs). While the net annual returns are around INR 0.68 lakhs (Year 2) to INR 1.17 lakhs (Year 5). The Benefit Cost ratio for an individual farmer is calculated to be 1.24 which is good.

Table 2: Economic analysis dairy with 2 buffaloes

Particulars	Amount in INR (in Lakhs)					Total
	Year 1	Year 2	Year 3	Year 4	Year 5	
Capital cost	140000	0	0	0	0	
Recurring cost	162400	166896	171422	175956	180472	
Total cost	302400	166896	171422	175956	180472	997146
Total benefits	223500	234675	270223	283734	297921	1310052
Net benefits	-78900	67779	98801	107778	117449	312906
Net present worth of cost @15%	692398					
Net present worth of benefits @15%	860028					
Benefit Cost Ratio	1.24					
IRR	28%					

IRR for a farmer rearing 2 buffaloes comes to 28% which indicates that the investment decision is sound and viable.

LOANS

It is envisaged that for this establishing a dairy unit an individual farmer would require a loan of INR 140000 for the purchase of 2 buffaloes. Repayment of loan would be initiated from the second year onwards and it would be repaid in six years.

Table 3: Loan taken by farmer for purchase of buffaloes

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Loan	140000	0	0	0	0	0
Repayment		40000	40000	40000	40000	32614
Interest on capital loan (Diminishing) @ 12% per annum	16800	14016	10898	7406	3494	0
Total loan outstanding	156800	130816	101714	69120	32614	0

5.2.2 Cost-benefit for FPOs

Details of cost-benefit of FPO engaged in aggregation and marketing of milk are as follows:

Table 4: Cost-benefits for FPO engaged in aggregation and marketing of milk (250 producers with 2 buffaloes each)

S.No	Particulars	Unit	Organic Cultivation		Year 1	Year 2	Year 3	Year 4	Year 5
			Quantity	Cost (Rs.)					
A.1	Capital Cost								
1.1	Storage (transit storage) cum office	Sq. ft.	1500	700	10.50	0.00	0.00	0.00	0.00
1.2	Office equipment (including computer and MIS system for inventory management and accounting system)	Lumpsum	1	150000	1.50	0.00	0.00	0.00	0.00
1.3	Milk Testing Kit and related Equipment	Nos	10	5000	0.50	0.00	0.00	0.00	0.00
1.4	Automatic Milk Analyser (Bond 5 in 1)	Nos	3	30000	0.90	0.00	0.00	0.00	0.00
1.5	Other Equipment (Utensils, Cans, etc.)	Lumpsum		200000	2.00	0.00	0.00	0.00	0.00
1.6	Mobile Chilling Van (including milk chiller, accessories)	Nos	2	1200000	24.00	0.00	0.00	0.00	0.00
1.7	Bulk Milk Cooler (6000 litres) Gen set, stabilizer, etc. (including installation cost)	Nos	1	1500000	15.00	0.00	0.00	0.00	0.00
1.8	Deep freezer and other equipment for dairy outlet	Nos	3	100000	3.00	0.00	0.00	0.00	0.00
	Total capital cost				54.40	0.00	0.00	0.00	0.00
A.2	Recurring cost								
2.1	Promotion of Feed/ Fodder Resources on Common and Private Land	Acre	50	2000	1.00	1.05	1.10	1.16	1.22
2.2	Capacity building of local youth as paravets - providing kits to paravets	Nos	5	7500	0.38	0.39	0.41		
2.3	Animal health camps	Nos	5	10000	0.50	0.53	0.55	0.58	0.61
2.4	Technical Training on Livestock Management, Enterprise Promotion	Nos	15	10000	1.50	1.58	1.65		
2.5	Procurement of milk from the community @40 per litre	Litres	1350000	40	540.00	567.00	595.35	625.12	656.37
2.6	Operational and maintenance expenses of chilling plant	Litres	1350000	0.5	6.75	7.09	7.44	7.81	8.20
2.7	Transportation expenses	Litres	1350000	0.25	3.38	3.54	3.72	3.91	4.10
2.8	Rent for FPO office and 3 outlets (including electricity etc.)	Month	12	120000	14.40	15.12	15.88	16.67	17.50
2.9	Staff, administration, travel, coordination, marketing etc.	Month	12	200000	24.00	25.20	26.46	27.78	29.17
2.10	Interest on loan for working capital (12%)	Half yearly			8.88	8.88	8.88	8.88	8.88
2.11	Interest on loan for capital cost (12%)	Per annum			6.53	6.05	5.52	4.92	4.25
	Total recurring cost				607.31	630.38	661.45	691.91	726.06
	Total cost - capital and recurring				661.71	630.38	661.45	691.91	726.06
B	Income/ Benefits								
1	Sale of milk	Litres	1323000	50	661.50	694.58	729.30	765.77	804.06
	Total Income				661.50	694.58	729.30	765.77	804.06
	Gross Profit				54.19	64.20	67.85	73.86	78.00

Assumptions

In the above analysis the following assumptions have been made:

- The above analysis assumes that the FPO is aggregation milk from about 500 dairy farmers with each have one buffalo/ the milk sold by each farmer being 10 litres per day.
- The available subsidy, if any, from various sources has not been factored in this model which has been prepared on the basis of maximum cost in order to assess economic viability.
- The FPO would assist the farmers in promotion of feed, capacity building as paravets, organising animal health camps and providing technical trainings.
- The storage infrastructure will be made of low-cost materials.
- Loan will be obtained for INR 148 lakhs as working capital for six-month each year for first five years. This would be used for procurement of milk from farmers and meeting operational costs of FPO.
- A loan of INR 54.40 lakhs would be obtained for meeting capital costs.
- An increment of 5% each year for price escalation in the costs and revenues has been factored in the above analysis.

ECONOMIC ANALYSIS

The FPO is projected to obtain a surplus from Year 1 onwards (in case capital costs are not considered) and from Year 2 onwards a net profit of between INR 64 to 78 lakhs is projected. This analysis also takes into account the interest on working capital and capital loans that are expected to be taken by the FPO. The benefit cost ratio comes to 1.08.

Table 5: Economic analysis of operations of FPO

Particulars	Amount in INR (in Lakhs)					Total
	Year 1	Year 2	Year 3	Year 4	Year 5	
Capital cost	54	0	0	0	0	
Recurring cost	607	630	661	692	726	
Total cost	662	630	661	692	726	3371
Total benefits	662	695	729	766	804	3655
Net benefits	0	64	68	74	78	284
Net present worth of cost @15%	2244					
Net present worth of benefits @15%	2418					
Benefit Cost Ratio	1.08					
IRR	25%					
Debt Service Coverage Ratio	4.52					
Payback period	1.003 years					
Break-even point for FPO operations	10.87 lakh litres per annum					

IRR for the business of federation is calculated at 25% for a five-year period which is indicative of viability of investment.

The payback period is slightly higher than one year which is indicating of the fact that in terms of cash flows the FPO would be able to recover its capital cost within an year of its operations. This indicates financial viability of this business model.

A DSCR greater than one that indicates that the business has enough income to comfortably cover principal and interest payments for capital loan and also working capital loan. In this case DSCR is coming to 4.52 in the first year and in the subsequent years too is higher than 3, thereby indicating that the business is generating sufficient income to meet its debt obligations.

LOANS

It is envisaged that for this business model the FPO would require a loan of INR 54.40 lakhs for capital expenditure and a loan of INR 148 lakhs for meeting the working capital requirements. Working capital would be required for 6 months each year. From the third year the value of procured commodities is expected to increase with the result that the FPO would require working capital of INR 600 lakhs.

Table 6: Working capital loan for FPO

Working Capital Loan	INR in Lakhs				
	Year 1	Year 2	Year 3	Year 4	Year 5
Yearly Working Capital Requirement	148	148	148	148	148
Repayment	148	148	148	148	148
Interest on net working capital Loan (Diminishing) @ 12% per annum	8.88	8.88	8.88	8.88	8.88

The repayment of loan of INR 54.40 lakhs for capital expenditure would be initiated from second year onwards and it is expected to be repaid over a period of 10 years.

Table 7: Capital expenditure loan for FPO

Working Capital Loan	INR in Lakhs									
	Y 1	Y 2	Y 3	Y 4	Y 5	Y 6	Y 7	Y 8	Y 9	Y 10
Capital expenditure	54.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Repayment	0.00	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	6.21
Interest on capital loan (Diminishing) @ 12% per annum	6.53	6.05	5.52	4.92	4.25	3.50	2.66	1.72	0.67	0
Total loan outstanding	60.93	56.48	51.50	45.92	39.67	32.67	24.83	16.05	6.21	0



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