

SUSTAINABLE RURAL LIVELIHOOD THROUGH AGRI-BUSINESS INITIATIVES IN BACKWARD DISTRICTS OF MAHARASHTRA

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ABSTRACT

National Agricultural Innovation Project (NAIP) is a major initiative of Indian Council of Agricultural Research (ICAR), New Delhi aiming to develop replicable and holistic approach for promoting sustainable livelihood for tribal and remote areas of Maharashtra through integration and blending of tested technologies and strategies of family focused and area based programmes. Project interventions encompass improved agriculture practices, livestock management, water resource development, horticulture plantations (*wadi*) and forest based interventions. The project coverage is 76 villages divided in 10 clusters from five backward districts of Maharashtra viz., Yeotmal, Gadchiroli, Chandrapur, Nandurbar and Ahmednagar.

From sustainability point of view, small scale agri-based enterprises have been taken up at cluster level. Scoping exercises with cluster committee members were undertaken and accordingly necessary equipments and facilities are installed through project support to establish agribusiness enterprises such as decentralized feed mix units, Urea-DAP briquetting machines, Bulk Milk coolers, shed net houses to meet seedlings demand, tasar rearing and reeling machinery, etc. Enterprise wise strategies have been developed for making the enterprise sustainable which is initiated through project operations. Adopting agri-business approach, initiatives such as seed production at farmer's field, goat rearing, collective purchasing of agriculture inputs, tasar rearing, etc, have taken up in project area.

Present paper emphasizes on agribusiness approaches adopted in project area and its operational strategies which will demonstrate sustainable agribusiness and also visualizes agribusiness as an umbrella to bring together agriculture, services, processing and marketing for the sake of socio-economic integration and development. The challenges of the rural economy can be addressed, provided there is better management in the growing agri-business.

1. INTRODUCTION

Agribusiness is a broad term encompassing all aspects of agricultural production, processing and distribution. It is a process and product of applying economics in business and development of agriculture. Also efforts are made to modernise and diversify agricultural operations using commercial approach and managerial expertise. In all, agribusiness is an umbrella term to bring together agriculture, manufacturing and services for the sake of socio-economic integration and development¹.

In this perspective, a value chain approach is adopted for the project under question. National Agricultural Innovation Project (NAIP) is a major initiative of Indian Council for Agricultural Research (ICAR), New Delhi with the mission of establishing a system and action-based research consortium for improvement in livelihood in 150 backward districts of country.

Under this, BAIF Development Research Foundation, Pune has been working as a Consortium Leader to implement the Sustainable Rural Livelihood Security Project (SRLS) in five backward districts of Maharashtra viz., Yeotmal, Gadchiroli, Chandrapur, Nandurbar and Ahmednagar. The project coverage is 76 villages divided in 10 clusters from five districts of Maharashtra. (Table 1)

Table 1 District wise clusters

District →	Ahmednagar	Nandurbar	Yeotmal	Gadchiroli	Chandrapur
Cluster →	Samsherpur	Mandane	Ralegaon	Indaram	Pombhurna
	Devthan	Khandbara	Ghatanji	Etapalli	Jivti

The overall objective of the project is to develop replicable and holistic approach for promoting sustainable livelihood for tribal and remote areas of Maharashtra through integration and blending of tested technologies and strategies of family focused and area based programmes. Project implementation period is five years i.e. from 2007-2012.

1.1 PROJECT INTERVENTIONS

Project has initiated different interventions in target area. The thrust is on developing natural resources through the interventions of improved agriculture, livestock development, water resource development and forest based intervention of Tasar Sericulture. The approach is of building people's institutions at local level and their capacity building to

cater the local needs of livelihood. The strategy is of tapering support to enable farmers to gradually adopt the improved technologies and practices.

1.2 PROJECT SUSTAINABILITY STRATEGY

Project design is based on a solid foundation of people's participation and developing strong institutions of people for ensuring the sustainability. Project sustainability here means continuity as well as escalation of development process initiated through project interventions even after withdrawal of implementing agency.

In order to develop ownership of the participant family towards the development process, 10% contribution money is paid by the participants to the project. This has created sustainability fund of about 40 lakh which will be utilized in post project period to sustain the programme.

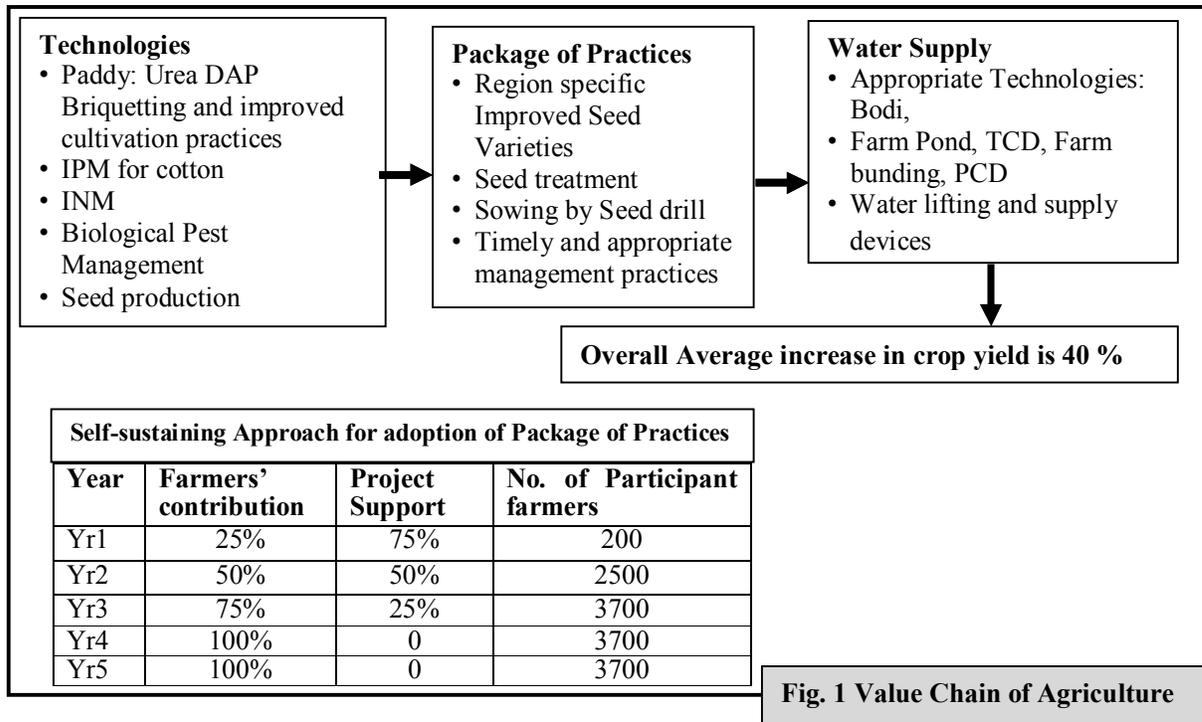
BAIF has been working with a three tier model of people's institutions; Primary or common interest group, village committee and cluster committee. But from learning of past experiences; it has been thought of formalizing one central management committee for all 10 clusters instead of formalizing 10 cluster committees. The apex body will be a Producer Company constituted by representatives of cluster committees and these committees would work as branches of central committee. The central committee would provide techno managerial inputs to cluster committees to enhance their capacities for post project management of the programme as well as for successful running of enterprises established through project contribution. From sustainability point of view, small scale enterprises have been planned at clusters. Scoping exercises with cluster committee members were done and accordingly necessary equipments are installed through project support such as decentralized feed mix units, Urea-DAP briquetting machines, Bulk Milk coolers, shed net houses etc. Technical capacity building of people to utilize these assets as enterprises is being done.

2. VALUE CHAIN APPROACH

A value chain is a sequence of steps involved in the process of production up to the forward linkages of market. Here the focus is on catering local needs in a sense that production will be consumed to fulfill the local needs. In all the interventions for livelihood, this approach is adopted. For example while working on agriculture development; we focused necessary

aspects of technologies, services, facilities and linkage to market. Value chain approach for agriculture is illustrated as follows;

Improved Agriculture Intervention



3. AGRI-BASED ENTERPRISES

Considering the local needs for critical inputs such as quality seed, seedlings and fertilizers in briquette form; certain facilities have been created at few clusters where it has demand.

3.1 UREA-DAP BRIQUETTING PLANT

When urea is applied to the crop significant quantity of it is lost either due to leaching out or due to degradation and losses of the urea in ammonia form. However such losses can be arrested to a great extent, provided the urea is applied in briquetted form. Thus, leading to slow release of it in the soil and resultantly avoiding losses due to above reasons, this innovative practice of applying urea in briquetted form has been introduced in the field area and being adopted by the farmers. Hence it became imperative to make provision of such facility at local level. For this purpose urea briquetting units have been established at three clusters viz., Devthan, Pomburna and Indaram. After completion of the project period these units will be handed over to the respective cluster level apex bodies of the people's institutions in these areas.

It is envisaged that, operations of this plant will be handled by the respective cluster committee and it is estimated that in the beginning unit may operate in a year at 30% level of its installed capacity. Through this operation the committee will generate an income of Rs. 54000 per anum @ Rs. 10 per bag as management commission over and above actual manufacturing cost from 5400 bags of urea briquettes produced annually. Total production in the year will be 10800 kg.

This activity will be continued at existing units; Devthan, Pombhurna and Aheri. During the first year of operation the plant will be run at 25% of its installed capacity. However during post project period the production will increase @ of 10 % per year and the income will increase proportionately. Escalation of the cost assumed is @ of 7% per year.

Economics of Urea DAP Briquetting machines is given as below (Table 2)

Table 2 Economics of Urea-DAP Briquetting Machine

No.	Details	Cost in ₹
Fixed costs. (₹)		
1	Machinery depreciation @15% of the cost Rs. 1,31,000	20550
2	Annual maintenance charges	5000
3	Rent of the shed @of Rs. 500/month	6000
4	Sub Total	31550
5	Fixed cost per 20 kg of urea briquettes (31550/5400)	5.85
Variable costs. (₹)		
6	Material cost (Urea and DAP in proportion of 60:40 in 108000 Kg.)	
6.a	Urea – (64800 kg in total briquette quantity of 108000 @ Rs.6.00/kg)	388800
6.b	DAP- (43200 kg in total briquette quantity of 108000 @ Rs.10.50/kg	453600
6.c	HDPE bags for packing Size 20kg. - No. 5400 bags for 108000 kg briquettes – Cost Rs.2/bag	10800
7	Total material cost	853200
8	Power cost 35 units per ton of production for 108 tons @ Rs.4 /unit (35 X 108 X 4)	15120
9	Total material and power cost	868320
10	Handling losses @ 2.5% of the total material cost (a+b+c)	21330
11	Labor cost 10% of total material and power cost	86932
12	Total variable cost for 5400 bags production(9+10+11)	976582
13	Per bag variable cost for 20 kg urea briquette bag (955252/5400)	180.85
14	Per bag total production cost (4+11)	186.7
15	Sale receipts through sale of 5400 bags @₹240/bag	1296000
16	Net income	319418
Cumulative figures for three units at Devthan, Pombhurna and Indaram		
18	Total variable cost for 5400 x 3 =16200 bags production.	2929746
19	Sale receipts through sale of 16200 bags @₹240/bag	3888000
20	Net income	958254
Three units at Devathan, Pombhurna and Indaram will be operated during post project period.		

3.2 SHED NET HOUSE FOR SEEDLING PRODUCTION

To cater the need of agri-horti-forestry saplings; shed nets have been established at four clusters viz., Mandane, Devthan, Pombhurna and Indaram. These shed nets have been erected at the campus of community resource centers and care is taken by respective village committees. At some places; SHGs are encouraged to take up nursery raising at this shed net. Business operations will increase @ 10 % per year and operational costs will rise @7 % per year. (Table 3)

Table 3. Operational details and Economics of Shade net house - 2000sq.feet.

Crop: Tomato, Cauliflower, Cabbage, Brinjal and Chilly

No.	Item	Unit Cost (₹)	Total cost (₹) for 1000 sq. feet
1	Land preparation / Bed preparation (labour – 8 persons)	80	640
2	Seed 30 packet (10gm)		10500
3	Farm yard manure (FYM)- 600Kg		300
4	Soil sterilization/Bav isten/pesticide etc.		200
5	Seed sowing ,seed treatment, fertilizer application and watering charges		1000
7	one Labour required for 30days for watering, weeding, application of pesticide and selling seedling etc.	100	3000
	Total cost for 1000 sq. ft.		15640
9	Sale receipts from sale of 90000 Seedling from farm of 2000 Sq. feet @ 0.75 paisa per seedling.	0.75	67500
10	Net income (67500 -15640)		51860
Totals for four units at Mandane, Devthan, Pombhurna and Indaram			
	Total cost		62560
	Total sale receipts		270000
	Total net income		207440
	Seed sowing distance:- Row to Row – 10cm / Plant to Plant – 2 cm		
	45 seedling/ sq. feet, thus seedling can be raised from 2000 sq. feet		

3.3 SEED PRODUCTION

Availability of quality seed at local level is a prerequisite to increase crop yield. It is observed that timely availability of reliable good quality seeds at reasonable costs has become a common problem in many areas. Therefore selected farmers are encouraged to take up seed production with technical consultation and close monitoring by Technical staff and scientists of BAIF. Seed production is taken on 57 acres of land (45 acres soybean + 12

acres gram). Total 6 quintal of soybean and 15 quintal of gram was qualified as seed. The seed was procured @ Rs. 3018/q for soybean and Rs. 2160/q for gram

Economical viability and sustainability of the operation is shown in the table given below (Table 4)

Table 4 Economical viability and sustainability of seed production

No.	Item	Cost/ day (₹)	Total cost/acre (₹)
1	Land preparation		
a.	cleaning		640
b.	Ploughing		1000
c.	Harrowing		500
d.	Farm yard manure 5 Tone 50% for one crop		1250
2	Spreading of FYM (1 labour)	100	100
3	Mixing with harrow (5 male)	100	500
4	Sowing ½ day (3 labourers)	100	300
5	Seed Cost (40 Kg)		1200
6	Fertilizer application cost/ seed treatment		1500
7	Weeding (10 labourers)	60	600
8	Application of pesticide/ Fungicide		300
9	Irrigation charges (6 irrigation: 6 labourers)	100	600
10	Electricity charges		200
11	Harvesting		1200
12	After care drying		100
13	Seed plot registration		200
14	Seed processing @ 150 per quintal with expected yield 14 q / acre		2100
15	Bagging, tagging (35 bag , 40 Kg packing)		1050
16	Transportation charges		1000
17	Other charges		500
18	Total cost		14840
19	Sale receipts through sale of 35 Bag (40Kg packing) @ 1100 / bag		38500
20	Net income		23660

4. LIVESTOCK BASED ENTERPRISES

The main objective of livestock intervention is to increase productivity through breed improvement. For large ruminants, it is achieved through Artificial insemination. In case of goats, buck and goats of improved breeds have been inducted with selected participant families. (Fig 2)

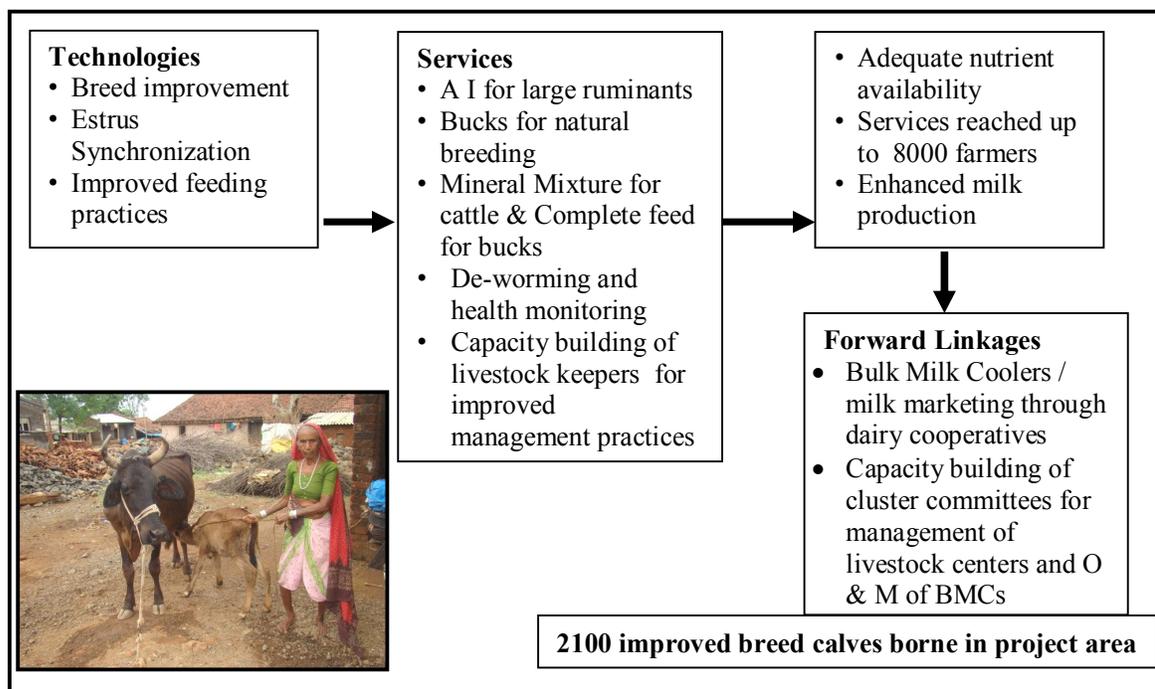


Fig. 2 Value Chain of Livestock Activity

4.1 CATTLE BREEDING CENTERS

After withdrawal of the project activities the center management will be taken over by the apex body of the cluster level management committees. Practice of levying the service charges for Artificial Insemination (AI) services has been already started during the project phase only on nominal basis in initial period. These rates are being increased gradually for smooth acceptance by the user group. The revenue thus realized through service charges collection will be used for running the cattle breeding centers. To make the centers economically sustainable on these lines, only seven out of existing 10 centers will be continued after project phase. Three of these centers will be from Ahmednagar district and two from Nandurbar. It is planned that the service charges being collected during project period will be put in corpus fund that will be used to support the centers for meeting out the deficits in case there is budgetary variance. (Table 5)

Increase in number of AI will be @10% per year. Operational and other material cost escalations will be @ 7% per year.

Table 5 Projected center economics after withdrawal of project activities

Name of the Center	Projecte d Annual AI	Service Charge s Rate / AI	No. of Seme n doses used	Budgeted annual expenses						Deficit/ Surplus	
				Receipt	M/C running	Semen cost	LN	Other	AI worker remuneration		Total
Devthan	1200	100	1260	120000	16000	12600	9000	1200	60000	98800	21200
Gardani	1200	100	1260	120000	16000	12600	9000	1200	60000	98800	21200
Khandbara	850	75	892.5	63750	12000	8925	9000	850	60000	90775	-27025
Khirvire	1200	100	1260	120000	12000	12600	9000	1200	60000	94800	25200
Mandane	850	75	892.5	63750	15000	8925	9000	850	60000	93775	-30025
Samsherpur	1200	100	1260	120000	0	12600	9000	1200	60000	82800	37200
Pimpalgaon	1200	100	1260	120000	16000	12600	9000	1200	60000	98800	21200
Total			8085	727500	87000	80850	63000	7700	420000	658550	68950

4.2 BULK MILK COOLERS

Bulk Milk Coolers have been established in two clusters with an objective to reduce the vulnerability of the producers in markets and eliminate their losses due to souring of milk. These units are of 2000 liters capacity. This is a step taken to establish forward linkage for marketing for the milk produced.

With the estimated daily procurement potential of 2000-3000 liters from the respective cluster areas, quantitatively it may not be feasible to send the cooled milk in retail outlets. Quality wise also it may not be advisable to send this produce in retail market without pasteurizing it. In view of this it is planned that the plants will be run in association with the existing dairy units in that area. These units are having with them the pasteurization plants and direct marketing linkages. Local units have shown their willingness to take these units for operations on contract basis. Financial terms for which they are agreeable are payment of rental charges to respective committee at the rate of Rs. 0.25 per liter of milk processed by them in these units.

It is estimated that they will be processing about 720,000 liters of milk on each plant per year. Through this the POs will generate a substantial income of Rs.180000 per annum which can be made use of by these POs for carrying out other developmental activities in their areas. Daily milk processing increase will be @10 % every year and proportionate increase in earnings through processing charges. Processing charges will be constant over the period. (Table 6)

Table 6 Budgeted income generation through bulk milk coolers

Item	Details
Plant Capacity	2000 liters per day
Estimated quantity of milk processed annually	720000 liters
Annual processes charges obtained through leasing @ 0.25 per liter	180000
Total processing charges acquired through operation of two BMCs	360000

4.3 GOAT DEVELOPMENT PROGRAMME

Base goat population in the project area at inception was about 6500. With the objective of motivating the people to adopt Osmanabadi goats in place of local nondescript animals, 630 pure Osmanabadi goats were inducted. ‘Goat Bank’ approach is adopted for this. The goats were given to selective participants with an understanding that they will give one female kid born to each goat they received; to the other non recipient family and these new recipients will continue the same practice so that over a period of time large number of participants in the project area will own purebred Osmanabadi goats.

It is estimated that base goat population existing in the area will nearly be totally replaced with purebred Osmanabadi goats.

In view of this eventuality; goat development activity has been planned to continue with some modifications. The total base goat population by this time in the area might have been upgraded with Osmanabadi breed. Male kids born during this phase will be of Osmanabadi breed and breeding requirement of their goat stocks may be met through their own bucks.

(Fig 3)

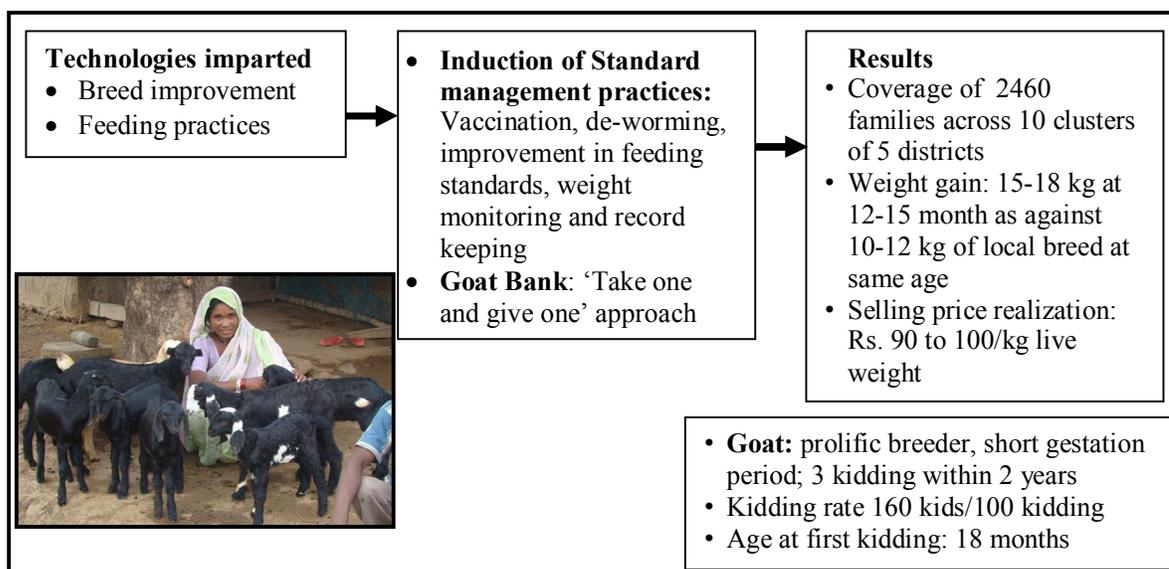


Fig. 3 Value Chain of Goat Rearing Activity

Role of People's institutions in this can be:

- a. Providing the required veterinary advisory services through engaging hired consultants.
- b. Procuring and making available the vaccines and medicines for preventive and primary health care.
- c. To explore the possibilities of expanding the goat development activities in the neighboring villages.

The vaccines and medicines required for in these operations will be made available to the participants on 5% commission basis. Income thus derived will be source of income to the committees for providing the monthly honorarium at fixed rates. Source of income for the goat keepers will be this amount of honorarium and the service charges being collected from the goat keepers for providing them vaccination, de-worming and primary veterinary health services.

5. FOREST BASED INTERVENTION: TASAR SERICULTURE

Success of Tasar activity at Gadchiroli district as a supplementary livelihood has been amply demonstrated under NAIP-3 project. Within two years of implementation the number of participants has gone up from 63 to 133 meeting the physical target as well objectives of income from Rs. 2000 to Rs. 6000/crop. Of this a two year old group of 11 participants earned Rs. 26000/person during the 2009 -2010 as compared to previous Rs 2000/person. This programme could have far reaching advantage when Tasar activities become family enterprising by undertaking both farm and non-farm activity. Worm rearing provides seasonal cash income as well as employment during lay of period while non-farm activities like reeling and spinning give regular income. Anticipating the potential of Tasar Activity in Gadchiroli district, it is envisaged to promote it in integrated manner comprising of Seed production, egg preparation, silkworm rearing and reeling leading to creation of byproducts. It has more marketing opportunities being non perishable product and its linkages with weaving activities. (Fig 4)

Sustainability strategy for continuation of this activity in post project period

It is anticipated that about 200 families would participating in the programme. The tasar activities carried out in two parts, one is that of egg and seed production and another is post cocoon activities.

About 20 Sericulture Farmers Groups of 10 participants each will be formed in the area. Out of these; ten would involved in post cocoon activities and 10 others would be involved in seed/DFL production activity.

These groups will be linked to cluster level committee which in turn will be linked with project level apex body that will be involved in organizing the marketing activities and arranging for required input supplies to the SHGs through the cluster level body.

It is envisaged that total annual expenditure required for cluster level structure would around Rs. 300,000. This money would be generated through the operations of cluster level committee, mainly that of production/procurement and sale of the DFLs and purchase of cocoons.

It is visualized that about 1.5 million cocoons will be grown in the area per annum. Through procurement and sale of these cocoons, annual profit of about Rs. 300,000 @ of Rs0.20 per cocoon can be generated. With the production of 1.5 million salable quality cocoons, simultaneously there will be production of about 300,000 to 400,000 cocoons of unsalable quality. These cocoons will be used for reeling and production of tasar silk locally. Selling price of these cocoons will be Rs.0.60 per cocoon. This will result in generation of additional income of about Rs. 2-3 lakhs. This is how the fund requirement for sustenance of the activity will be ensured.

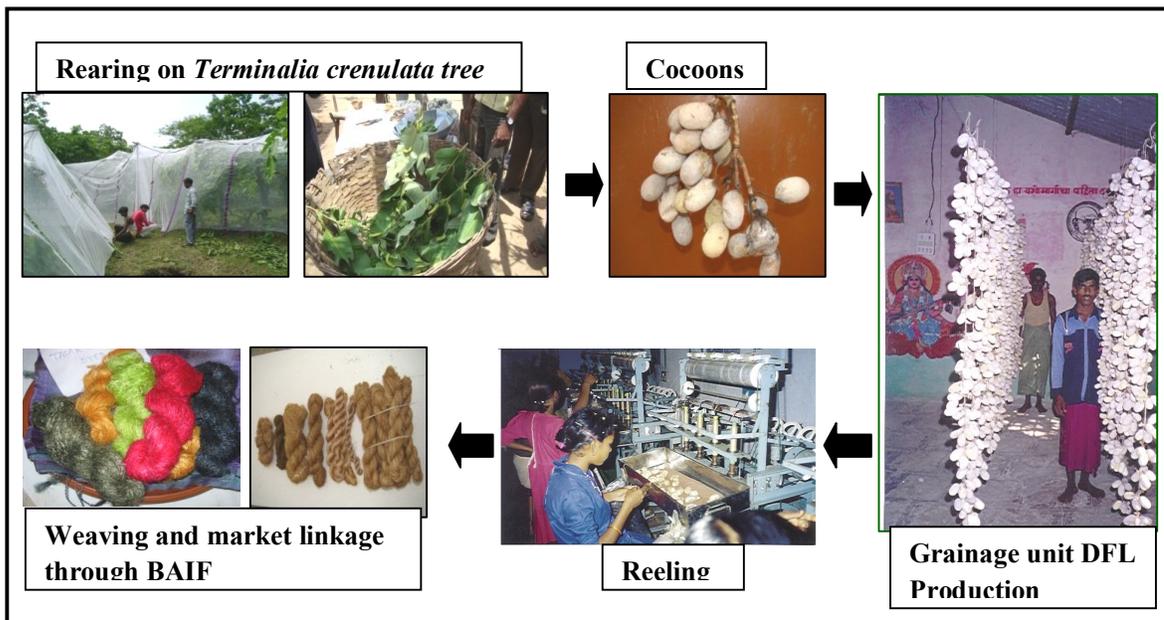


Fig. 4 Value Chain of Tasar sericulture

Out of total expenditure for different activities; it is assumed that 20% expenses will be on labour. The projected cash flow is subject normal weather conditions.

6. SUMMARY OF THE CASH FLOW FOR POST PROJECT PERIOD 2012-2017

Summary of cash flow for post project period i.e. 2012-2017 is as below

Table 7 Summary of cash flow

Year ↓	Activity						Total for all activities
	Projected income, expenditure & deficit /surplus	Cattle Breeding Centers	Bulk Milk Cooler	Urea Briquetting Unit	Shed Net House	Seed Production	
2012-13	Income	727500	36000	3888000	270000	38500	4960000
	Expenditure	658550	0	2929746	62560	14840	3665696
	Deficit/surplus	68950	36000	958254	207440	23660	1294304
2013-14	Income	800250	39600	4276800	297000	42350	5456000
	Expenditure	698063	0	3222721	68816	16324	4005924
	Deficit/surplus	102187	39600	1054079	228184	26026	1450076
2014-15	Income	880275	43560	4704480	326700	46585	6001600
	Expenditure	739947	0	3544993	75698	17956	4378593
	Deficit/surplus	140328	43560	1159487	251002	28629	1623007
2015-16	Income	968303	47916	5174928	359370	51244	6601760
	Expenditure	784344	0	3899492	83267	19752	4786855
	Deficit/surplus	183959	47916	1275436	276103	31491	1814905
2016-17	Income	1065133	52708	5692421	395307	56368	7261936
	Expenditure	831404	0	4289441	91594	21727	5234167
	Deficit/surplus	233729	52708	1402980	303713	34641	2027769
Total for five years	Income	4441460	219784	23736629	1648377	235046	30281296
	Expenditure	3712308	0	17886392	381935	90600	22071235
	Deficit/surplus	729153	219784	5850236	1266442	144447	8210061

7. CONCLUSION

Situation analysis in project area revealed the need for imparting improved technologies, services and inputs to enhance agriculture and livestock productivity and ultimately livelihood of the family. To cater the needs for services and critical inputs, enterprises such as Urea-DAP Briquetting units, shed net, seed production, bulk milk cooler, cattle breeding centers and tasar sericulture units are established.

The adoption of value chain approach helped to understand major component involved in the value chain. Accordingly though is given to strengthen the missing links in the chain mainly timely supply of critical inputs and essential services. These facilities will provide uninterrupted supply of these inputs and services for sustainable livelihood. For regular

operations and management of these services and facilities, Producer Company will be formalized as an apex body. Farmers will be the owners and stakeholders of the company.

Producer Company will work towards providing techno managerial inputs to farmers for operations of these enterprises. Hence, the process will certainly lead towards capacity building of farmers as well as self sustenance of the producers' company.

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Reference

1. Hans, V. Basil, Agri-Business and Rural Management in India, *Issues and Challenges Social Science Research Network*, September 21, 2008
2. NAIP SRLS-3 Baseline Survey Report, 2008-09
3. Sustainability Approach for NAIP component 3: BAIF, 2010-11