

A Value Chain on Commercial Exploitation of Underutilized Fruits of Tribal Zones of Rajasthan

Environmental and Social Safeguards Management

(A) Basic Information

1. Project Statistics

Component code 2

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Consortium Partners 1., Central Institute of Post Harvest Engineering and
Technology, Abohar centre

2., FIRST Sansthan, Udaipur

3. GG Foods, Udaipur.

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2. Date of Start December 5, 2008

3. Project Duration December, 2008 to June, 2012

4. Project Cost **Rs. 343.714 Lacs**

5. Project Objectives 1. To standardize rejuvenation or production
technology for enhancement in productivity
and quality of underutilized fruits such as
custard apple, aonla and ber in the tribal and

arid dominated area of Rajasthan.

2. To standardize post harvest management for underutilized fruits such as custard apple, aonla, ber and jamun to increase shelf-life.
3. To develop novel products and value chain for these fruits for higher economic returns.
4. Transfer of technologies among farmers and industries for commercial exploitation and sustainability.

6. Brief Project Description:

The present project proposal “A value chain on commercial exploitation of underutilized fruits of tribal zones of Rajasthan” will be undertaken by MPUAT, Udaipur (lead centre) and three partners CIPHET, Abohar, (ICAR institute), FIRST Sansthan (NGO) and GG Foods (private sector industry). All these partners are carefully chosen for manageability and to deal on the four targeted underutilized fruit crops *viz.*, custard apple, aonla, ber and jamun with special emphasis on custard apple and aonla for post harvest management and processing and ber for rejuvenation. The complete value chain model will be developed for custard apple, ber and aonla.

Broadly, the project consists of four components with different objectives and activities to under them. The first objective aims to undertake on rejuvenation technology in custard apple and ber, and production technology in aonla. The custard apple and ber local and inferior genotypes will be head back and budded with superior cultivars. In these two crops along with aonla the modules will be developed for IPNS, IWM, IPM and IDM. The interventions here are aims at production of better quality fruits yield and linked up with product preparation for continuous supply chain management. Buds of identified improved cultivars which are specific to a product will be supplied to targeted farmers. Water conservation measures, nutrient, pest and disease management strategies will be developed for quality fruit production. Further, new genotypes suitable for better processing quality for specific products will be identified through evaluation of local genotypes and farmers field or in forests of custard apple and registered before sharing with farmers and entrepreneurs

Second objective aims at development of products for post harvest handling and management as well as to develop harvesting tools and platforms. Suitable harvesting indices of all the four targeted fruit crops for improving the shelf life suitable for arid and tribal farmers will be standardized. Protocols for storage and packaging for long distance transport of these underutilized fruits also aims to develop. Technologies would be evolved for management of post harvest disorders by using pre and post harvest use of plant bio-regulators, chemicals, nutrients, suitable packaging technology and studies will also be done on long term storage practices including standardization of pre-cooling of produce, cold storage and packaging of fruits. Harvesting tools and platform will be developed /modified /adopted for safe harvesting, reducing post harvest losses, drudgery reduction and better end products. Equipments like pulper for custard apple, sorting /grading, shredding, pricking, destoner and juicer for aonla will be either develop / modified / adopted by the partner CIPHET. Studies an ZECC will also be made for these underutilized fruits.

Third objective aims at development of novel processed products and value chain for the targeted underutilized fruits for higher economic returns. Effort will be made for bringing free pulp making and preservation and new processed products from preserved pulp will be made. In case of aonla, products like RTS beverages, carbonated beverages, blended juices, powder, laddoo, barfi, flavored supari, etc. are aims to develop and also develop the automatic technology for candy making. Spray drying technology, development of antidibetic tablets, botanical insecticides and processed products technology will be standardized in jamun. Based on inputs from a market survey the potential products will be identified which can be marketed in various market segments as broad spectrum products, niche products and products for non-conventional markets. Such products will be unscaled, packed, labeled and marketed. It is aims to identify suitable packaging materials and packaging interventions to enhance better marketability of processed products.

The last objective emphasizes on popularization of value added products, demonstration of post harvest handling technology for reducing postharvest losses, setting up of processing plant for custard apple, and up scaling of semi-automated processing plant of aonla. These can be brought about by branding value added products

as health foods by creating awareness through training programmes, literature and mass media on nutritional and economic benefits of underutilized fruits products to the targeted population in rural and urban markets. Various programmes for farmers, processors entrepreneurs, unemployed rural youth, women, small-scale processors, new entrepreneurs, industry personnel interest in processing line and consumers will be organized. The different topics will be discussed are production technology of targeted underutilized fruits, integrated nutrient, water, pest and disease management, post harvest management, harvesting and processing equipments, novel products preparation, health benefits, packing, labeling, recipe making, economic assessment of final products, preparation of business modal, demonstration of pilot processing plant etc. This will help in empowering stakeholders through entrepreneurship development.

7. Environmental category issues in the subproject

(I) Social issues:

- Interventions planned in the project have direct bearing on the socio-economic conditions as the project beneficiaries are tribal, poorest of the poor farmers, small scale entrepreneurs, women and other social groups.
- Economic empowerment of tribals through reduction in pre and post harvest losses, value added product development, strong marketing links and employment generation along the value chain shall focus.
- Natural intake of nutrients through processed products will ensure nutritional security in less expensive way. Urban rich and unemployed youths are targeted for selling new processed products.

(II) Environmental issues:

- Organic nutrient models in production of custard apple; IPM, IDM, IWM models for custard apple, aonla and ber production; use of botanicals to reduce post harvest losses and processing waste utilization.
- Environmental benefits through efficient water and nutrient management.
- Use of new and renewable energy resources such as solar tunnel dryer and efficient process heat technology in value addition.

8. Safeguard Policies Triggered (World Bank Policies)

Safeguard Policies Triggered (World Bank Policies)		
	Yes	No
Environmental Assessment (OP / BP 4.01)	[√]	[]
Natural Habitats (OP / BP 4.04)	[]	[√]
Pest Management (OP 4.09)	[]	[√]
Cultural Property (draft OP 4.11 – OPN 11.03 -)	[]	[√]
Involuntary Resettlement (OP / BP 4.12)	[]	[√]
Indigenous Peoples (OD 4.20)	[]	[√]
Forests (OP / BP 4.37)	[]	[√]
Safety of Dams (OP / BP 4.37)	[]	[√]
Projects in Disputed Area (OP / BP 7.60)	[]	[√]
Projects in International Waterways (OP / BP 7.50)	[]	[√]

B. Risk Analysis and Related Issue

- Production in rejuvenated trees start after two years, it may take some time for acceptance.
- The main stakeholders in the project are tribal people. These are laggards and adoption of new technologies is difficult.
- Fruit production is environment dependent, if the weather and monsoon will be poor during project period, then adoption of technologies will be slower.
- Adoption of improved package of practices in a holistic way may be a problem if funds are not adequate.
- Supply chain for all the products are important, if at any time, short supply than it may have negative effect on marketing.
- The products from custard apple and jamun are new, it may take some time for their acceptance to society.
- Availability of partners to carry out the programme on a large scale for commercialization.
- Training programme among unorganized and low educated tribal people may have some problem.

9. Impact Assessment

It is expected that all stockholders involved in the value chain of custard apple, aonla, ber and jamun including growers, tribal people, entrepreneurs, industrial personnel, market man, traders and policy makers will be equipped with efficient and promising inputs after this study. Overall earning at growers level through more quality products and efficient processing at entrepreneurs level will increased about double its present rate.

10. Potential indirect and/or long-term impact due to anticipated future activities in the project area (assessment of anticipated conflict/complimentarily with the current as well as those proposed for the next five years in the areas of activities of the sub-project)

Indirect and long term impact:

- It is expected that more refined rejuvenation or production technology will increased yield of declining orchard by double its present rate.
- Developed technologies in terms of efficient harvester, cool chain at field level, drying, browning free pulp of custard apple, value added products of custard apple, aonla, ber and jamun, medicinal products from jamun, botanical insecticides from jamun seeds and by products development and structured organized marketing will increase value addition to double its present level.
- The health of the targeted population is improved through underutilized fruits and value added products consumption keeping many deficiencies (nutrient) and diseases at bay.
- Increased availability of underutilized fruits due to better production technologies and post harvest management.
- The indirect benefits will be sustainability of underutilized fruits production in tribal and arid dominated areas offering economic security to disadvantaged portion of society.
- Development of small and medium scale processing industries in rural areas.
- Awareness of farmers for achieving better returns with improved marketing approaches.

- Rural entrepreneurship will help in reducing migration to urban areas through enhanced empowerment and income generation.

11. Identify the key stakeholders and describe mechanisms for consultation with and to them done / disclosure so far done including pre-project consultations with stakeholders workshop before formulating the full proposal, discussing the full proposal with some stakeholders before submission to the PIU :

Public institutes

1. MPUAT, Udaipur
2. CIPHET, Abohar
3. Farmers and consumers

Private participation:

4. G.G. Foods
5. Sun Foods
6. Aditya Agrobiotech

NGO's:

7. FIRST Sansthan, Udaipur

Preliminary discussions were held with few stakeholders and NGO's before organizing stakeholders workshop. They were aware of NAIP project objectives and expected outputs and impact. The final modalities will be worked out after the project approval. Key stakeholders are tribal people, growers, entrepreneurs, processors, fabricators and middle man at marketing, traders and policy makers etc. At initial level the problem was discussed in length at grower's level, industrial level and market level to formulate the proposal. A concept note was prepared in consultation with all stakeholders involved and submitted to NAIP for approval. After this a comprehensive study was planned to cover all stakeholders involved at different level of value chain.

12. Chronology of meetings / activities held in connection with preparation of the concept note and full proposal

S. No	Date & Location	Programme	Participants	Remarks
1	October, 15, 2007	<i>Brain storming session on NAIP</i>	Vice Chancellor, DR, DEE, ZDR, HODs, scientists	To evolve broad contours of PCS value chain consortium
2	October, 29, 2007	<i>Meeting with growers and processors</i>	Farmers and small scale processors	Discuss about potential and problems in processing of targeted crops
3	November, 1, 2007	<i>Discussion with NIAM</i>	Dr. P. Sharma, Dr. S. Pareek	Discussing the possibilities of marketing of under utilized fruits and vegetables
4	November, 8, 2007	<i>Meeting with small entrepreneurs</i>	Various processing entrepreneurs of Udaipur	Present position and future scope of processed products of targeted crops
5	November, 28, 2007	<i>Interaction workshop at NAARM, Hyderabad</i>	Dr. N.S. Rathore, Dr. R.A. Kaushik	For developing full proposal
6	December, 1, 2007	<i>Meeting with Director Research, Director Extension Education and Dean, RCA with full faculty of Department of Horticulture</i>	Dr. Pratap Singh, Dr. V.N. Joshi, Dr. HCL Gupta, Dr. P.L. Maliwal	Discussion on the action plan for the development of full proposal
7	November-January	<i>Series of telephonic discussion with Assistant Director, NIAM</i>	Dr. P. Sharma Dr. R.A. Kaushik, Dr. S. Pareek,	To develop value chain and SCM
8	December, 4, 2007	<i>Telephonic discussion and e-mail conversation with Dr. S.K. Malik, PS, NBPGR</i>	Dr. S.K. Malik, Dr. R.A. Kaushik	Discussion on biodiversity conservation of underutilized fruits and vegetables
9	December, 2, 2007	<i>Telephonic discussion with Scientists of CIAH, Bikaner</i>	Dr. O.P. Awasthi, Dr. D.K. Samadia, Dr. R.A. Kaushik, Dr. S. Pareek	Production and processing of kachari in arid regions
10	December, 2, 2007	<i>Personal meeting with Dean, SKNCOA, Jobner</i>	Dr. R.A. Singhanian, Dr. S. Pareek	To find out the possibilities as consortium partner
11	December-January	<i>Series of meetings with Hon'ble VC</i>	Dr. R.A. Kaushik, Dr. A.K. Shukla, Dr. S. Pareek	Discussion on the action plan for the development of full project
12	January, 3, 2007	<i>Telephonic discussion with Director, IIHR</i>	Dr. S.L. Mehta, Dr. G.K. Murthi	To discuss the work to be taken up by IIHR
13	January, 3, 2007	<i>Telephonic discussion with Director Research,</i>	Dr. S.L. Mehta, Dr. Reddy	To discuss the work to be taken up by ANGRAU

		<i>ANGRAU</i>		
14	January,3 and 12, 2007	<i>Telephonic discussion with DG, NIAM</i>	Dr. S.L. Mehta, Mr. A. Bhatnagar, IAS	To discuss the work to be taken up by NIAM
15	December and January	<i>Conversations with Director, CIPHET through e-mail</i>	Dr. R. K. Patil, Dr. R.A. Kaushik	To discuss the work to be taken up by CIPHET
16	December, 28, 2007	<i>Meeting with NAIP cell</i>	Dr. R. A. Kaushik	To discuss the full proposal forproject
17	January, 7 and 8, 2007	<i>Stakeholders workshop with consortium partners</i>	Dr. S.N. Reddy, Dr. A. Geerwani, Dr. D.B. Singh, Dr. Thakur, Dr. D.K. Samadia, Sharma, , Dr. N.S. Rathore, Dr. R.A. Kaushik, Dr. A.K. Shukla,	To discuss about the detailed technical programme of the proposal and fixing responsibilities to the partners associated to the project

13. Measures to Address the Issues:

Local tribal people will be trained on rejuvenation practices for their senile and old orchards and in turn to integrate few new innovative processing techniques for more return. Tribal people will be motivated for supply of their raw material to trained entrepreneurs of the area and get nutrition rich processed products for their consumption. These tribal growers will be federated to develop their own processing unit based on developed technology and make use of their own raw materials. In order to sale their processed products, University will extend facility of sale counter and thereby they will get more income. Further, NGO working in this project will be made a group of growers and purchased the raw material which will be utilized by the processing industries specially three industries involved in this project and it is expected that some big players of ice cream industries also take the technologies and purchase raw material from the region under study and run their industries in this region. These industries will take care of the sustainability of the project after the termination of the project period

Awareness of risk related factors will be addressed to the stakeholders through orientation sessions on topics such as adoption of improved rejuvenation and package of practices in a holistic way, using technologies such as harvesting the underutilized fruits at physiological maturity and sorting and grading along with proper packaging for marketing. Issues such as packaging interventions will be addressed in the un-organized sector through utilization of biodegradable packaging material as far as possible so as to take care of environmental safeguards etc.

14. Consultation / Disclosures to be Done in Future

Local disclosure through mechanisms such as launch workshop, interfaces during the implementation stage of the subproject for sharing the results and soliciting feed back, one will circulate project brochures and implementation progress from time to time, putting up annual reports on the website and annual stakeholder's workshop wherever feasible.

The consultation/ disclosures will be done as per NAIP guidelines depending on the progress of the project. Participating farmers, marketing personnels and processors will be trained through demonstration programmes and workshops on various themes relevant to rejuvenation and production technology, post harvest management, nutritional analysis, marketing, labeling, recipe making, product processing, and entrepreneurship development aspects etc.

The project findings (brochures/CDs/videos/literatures) will be disclosed time to time and necessary feed back will be collected for further improvement and better implementation. Assistance of different related organizations will be taken.

1. Dissemination of holistic underutilized fruit production and rejuvenation technology and extension services to participating farmers specifically IPM, IDM, IWM and IPNS through training and education programme.
2. Demonstration of post harvest management and primary processing technology to stakeholders.
3. Transfer of technology to stakeholders.
4. Demonstration of harvesting tools, platforms, processing machineries and processing unit to stakeholders.
5. Dissemination of information and sensitization of line departments of state and central governments to policy makers, planners and project partners for enhancement of underutilized fruits consumption and reduction of post harvest losses.
6. Popularization through information dissemination on nutritional, medicinal and value addition of developed products to the consumers.
7. Information dissemination through mass and print media on health, nutritional and economic benefits to stakeholders and targeted groups.

8. Linkages with financial institutions will be enabled so that as and when required the entrepreneurs are adequately financed for their commercial activities. Both print and other media will be fully utilized to attain the desired goals and objectives.

9. NGO's and farmers groups will play a major role along with state department of Agriculture in imparting skills to small, medium and large scale processors.

Consortium PI

National Coordinator

National Director

Annexure I

Environmental Safeguard: Activities, issues, impact and mitigation Measures

Activity	Issue	Anticipated level of impacts		Mitigation
		Positive	Negative	
Production technology	Yield increase	4		
	Use & availability of water resources	4		
	IPM& IDM	3		
	IPNS	4		
	Rejuvenation with improved cultivars (Agro biodiversity)	4		
Standardization of maturity indices	Reduction in post harvest losses and better quality	4		
Extending shelf life of fruits	Development of ecofriendly efficient technology for handling and storage	3		
Development in harvesting tool and platform	Save labour and increase efficiency, reduce post harvest losses and increase quality	4		
Technologies for browning free pulp extraction and storage	Value addition	5		
Development of novel processed product	Value addition and increased consumption of processed products	4		
Packaging and marketing	Packaging material disposal		2	As far as possible usage biodegradable packaging material will be ensured.
Sensitizing line departments of governments for enhancing underutilized fruits consumption	Nutritional security is in place	5		

Annexure II

Social Safeguard: Activities, issues, impact and mitigation measures

Activity	Issues	Anticipated level of impacts		Mitigation
		Positive	Negative	
Rejuvenation and production technology	Biodiversity	3		
	Change in occupational patterns	2		
	Hike in income	4		
Development of harvesting tools, platforms and processing machineries	Unemployment of labourers		2	Additional manpower generated in processing industry
Extending shelf life and storage	Supply chain management is in place for commercialization	4		
Formation of producers/ marketing group	Greater access to larger market with bargaining for better input and price. Women participation in value chain.	3		
Entrepreneurship development of stakeholders for better cultivation, product development, mechanization	Health brand promotion in place, generation of off farm employment	4		