



A Value Chain on Mango and Guava for Domestic and Export Market

Environmental and Social Safeguards Management under the Sub-project

A. Basic Information

1. Project statistics:

- Component code : II
Consortium Leader : Dr B.M.C. Reddy, Director, CISH, Lucknow
Name of Consortium P.I. : Dr Sushil Kumr Shukla
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- Consortium Partners : 1. Tamil Nadu Agricultural University, Coimbatore
2. Andhra Pradesh Horticulture University, Tedepalligudem-534101, West Godavari Distt, A.P.
3. Navsari Agricultural University, Gujarat
4. BAIF Development Research Foundation, Pune
2. Date of Start : 1st April 2009
3. Planned duration : 3 years 3 months
4. Project cost : Rs. 443.7565 lakhs
- ##### **5. Project objectives:**
- i) Enhancing productivity and quality of mango and guava through good agricultural practices.
 - ii) Reducing post-harvest losses, enhancing shelf life through scientific pre and post harvest management practices.
 - iii) Strengthening of processing of mango and guava through entrepreneurship development and tying up with processors.
 - iv) Facilitating the producers in getting domestic and international market access for their produce by creating market linkages.



6. Brief project description:

The proposed project “A Value chain on mango and guava for domestic and export market” will be undertaken by Central Institute for Subtropical Horticulture, Lucknow, an ICAR institute as lead centre, three State Agricultural/Horticultural Universities, viz. TNAU, Coimbatore, APHU, Tedepalligudem (A.P.) and NAU, Navsari and a private company, BAIF, Pune in private sector as Consortium Partners. All these partners have been chosen carefully for manageability to deal with different varieties of two targeted fruits crops, i.e. mango and guava. Dashehari, Langra and Chausa are the major varieties in North India, while Kesar is leading mango variety in western parts (Gujarat and adjoining area) and Neelum, Totapuri (Bangalora), Alphonso, Banganpalli (Baneshan) are the target mango varieties in Andhra Pradesh and Tamil Nadu. The State Agricultural Universities have already developed the state of the art production and post harvest management technologies for the fruit varieties prevalent in respective areas. BAIF is a leading private company in the field of processing and marketing of fruit products. Besides these Consortium Partners, several other associate partners as given below will also be involved to strengthen the value chains of mango and guava from production to consumption :

CISH, Lucknow	All India Mango Growers Association (AIMGA), State Department of Horticulture (National Horticulture Mission/State Horticulture Mission)
TNAU, Coimbatore	Tamil Nadu Mango Growers’ Federation, Dharmपुरi; Mango Guava Processors’ Federation
APHU, Tedepalligudem	APEDA; Federation of Farmers Association of AP, State Department of Horticulture (National Horticulture Mission/State Horticulture Mission)
NAU, Navsari	M/s. Desai Fresh Fruits and Vegetables Pvt. Ltd., Navsari; Amalsad Seva Sahakari Mandali, Amalsad, Navsari; Petson Food Pvt. Ltd. N.H. No – 8, Navsari

Broadly, the project consists of four components with different objectives and activities under them.

The first objective aims at enhancing production of quality fruits of mango and guava using latest production and crop protection technologies for continuous supply chain management for commercial production of fruits. Existing mango and guava orchards are in bad shape with dense and intermingling canopies, poor nutrient and water management, irregular bearing in mango orchards, ineffective disease and pest management. Efforts will be made to manage the selected orchards using latest technologies developed by the Institutions. After selection of target farmers and baseline survey the interventions Canopy management (such as centre opening, light pruning in existing orchards of mango and guava), irrigation management during critical periods, integrated nutrient management based on soil and leaf tissue tests, use of chemicals for regular bearing, eco-friendly disease and pest management will be tried in farmers fields. Besides this, fruits will also be analysed for any chemical residues to ensure the quality of



fruits. Training will also be imparted to the targeted farmers and awareness will be created through field days / kisan gosthies.

Second objective aims at reducing post-harvest losses and enhancing shelf life of mango and guava fruits through scientific preharvest and post harvest management practices. In India, a major portion of mango and guava fruits either goes waste or does not fetch good price due to unscientific post harvest handling and management methods being followed by mango and guava growers. Efforts will be made to minimize post harvest losses through use of scientific pre and post harvest management practices. The proposed interventions under the objective include harvesting at proper maturity using specifically designed tools, ripening of mango fruits with recommended doses of ethrel, pre-cooling for removal of field heat, sorting, grading and packaging of fruits in CFB Boxes/plastic crates and safe transport of produce for marketing. The fruits will be subjected to improved primary processing and enhancing shelf-life through proper packaging in CFB (Corrugated Fibre Board) boxes for distant markets and in plastic crates for value-addition to the fruits for sale in domestic and international markets.

Third objective involves strengthening of processing of mango and guava through entrepreneurship development and tying up with processors. Rural youths and other entrepreneurs from processing sector will be imparted practical training on the principle of learning by doing for processing mango and guava into various value added products such as mango panna, mango pulp, mango leather, *amchoor*, dehydrated mango powder, guava cider, guava pulp, dehydrated ripe guava powder, etc. Besides, development of by-products from mango peel, mango stones will also be promoted through entrepreneurship development. Efforts will also be made for tying up of target mango and guava growers with BAIF/other processing industries for processing of produce into different value added products and their sale.

Fourth objective entails facilitating the mango and guava producers in getting domestic and international market access for their produce by creating market linkages. Efforts will be made to strengthen the market linkages to ensure better price to the target farmers for their produce. Efforts will also be made to ensure tying up of producers with purchasers and thereby enhancing producer's share in consumer's price. For the purpose, buyers-growers meet/interaction will be organized. Fruit producers will be facilitated to have tie up with the market agencies in the country and exporters. They will be helped



with the market information to find out the potential domestic and international markets for their produce.

7. Environmental category issues in the subproject

- Environmental
- Social

8. Safeguard policies triggered (World Bank policies)

Safeguard Policies Triggered (World Bank Policies)		
	Yes	No
Environmental Assessment (OP/BP 4.01)	[X]	[]
Natural Habitats (OP/BP 4.04)	[]	[]
Pest Management (OP 4.09)	[X]	[]
Cultural Property (draft OP 4.11-OPN 11.03 -)	[]	[]
Involuntary Resettlement (OP/BP 4.12)	[]	[]
Indigenous Peoples (OD 4.20)	[]	[]
Forests (OP/BP 4.36)	[]	[]
Safety of Dams (OP/BP 4.37)	[]	[]
Projects in Disputed Areas (OP/BP 7.60)	[]	[]
Projects on International Waterways (OP/BP 7.50)	[]	[]

B) Risk analysis and related issues

- Adoption of improved package of production technologies for mango and guava by the farmers may be slow.
- Farmers often use excessive quantities of banned chemicals for control of diseases and pests in mango.
- Safe transport of produce and marketing of fresh fruits may be difficult for the target farmers, unless the cold chain is maintained from the production site to the consumer.
- Conflict of interests between actual owner of the fruit orchards and fruit contractors may pose problems in effective implementation of the programme.
- Popularisation of CFB boxes among the farmers to replace the traditional wooden boxes may be difficult due to cost factor.
- Consumer's response may not be overwhelming, without very active promotional exercise.
- Problems of electricity failures, lack of timely water supply in canals and strong wind storms during summer often cause major loss to the mango growers.
- Fruit growers very often expect subsidies / incentives in the form of inputs like suitable varieties, quality planting materials, other agricultural inputs, storage and marketing, infrastructure, etc through the project.

9. Impact assessment

Given below, and adequately addressed

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



- The health status of the targeted population will be improved through consumption keeping many deficiencies (nutrient) and diseases at bay.
- Fruit intake will help due to their therepeutical value in both urban and rural areas.
- While potential direct impact would be household livelihood security and nutritional security of people is assured through replication of more such models on mango and guava.
- The other benefits will be sustainability of fruit production in respective fruit belts, offering employment generation, higher fruit yield and higher income to the fruit growers.
- Awareness of farmers for achieving better returns with improved post harvest handling and marketing approaches.
- Rural/urban entrepreneurship in processing sector will help in employment and income generation in both rural and urban areas leading to improved living standards of people.

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

Public institutions:

1. CISH, Lucknow
2. Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu
3. Andhra Pradesh Horticulture University, Tedepalligudem-534101, West Godavari Distt, A.P.
4. Navsari Agricultural University, Gujarat

Private participation:

5. BAIF Development Research Foundation, Pune

Preliminary discussions were held with all the above mentioned stakeholders before finalizing the project. They were made aware of the objectives of the NAIP project, activities, their role, expected outputs and impact. The final modalities will be worked out after the project approval.

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

S.No.	Date & Location	Programmes	Participants
1	2 6 to 30 th May, 2008 CISH, Lucknow	Concept Note formulation	All workers of CISH, Lucknow
2	25 August, 2008 CISH, Lucknow	Core Programme formulation	Workers of CISH, Lucknow
3	10-12 September, 2008 NAARM, Hyderabad	Interactive Training workshop on winning proposal	Participants of CISH, TNAU, APHU and MSAMB
4	25-26 September, 2008 CISH, Lucknow	Formulation of full proposal	Workers of CISH, TNAU, APHU
5.	19-20 November 2008, PIU-NAIP, KAB-II, Pusa, New Delhi	Presentation of full proposal in the Expert Group Meeting	Workers of CISH, Lucknow
6.	29-30 December 2008, PIU-	Presentation of full proposal in	Workers of CISH, Lucknow



	NAIP, KAB-II, Pusa, New Delhi	the RPC Meeting	
7.	22-23 January 2009, PIU-NAIP, KAB-II, Pusa, New Delhi	Presentation of full proposal in the RPC Meeting	Workers of CISH, Lucknow
8.	5th February 2009, PIU-NAIP, KAB-II, Pusa, New Delhi	Discussion of CISH scientists with National Director and National Coordinator (Component-II), NAIP regarding modification	ND, NC and Workers of CISH, Lucknow
9.	11 February 2009, PIU-NAIP, KAB-II, Pusa, New Delhi	Presentation of full proposal in the RPC Meeting	Workers of CISH, Lucknow
10.	19 February, 2009, CISH, Lucknow	Discussion with Consortium Partners and finalization of work programme of each partner in view of RPC comments	All the Project Workers from CISH, TNAU, APHU, NAU and BAIF

13. Measures to Address the Issues:

A document on Safeguard Matrix will be prepared. Farmers' Education and Training on the use of Integrated Pest Management will be conducted for the participating Farmers in the sub-project. Awareness of risk related factors will be created among the stakeholders through orientation sessions on various topics and suitable measures available will be tried to mitigate the ill effects of different issues concerned with the implementation of the programme. The major issues and suggested measures are given below :

Adoption of improved package of production technologies for mango and guava in a holistic way may be a problem if funds are inadequate.	Farmers will be educated about implementation of improved package of practices in a holistic way, using various latest technologies even with the support of crucial critical inputs.
Farmers often use excessive quantities of banned chemicals for control of diseases and pests in mango.	The farmers will be trained to follow the calendar for integrated disease and insect pest management using safe/eco-friendly chemicals in recommended doses at critical stages for both mango and guava. No banned pesticides will be advocated.
Safe transport of produce and marketing of fresh fruits may be difficult for the target farmers, unless the cold chain is maintained from the production site to the consumer.	Farmers will be made aware of the advantages of safe transport of produce either in plastic crates for local market or in CFB boxes for distant markets for reduction in post harvest losses and higher



	income.
Conflict of interests between actual owner of the fruit orchards and fruit contractors may pose problems in effective implementation of the programme.	Efforts will be made to educate both orchard owner and the fruit contractor to perform various orchard activities properly.
Replacement of traditional wooden boxes with the CFB boxes by the farmers may be a problem due to cost factor.	Farmers will be educated about the advantages of the CFB boxes which are far better than wooden boxes for proper aeration and safe transport of produce besides being biodegradable.
Consumer's response may not be overwhelming, without very active promotional exercise.	The farmers will be motivated through promotional exercises like Launch Workshop, Kisan Gosthi, Kisan Mela and Field Days, etc
Problems of electricity failures, lack of timely water supply in canals and strong wind storms during summer often cause major loss to the mango growers.	The help from the state departments will also be sought for regular electric and water supply in the project area. Farmer will be made aware to use wind breaks, and harvest at proper stage to avoid loss through wind storms.
Fruit growers very often expect subsidies / incentives in the form of inputs like suitable varieties, quality planting materials, other agricultural inputs, storage and marketing, infrastructure, etc through the project.	Efforts will be made through training/awareness camps to change the mindset of the farmers for adopting the improved production, protection and post harvest technologies only with the supply of most critical inputs.

13. Consultation/ disclosures to be done in future:

Local disclosure will be done through launch workshop, interface meetins during the implementation stage of the subproject for sharing the results and soliciting feed-back. Project brochures and implementation progress reports will be shared from time to time.

The consultation/ disclosures will be done as per NAIP guidelines depending on the progress of the project. Participating farmers will be trained through demonstration programmes and workshops on various themes relevant to farming including use of IPM, post-harvest handling, packaging, labelling, nutritional benefits awareness of value added products, recipe making, marketing aspects, *etc.*

The project findings (brochures/ CDs/ videos/ literatures) will be distributed from time to time and necessary feedback collected for further refinement and better implementation. Assistance of different related organizations will be taken.



1. Dissemination of holistic orchard management and extension services to participating farmers specifically IPM through training & education programmes.
2. Demonstration of new value added product preparations to stakeholders and entrepreneurs during training.
3. Transfer of technology of value-added products to stakeholders.
4. Dissemination of information and sensitization of line departments of state and central governments to policy makers, planners and project partners for enhancement of mango and guava production.
5. Popularisation through information dissemination on safety of developed products to the consumers.
6. Information dissemination through mass and print media on health and nutritional benefits to stakeholders and targeted groups.
7. Linkages with financial institutions will be enabled so that as and when requested 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.
8. NGOs will also play a major role along with the *Panchayat Raj* institutions in imparting skills to small-scale processors, family run small business units.

(S. K. Shukla)
Consortium PI

(B. M. C. Reddy)
Head of the Lead Centre & Chairman, CIC

National Coordinator

National Director



Annexure I: Environmental safeguard: Activities, issues, impact and mitigation measures

Activities ¹	Issues	Anticipated level of Impacts ³		Mitigation measures (Negative Impact) ⁴
		Positive	Negative	
Enhancing productivity and quality of mango and guava through good agricultural practices				
Centre opening and light pruning in existing orchards of mango and guava	Enhanced yield due better light penetration	4		
Water application during critical periods	Yield increase and better quality fruits	4		
Integrated nutrient management based on soil and leaf nutrient analysis	Yield increase and better quality fruits	4		
Use of chemicals for regular bearing in mango	Regular bearing and higher yield in mango	3	2	Only recommended doses of chemical will be used to avoid any harmful residue in soil/fruit
Management of insect –pests and diseases using environment friendly molecules and bio-agents	Effective management of diseases and insect pests	3	2	Only safe/ecofriendly chemicals will be used in recommended doses for the purpose to avoid any environment hazard
Pesticide residue analysis in fresh mango and guava fruits.	Better quality fruits devoid of any chemical residues beyond permissible limits	4		
Reducing post-harvest losses, enhancing shelf life through scientific pre and post harvest management practices				
Harvesting at proper maturity and use of harvesting tools	Safe harvesting of fruits and avoiding physical damage	4		
Ripening of mango fruits with recommended doses of ethrel	Proper color development of fruits for better appeal and market prospects	3	2	Recommended doses of chemical will be used to avoid any health hazard
Pre-cooling, sorting and grading of fruits	Better quality and market prospects	4		
Packaging of fruits in CFB Boxes /plastic crates and safe transport of produce	Use of safe material for safe transport and longer shelf life of fruits	4		



Annexure II: Social safeguard: Activities, issues, impact and mitigation measures

Activities	Issues	Anticipated level of Impacts		Mitigation measures (Negative Impact)
		Positive	Negative	
Selection of target farmers and baseline survey	Availability of accurate baseline information	3	2	Farmers especially from socially backward classes will be given due representation among beneficiaries of the project.
Field days and training of farmers/stakeholders for timely and correct orchard management practices	Better technological skill of target farmers	4		
Training of farmers/stakeholders in on-farm handling, pre and post harvest management practices	Better technological skill of target farmers	4		
Entrepreneurship development for processing into value added products	Employment generation and better income to entrepreneurs	4		
Tying up of target mango and guava growers with processing industries for processing of produce into mango pulp, guava pulp and guava cider.	Enhanced processing share of fruit produce	4		
Strengthening of market linkages by organizing buyers-growers meet/interaction.	Better price to the fruit growers and improved living standards	4		
Tying up of producers with the market agencies in the country and exporters	Better price of the farmers produce	4		