

A Value Chain on Selected Aromatic Plants of North East India

Environmental and Social Safeguards Management

A. Basic Information

1. Project statistics:

Component code : 2
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Consortium Partners

- 1 National Research Centre on Orchids, Pakyong, Sikkim.
- 2 ICAR Research Complex for NEH Region – Sikkim Centre, Tadong, Gangtok, Sikkim.
- 3 Micro, Small and Medium Enterprises – Technology Development Centre (FFDC), Kannauj, U.P.

2. **Date of Start** : March 2009
3. **Planned duration** : 3 years 4 months
4. **Project cost** : Rs. 398.54 lakhs

5. Project objectives:

- 1 Facilitation of methods of propagation and mass multiplication of quality planting materials of targeted aromatic plants (input supply).

- 2 Refinement of cultivation practices of targeted aromatic crops under Sikkim conditions (production).
- 3 Exploration and fine-tuning of plant/location (altitude) specific post harvest management, value-addition and residue utilization technologies of targeted plants to extend shelf life, retain quality and develop novel products etc. (post harvest management, processing and value addition).
- 4 Conduct market research and create data base for market intelligence and GI status to enable higher economic returns to concerned stake holders across the supply chain (marketing).
- 5 Capacity building of primary and secondary stake holders through knowledge sharing, dissemination and demonstration, training and entrepreneurship development/promotion. (Collective action and use of ICTs.)

6. Brief project description:

This is a multi-disciplinary consortium project with an aim to develop an effective value chain on selected aromatic plants produced in NEH region through innovations in production, processing, value addition, technology transfer, efficient institutional mechanism and support system. The proposed project entitled 'Value chain for selected aromatic plants of NEH Region' will be undertaken by College of Agricultural Engineering and Post Harvest Technology (CAEPHT) – Central Agricultural University, Gangtok (lead centre) and three other partners viz., NRC-Orchids, ICAR Research Complex for NEH Region-Sikkim Centre, (all Gangtok based government institutions) and MSME-TDC (FFDC), Kannauj (U.P) (also a government institution associated with industrial activities). Marketing linkage to the project will be provided by SIMFED, Department of Horticulture and Cash Crops, Government of Sikkim and some identified private partners including Flavour and Fragrance Industries.

All these consortium partners and associate partners are carefully chosen for manageability, necessary techno-managerial interventions and to deal on targeted aromatic plants of Sikkim/ NEH states viz., Orchid, Citronella grass, Geranium, Patchouli, Lemmon grass. NRC- Orchids, and ICAR Res. Complex attribute their competence by virtue of their leadership in their respective crops namely orchids, and other aromatic plants produced/being encouraged to be produced in Sikkim. FFDC, Kannauj is strong in front-end integration on product development and marketing (through its industrial linkages) of value added flavour and fragrance products. Central Agricultural University – College of Agricultural Engineering and Post Harvest Technology has a strong faculty of academicians (teachers) belonging to different disciplines of Agricultural Engineering (Soil and Water management, Farm Machinery and Power and Process and Food Engineering/Post-Harvest Technology). Other associate members viz., MSME-DI, nurseries (namely The Wayside Gardens and Nurseries Pvt. Ltd., East Sikkim, By-Yul Nursery, East Sikkim, Sikkim Flora Limited, Majhitar, East Sikkim and Hidden Forest Nursery, Sichey, Sikkim), Farmers Grower Association and M/s Munnal Lal Aromatic Private Ltd., a private industry on flavour and fragrance located at Kannauj will be involved for different roles viz., production of quality planting materials and large scale cultivation, processing, post-harvest operation, marketing, capacity building activities etc.

Broadly, the project consists of five components with different objectives and carefully planned activities under them. These activities are based on techno-managerial interventions for present weak links in supply chain and are related to input supply, production, post-harvest management and value addition, marketing and capacity building/entrepreneurship development.

The first objective aims to undertake massive production (with technical back stopping) of quality planting materials under Sikkim conditions and facilitating relevant technologies to nurseries/growers organizations/SHGs. Already lab. tested methods of propagation and mass multiplication of planting materials of selected species of orchid and aromatic plants will be utilized for this purpose. Initially planting materials will be produced by NRCO, and ICAR Res. Complex but the technology will be simultaneously transferred to selected SHGs and nurseries for sustainability of this intervention in future.

The second objective aims at refinement of technologies for large scale production of targeted crops. The interventions here are application of soil water management practices, protected cultivation, precision farming tools, INM and IPM technologies. Based on inputs from bench mark studies and review of literature, potential technologies will be identified and evaluated. The identified tools/equipment will be suitably modified to suit to local conditions.

The third objective focuses on fine tuning of post-harvest/processing/value-addition technologies of different targeted plants. The processed products will be properly treated (pre-cooled/treatment with chemicals etc), packed, semi-processed (dried/dehydrated), distilled for essential oils and their derivatives. The by-products viz., de-oiled meal will be used to produce scented sticks (Agarbati), Dhoop, Havan Samagri etc. Such products will be properly packed and marketed. It is aimed to identify suitable packaging materials and methods of packaging to enhance shelf life/keeping qualities and marketability of fresh and processed plants and their processed/value added products. Utilization of residues (biomass) and value addition of by-products is envisaged to increase the profit of enterprises and concerned stake holders.

Fourth objective entails assessment of consumers' response/acceptability, collect market and price related data, conduct profitability analysis and to device pricing and marketing strategies for the produced products. Data bank will be developed to indicate better markets, seasons, market and price trends etc to facilitate stake holders.

The fifth and last objective emphasizes on sensitization of different stake holders, line departments of state and central government, dissemination and demonstration of technologies, organization of entrepreneurship development programmes etc. Standard methods of technology dissemination through TV/Radio and print media, publication of extension literature, frontline and pilot plant level demonstrations etc will be used. Various training programmes for farmers, processors, entrepreneurs, unemployed rural youth, women, trainers of line departments etc interested in various activities of the project, and allied activities viz., construction of structures for protected cultivation, manufacturing of farm tools, packers and movers (material handlers) etc will be organized. Different topics to be discussed and demonstrated would include mass multiplication of planting materials/cultivation of targeted plants in protected structures, INM and IPM, processing, packaging, product development, economic assessment, marketing and quality control etc. Such programmes will help in capacity building and empowering stake holders through entrepreneurship development. Business meeting will be organized for promotion of developed products and technologies. Pilot plant for value addition technology of aromatic plants will be installed at College of Agricultural Engineering and Post Harvest Technology.

7. Environmental category issues in the sub-project

• Social:

The major social issues likely to arise are related to how we target the most deserving stake holders in the cluster in terms of project interventions related to input supply, production, processing/value addition, marketing and capacity building etc. The technological interventions will have impact on income and employment generation of small/medium growers and others in society and interventions will have impact on women in terms of increasing their work efficiency or reducing drudgery etc. Other issues are related to overall development of region, export potential, standard of living of stake holders.

• Environmental:

The project will have mostly positive impact on environment as it focuses on soil and water conservation, bio-diversity, bio-fertilizers/bio insecticides/bio-pesticides, use of potential cultivation techniques, utilization of residue/biomass etc. The interventions will also focus on promotion of IPM and INM practices.

8. Safeguard policies triggered (World Bank policies):

Safe guard policies triggered world bank policies	Yes	No
Environmental Assessment (OP/BP 4.01)	[X]	[]
Natural Habitats (OP/BP 4.04)	[]	[X]
Pest Management (OP 4.09)	[]	[X]
Cultural Property (draft OP 4.11- OPN 11-03)	[]	[X]
Involuntary Resettlement (OP/BP 4.12)	[]	[X]
Indigenous Peoples (OD 4.20)	[]	[X]
Forests (OP/BP 4.36)	[]	[X]
Safety of Dams (OP/BP 4.37)	[]	[X]
Projects in Disputed Areas (OP/BP 7.60)	[]	[X]
Projects on International Waterways(OP/BP 7.50)	[]	[X]

B. Risk analysis and related issues

In addition to the issues covered above in the Table, the interventions proposed in the project might trigger following issues also:

- Adoption of improved package of practices in a holistic way may be a problem if funds are inadequate.
- Packaging interventions in unorganized sector may be a complex issue
- Emergence of small scale processing industries in high altitudes may take some time
- There may be some logistic problems as these models will be tried for the first time in Sikkim.
- There may be some problems related to conflict of interests in marketing of targeted crops
- Response from various stake holders may not be overwhelming initially without very active promotional exercises

- Access to some areas in Sikkim during period of heavy rainfall and snowfall may be a hurdle in progress of targeted activities

The project interventions will certainly have impact on the total production of aromatic plants in the clusters and hence efforts will have to establish/develop market linkages and processing industries. Initially buy back mechanism will be required and contract farming encouraged. Efforts will be made to establish linkages with efforts of Government of Sikkim, Ministry of Agriculture (GOI) and Ministry of Food Processing (GOI). As far as contract farming is concerned, initially initiatives taken may face the risk of breach of contract either by farmers or by the purchasers/processing industries in spite of caution exercised while writing MOUs.

9. Impact assessment

Given in proposal (Appendix-I and II), and adequately addressed. The project mostly will have positive impact as it involves the production, productivity, value addition, marketing, consumption and profitability.

10. Potential indirect and/or long-term impacts due to anticipated future activities in the project areas (assessment of anticipated conflict/complimentarily with the current as well as those proposed for the next 3 - 4 years in the areas of activities of the sub-project.

- Export of processed and value added aromatic plant products will help not only Indian populations but across the globe.
- The long-term benefits will be sustainability of aromatic crops cultivation in Sikkim
- Increased cultivation of targeted plants will be at the cost of replacement of some other crops. Obviously less remunerative crops will be replaced.
- Development of animal feed sector with possible utilization of biomass of targeted plants.
- Awareness of farmers for achieving better returns with soil/water management, precision farming tools/equipment, post harvest management and improved marketing approaches.
- Rural entrepreneurship will help in reducing migration to urban areas through enhanced employment and income generation.
- Post harvest losses will be greatly reduced setting example for other crops.

11 . Identify the key stake holders and desirable 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 stake holders before submission to the PIU

Farmers, nurseries, Panchayati Raj Institutions, research, institutions, government and non-government institutions including SHGs are the key stake holders for this project as listed below.

Public institutes

- CAU-CAEPHT, Gangtok
- NRC-O, Gangtok
- ICAR Research Complex, NEH Region, Gangtok
- MSME-TDC/FFDC, Kannauj (U.P)
- Farmers and Consumers
- SHGs/Growers Associations
- Panchayat Raj of Govt. of Sikkim
- Micro, Small and Medium Enterprises Development Institute, Sikkim Unit, Gangtok.
- Horticulture and Cash Crops Development Department, Govt. of Sikkim, Gangtok.
- Sikkim Marketing Federation (SIMFED), Gangtok
- Department of Management Studies, SMIT, Majitar, Dist. East Sikkim

Private participation

- Sikkim Flora Ltd., East Sikkim
- M/s. Munna Lal Aromatic Pvt. Ltd, Patkhana, Kannauj (UP)
- Assam Lingzey Sengava Orchid Growers Association, East Sikkim.
- Wayside Gardens and Nurseries, 6th Mile, Gangtok.

Preliminary discussions were held with few stake holders before planning to organize stake holder's workshop. They were made aware of NAIP Project, objectives and expected outputs and impacts. Unfortunately the stake holders workshop could not be organized before submitting the full proposal. 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

SI No	Date and Location	Programme	Participants	Remarks
1	06.05.2008 at CAEPHT, Ranipool	Discussion for preparation of concept note	All consortium partners	-
2	15.05.2008 at CAEPHT, Ranipool	Discussion for preparation of concept note	All consortium partners	-
3	28.05.2008 at CAEPHT, Ranipool	Discussion for preparation of concept note	All consortium partners	-
4	13.08.2008 at CAEPHT, Ranipool	Discussion and formulation of core programme	All consortium partners	-
5	20.08.2008 at CAEPHT, Ranipool	Discussion and formulation of core programme	All consortium partners	-
6	29.08.2008 at CAEPHT, Ranipool	Discussion and formulation of core programme	All consortium partners	-
7	10-12 Aug 2008 at NAARM Hyderabad	NAIP Workshop	Dr P K Srivastava Dr H Rahman Dr Aditya Sharma	
8	15.09.2008 at CAEPHT, Ranipool	Discussion and formulation of full proposal	All consortium partners	-
9	21.09.08 at ICAR	Discussion and formulation	PI and CoPIs of	

	Tadong, Gangtok	of full proposal	CAEPHT and ICAR	
10	24.09.08 at CAEPHT Ranipool	Discussion and formulation of full proposal	All consortium partners	
11	25.09.2008 at CAEPHT, Ranipool	Discussion and formulation of full proposal	All consortium partners	-
12	26.09.08 at CAEPHT Ranipool	Discussion and formulation of full proposal	All consortium partners	-
13	30.09.08 at CAEPHT Ranipool	Submission of full proposal to NAIP	All consortium partners	-
14	20.11.08 at ICAR, New Delhi	Expert group meeting	Prof. P. K. Srivastava, Dr. S. N. Yadav and Dr. Aditya Sharma	
15	29 th to 30 th Dec 2008, ICAR, New Delhi	RPC meeting	Prof P K Srivastava	
16	06.02.2008 at ICAR, New Delhi	Final presentation in ICAR under the chairmanship of Hon,ble DG, ICAR	All consortium partners	
17	23.03.2009, ICAR New Delhi	Meeting with National Coordinator	Prof P K Srivastava	

13. Measures to Address the Issues:

The construction of poly houses, net houses, low tunnels and cloches is planned in the Project. Bio-degradable material for construction of these houses to avoid environmental hazards will be used. The farmers will be advised and motivated for using such materials only and the consortia partners will monitor that no other materials except bio-degradable are used by the farmers. The by-product available after primary processing/distillation will be used for production of essence sticks, dhoop and hawan samagri for value addition as well as for safe guard of environment. The health hazard is expected while using bio-fertilizer/pesticides/insecticides. To address the issue, farmers will be trained for using the safety gadgets.

13. Consultation/disclosures to be done in future

Local disclosures through mechanisms such as launch workshop, interfaces during the implementation stage of the sub-project for sharing the results and soliciting feed back etc will be done by circulating project brochures and implementation progress from time to time, putting up annual reports on the website and annual stake holder workshops wherever feasible.

The consultation/disclosure will be done as per NAIP/ICAR guidelines depending on the progress of report training, demonstration programmes and workshops on various themes relevant to farming, primary processing, post-harvest product preparations, packing, labeling, retrofitting, recipe making, marketing 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 crop management and extension services to farmers through other partners.
2. Demonstration of developed technologies and new products preparation to stake holders.

3. Transfer of technology of value chain of aromatic plants/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 consumption value added products of aromatic plants
5. Popularization through information dissemination on quality and safety of developed products to the consumers.
6. Information disseminations through mass and print media on health and medicinal benefits to stake holders, targeted groups and other consumers.
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 electronic media will be fully utilized to attain the desired goals and objectives.
8. SHGs/NGOs will play a major role along with the Panchayat Raj Institutions in imparting skills to small scale processors, family run small business units etc.

Consortium PI

National Coordinator

National Director

Appendix-I

Environmental Safeguard: Activities, issues, impact and mitigation

Sl. No.	Activities	Issues	Anticipated level of impacts		Mitigation measures (for negative impacts)
			Positive	Negative	
1	Crop diversification		3		
2.	Propagation and mass multiplication of quality planting materials of targeted plants	Enhanced productivity and quality	4		
3.	Assessment of bio-fertilizers/pesticides/insecticides etc and other INM and IPM techniques for organic and disease free production of targeted plants	No use of chemicals	5		
4.	Development/adoption of specially designed poly houses, net houses, low tunnels and cloches for protected cultivation of targeted plants	Use of plastic sheets	-	3	Disposal of plastic has to be planned for recycling
		Improved environmental control	3	-	
5.	Applications of bio-engineering and plasticulture techniques for soil and water management	Reduction in requirement of soil nutrients and water use.	4	-	
6	Cultivation in protected structures	Enhanced productivity	4	-	
		Reduction in water and fertilizer use	4		
		Better control of insects/pests	3		
		Lesser use of pesticides	4		
7.	Adoption of precision farming and improved harvesting tools	Reduction in drudgery and operation time	3		
		Higher productivity	4		
		Damage free, time and labour saving tool of harvesting	4		
8.	Fine-tuning of post harvest management/primary processing operations and	Reduction in post harvest losses	4		
		Enhanced shelf life	4		

Sl. No.	Activities	Issues	Anticipated level of impacts		Mitigation measures (for negative impacts)
			Positive	Negative	
	distillation/essential oil extraction techniques	and other qualities			
		Biomass (waste or residue/by-products) generation	-	1	Use in animal feed, bio-fertilizer and value added products like scented stick, doop/hawan samagri is be planned
		Disposal of plastic packaging materials	-	3	Bio degradable material is planned to be used

Appendix-II

Social Safeguard: Activities, impact and mitigation

Sl. No.	Activities	Issues	Anticipated level of impacts		Mitigation measures (for negative impacts)
			Positive	Negative	
1.	Bench mark study of existing art of technology/value chain	Base line data	2		
2.	Propagation and mass multiplication of quality planting materials of targeted crops	Enhanced productivity and availability	4		
		Reduction in production inputs	4		
		Employment generation	4		
		Gender issues	3		
		Better quality of planting materials	4		
3.	Development and adoption of specially designed poly-houses, tunnels, net houses, shade nets, cloches etc.	Enhanced productivity	4		
		Reduction in production inputs	4		
		Improved quality	4		
		Off-season availability	3		
		Employment generation	4		
		Gender issues	3		
4.	Application of improved soil and water management technologies	Reduction in loss of soil nutrients and water and higher input efficiency	4		
		Higher productivity of targeted plants	4		
		Reduction in drudgery	3		
5.	Use of ergonomically designed farm tools, precision farming equipment, micro irrigation devices and harvesters	Higher productivity	3		
		Damage free harvesting	3		
		Time and labour saving	4		
		Better input efficiency	4		
6	Use of bio-fertilizers/ pesticides/insecticides etc	Better IPM/INM	4		
		Reduction in pre-production losses	3		
7.	Evaluation and fine tuning of pre-packaging	Reduction in post-harvest losses	4		

Sl. No.	Activities	Issues	Anticipated level of impacts		Mitigation measures (for negative impacts)
			Positive	Negative	
	treatments	Enhancement of shelf life and quality	4		
8.	Adoption of primary processing / semi-processing operations	Value-addition	4		
		Income and employment generation	4		
9.	Adoption of modern methods and materials of packaging	Reduction in post harvest losses	4		
		Enhanced self life and retention of quality characteristics	4		
		Enhanced convenience and income	4		
10	Value addition, by-product/residues utilization and product diversification	Better income	4		
11	Sensitization of all stake holders	Increased awareness	3		
12	Dissemination of developed technology	Enhanced socio-economic status of stake holders	4		
13	Development of documentaries and extension literatures, training manuals etc.	Increased awareness and motivation	4		
14	Organization of EDPs	Economic upliftment	4		
		Employment generation	4		
15	Organization of business meets/trade fairs etc	Enhanced awareness	4		
		Commercialization of developed technologies	3		