

A Value Chain on Castor and Its Industrial Products

Environmental and Social Safeguards Management

A. Basic information

1. Project Statistics

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Consortium partners	: 1. Jayant Agro-Organic Ltd., Mumbai 2. Royal Castor Products Ltd., Siddhpur 3. IICT, Hyderabad

2. Date of start : April 1, 2009

3. Planned Duration : 3 years and 3 months

4. Project cost : Rs. 383.2995 lakh

5. Project Objectives:

- **Production:** To increase farmer's income and castor productivity through popularization of latest high yielding castor hybrid and its agronomic practices and innovative farming.
- **Processing:** To develop post harvest handling and processing technology to improve quality of produce and reduces losses.
- **By-product value addition:** To develop products from castor cake (by products of castor oil extraction) for higher benefit of castor oil extraction units and farmers
- **Specific to value chain:** To develop higher generation castor oil based derivatives for promotion of export and benefit of all stakeholders.

6. Brief Project Description:

The project entitled “ A Value Chain on Castor and Its Industrial Products” under NAIP component II will be under taken by Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar (Consortia lead Centre), Jayant Agro Organics Ltd.; Mumbai (Private sector), Royal Castor Products, Siddhpur (Private sector) and Indian Institute of Chemical Technology, Hyderabad (CSIR, Institute).

SDAU, Sardarkrushinagar the lead centre is most prestigious research station engaged in castor research and development. Developed six castor hybrid, two castor varieties, production/protection technology for castor production.

All the partners of consortia chosen carefully on their expertise and related fields of castor production, extraction of oil, research and development in the field of castor oil based products. JAOL is the largest company in country with respect to R & D for castor based derives ties. Company has a strong team of chemical engineers, oil technologists and technical persons. More than 40 products based on castor oil have been developed and some of them patented by JAOL. The group’s subsidiary unit, **Ishedu** has 1000 t/day castor seed crushing capacity. Recently, the JAOL group entered in backward integration for propagation of castor cultivation and purchasing castor seed directly from farmers. JOAL is actively involved in value chain on castor from castor production, oil extraction from castor seed and development of castor oil based high value production. Its oil extraction plant is situated near to SDAU head quarter and castor production area. The responsibilities of JAOL will to provide information as well as assistant in study of In Plant study of oil extraction units and cover newer area.

Royal castor Product (RCP), Siddhpur actively engaged in the castor derivatives like HCO (Hydrogenated Castor Oil), 12 HAS (12 Hydro Oxysteric Acid) etc. and exporting first generation derivatives. The company has 12 years experience in castor based derivatives development. Castor oil derivatives are used in development of lubricants. RCP is interested to develop higher generation castor based derivatives and expressed interest to join in NAIP project. Company will take up higher generation ester based derivatives for diversified uses. These secondary ester based products will be used as biolubes. In the era of environmental concern biolubes are highly desirable.

IICT (Indian Institute of Chemical Technology) is a prestige institute engaged in the field of castor derivatives development. Institute patented number of castor based derivatives and technology for erection of plants etc. Institute has most competent scientific human resources.

The objectives of project have been categories broadly under four component. The first objective is related to enhancing castor productivity and raising farmer’s income. The project is proposed to demonstrate higher genetic potential for oil and yield of castor hybrid GCH 7 and increase profitability of farmers by innovative farming. The adoption of new genotype (Castor hybrid GCH 7, a wilt resistant high oil content and higher seed yielding genotype) and recommended production technology will increase productivity of castor and income. Critical mass of castor produce will sell to oil extraction units through SHG.

The second aim is value addition of castor produce at farm level by on farm primary and secondary processing. The processing would help in higher price offer for quality produce. In plant study will be used to improve the efficiency of castor oil extraction industry and

higher recovery of oil in extraction process. The activities at farm level are aimed to demonstrate how a given area (village) can be used as a glue to bring expert and officials of diverse backgrounds, departments and agency to work together in a live working environment for the common good of castor growers.

Third objective is related to addition of value to by products obtained from castor seed crushing/oil extraction. The castor cake obtained in oil extraction process is mostly used as manure and unfit for the animal feed because of presence of anti nutritional factors. In present project it is proposed to develop products from byproducts (castor cake) to add value and reduce cost in castor oil extraction and derivatives developments. The detoxification technology of castor cake will be verified/ refined if required. The increased in value will be distributed to farmers, oil extraction units and industries.

The forth objective is specific to value chain for higher generation castor derivatives development. In specific higher generation derivatives development second or higher generation products will be used as base material like secondary esters, 2 octonol and , undecinoic acid. The high value castor oil based derivatives development will favour export promotion as well as enhancing the domestic consumption of castor oil. Such plant based products are renewable, biodegradable and eco friendly in nature thus beneficial to environment.

7. Environmental category issues in the subproject:

- Social
- Environmental

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)		
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/BP4.37)		
Projects in disputed areas (OP/BP 7.60)		
Projects on international waterways (OPBP 7.50)		

B. Risk analysis and related issues

- Adoption of improved package of practices in a holistic way may be a problem if funds are inadequate
- Innovative farming and packaging interventions in the un-organized sector is a complex issue.
- Training programme among un-organized and low educated persons may be a complex problem.
- Creating understanding between different stakeholders viz., farmers, scientist, traders, various government/semi government organizations and industry.
- Emergence of new markets on castor derivatives and products.
- Difficulty in accepting the products developed from castor cake
- Availability of partners to carry out the programme on a large scale for commercialization.
- Logistics problems as these models are going to be tried out for the first time in country.
- Higher attention is required for finding application use of higher generation derivatives developed

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/ complimentarily with the current as well as those proposed for the next five years in the areas of activities of the sub-project):

- The castor grower's income will be increased due to enhanced productivity and better prices. The livelihood of rural farmers will be better due to higher farm income
- Increased castor oil availability will increase domestic consumption of castor oil and production of more derivatives development.
- The use of castor cake for product development will be more profitable for industries.
- Use of castor cake for product development will reduce its uses as manure and fetch more profit to industry and farmers.
- The increase castor production profitability may expand area by replacement of less competitive crops.
- The indirect benefit by increased area of castor will be more green area in dry areas of North Gujarat.
- The higher derivatives developments and utilization of co-products will promote export of castor oil based derivatives/products.
- The product development from higher generation derivatives and increased domestic consumption may affect global castor world trade.
- Castor oil based derivatives uses for diverse product development will be eco-friendly renewable and biodegradable and thus reduce environmental pollution.

- Awareness of farmers for achieving better returns with improved marketing approaches.
- Rural entrepreneurship will help in reducing migration to urban areas through enhanced employment and income generation.
- Trained human resources i.e. scientists, farmers and entrepreneurs

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 Institute:

1. S.D.Agricultural University, Sardarkrushinagar
2. IICT, Hyderabad

Private Participations:

1. Jayant Agro Organics Ltd., Mumbai
2. Royal Castor Products Ltd., Sidhpur.

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

Sl. No.	Date & Location	Programme	Participants	Remarks
1	04.04.2008	NAIP orientation & sensitization programme	Director of Research and Heads of the department of University	To orient the staff on the objectives & guidelines of NAIP and preliminary discussion for proposal
2	22.04.2008	Meeting with industry persons	Royal Castor Product Sidhpur	Discussion on derivative development
3	23.04.2008	Meeting with industry persons	Royal Castor Product Sidhpur	Discussion on derivative development and project
4	24.04.2008	Meeting with industry person	Directors of JAOL	Meeting to explore scope of submitting proposal in consortium mode
5	02.05.2008	Meeting with related scientists	Breeders, Agronomist, Soil Scientist Biochemist, Ag. Engineer, Animal Nutritionist	Discuss about to share responsibility jointly for castor project

6	12.05.2008	Group meeting	Scientist and officers	Discussion about possible proposal
7	27.05.2008	Discussion on proposed area of project	Director of ISHEDU	Meeting to discuss on proposal formation.
6	30.05.2008	Submission of concept note	-	-
7	18.08.2008	Telephonic discussion	Vice –President, RCP , Director, JAOL , Dr. R, B. N. Prasad ,Head Lipid Science, ICT	Communication regarding acceptance of concept note and suggestions made by approval committee
8	26.08.2008	Joint meeting	All participatory Scientist and Director Research	Area of cooperation and detail discussion on submission of project as per suggestions made by TAG
9	28.08.2008	Meeting with partners	Vice –President, RPC ,Sidhpur , Director, JAOL Jagana	Discussion on giving emphasis on high value derivatives
10	28.08.2008	Email received for selection of derivatives	Director, JAOL	Fine tuning for selection of derivatives and products
11	05-09-2008	Email received for selection of derivatives	Head, Lipid Sciences, ICT, Hyderabad	Fine tuning for selection of derivatives and other areas of cooperation
12	15-09-2008	Group meeting	SDAU, Scientists & officers	Fine tuning of the proposal & proposal selection
13	24-09-2008	Meeting with Directors of JAOL, Mumbai	Directors of JAOL group and Scientist	Derivatives selection, detoxification of castor cake discussion
14	25-27-09-2008	Interactive work shop, at NAARM	Scientists and Experts on subject	Experts assessment and improvement in proposal planning
15	29-09-2008	Meeting with Director, RCP, Mumbai	Scientist from RCP and SDAU	Discussion regarding proposal plan on derivatives

16	03-10-2008	Meeting to brief suggestion made by experts and Directors	Director Research and Scientist of SDAU	Fine tuning of objectives and activity of proposed project
19	05-10-2008	Email contact	Director, JAOL	Suggestion on derivatives and budgetary issue
20	05-10-2008	Meeting with industry's oil technoligst	Vice President, RCP, Sidhpur Director, ISHEDU, Jagana	Discussion on revised objectives and activity
21	21-11-2008	Meeting with industry's oil technoligst	Sh Subhash Udheshi	Discussion on comments and finalization of project
22	27-11-2008	Meeting with consortia partner	DR. Abhay Udheshi	Discussion on comments and finalization of project
23	20-11-2008	Communication to consortia partnerer regarding meeting of expert group held at Delhi on 17-12-2008	DR R B N Prasad Sh Subhash Polara DOR SDAU	Information on expert group meeting and action to be taken
24	17-12-2008	Expert meeting at IARI New Delhi	DR Subhash Udheshi DR S S Solanki	Discussion on project
24	23-12-2008	Information on project	DR R B N Prasad	Change to made
25	24-12-2008	Information about project	DR Subhash Udheshi	Proposed plan of project
26	25-12-2008	Discussion on project with Directors of RCP at Sidhpur	DR S S Solanki Mr Haresh Vyas Mr Subhash Polara	Briefing Directors of RCP about project progress

13. Measures to address the issues:

Document on safeguard matrix has been prepared. Farmer's education and training on adoption of improved production technology will be given for obtaining higher yield and better utilization of natural resources with no hazards to environment.

Awareness of risk related factors will be addressed to the stakeholders through orientation session like adoption of packages in a holistic approach emphasizing on use of recommended fertilizer doses, use of approved pesticides, proper irrigation schedule and harvesting, drying, on farm processing of produce etc.

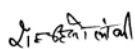
Safer disposal of ricin by burning and burying in ground. Use of safety kit in laboratory works. Packaging material issue will be addressed by utilization of biodegradable material.

14. Consultation/ disclosures to be done in future:

Local disclosures through mechanism such as launch workshop, interfaces during the implementation stage of the sub project for sharing the results and soliciting feedback, one will circulate project brochures and implementation progress from time to time putting up annual reports on the web site and annual stakeholder workshop wherever feasible.

The consultation/disclosures will be done at par NAIP guidelines depending on the progress of the project. Training, demonstration programmes and workshop on various themes relevant to farming, primary processing, by product utilization, preparation of high value derivatives and marketing aspect etc. The project finding (brochures/CDs/Videos literature) will be disclose time to time and necessary feed back will be collected for further improvement and better implementation. Assistant of different related organization will be taken.

1. Dissemination of holistic crop management and extension services to farmers through other partners.
2. Demonstration of new product preparation to stakeholders.
3. Transfer of technology of value added castor production to stakeholders.
4. Dissemination of information and sensitization of line departments of state and central government policy makers, planners and project partners for enhancement of castor production, utilization of castor cake and derivatives developments.
5. Population, through information dissemination on safety of developed products to the costumers.
6. Information dissemination through mass and print media on heath and nutritional benefits to stakeholders, targeted groups.
7. Linkages with financial institutions will be enable so that as 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.



Consortium PI

National Coordinator

National Director

Annexure 1- Environmental safeguard: Activities, issues, impact and mitigation Measures

Activities	Issues	Anticipated level of Impacts		Mitigation measures (Negative issues)/Remarks
		Positive	Negative	
On farm production of specific end use, 1) High yielding castor genotype. 2) Improved package of practices. 3) use of MIS	Seed yield increase	4		
	Positive effect of water saving and higher yield	3		
	Positive effects of changes in cropping pattern on soil , water and environment due to long duration(240 days) and high foliage	4		
	Effect on agro biodiversity- Suitable for crop rotation	4		
Processing of produce at farm level	Quality produce for oil extraction	4		
Integrated farm extension services with buy back	Crop management trainings to participating farmers at farm level and research station	5		
Procurement, storage of produce in targeted region	Availability of space for safe storage as crop require five –six harvesting and threshing		2	Modern packing material use of solar dryer for fast drying and ideal castor decorticator. Storage at public building/ ware houses.
Estimation of ricin in castor genotypes	Disposal of ricin (toxic protein)estimated		5	Use of safety kit during estimation in laboratory Safe disposal of ricin like burning
By product value addition	Uses in product/ animal feed etc	5		
	Verification/ refinement of detoxification technique of castor cake		2	Use of standard ricin estimation method to detect minute amount of ricin

Higher generation derivatives	Derivatives based on octonol Reduce cost of Sebacic acid production & alternate for petroleum product	4		
	Ester derivatives For biolubes	4		
	Enrichment of ricinoleic acid and derivatives development from undecenoic acid	4		

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

Activities	Issues	Anticipated level of Impacts		Mitigation measures (Negative issues)/Remarks
		Positive	Negative	
Base line survey	Availability of information on initial status of area		2	Participatory approaches for data collection will be carried out
On farm production of specific end use, 1) High yielding castor genotype. 2) Improved package of practices. 3) use of MIS	Change in occupational pattern	2		
	Unequal access to inputs		2	
	Selection of farmers		3	Involvement of village panchayat, cooperatives and other agency
	Increase in income of farmers	4		
Integrated farm extension services	Effective crop management practices	4		
Buyback assurance	Market assurance	4		
Procurement of seed from farmer	Mixing of inferior quality seed and foreign material		2	Emphasis on farm level processing and quality maintenance for higher economic returns
Transport and processing of produce			2	
Uses of detoxified castor cake and products developed	Use in animal feed	4		
Products of 2 octonol, undecenoic acid and esters	Higher export of derivatives and more products availability for society	4		
Pricing of the derivatives and	Increased profit for industry and higher remuneration to	4		

products developed	farmers for raw material(seed)			
Sensitizing line department for enhancing castor production	Assured supply of raw material for industry	3		
Entrepreneurship development of stakeholder for intensive cultivation and processing and castor oil based derivatives	Higher income and export promotion	4		