

A Value Chain on Cashew for Domestic and Export Markets

Environment and Social Safeguard Management

A. Basic Information

1. Project Statistics

Component code	2
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Consortium Partners	AICRP on Post Harvest Technology University of Agricultural Sciences, Bangalore - 560 065. Phone : 080 23330153 ext.345 Cell : 09449866931 rengannab@gmail.com National Research Centre for Cashew (ICAR), Puttur-574202, Dakshin Karnataka, Karnataka. Phone : 08251 231530 Fax : 08251 234350 nrccaju@sancharnet.in The Kerala State Cashew Development Corporation (KSCDC) Ltd, Cashew House, P.B. No. 13, Mundakkal, Kollam 1, Kerala

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|---------------------------|-----------------------------------|
| 2. Proposed Date of Start | 1 st June,,2009 |
| 3. Planned duration | 36 months (June 2009 – June 2012) |
| 4. Project Cost | 287.32 lakh |

5. Project Objectives

- Development of standards for storage management of raw cashew nut
- Development of efficient raw cashew nut processing technique
- Development of quality standards for cashew kernels
- Identification/development of value added products of by-products
- Evaluation and promotion of developed technologies, quality certification and entrepreneurship development

6. Brief project description:-

The proposed project A value chain on Cashew for domestic and export markets will be undertaken by the Cashew Export Promotion Council, Kollam(lead centre) and three partners viz.. NRC Cashew, Puthur (ICAR) , UAS, Bangalore(SAU) both are Govt organizations and Kerala State Cashew Development Corporation(KSCDC) (Corporation under Govt. of Kerala).The co partners were selected on the basis of their expertise and manageability to full fill the major targeted objectives proposed in the project on farmer processor interaction, adoption/development of high performance processing system for raw cashew nut processing, value addition of byproducts of the cashew industry and packaging and marketing and come out with working model .Post harvest division of NRCC, Puthur and AICRP on Post HarvestTechnology division of University of Agricultural Sciences are leading institutions in developing and modifying the processing equipments and gadgets for various food and related industry in our country. More or less these two intuitions have made sufficient contributions in cashew nut processing industry. The KSCDC has pioneered in value added products from cashew and has very good marketing network through out the country and abroad. Their expertise in packaging and marketing will be utilized in this project. They have 33 cashew processing and packaging units distributed through out kerala and the facility can be utilized for the experimentation and trails of the gadgets and machinery developed in the project. Mangalore Cashew Processors association and Maharashtra cashew processors association were included as associate partners with view to develop a marketing network for the cashew kernels, value added by products. Cashew Farmers and cashew farmers associations from Kerala, Karnataka, Maharashtra and Goa will be involved as associate partners/stake holders in the project.

The consists of five major objectives to address existing problems in the cashew industry

The first objective "To develop standards for raw cashew nuts and to have good storage management for raw cashew nut" which envisages addressing the farmer processor interaction on storage aspects. As there is no visible interaction exist between these groups on the farm production aspect. However though the pre harvest farm production is very much essential so as to full fill the gap by import of raw cashew nut, this project proposal do not cover the pre harvest aspect. Both the farmer and the processor need to store the raw cashew nut for long period prior to processing. As there is no standardized storage technique available ,the quality of the cashew kernel becomes inferior and creates marketing problem Standard storage system and grading has to be worked out so that both farmer and processor is benefited. This researchable aspect will be handled by NRC for Cashew, Puthur and CEPC, Kollam. The standardized storage system for farmer and the processor will lead to quality kernel production.

The second objective is to develop high performance cashew processing system which envisages to address problems associated with the processing of raw cashew nut. One of the main sub objective is developing efficient technology for handling Cashew nut shell liquid prior to and post thermal processing of cashew nut. As the cashew nut shell liquid is highly polymerizable chemical in high temperature, a technology to extract prior to thermal processing of cashew nut will be much valuable for the industry. The anacardic acid component of cashew nut shell liquid which gets converted to cardol and cadanol under high temperature processing, fetches very high price compared to other two chemicals. The cardol and cardanol is being used as base for paints , water proof materials and in the manufacture of breaklines for automobile industry. CEPC at kollam will be responsible in addressing above mentioned problem in association with private industry dealing with extraction of CNSL. Another sub objective to deal with the development of mechanized shelling process to recover maximum whole kernel. This researchable issue will be handled by NRCC, Puthur and CEPC Kollam in association with UAS Bangalore. The third sub objective is to develop a peeling machine for efficient removal of testa from the kernels. The present practice is subject the kernels for thermal treatment and then hand peeling , which invites microbial contamination of the kernels. The development of a peeler will be taken up by UAS Bangalore.

The third objective involves development of quality standards for cashew kernels. This researchable issues under this objective will be handled by CEPC, Kollam, NRCC, Puthur, UAS , Bangalore .The main researchable issue under this objectives are refining the existing quality standards for cashew kernels(addressed by CEPC, Kollam), colour grading system for cashew kernels(CEPC , Kollam and UAS ,Bangalore) Developing a biosensor for the online detection of microbes and insects (CEPC , Kollam) and Developing an online sterilizer before packing (CEPC,

Kollam) in association with UAS Bangalore.

The next major objective is to identify or develop high nutritional value added products from cashew kernels, value addition of rejects from the factory and utilization of by products (KSCDC, Kollam). The objective envisages to take researchable issues like utilization of cashew shell for production of particle board fuel briquette (NRCC, Puthur) . Further, Production of biopolymer degrading enzymes from cashew shell using microbes. Enzymes like pectinase, cellulose and lipase are industrially important which can be synthesized from cashew shell (CEPC, Kollam) . Most important researchable issue is developing bioremediation technique for reducing the pollution by the waste water as well as smoke so as to give a green atmosphere for the working group as cashew shell liquid is as irritant to human being(CEPC, Kollam) .

The fifth objective entails evaluation and promotion of developed technologies, quality certification, developing market linkages and entrepreneur development. This issue will be addressed by all the consortium partners. Activities under this objectives are organizing field demonstration and gathering feed back, adoption of gadgets available publicity, developing entrepreneurship among stakeholders. Total funds required is Rs 636 lakhs

7. Environmental category issues in the subject

* Social

*Environmental

8. Safeguard policies triggered (World Bank policies)

No	Safeguard policies triggered (World Bank policies)	Yes	No
1	Environmental assessment (OP/BP 4.01)	X	
2	Natural Habitats (OP/BP 4.04)		X
3	Pest management (OP/BP 4.09)		X
4	Cultural Property (OP/BP 4.11)		X
5	Involuntary Resettlement (OP/BP 4.12)		X
6	Indigenous People (OP/BP 4.20)		X
7	Forests (OP/BP 4.36)		X
8	Safety of Dams (OP/BP 4.37)		X
9	Projects in disputed areas (OP/BP 7.60)		X
10	Projects on International waterways (OP/BP 7.50)		X

B. RISK ANALYSIS AND RELATED ISSUES

- One of the major reluctance of small farmers in adopting cashew crop is non availability of floor price for their product. There is no organised agency to collect against reasonable price as it is not declared as plantation crop by the government.
- The other agencies like Rubber board, coffee board, they are financing their farmers for all agricultural operation in time. No agency so far for the cashew farmers to protect their interest.
- The above mentioned reasons reflect on the adopting of agro techniques in cashew.
- Never considered the risky and non-co-operative stakeholders
- A compatible and harmonies team of multi institutions of multi discipline have been considered.
- The availability and expertise was the main points for selection of stakeholder.
- Selected suitable Co-PIs & alternate is also being thought off.
- The collaborating institution PIs are regularly informed during the development of the proposal once preparation was initiated.
- The PIU are requested to help in their assessment directly for implementation.
- Timely release of grants and guidance is required to complete the
- programme in time.
- Similarly the public institutions need good co-ordination and support.
- Guidance by PIU in above matters is appreciated.
- The gadgets and machinery getting obsolete during post project
- period is one of the risk factor to be considered

9. IMPACT ASSESSMENT

Given below in item No 10

10. Potential indirect and/ or long term impacts 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 sub project:-

The Activities envisaged in the proposal will be completed by active participation of consortium partners which will result sustenance of the value chain in the post scheme period.

- Involvement of active group working on various aspects like from generation good planting material to quality consumable kernel will lead a new opening in the cashew sector.
- Enhanced production through adopting modern agro techniques will generate more income to the farming community and thereby cashew plantations.
- Incorporation of modern machinery in the process system will lead to the

production of quality cashew kernels of international standard and fetch higher price for the produce. Further value addition will boost the marketability of produce in the domestic market.

- The clean and healthy working atmosphere will enhance the production per unit and greener environment will be created.
- Market assurance for small processors and food enterprise will be enabled through supply chain.
- Financial support by Government and Non-governmental organization will be solicited for sustain of project beyond the time limit.

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:

1	Public Institutes	1. CFTRI, Hyderabad 2. CIPHET, Ludhiana 3. NIANP, Bangalore
2	Associate Partners NGO	Mitranikethan, Vellanad, Trivandrum Karnataka Cashew manufacturers Association, Mangalore. Goa Cashew manufacturers Association, Panaji, Goa.
3	ASSOCIATE MEMBERS	List of farmers Mr.K.S.Vijayan, Kalayil (house), Chandanakampara.p.o, Kannur.dt- 670633, Kerala 04602-215713 Mr.T.M.joshy, Tuluvananickel (house), Chandanakampara.p.o, Kannur.dt- 670633, Kerala 04602-215279 Mr.Baby pulimootil, Pulimootil (shop), Chandanakampara.p.o, Kannur.dt- 670633, Kerala 04602-215167
4	Industry	M/s Aneesh Enterprises, Manufacturers of Cashew cutting Machines, Boilers, Borma and other steel products, Kollam

4	20/5/2008	NRCC, KSCDC , UAS	First draft concept note was communicated from CEPC
5	26/5/2008	NRCC, UAS, KSCDC	Modified second draft was communicated from CEPC
6	29/5/2008	CEPC	Final concept note was submitted to NAIP HQ, New Delhi by online.
7	20/8/2008	CEPC	Received the communication regarding short listing our proposal for preparing full project proposal and resubmit by 30 th August.
8	25/8/2008-27/8/2008	NRCC, UAS, KSCDC ,CEPC	Discussed in detail and incorporating all inputs from all partners and zero draft prepared
9	30/8/2008	CEPC	Forwarded the zero draft after verification by the partners
10	12/9/208	CEPC	Contacted all the members about the out come of the Hyderabad meeting.
11	20-22/9/09	CEPC, UAS, KSCDC and NRCC	Discussed in details and prepared the draft and decided to forward on or before 27 th of September to NAIP HQ.
12	27/9/08	CEPC	The copies of the full proposal was send to NAIP HQ seven copies and a soft copy one soft by email
13	14/10/08	CEPC	Discussed the details of market strategy to developed with KSCDC
14	20/10/08	CEPC	Discussed with consortium members regarding the preparation of modified draft proposal
15	CEPC	CEPC	Discussed with consortium members regarding the suggestion from RPC
16	16/12/08	CEPC	Scientist from NRCC and KSCDC jointly prepared the revised text as per the suggestion made by RPC
17	20/12/08	CEPC	Forwarded the revised proposal to

			Dr KL Chaddha for evaluation
18	12/01/09	CEPC/UAS(B)/KSCDC and NRCC	Discussed and Incorporation of suggestions by Dr KL Chaddha
19	23/1/09	CPI Presented at RPC meeting with COPI from UAS(B)	Presentation at RPC
20	27/01/09	Discussed with consortium partners on the preparation for PMC meeting on 6 th February	Presented the proposal by NC and got Approved.

13. Measures to Address the Issues:

A document on Safeguard Matrix has been prepared. Education and Training on target group viz farmers and processors, the use of IPM and IPNS will be conducted for the participating Farmers in the sub-project.

Awareness of risk related factors will be addressed to the stakeholders through orientation sessions on topics such as adoption of improved package of practices in a holistic way, using latest technologies, educate them to safeguard the conflicting interests of food uses vs industrial purposes in the value chain of cashew for domestic and export markets. Issues such as high performance processing, by product conversion in to value added products, packaging and marketing interventions will be addressed in the organized sector through utilization of data generated through the project 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 web site and annual stakeholder workshops wherever feasible.

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 and processing including use of IPM & IPNS, primary processing, product preparations, packing, labelling, retrofitting, nutritional benefits awareness, marketing aspects *etc.*

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

1. Dissemination of holistic cashew nut processing and popularization services to participating farmers as well as industry specifically IPM & IPNS through training & education programmes.
2. Demonstration of new value added products preparations to stakeholders
3. Transfer of technology of value-added products from kernel and byproducts 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 cashew cultivation in extensive areas as our domestic production is not sufficient to meet the our processing industry.
5. Popularisation through information dissemination on safety of developed products to the consumers.
6. Information dissemination through mass and print media regarding the innovative approach to the cashew processing system so as attract more enterpruners and benefits to stakeholders, targeted groups and consumers.
7. Linkages with financial institutions will be enabled 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.
8. NGOs will play a major role along with the local government bodies/ institutions in imparting skills to small-scale processors and farmers .

Annexure I

Environmental safeguard: Activities, issues, impact and mitigation measures

Activities	Issues	Anticipated level of Impacts ³		Mitigation measures (Negative Impact) ₄
		Positive	Negative	
Developing standards and storage management for raw cashew nut (KSCDC and NRCC) Design and development of grader for raw cashew nuts(NRCC	No Grades for raw cashew nut available and farmers as well as processors are cheated	4	-	Grading system for raw cashew nuts both for domestic and imported ones
		4	-	
Development of cutting hand tool to assess kernel quality of raw cashew nut (UAS(B) and NRCC).	Hand cutting tool for fixing the grades are not in vogue.	4	-	Cutting tool for both farmer and processors to assure the grades of raw cashew nut
Development of Storage management practices of raw cashewnuts to improve shelf life.(CEPC and NRCC) and initiation of formation of association between farmer and processor.	Good storage protocol for storing raw cashew nut storage are not available	4	-	Efficient and good protocol for long shelf life of raw cashew nut
Performance studies on cashewnut processing system to improve kernel percentage recovery at packaging Performance studies of existing processing technology	Low performance cashew processing system is existing	4	-	High performance cashew processing system enhances the turn over and both processor and worker will be benefited
Development of mechanised shelling process for whole kernel recovery Studying performance of existing dryers and incorporating modification for uniform drying of kernels	Manual shelling is present at processing centres which is less in efficiency	4	-	Increases the efficiency and benefit for processor and worker

Studies on raw cashew nut processing without thermal application for effective extraction of Anacardic acid for more financial benefit	Due to thermal heating of raw cashew nut ,the valuable anacardic acid present in the shell is converted in to cardol and cardanol.	3	-	Financial enhance ment to processor and provides green atmosphere to the processing units
Refinement of existing quality standards for cashew kernels Development of bio sensor for online detection of contaminated kernels	There are few gaps in the existing quality standards	4	-	Processor can supply cashew kernel with out any microbial contamination as healthy food
Identification / development of commercially promising value added food products from cashew kernels	There is good scope for increasing the value addition of cashew nut kernels	4	-	Addition few more grades will widen the marketability of cashew kernels
	Utilization of cashew industry by-products like cashew shell,cashew shell liquid, testa are not exploited fully	3	-1	Better utilization of the by products enhances income to processor, resource generation and employment generation.
Packaging standardisation, evaluation and promotion of developed technologies, quality certification and entrepreneurship development	Large scope for improving the scope of packaging standardisation	4	-	Enhaces marketability of products
Evaluation and promotion of developed gadgets / machineries and technologies.	Technology transfer and entrepreneurship development.	4	-	More enterpruner will be created to take up the industry with more profits

Annexure II

Social safeguard: Activities, issues, impact and mitigation measures

Activities	Issues	Anticipated level of Impacts ³		Mitigation measures (Negative Impact)
		Positive	Negative	
Base-line survey	Availability of accurate bench mark information		2	Participatory approaches for data collection will be carried out
Forming farmers cooperatives so as to supply raw cashew nut directly to processor	1.Organizing farmers forum	4	-	
	2.Hike in income	4	-	
Development of raw nut grading system.	Price fixation and effective bargaining capacity for raw cashew nut price by farmer.	4		
Development of storage protocol	Storage of raw cashew nut for 3 to 6 months gets microbial and insect contamination. Farmer gets good price for quality raw cashe wnut	4	-	Introduction of good storage protocol
Providing green atmosphere around processing unit	Environmental Contamination by CNSL	3	1	Developing bioremediation technique for preventing contamination
Reduction of drudgery to working women as 90% of the workers are women folk	Working place particularly floor gets contaminated with CNSL		2	Developing bioremediation technique for preventing contamination
Packaging material to be standardized	Contamination by packaging materials		1	Using biodegradable plastics for packing the products
Implementation of HACCP.	Safety certification is in place	4		

<p>Identification of number of potential value added food products for wide ranging and niche markets through market survey</p> <p>Pricing of the developed food products</p>	<p>Few and potential foods identified and are prioritized for potential markets.</p> <p>Increased profits from cashew nut and value added products</p>	<p>4</p> <p>3</p>		
<p>Sensitizing line departments of governments for enhancing cashew consumption as it is cholesterol free, highly nutritious.</p>	<p>Nutritional security can be achieved</p>	<p>2</p>		

TECHNICAL PROGRAMME

- OBJECTIVE 1** : To develop standards and storage management for raw cashew nut
- Production centres involved** : CEPC, NRCC,UAS(B) and KSCDC
- Activity 1** : Confirmation of heterogeneity of raw cashewnuts by assessing its characteristics (KSCDC and NRCC)
- Activity 2** : Identifying quality parameters of raw cashewnut for to develop standards for different grades.(KSCDC and NRCC)
- Activity 3** : Developing empirical relationship among the selected quality parameters of the raw cashewnuts and arriving protocols for various grades of raw cashewnuts.(KSCDC,NRCC and UAS(B))
- Activity 4** : Design and development of grader for raw cashewnuts(NRCC)
- Activity 5** : Development of cutting hand tool to assess kernel quality of raw cashew nut (UAS(B) and NRCC).
- Activity 6** : Development of storage management practices of raw cashewnuts to improve shelf life.(CEPC and NRCC) and initiation of formation of association between farmer and processor.

Identifiable indicators

- Standards for different grades of raw cashew nuts
- Cutting hand tool for quality assessment of raw cashew nut .
- Raw cashew grader
- Storage protocol for raw cashew nuts
- Farmer cooperatives in production catchments.

Work Programme

Sl No	Major Activities	Verifiable Indicators	Executing Agency	2009-2010		2010-2011		2011-2012		2012-2013	
				I	II	I	II	I	II	I	II
	Activity1	Confirmation of heterogeneity of raw cashewnuts	CEPC, KSCDC NRCC			√	√				
	Activity2	Standards for different grades of raw cashew nuts	CEPC, KSCDC NRCC			√	√	√	√		
	Activity3					√	√	√	√		
	Activity4	Grader for raw cashewnuts	NRCC			√	√				
	Activity5	Cutting hand tool for kernel assessment	UAS (B)			√	√	√	√		
	Activity6	Raw cashewnut storage management protocols	CEPC & NRCC			√	√	√	√		

OBJECTIVE 2	:	To develop high performance cashew processing system
Production centres involved	:	CEPC, NRCC and UAS(B)
Activity 1	:	Performance studies of existing processing technology
Activity 2	:	Development of mechanised shelling process for whole kernel recovery
Activity 3	:	Studying performance of existing dryers and incorporating modification for uniform drying of kernels
Activity 4	:	Studies on raw cashewnut processing without thermal application for effective extraction of Anacardic acid for more financial benefit

Identifiable indicators :-

Development of high performance technique to enhance profitability of the industry

Non-thermal extraction technology for Anacardic acid and edible kernel

WORK PROGRAMME

SI No	Major Activities	Verifiable Indicators	Executing Agency	2009-2010		2010-2011		2011-2012		2012-2013	
1	Activity 1	Identified list of problems of cashew nut processing industry	NRCC		√						
2	Activity 2	Improved cashew nut processing technology / and machinery	UAS(B) CEPC & NRCC			√	√	√	√	√	
3	Activity 3	Improved cashew kernel dryer	NRCC			√	√	√			
4	Activity-4	Non-thermal processing technology for cashew	CEPC			√	√	√			
		Industrial protocols for extraction & purification of anacardic acid	CEPC			√	√	√	√	√	

OBJECTIVE 3	:	Development of quality standards for cashew kernels
Centres involved	:	CEPC, NRCC and UAS.
Activity 1	:	Refinement of existing quality standards for cashew kernels.
Activity 2	:	Development of bio sensor for online detection of contaminated kernels

WORK PROGRAMME

Sl. No	Major Activities	Verifiable Indicators	Executing Agency	2009-10		2010-11		2011-12		2012-13	
1	Activity - I	Quality standards for different grades of cashew kernels	CEPC & NRCC		√						
		Colour grading system (charts) for different grades of cashew kernels	NRCC		√	√					
2	Activity - II	Bio-sensor for detection of cashew kernel contamination	CEPC		√	√	√	√			
			CEPC &				√	√	√		

Identifiable markers:

- Quality standards
- Bio-sensor for detection of cashew kernel contamination

OBJECTIVE 4	:	Identification/development of value added products of cashew kernels, utilization of by-products
Centres involved	:	CEPC and KSCDC .
Activity 1	:	Identification / development of commercially promising value added food products from cashew kernels
Activity 2	:	Utilization of cashew industry by-products.
Identifiable indicators	:	Innovative value added products from cashew kernels By-products development

Sl. No	Major Activities	Verifiable Indicators	Executing Agency	2009-10		2010-11		2011-12		2012-13	
1	Activity - I	Identification of innovative value added products from cashew kernels	KSCDC		√	√	√	√			
2	Activity - II	Improved CNSL extraction process from cashew shell	CEPC			√	√	√	√		
		Bio-polymer degradation enzymes from by-products of cashew	CEPC		√	√	√				
		Bioremediation technique for waste water	CEPC				√	√	√	√	

Identifiable indicators

- Innovative value added products from cashew kernels
- By-products development
- Bioremediation technique for waste water of cashew industry

OBJECTIVE 5	:	Packaging standardisation, evaluation and promotion of developed technologies, quality certification and entrepreneurship development.
Centres involved	:	CEPC, NRCC, UAS and KSCDC
Activity 1	:	Packaging standardisation.
Activity 2	:	Evaluation and promotion of developed gadgets / machineries and technologies.

- Identifiable indicators** :
- **Packaging improvement.**
 - **Adoption of gadgets/machineries and technologies by the end users**
 - **Entrepreneurs development**
 - **Publicity of technology**

Sl. No	Major Activities	Verifiable Indicators	Executing Agency	2009-10		2010-11		2011-12		2012-13	
					√	√	√	√	√	√	√
1	Activity - I	Packaging condition Standardisation	KSCDC, CEPC.		√	√	√	√			
2	Activity - II	No. of field demonstrations / Gathering feed back	CEPC					√	√	√	
3	Activity-III	Adoption of gadgets, machineries and technologies by the end users	UAS(B) NRCC, KSCDC & CEPC						√	√	
		Entrepreneurs development	KSCDC & CEPC					√	√	√	
		Publicity of technology / machinery	UAS(B) NRCC, KSCDC & CEPC					√	√	√	√
		No. of quality certifications	CEPC				√	√	√	√	√

Identifiable indicators

- **Adoption of gadgets/machineries and technologies by the end users**
- **Entrepreneurs development**

- **Publicity of technology**