

Value Chain on potato and potato products

Environmental and Social Safeguards Management

A. Basic Information

1. Project statistics:

Component code	:	2
Name of Consortium Leader	:	Dr. S.K. Pandey
Name of CPI	:	Dr B. P. Singh
Institution	:	Central Potato Research Institute (CPRI)
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Consortium partners	:	<ol style="list-style-type: none">1. Central Institute of Post Harvest Engineering and Technology, Ludhiana (Pb)2. Plant Tissue Culture & Molecular Biology, TERI, New Delhi3. M/s. Merino Industries Ltd., Hapur, Distt.-Ghaziabad (UP)4. M/s. United Phosphorus Ltd., Mumbai (MS)
2. Date of Start	:	April 1, 2008
3. Planned Duration	:	4 year and 3 months
4. Project Cost	:	Rs. 583.572 Lakhs

5. Project Objectives

1. Development of rapid and low cost alternative propagation technologies and diagnostic tools for augmenting seed production.
2. Upgradation of processing chain on French fries.
3. Establish a supply chain on specialty potatoes in NCR region
4. Utilization of industrial waste and non-marketable potatoes for production of animal feed and dietary fiber
5. Study market demand and supply chain for planting material, specialty potatoes, French fries, animal feed and dietary fibres.

6. Brief Project Description

The proposed project “Value chain on potato and potato products” will be undertaken by Central Potato Research Institute Campus Modipuram, Meerut (Lead Institute) with four partners namely CIPHET and TERI (government/non-profit institution) while Merino Industries Ltd. and UPL in Private sector. All these partners

are carefully chosen for manageability and to deal on the potato crop. CIPHET is a leading ICAR institute which is doing frontier work in the field of post harvest engineering of horticultural crops and cereal as well. Considering the expertise available in the field of post harvest engineering, the CIPHET was considered in the project. TERI is a non-profit organization being competence in the field of tissue culture and fast multiplication of disease free planting material. Considering the expertise available in the field of faster seed multiplication, the TERI was considered in the project. UPL is expertise in field of potato with specialization in high temperature storage technique (10-12°C) including packaging, branding and retailing. Considering the expertise available in the field of low sugar potatoes (stored at elevated temperature), their branding and marketing, the UPL was considered in the project. Regarding Merino industry/stakeholder Merino is a rising industry. Merino has imported a complete line for processing of potatoes into dehydrated potato flakes. Industrial waste generated in the flake industry need some product development and supply to CIPHET for possible way outs to utilize it. Bhatti farms and Sanga Seeds, Jalandhar (seed sector), Satnam Agro products, Jalandhar (processing), Haldiram Snaks Pvt. Ltd., Noida (processing), will be involved as associate/stakeholders in this project.

Broadly, the project consists of five components with different objectives and activities under them. The first objective aims to make available of disease-free planting material which is a critical input in augmenting potato production in the country. Breeder seed produced by CPRI goes into seed multiplication and supply channel only in 46% of the total potato area (1.3 m ha) in the country. There is no organized seed multiplication & seed supply channel available in the remaining 54% area comprising the states of West Bengal (25.1%), Karnataka (3.4%), Maharashtra (1.3%), Orissa (0.6%), NEH Region (9.7%), Gujarat (2.7%) and Bihar (11.5%). In order to harness full potential of potato productivity in these areas, it is essential to set up an organized supply chain for quality seed potatoes. Providing quality seed at reasonable rate will increase production per unit area and thereby, uplift the economic status of the farmers. Better quantity and quality produce will be available for ware consumption including specialty potatoes and establishment of processing units in these areas. Besides, establishment of seed multiplication facilities & distribution channel will provide employment to the local people.

Second objective aims to increase Potato processing at fast pace in India after liberalization of the economy and availability of raw material. Currently 2% of the total produce is processed in organized sector and almost similar quantity is processed in unorganized sector. Currently growth rate of the potato processing in organized sector is approximately 25%. This growth is likely to continue for the next five years, putting lot of demand on quality processing raw material. Amongst various processing products, french fries and reconstituted are in great demand. The current demand of french fries in the country is around 5000 MT per annum, while the indigenous production is only around 2400 MT, rest of the fries are imported. By 2010-11 the french fry demand is expected to increase to 47,400 MT. There is need to meet this demand through indigenous production of fries which will not only cut down on cost of fries in the retail chain, but also save million of rupees on foreign exchange through reduced imports. The project is aimed at spurring necessary growth in french fry industry. Upgradation and capacity building of the french fry industry will also generate huge

employment opportunities. The expected increase in per capita income, urbanization and number of working women are expected to fuel the increased demand on processed potato products in India. By 2010, the Indian population will be around 1.25 billion, 60% of which (750 million) will be below 30 years of age. This segment shall experience severe time constraint, which will enhance demand for ready to eat food products.

Third objective aims the faster urbanization, changing life style and enhanced purchasing power of sizeable Indian population (300 million) has created immense opportunities for quality/branded agricultural products including potato. Corporate sector has shown lot of interest in the retail market of agricultural commodities, but there is hardly any R&D available off shelf for meeting this requirement. The project is aimed at developing entire chain on ‘specialty potatoes’ and their marketing through megamart, modern shopping outlets etc. Emphasis would be on low sugar, anti-oxidant and nutritionally rich, salad and baby potatoes. This would lead to natural resource conservation, enhanced income of the farmers as well as that of various components of the retail chain.

Fourth objective entails the amount of waste and by-product of potato industry is estimated to be around 12 – 20 % of their total production. Potato processing generates waste in the form of peels, pulp and rejects. A substantial portion (15 %) of the potato crop remains unusable for seed, table stock, or processing, depending on weather during the growing season, pest and disease problems. Potatoes that are, edible (but rejected for reason of size, shape, etc.) can be used for animal feed. Potato peels; pulp and unmarketable potatoes can be processed and incorporated into animal feed formulations. Thus the attempt to utilise the industrial wastes (potato peel, pulp and starch) and waste potatoes for animal feed will provide additional food for the livestock and also make potato growing and processing more economical. Besides, Extraction of dietary fibre from potato peels seems to be an important proposition. In this context, interest in the potential use of industrial wastes of potato processing units and waste potatoes for preparing animal feed and dietary fibre (from peels) will be.. .

The last objective emphasizes the supply chains carrying seed, processing includes waste utilization and specialty potatoes, need major policy interventions in order to improve their efficiency. Taking into consideration new developments such as commercial growing and retail chain marketing that are changing face of Indian agriculture very fast, new supply chains are expected to replace the old ones. In order to increase overall welfare level in the value chains for Indian potato it is necessary to suggest strategies for increasing overall efficiency of the supply chains.

7. Environmental category issues in the sub project

- Social
- Environmental

8. Safeguard 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 absence or, leaving of trained man power, tissue culture facility developed by private/consortium partner may suffer.
- If cost of portable virus detection kit is not cost effective, adoption may not take place.
- If the cost of tissue culture grown seed far exceeds the seed produced from conventional method, disposal may be a problem.
- In absence of identification of suitable French fry variety from ongoing research programme does not materialize, French fry chain may be adversely affected.
- If acrylamide content is above permissible limits French fry export may be hampered.
- If the prices offered by processing industry for procuring raw material are not competitive the industry will suffer from lack of raw material.
- If the market acceptability of animal feed and dietary fibre remains low in comparison to the existing products, their sales may suffer resulting in losses to the industry.
- If specialty potatoes are not accepted by the consumers/market than the envisaged employment and farmers benefit will be at risk

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

- **Employment generation:** The process, product and pilot plant developed through this project would spur growth in potato industry, especially, processing and seed industry and ware potato business including specialty potatoes, which would generate employment opportunities substantially both in rural and urban areas.
- **Income enhancement:** Establishment of new seed supply chain, increased availability of raw material to the French fry industry and production of specialty potatoes would immensely increase the income of all stakeholders including farmers.
- **Sustainability/economic/social/environmental impact:** The technologies to be developed would be robust enough for providing sustenance to the concerned industries. The new product and technologies that would come up as a result of research and development through the project would be in the segment, where there would hardly be any competition and therefore would remain stable for a longer period of time.

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

Public institution

1. CPRI, Shimla
2. CIPHET, Ludhiana, Punjab
3. TERI, New Delhi
4. CFTRI, Mysore
5. GADUV&AS, Ludhina, Punjab

Private participation:

6. Merino Industries Ltd., Hapur, Ghaziabad (UP)
7. UPL, Mumbai
8. Bhatti Farms, Jalandhar (Punjab)
9. Sangha Seeds, Jalandhar (Punjab)
10. Haldiram Snacks Pvt. Ltd., Noida (UP)
11. Satnam Agro, Jalandhar (Punjab)
12. Mother Dairy, New Delhi

NGOs:

13. Fresh-O-Veg, Indore

International Institutes: Nil

Preliminary discussions were held with concerned stakeholders and NGOs before organizing stakeholder's workshop. They were made aware of NAIP project, objectives and 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	Programme	Participants	Remarks
1.	25.06.06 & 14.07.06 CPRI Campus Modipuram	Telephonic discussion with scientist from DFRL, Mysore	Dr. PS Raju Scientist 'E' DFRL, Mysore	Development of ready to eat potato products
2.	26.06.06 and 27.06.06 CPRI Campus Modipuram	Telephonic discussion with scientist from NIAN & P, Bangalore	Dr. CS Prasad Principal Scientist NIAN & P, Bangalore	How National Institute of Animal Nutrition and Physiology, Bangalore could associate in development and testing of animal feed utilizing potato waste and waste potatoes
3.	26.06.06 & 02.07.06 CPRI Campus Modipuram	Telephonic discussion with scientist from IIP, Mumbai	Prof. PL Nagarsekar, In-Charge, Indian Institute of Packaging, Mumbai	Development of packaging for potato and potato products

4.	27.06.06 & 01.07.06 CPRI Campus Modipuram	Telephonic discussion with Dr. NR Kumar	Dr. NR Kumar Senior Scientist Indian Institute of Vegetable Research, Varanasi, ICAR	Agricultural Marketing, SWOT analysis
5.	27.06.06 & 04.07.06 CPRI Campus Modipuram	Telephonic discussion with Mr. Sivaprasad and Mr. Arun	Mr. K. Sivaprasad Vice Chairman Golden Fries Ltd., Coimbatore	For French fry supply chain functioning
6.	27.06.06 & 05.07.06 CPRI Campus Modipuram	Telephonic discussion with Dr. SP Singh	Dr. SP Singh General Manager (Agro.) Chambal Agritech Ltd., Chandigarh	Multiplication of early generation seed potato
7.	28.06.06 & 11.07.06 CPRI Campus Modipuram	E-mail and telephonic discussion with representative from TERI	Dr Sanjay Saxena, Senior Fellow & Area Convener	How TERI could associate in the proposed project was thoroughly discussed and got approval
8.	20.10.06 & 21.11.2006 CPRI Campus Modipuram	Telephonic discussion with representative from CIPHET	Dr Devendra Dhingra Senior Scientist	How CIPHET, PAU Campus Ludhiana Punjab could associate in the proposed project was thoroughly discussed and ideas were shared to elaborated the utilization of industrial waste and waste potatoes
9.	21.07.06 & 10.09.07 CPRI Campus Modipuram	Invited the representative from M/s. United Phosphorus Ltd., Mumbai	Dr VK.Singh Senior Marketing Manager	Considering the expertise available in the field of low sugar potatoes, their branding and marketing, the role of UPL was identified in the project
10.	31.07.06 & 12.08.06 CPRI Campus Modipuram	E-mail, Fax and telephonic discussion with the Deptt. of Hort., Govt. of Manipur	Mr Kiran Kumar Director Deptt. of Hort., Govt. of Manipur	Wrote to the Director for their possible role in the NEH region. The officials of this Department are already being trained in the field of micro propagation of quality seed.
Concept note submitted to NAIP on 28/11/2006				
11.	03/08/07 NAIP, Delhi	E-mail and fax from the national Coordinator NAIP	NAIP Office	Concept note was approved by the competent authority
12.	12.08.07, 21.08.07 and 01.09.07 M/s. Haldiram Snacks Pvt. Ltd., Noida (UP) and CPRI C, Modipuram	Telephonic and personal discussion with representative from Haldiram Group of Companies	Dr A.K. Tyagi President (FMCG Business)	Visited M/s. Haldiram Snacks Pvt. Ltd., Noida (UP) for discussion on possible association In the project.
13.	12.08.07 & 01.09.07 Mother Dairy, Mongolpuri, New Delhi & CPRI C, Modipuram	Telephonic and personal discussion with representative from Mother Dairy	Dr. Vaneet Kathuria	For up gradation of value chain on French fries
14.	14.08.07 NAIP, DELHI	To meet the National Coordinator NAIP	NAIP Authorities	To discuss the modalities of holding the stake holders workshop and presentation plan of the full project proposal

15.	15.09.07 & 25.09.07 CPRI Campus Modipuram	Telephonic and personal discussion with representative from M/s. Satnam Agri Products Pvt Ltd, Jalandhar	Mr Karan Dhand, General Manager	Anticipated role of Satnam Agri Products Pvt Ltd, in the project was discussed and consent was recieved
16.	14.08.07 & 05.09.07 M/s. Merino Industries Ltd Hapur Distt-Ghaziabad (UP)	Discussion with representative from M/s. Merino Industries	Dinesh Garg General Manager and other officials	Visited M/s. Merino Industries Ltd Hapur and got apprised with the magnitude of industrial waste generated in the flake industry and discussed possible way outs to utilize it.
17.	16.08.07 & 05.09.07 CPRI Campus Modipuram	Telephonic discussion with the representative from M/s. Bhatti Farms, Jalandhar	Mr S.S.Bhatti Managing Director	The Managing Director agreed to participate in the project
18.	25.09.07 CPRI Campus Modipuram	Telephonic discussion with Mr. Pradeep Raj, Sadhguru Foundation, Hyderabad	Mr. Pradeep Raj	To discuss about the presentations
19.	3.10.07 & 04.10.07 CPRI C, Modipuram	Stakeholders workshop	All partners, officials of NAIP	To finalize the proposal on value chain
20.	15.10.07 CPRI Campus Modipuram	Telephonic discussion with representative from CIPHET	Dr Devendra Dhingra Senior Scientist	For inclusion of dietary fiber component

13. Measures to address the issue

A document on Safeguard Matrix has been prepared. Farmer's workshop on the specialty potato 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 absence of trained man power for tissue culture facility developed by private/consortium partner. Further portable virus detection kit may not be cost effective, and its adoption may not take place. In case, cost of tissue culture grown seed exceeds than the seed produced from conventional method, such issue will be discussed in detail with the stakeholder for possible remedy or alternate solutions.

14. Consultation/disclosures to be done in future

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 seed production technology, Indian GAP for specialty potato, marketing aspects etc.

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

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

1. Dissemination of holistic technology of micro plants propagation/seed programme to participating farmers through training & education programme.
2. Demonstration of low cost virus detection kit to stakeholders
3. Transfer of tissue culture technology for production of microtuber/minute tubers to stakeholders
4. Information dissemination on mechanical damage susceptibility of different varieties, specific damage points and extent of damage to the farmers/stakeholders.
5. Dissemination of knowledge regarding improvement in machinery designs and operation to stakeholders.
6. Information on Indian GAP for production of specialty potatoes to meet the AGMARK standards will be made available to farmers.
7. Information dissemination on biosafe plant based sprout suppressant to stakeholders
8. Popularization of developed animal feeds from industrial waste.
9. Information dissemination through mass and print media on health and nutritional benefits of specialty potato to stakeholders, targeted groups especially in NCR region.
10. Linkages with financial institutions will be enabled so that as whenever requested the entrepreneurs is adequately financed for their commercial activities. Both print and other media will be fully utilized to attain the desired goals and objectives.
11. NGOs will play a significance role in forwarding various technologies developed through the sub-project to small-scale farmer, producer, processor, family run small business units etc.



Consortium PI

National Coordinator

National Director

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

Activities	Issues	Anticipated level* of Impacts		Mitigation Measures (Negative impacts)
		Positive	Negative	
Development of portable virus detection kit	Easy detection of virus which will save time	2	0	0
Standardization of agrotechniques for production of minitubers and supply of mini tubers to chain partners	Increase in the availability of healthy quality seed in lesser time	3	0	0
Standardization of production methodology and industrial testing for French fry potatoes	Increase in the availability of suitable variety of French fry	3	0	0
Standardization of harvesting and handling methodology of French fry potatoes	Minimization of losses during harvest and handling	2	0	0
Estimation of acrylamide content in French fry varieties/advanced hybrids during storage	Healthy food with low acrylamide content available to consumers	4	0	0
Précised production technology for antioxidant, Ca rich potatoes and baby and salad potatoes	Healthy food with Ca/antioxidant rich potato for quality conscious people	3	0	0
Residue estimation of organo mercurial compounds, herbicides, fungicides and insecticides in potato tubers	Reduction in the leaching of pesticides and improvement in soil health	3	0	0
Testing of botanicals for sprout suppression for bio-safe low sugar potatoes	Minimum residue level by use of botanical sprout suppression	4	0	0
Development of 'Indian GAP' for production of specialty potato	Reduction in the pesticides load on soil and ground water quality through optimization of methodology for specialty potatoes as per Indian GAP	2	0	0
Manufacturing of animal feed and dietary fibre from potato waste	Utilization of industrial waste by manufacturing animal feed and dietary fiber	4	0	0
Develop process for extraction of dietary fibre from potato peel/waste potato	Use of wastage of food products for development of animal feed and dietary fibre	4	0	0

* On 1-5 scale

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

Activities	Issues	Anticipated level* of Impacts		Mitigation Measures (Negative impacts)
		Positive	Negative	
Base line survey	Availability of accurate bench mark information	1	0	0
Contract farming for need based qualities of potatoes	Industries will be in direct contact of farmer and farmer groups for the needed quality and quality of potatoes	3	0	0
Development/identification of indigenous cultivars for French fries	Decrease in dependence on imported French fries and savings in foreign exchange	3	0	0
Development of protocols for potato handling	Mechanized potato handling will reduce drudgery for women and children	2	0	0
Development /identification/production of specialty potatoes	Employment generation and increased economic activity	2	0	0
Retail outlets for selling of specialty potatoes and potato products	Increase employment generation and decreased poverty	2	0	0
Market information system Retail outlets	Information generation Alternative employment	2	0	0
Use of plant based chemical as sprout suppressants and specialty potato production	Availability of bio-safe/nutritionally rich potatoes	3	0	0
Retails outlets for specialty potatoes	Direct linkages with farmer and farmer groups will reduce the role of middleman	3	0	0
Utilization of industrial waste/non marketable potatoes	Development of animal feed and dietary fibre, employment generation	3	0	0
Market information system for seed , processing and specialty potatoes in social science component	Information generation	2	0	0

* On 1-5 scale