Implementation Completion Review Mission
(21-08-2014)

National Agricultural Innovation Project
Component -2
Research on Production to Consumption Systems
(A Value Chain Approach)

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(Component-2)
Major objectives

1. To promote Production to Consumption Systems ("value chains") in priority areas/themes to enhance productivity, profitability, income, employment and nutrition

2. To contribute to optimum utilization of the limited resources, deriving maximum coordination benefits, and enhancing synergies among participating institutions

3. To build a national system of innovation, integrating the wider processes of social and economic changes involving all the stakeholders
Background and Rationale

- The **importance of marketing in agriculture** is being realized increasingly to raise income, employment, profitability, global competitiveness and welfare in the market context, a **holistic approach** with emphasis on production to consumption systems (PCSs) is required.
- To achieve success in agri-marketing, higher priority to be given to post-harvest processing and quality management.
- Such a system will also have **backward linkages** with the input-supply system and **forward linkages** with food-chain aspects.

- The involvement of the **private sector**
- Collective action of **all the stakeholders**
- **Consortium concept as central** to facilitating the flow of knowledge, experimentation and value-addition in the agriculture sector.

- **Client-driven not research-driven interventions** in the value chain.
- Component-2 tried to help enhance the potential value of agri-products, mobilize partnerships, contribute to optimum utilization of the limited resources and enhance synergies among the participating institutions.
Project governance

- The approach used for inviting, peer reviewing and approving sub-project proposals in component-2 of NAIP was **competitive mode**.
- Identification of priority theme through a wide spread stakeholder consultative process.

Call 1

- **Three peer reviewers** examined each concept note.
- The committee constituted for short-listing of these concept notes considered the comments of peer reviewers.
- **Three experts** reviewed the full proposals.
- **Technical Advisory Group (TAG)** also discussed their comments. This process took quite a long time.
Call 2

- An **Expert Committee** was constituted to review the concept notes and members were called at PIU to **short-list** the potential concept notes (CNs) for full proposal development.
- The **Expert Committee** examined the CNs as well as full proposals to avoid delay and bring in continuity in review.
- Some of the **TAG members** were also included in the Expert Committees in the review process.
- The full proposals were forwarded to **TAG** for review and recommendation to Research Programme Committee (RPC) and Project Management Committee (PMC).
- This process avoided the delay in refereeing the concept notes and **saved about 4 to 5 months** in all.
- The Concept Notes during 2\textsuperscript{nd} and 3\textsuperscript{rd} Call were reviewed by using the **score sheet** by specially constituted Expert Group for each component followed by TAG, RPC and PMC to consider them for approval or otherwise.

Call 3

- The same **Expert Groups** which reviewed the CNs reviewed the full proposals instead of **TAGs**.
- The recommendations of the **Expert Group** were reviewed by RPC and PMC for consideration of approval or otherwise.
Number of concept notes received and approved

<table>
<thead>
<tr>
<th>Total number of concept notes received</th>
<th>431</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of concept notes approved for development into full proposals</td>
<td>76</td>
</tr>
<tr>
<td>Number of full proposals received</td>
<td>75</td>
</tr>
<tr>
<td>Number of proposals approved</td>
<td>51</td>
</tr>
</tbody>
</table>

Distribution of approved consortia call-wise under component-2

<table>
<thead>
<tr>
<th>Number of consortia approved</th>
<th>Call 1</th>
<th>Call 2</th>
<th>Call 3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10</td>
<td>18</td>
<td>23</td>
<td>51</td>
</tr>
</tbody>
</table>
Component -2

51 sub-projects were approved

<table>
<thead>
<tr>
<th>Theme</th>
<th>Number of sub-projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value Chains for Food and Nutritional Security</td>
<td>: 6</td>
</tr>
<tr>
<td>Value Chains in Agro-forestry, Forest Products and Biomass</td>
<td>: 4</td>
</tr>
<tr>
<td>Value Chains for Industrial Products</td>
<td>: 2</td>
</tr>
<tr>
<td>Value Chains for Export Promotion</td>
<td>: 8</td>
</tr>
<tr>
<td>Value Chains in Horticultural crops</td>
<td>: 13</td>
</tr>
<tr>
<td>Value Chains in Natural Fibres</td>
<td>: 5</td>
</tr>
<tr>
<td>Value Chains in Dairy Foods</td>
<td>: 2</td>
</tr>
<tr>
<td>Value Chains in Livestock</td>
<td>: 3</td>
</tr>
<tr>
<td>Value Chains in Fisheries</td>
<td>: 8</td>
</tr>
<tr>
<td>Total</td>
<td>51</td>
</tr>
</tbody>
</table>

The commodities identified in value chains include food grains and oilseeds, fruits and vegetables, flowers, plantation crops, medicinal and aromatic plants, bio-fuel crops, natural dyes and agro forestry, poultry, fisheries, livestock and dairy products

Covering 46 ICAR institutions, 41 SAUs, 51 private industries and 18 NGOs
Component-2  Achievements

- 51 consortia established
- 69 private sector organizations (including NGOs) participated in the consortia
- 131 production technologies were developed
- 174 processing technologies were developed
- 36 patent/intellectual property protection applications were filed
- 16 pilot plants established
- 58 new rural industries were piloted
- 5 producer companies started
Some of the good value chains are:
Agro-forestry, flowers, guava & mango, banana, custard apple, ginger, saffron, coconut, protected cultivation, sorghum, bioethanol, millets, linseed, prosopis, seabuckthorn, biomass, natural dyes, pashmina, meat, milk, dairy products, small pelagics, oysters, and tuna fish.
Profitable agro-forestry value chain

- **Industries**
  - 44% of raw material from contract farming
  - Quality and uniform raw material
  - Assured supply

- **Rural Industries**
  - Value addition – Rs 1750 / t of briquette

- **Farmers**
  - Quality seedlings with subsidized cost – Rs 2715.06 Lakh
    (3000 Seedlings x 45251 ha x Rs 2 Revenue)
  - Yield increase – Rs 226255 Lakh (Rs 2 Lakh/ha increased)
    (100 t x 45251 ha x Rs 5000)

- **Nursery growers**
  - Increased sale of clonal seedlings – Rs 20 Lakh
    (Rs 1 for every clone produced)
Supply chain

Major interventions and their impact

<table>
<thead>
<tr>
<th>Interventions</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Quantity</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>1. Technological interventions</strong></td>
<td></td>
</tr>
<tr>
<td>Clonal technology</td>
<td>10 million plants</td>
</tr>
<tr>
<td>Short rotation varieties</td>
<td>125-150 t/ha</td>
</tr>
<tr>
<td>Alternate species</td>
<td>200 t/ha.</td>
</tr>
<tr>
<td>Briquetting technology</td>
<td>5-10 t/ha.</td>
</tr>
<tr>
<td><strong>2. Organizational interventions</strong></td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>39442 ha x 100t x Rs 5000</td>
</tr>
<tr>
<td>Agri business incubators</td>
<td>4 (2 million plants)</td>
</tr>
<tr>
<td>Felling and marketing group</td>
<td>3 (36,000 t/annum)</td>
</tr>
<tr>
<td><strong>3. Marketing interventions</strong></td>
<td></td>
</tr>
<tr>
<td>Baseline price</td>
<td></td>
</tr>
<tr>
<td>Casuarina</td>
<td>Rs 2000</td>
</tr>
<tr>
<td>Ailanthus</td>
<td>Rs 2100</td>
</tr>
<tr>
<td>Melia dubia</td>
<td>-</td>
</tr>
</tbody>
</table>
Nutrition

- **Health benefits:** sorghum, minor millets, rice bran, linseed, KKJJ

- **Processed products with improved nutrition:** Millets in idly mix and dosa mix, rice bran in cookies, sorghum in cookies, maize based products (for diabetics), millet food for diabetic patients.

- **Millet foods in mid-day meal:** Two anganvadies (101 students), two primary schools (180 students)

- **Omega-3 chicken, Omega-3 egg (fish, linseed), Probiotics-Center filled candy, Bajra lassi, Kokum juice**
Linkages to markets

Middle man eliminated.

➢ Producers of jasmine, guava, forest trees, fish formed producer companies and established linkages with traders in the national as well as international markets.

➢ The export volume for jasmine is projected at 1350 and 1500 kg/week to Dubai and USA. Xanthophyll and Gingerol are exported to USA.

➢ Branding and marketing: EATRITE, NAIPKURE, ALVEL, ODIZIN, SEAFRESH, FISHMAID, DRISH, FISHSTIX FERTIFISH, MUZURIS
Innovations

- Packaging technique improved the shelf-life of jasmine flowers from 24 to 72 hours - export to U.S.A.
- Pruning in Guava minimized post-harvest losses
- Simple rooting techniques in forest tree nurseries
- Minimal processing and packaging in small pelagics
- Disease control in pashmina goats, improved charka
- Testing, drying and packaging in saffron
- Innovative value added products: omega-3, millets, rice brawn
- Small machines like raspador, jackfruit cutter, propeller,
  Mechanized extraction of pulp from custard apple
- *Prosopis* pod based concentrate ration
Scaling up - Pilot Plants

- Biomass Briquetting Plant
- Biomass Based Power Generation Plant
- Sorghum Biscuit Plant
- Linseed Oil Extraction Unit
- Patchouli Oil Extraction Unit
- Gingerol Extraction Plant
- Pomegranate juice & concentrate processing unit
- Kokum Liquid Concentrating Unit
- Honey Processing Unit
- Organic Liquid Fertilizer from Banana Pseudostem Sap Unit
- Natural Dye Extraction Plant
- Activated Carbon from Coconut Shell Plant
- Feed Processing Unit
- Shell Fish Value Added Production Unit
- Sheep Slaughterhouse and Processing Unit
- Pig Slaughterhouse and Processing Unit
Environment protection

- Natural dyes,
- Biopesticides,
- Biomass briquetting,
- Cashew-pollution prevention system,
- Activated Carbon plant with reduced CO₂ emission,
- Protection of river-bank from erosion,
- Responsible harvesting-green initiative,
- Slaughterhouse waste in aerobic waste disposal pond,
- **Fuel saving**: Diesel saving 15-20\% (propeller).

- **Labour saving**: Long line fishing (tuna) semi-mechanized harvesting of trees, Guava pruning machine.
Waste utilization

- Dry flower
- Crop residues for energy
- Banana fibre, milling industry
- Coconut coir pith as reinforcing material
- Activated carbon from coconut shell
- Fish waste
Women empowerment

- Flowers
- Pashmina
- Responsible harvesting
- Milk
- Milling industry
- KKJJ
Non-farmer beneficiaries

- Pashmina fibre (charka, weaver)
- Coconut fibre (geo textiles)
- Banana fibre (labourers, entrepreneurs)
- Briquetting (labourers, entrepreneurs)
- Tuna, Squids, Small pelagics (boat owners)
- Small pelagics (women-fish processing, women entrepreneurs-fish products outlet)
- Agro-forestry (landless labourers, tree cutters)
- Wild honey, natural dye, ginger, rice, tuna (tribals)
- Protected cultivation (armed forces–ITBP jawans)
Pluralism – Experiences

- 69 private sector organizations including NGOs (26 %)
- ICAR/SAU: Mixed experiences with private sector
- Some good: CITRAN (Ginger), SAGAR (kkjj), JK PAPER (banana) BRITANNIA (sorghum), NEWSPRINTS, PAPER BOARDS, MATCH WORKS (agro-forestry), VANGUARD EXPORTS, SALEM SPICES (flowers), NGO (QSS, Kollam-Responsible harvesting)
- Some bad: PRIVATE (potato), STATE GOVERNMENT DEPARTMENT (saffron,pashmina), NGO (prosopis)
- Private: Difficult to work with government departments
Cross-cutting learning experience

Component 2 and 3
Jackfruit cutter - Dapoli to Jharkand
Processing – Small scale processing units (Raichur), Value addition (BHU), Kokum
Value chains – component 3 has value chains: saffron (Almora), turmeric (MPUAT), briquette value chain (BAIF)
Component 2 has livelihood security
Linseed – Started with livelihood project - extended it to value chain
Oyster-fish-sea weeds
Component 2 and 4
Value added products (Instant idly)
Component 2 and 1
Agro-forestry (2) – Market intelligence(1): Market advisory on forest species
Post-project Sustainability

- **Saffron**: Rs 411 crore National Saffron Mission
- **Sorghum**: DAC launched INSIMP (Initiative for nutritional security through intensive millet promotion) Rs 300 crore project—during 2011-12 based on NAIP value chain, Britannia has given Rs 30 lakh for R&D
- **Pashmina**: Rs 10 crore Central Wool Development Board; 30 lakh DBT
- **Agroforestry**: Industry (Plywood, matches) to fund future research, Insurance companies to insure, Banks to give loan, 16 rural industries, Industry procures 25,000 t of wood directly from farmers, MoU worth Rs 10 crore signed.
- **Lac**: Rs 62 lakh project for promotion of lac by Jarkhand govt
- **Linseed**: DST project, BVP supported bio-village
- **Responsible harvesting**: Kerala fisheries department
- **Seabuckthorn**: Value chain project on seabuckthorn for five states (Himachal Pradesh, Jammu Kashmir, Uttara Khand, Sikkim, Arunachal Pradesh) under National Mission on Seabuckthorn for Rs 1000 crore
Lessons learnt

- Lack of varieties suitable for processing was a major limitation in value addition.
- Growers should also become small scale processors for higher income through value addition (Patchouli).
- Small scale processing technologies are generally preferred (Patchouli, Tomato, and Pomegranates). Dependence on one big processing plant can create problems for the growers (Biofuel). In some cases, Common Facility Centre was useful (maize).
- Labour intensive operations reduced for cost reduction (Agro-forestry, Meat).
- Entrepreneurship development programmes are essential for sustainability.
- Higher income in horticultural crops contributed to the success of the value chain.
- Export market oriented value chains were more successful.
- Experience with private partners was mixed. It was largely a good experience but in a few cases the experience was not good and the partnership did not last.
- Experience with state government departments was also mixed. It was good in some states (Tamil Nadu, Kerala), and not so good in other states (J&K).
- What not to do – Slaughterhouse.
Issues

1. Did we do the right thing?  
   Yes
Did we do it right?  
Yes and No

The concept of value chain was captured in about 50% sub-projects. Remaining were not successful in developing value chains.
2. Did we achieve project development objectives?

Results Framework Indicators of component-2

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Base line</th>
<th>Progress up to March, 2014</th>
<th>End Project Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Number of consortia established</td>
<td>0</td>
<td>51</td>
<td>15</td>
</tr>
<tr>
<td>Total Number of private sector organizations participating in consortia</td>
<td>0</td>
<td>69 (Pvt= 51, NGO =18)</td>
<td>40</td>
</tr>
<tr>
<td>Total Number of production technologies released and/or adopted based on NAIP research</td>
<td>0</td>
<td>131</td>
<td>35</td>
</tr>
<tr>
<td>Total Number of processing technologies released and/or adopted based on NAIP research</td>
<td>0</td>
<td>174</td>
<td>40</td>
</tr>
<tr>
<td>Total Number of new rural industries established</td>
<td>0</td>
<td>58</td>
<td>14</td>
</tr>
<tr>
<td>Total Number of product groups for which national or regional quality grades have been agreed on through NAIP consortia</td>
<td>0</td>
<td>35</td>
<td>25</td>
</tr>
<tr>
<td>Number of technologies/products commercialized based on NAIP research</td>
<td>0</td>
<td>84</td>
<td>40</td>
</tr>
<tr>
<td>Number of producer companies formed</td>
<td>0</td>
<td>5</td>
<td>–</td>
</tr>
<tr>
<td>Number of patent/intellectual property protection applications filed based on NAIP research</td>
<td>0</td>
<td>36</td>
<td>–</td>
</tr>
<tr>
<td>Number of peer-reviewed research papers published in high impact (&gt; 6) International journals based on NAIP research</td>
<td>0</td>
<td>69</td>
<td>–</td>
</tr>
<tr>
<td>Number of scientists trained overseas in consortium-based subject areas</td>
<td>0</td>
<td>56</td>
<td>–</td>
</tr>
<tr>
<td>Total Number of farmers involved in consortia activities</td>
<td>0</td>
<td>68, 603</td>
<td>12,750</td>
</tr>
</tbody>
</table>
3. Overall project contribution, impact and performance

Contribution
- 51 consortia covering crops, livestock and fisheries
- Institutions - ICAR: 46, SAU: 41, NGO: 18, Pvt: 51
- 131 production technologies, 174 processing technologies developed, 58 rural industries established

Notable Innovations
- New rooting techniques in forest tree nurseries – clonal propagation
- New packaging technique - improved shelf-life of jasmine from 24 to 72 h
- New testing, drying and packaging methods in saffron
- Improved management, minimized post-harvest losses in guava
- Minimal processing and packaging methods in small pelagics
- Improved charka for pashmina
- Innovative value added products: From fruits, millets, rice brawn, fish, meat, pork
- New small machines like raspador, custard apple pulp extractor, jackfruit cutter
Short rotation industrial wood agro-forestry was demonstrated in 258 ha by involving 10 clusters with 276 beneficiaries against the targeted area of 200 ha, which resulted in the horizontal expansion of 44724 ha against the proposed target of 10000 ha in Tamil Nadu.

An export packaging technology for jasmine flowers was developed. This technology reduced post-harvest losses from 40% to 10% and enabled export to long distance overseas market (USA). Increase in export volume to Dubai and USA. Dubai: from 600 kg to 900 kg/day (5 days/week), USA: from 500 kg to 1000 kg/day (2 days/week). Increase in net profit; Dubai: from Rs 2250/day to Rs 9250/day, and USA: from Rs 9250/day to Rs 17250/day.

Protection of Plant Varieties and Farmers Rights Authority (PPVF&RA) awarded Rs one million cash as Plant Genome Saviour Community (PGSC) to Jeypore farming communities for their conservation and large scale promotion of landraces.

Recognition by FAO as Globally Important Agriculture Heritage System (GIAHS) to Jeypore farming communities for their genetic resources conservation and traditional agricultural farming was another important recognition.
4. Will the results be sustainable?

- Most of the results are sustainable.
- Some of them may not be sustainable - e.g. Geotextiles, Murrel, Tomato, Kokum, Karonda, Jamun and Jackfruit, Tomato, Patchouli, Aloevera
5. What has been done and planned to scale-up the results
Value chains have been identified for consolidation and scaling up

- **High value addition**: Gingerol from ginger, xanthophyll from marigold, Omega-3 from linseed.
- **Export promotion**: Jasmine, dry flowers, guava, spices, saffron, natural dye
- **Horticulture**: Protected cultivation of Gerbera, Chrysanthemum, cucumber, coconut, custard apple
- **Millet for nutrition**: Introduction in mid-day meal programme, for diabetic patients
- **Agro-forestry**: Agro-forestry value chain, biomass, wild bee honey
- **Waste utilization**: Banana pseudostem, rice bran, coconut shell
- **Fibre**: Pashmina, coconut, cotton, composite
- **Meat and meat products**: Goat, Pig.
- **Fish and fish products**: Small Pelagics, Tuna, Oysters, Squids,
- **Market intervention**: Elimination of middle man, producer companies
- **State governments and funding agencies will be contacted to carry forward the value chains.**

Some of the value chains e.g. Agro-forestry, flowers, guava, ginger, linseed, saffron, natural dye, custard apple, pashmina, banana pseudostem are self sustaining because of the private industry involvement.
6. Lessons for future projects

1. The number of Consortia (51) was too large to handle under one component. A maximum of thirty would have been better for monitoring and guidance.
2. The release of funds could have been more timely.
3. Private partners were largely productive with a few exceptions. But many of them found quarterly submission of SoE inconvenient.
4. NGOs not very productive. NGOs and private institutions as Consortium Leader should be avoided.
7. Contribution of the project in reforming ICAR operations

Involvement of 51 pvt industries in the consortia was done for the first time.
8. Positive and negative aspects of the project

Positive aspects
1. Well defined role for all the stakeholders in the consortia.
2. Liberal financial assistance.
3. More freedom to execute the project.
4. Travel facilitated with liberal budget under T.A.
5. Sufficient funds for consumables.
6. Large number of RAs and SRFs

Negative aspects
1. Treating project as a separate activity by SAUs and ICAR Institutes.
2. Procedural delays.
3. Inability of professors in SAUs to devote sufficient time.
9. Capacity building and institutional reforms

1. International trainings : 61
2. Ph.D. : 75

3. Field work was facilitated : T.A. and vehicle hiring.
4. Collaborative work with industries and NGOs made possible.

10. Were the constraints addressed by PIU on time and satisfactorily.

Meant for CPIs
11. Views of project beneficiaries and stakeholders. They found NAIP model very useful and wanted the project to be extended.


13. Lessons for NAEP. Performance in NAIP by SAUs may be kept in mind while judging their competence in different areas.
THANK YOU