

National Agricultural Innovation Project

The National Agricultural Innovation Project (NAIP) has made remarkable progress in approving and grounding 187 sub-projects (39 under Component-1, 51 under Component-2, 36 under Component-3 and 61 under Component-4) at a total outlay of about Rs 1,017 crore. These sub-projects have very diverse partnership such as ICAR Institutions and State Agricultural Universities, General Universities, IITs, IIMs, CSIR laboratories, other Central and State government departments, private sectors and NGOs. The project is being operated under following four components:

Component-1 (Strengthening ICAR as Catalyzing Agent of Management of Change in the Indian NARS)

A total of 39 projects have been approved. Under e-theses repository, more than 3,000 theses have been digitized and full text data uploaded (<http://www.hau.ernet.in>). The database access (password based) has been provided to all stakeholders. The 'Agropedia' has further diversified with many discussions online and is evincing increased interest with over 30,000 people from 165 countries visiting the site (www.agropedia.net). aAQUA SMS and voice services are reaching over 10,000 farmers regularly.

Consortium for e-Resources in Agriculture (CeRA) continues to attract more users with cumulative hits on their website (www.cera.jccc.in) crossing the one million mark and 0.36 million downloads. The consortium is now providing access to additional 930 journals from four new publishers. The e-courses for degree programmes in Agriculture, Horticulture, Home Science, Fisheries, Dairy Technology, Veterinary Science and Animal husbandry are being developed. The developed courses are being uploaded on mms.tnau.ac.in, tau.tnau.ac.in (Agriculture), <http://www.elearnvet.net> (Veterinary and Animal



Linking research and extension with farmers

Sciences) and www.elearnfish.net (Fisheries). Five Business Planning and Development (BPD) projects are being implemented at IARI, CIRCOT, CIFT, IVRI and NIRJAFT. Five more BPD projects have recently been approved for CCSHAU, Hisar, JNKVV, Jabalpur, BAU, Ranchi, AAU, Anand and TNAU, Coimbatore. So far, 126 scientists have been deputed for international training.

Component-2 (Research on Production to Consumption Systems)

Cheaper concentrate mixture feed for livestock production: A simple feed technology was developed for the preparation of low-priced and balanced concentrate feed mixture utilizing ground feed ingredients available locally, namely *Prosopis juliflora* pods, *tumba* (*Citrullus colocynthis*) seed-cake, *guar* (*Cyamopsis tetragonoloba*) *korma*, *til* (*Sesamum indicum*) seed-cake, wheat bran, maize grain, common salt, mineral mixture etc. as per requirement and mixing them uniformly. The acceptability and palatability of formulated concentrate mixture fed to Tharparkar cattle was better than traditional control group, with no ill-effect on health. The experimental cattle

showed higher milk yield than the costlier concentrate mixture feed available in market. Farmer accepted this process technology for concentrate feed mixture owing to its low cost.

Propagation technology for industrial agroforestry: A clonal propagation technology was developed for mass multiplication of elite genetic resources particularly in *Casuarina junghuhniana*, which resulted in early harvest of three years against five years in practice.



Clonal mass multiplication

Standardization of processes for preparation of value-added products from seabuckthorn: A methodology was standardized for preparation of seabuckthorn-based value-added products, namely ready-to-serve squash, beverage (RTS), jam, syrup and fruit toffees with and without blending with different fruits. Acceptable blends of mango pulp were identified for the preparation of RTS, squash, syrup, fruit toffee and jam. The products were standardized taking into consideration FPO and International Standards.

Value-added extruded products from tuna red meat: The red meat collected from tuna was incorporated with cereal flour for the production of extruded snack product. The process parameters were standardized with different percentage of red meat with cereal flours by using twin screw extruder.

SILO feed from tuna processing waste: On an average 3,000 tonnes of tuna wastes is generated annually at Lakshadweep islands and fishermen bury the wastes in the beach itself creating serious environmental problems and health hazards. The effluent leaching from the decomposed wastes is a major threat to the pristine coral ecosystem of the islands. Hence, a technology was developed using waste generated during processing of tuna and converting it into a liquid protein source for animal feed preparation and developed fish feed under the brand name of SILO feed. It is a promising feed for cultivable fishes such as sea-bass, grouper and cobia.

Component-3 (Research on Sustainable Rural Livelihood Security)

Through 36 approved projects, 102 disadvantaged districts (out of 150 disadvantaged districts in 28 States of the country) are covered.

The total number of targeted farmers /agricultural labourers includes 130,000. Baseline survey was conducted and location-specific integrated farming system, capacity building and social mobilization through formation of different SHGs were designed and implemented in target areas. The major interventions across all clusters included introduction of improved variety of crops, including horticultural crops and increase in productivity of livestock. Income-generating activities such as lac cultivation, mushroom cultivation, vermi-composting, tasar silk cultivation were introduced wherever it had potential. Natural resource management interventions such as water harvesting, conservation agriculture etc. are also important activities being carried out for sustainable livelihood. The other major activities included establishing infrastructure and deploying ICT equipment for site-specific knowledge empowerment through Village Resource Centres; strengthening existing community-based organizations (CIGs, SHGs and VOs) and enabling the new ones to participate in productive enterprises through capacity building; linkages established with concerned departments and agencies such as National Rural Employment Guarantee Scheme and National Bank for Agricultural and Rural Development. Some of the salient findings are:

- The project has been able to motivate people in these backward areas with large population of tribals and also characterized by diverse socio-economic conditions, inaccessible roads, adverse climates, violence and frequent bundhs. More than 48,000 farmers have already been covered under the programme for various interventions.
- Various consortiums under the project responded to drought situation by adopting suitable mitigation measures. Interventions like transplanted pigeonpea, fodder cultivation, growing of less water-consuming vegetables etc. were adopted with suitable advice to the farmers.
- The introduction of lac cultivation in states of Jharkhand, Chhattisgarh and Madhya Pradesh has proved to be major income-generating activity, particularly under rainfed/dryland situations. As estimated, Rs 1-1.5 lakh can be generated from one hectare area in a year.
- The CRIDA, Hyderabad, BAIF, Pune, VPKAS, Almora and other consortia have developed number of farm ponds for water harvesting with suitable recommendations for multiple use of water. Introduction of HDPE pipes for better utilization of water has been widely accepted by the farmers.
- Apart from introduction of improved variety

of crops and livestock, the interventions like SRI method, zero tillage and vegetable cultivation with appropriate market linkages are being appreciated by the farmers as a source of livelihood.

- To ensure sustainability of the project the MPUAT, Udaipur, has been able to generate more than Rs one crore to be used by the participating farmers after the withdrawal of the project.

Component-4 (Basic and Strategic Research)

In all 61 sub-projects have been sanctioned. The last sub-project under the Component-4 was 'Bioprospecting of genes and allele mining for biotic stress tolerance' is the largest in NAIP (Rs 57 crore budget and 36 partners). It is a bold attempt to bring in a large number of scientists together to attempt a far-reaching initiative in basic and strategic research cutting across all species barriers (animals, microbes and plants). A few examples of the results are:

- A new micro-well chip platform (a fine example of micro engineering) was designed and fabricated and based on this a novel micro-well chip-based biosensor for high throughput analysis of ultra trace concentration of the potent pesticide Paraoxon

methyl (lower limit of detection $5 \text{ ng}^{\text{L}^{-1}}$) in low fat milk (0.5%) was developed. Indigenous specifications and manufacturing process of a composite material for Rubber dam application were developed for the first time in India.

- First prototype of sensor node with 3D Accelerometer was developed and tested on lame cows for gait and other types of remotely recorded movement detection.
- Nanowhiskers and nanofibrils prepared from cotton waste by mechanical process were used as fillers in preparation of starch biodegradable films that showed improved mechanical properties of films and thus usability.
- A new methodology for isolation and purification of microbial polysaccharides (potent in reducing water evaporation from soils) was developed.
- Isolates of nitrate-reducing microbes which have the desired characteristics of speeding up methane inhibition were isolated and appear to have a potential to be used as probiotics to mitigate methane emission for eco-friendly livestock production.
- About five technologies are at the patentable stage now. □

