4. National Agricultural Innovation Project

Activities under the National Agricultural Technology Project were completed in June 2005 and 4 months (from July to October 2005) were provided for consolidation of different reports, settlement of account, audit utilization certificate and reimbursement of claims etc.

An impact assessment study on the NATP indicates significant progress made by it in the implementation of diverse activities planned under its different components (i) Organization and Management System, (ii) Agro-ecosystem Research, and (iii) Innovation in Technology Dissemination.

Organization and Management System

A simple yet effective system for project-peer review and monitoring was developed through NATP. In 32 institutes (38% of the candidate institutes), Priority-setting, Monitoring and Evaluation (PME) cells were established to strengthen priority-setting, monitoring, evaluation and impact assessment works within and outside the NATP project. An Intellectual Property Rights (IPR) cell, led by an ADG, was established. Guidelines for increasing revenues were disseminated to ICAR institutes. The newly established Agricultural Technology Information Centres (ATICs) have generated Rs 99.5 million as revenue.

Human Resource Development for Research Management: A total of 80 administrative personnel were trained within the country and 9 from outside. Two retreats for ICAR top management (40 participants) and one management development programme for comptrollers of SAUs were organized. In addition, training programme were conducted mostly at the NAARM for directors, administrative, finance and accounts officers of the ICAR institutes, and for comptrollers and directors of research of SAUs.

Information Systems Development: In 70% of the institutes, 50-100% of scientists have now a computer. A total of 310 units in the system have local-area networks and 280 are linked to the internet very effectively, and substantial improvements in the ICAR's library system have been made; 128 libraries were strengthened, of which 39 are now fully computerized.

Agro-Ecosystem Research

This component had supported 4 modes of researches.

Production Systems Research (PSR): These were location-specific research projects that focused on production systems improvement, rather than single commodity or discipline, reinforcing emphasis on sustainability and on an integrated approach have had a major impact on farm incomes and rural development. Two hundred and sixty-four research projects in 5 main agro-ecosystems were implemented. The impact analysis of zero tillage programme has clearly illustrated high returns. A total of 70 research projects were also implemented under Institute Village Linkage Programme.

Zero tillage in wheat, zero till drill (inset) under irrigated agro-ecosystem

Cross-Cutting Mission Mode Research (MMR): In this, research activities spanned more than one agro-ecosystem and were designed to generate critical outputs needed to back-stop

Vanaraja birds at farmer's backyard

Aerides multiflora, an epiphytic orchid with ornamental, high vase value (15 days) and very long spikes collected from Sikkim

KBSH 44, a sunflower hybrid with 21% higher yield over national check KBSH 1 recommended for all sunflower growing states

location-specific PSR projects in more than one production system. The main objective was achieved through the implementation of 43 well-defined, multi-institutional, inter-disciplinary projects. Six improved technologies were released for commercial production, 47 scientists had received international training and 535 scientists were trained locally in thematic areas. More than 49,000 farmers received training. Two projects on "Conservation of Biodiversity" and "Household Food and Nutritional Security" were included in 21 science-and-technology missions supported by the Government of India.

Mission Mode Research

Notable results include: household food and nutritional security; collection, characterization and conservation of agro-biodiversity (plant, animal, fish); production of hybrids of maize, sorghum, rice, millets, sunflower, castor bean, chilli and brinjal; production of transgenic phenotypes of rice, cotton, and brassica; development of diagnostics for emerging plant and animal diseases; validation and promotion of IPM technology in different crops; improvement of watersheds; and development of prototypes of farm machines.

A prototype of indigenous chopper type sugarcane combine harvester developed to work even under adverse conditions

Strategic Research through Teams of Excellence (TOE)

These were created to conduct strategic and upstream research, and to provide technical assistance to PSR and HRD. The objectives were achieved through implementation of 31 projects. In addition, 218 short- to medium-term specialized trainings were conducted for 3,311 scientists. Long-term training was given to 235 scientists in priority areas like molecular diagnosis, cloning, virus identification and molecular markers. The TOE research has generated 83 promising technologies.

Team of Excellence

Notable achievements are: molecular characterization of major viral diseases of rice, banana and papaya; isolation of full gene sequences from banana mosaic virus; identification of very virulent pathotypes of bursal viral disease; identification of efficient rhizobacterial isolates for nitrogen fixation in rice; development of farm machinery for grading fruit, soil tillage and chemical crop spray; and establishment of 4 referral laboratories for pesticide residues, meat products, fish products and cotton textiles.

Competitive Grants Programme (CGP)

The objective of CGP was to improve research efficiency by promoting innovative research and also to provide an incentive for research partnerships and collaboration to maximize complementarities among research providers. The project provided

funds to mobilize the best scientific expertise in the country, including NGOs and the private sector. A total of 120 technologies were developed/ refined under the CGP, including diagnostics and vaccines, biocontrol agents, farm machinery and equipment, processed foods and products.

Innovations in Technology Dissemination

The goal of this component was to develop models that improve effectiveness and financial sustainability of technology dissemination system with greater accountability to, and participation by farming communities. The Agricultural Technology Management Agency (ATMA—a registered society) model was established in 28 districts to facilitate programmatic convergence of line departments and to link research and extension activities with rural-farm households within each district. Participatory Rural Appraisal (PRA) procedures were used to develop a Strategic Research and Extension Plan (SREP) for each district which provided a framework for development of annual work plans at the block and district levels in consultation and with approval of stakeholder groups. State Agricultural Management and Extension Training Institutes (SAMETIs) were established in 7 participating states to train and support implementation of the ATMA model; particularly in the 3rd and 4th phase districts. In addition, the ICAR's Division of Extension including headquarters and 8 Zonal Coordinating Units (ZCUs) were strengthened; 53 Zonal Agricultural Research Stations (ZARSs) were remandated (transformed) into KVKs to provide "farming systems research" and training capacity that could link with extension institutions and stakeholder groups. Finally, 44 ATICs were established to provide a "single window" delivery point at each of the 28 SAUs and 16 ICAR institutes.

Lessons learnt

The NATP has helped in accelerating sustainable agricultural growth, rural and human capital development. It has increased substantially the availability and adoption of appropriate technologies.System efficiency was enhanced through a series of organization and management reforms. The following lessons have been learnt from the NATP.

- Organization and management reforms, decentralization and devolution of powers are essential features of programme development and implementation.
- Production system research under sponsored and competitive grant modes can generate healthy competition among scientists and improve relevance to research in addressing the national goals.
- Inter-institutional and multidisciplinary programmes are essential for addressing location-specific problems and meeting needs of farmers.
- Information technology-based information system is essential for capacity-building.
- Agro-ecosystem research through sponsored and competitive programmes is a holistic approach for addressing sustainable agricultural growth and rural development. Sponsored research programmes under Rainfed, Arid, Coastal, Hill and Irrigated Ecosystems directly generated location-specific technologies. Mission Mode and Teams of Excellence strategic research systems strengthened research capacity and human capital.
- Research relevance improves by participatory approach. Multidisciplinary and multiinstitutional teams and participation of social scientists could address more effectively environmental and poverty alleviation objectives.
- Competitive grant programmes improved quality of research by wider participation of competent scientists.
- The Innovations in Technology Dissemination component helped in reducing technology vacuum and productivity gap, particularly for resource-poor farmers. This system could link the production system research with technology assessment and refinement through Institution Village Linkage Programme and the Agricultural Technology Management Agencies for a demand-driven technology dissemination system.

Proposed National Agricultural Innovation Project (NAIP)

The proposed National Agricultural Innovation Project (NAIP) is the next step towards attaining excellence in science, utilizing science for commerce and using science for enhancing rural livelihood security through integration of technology orientation with agricultural economy orientation. This project responds to Government of India's objectives as well as World Bank's objectives as have been expressed in their main policy documents. The project is planned for 6 years and is likely to become effective from July 2006.