

**POLICY
PAPER
18**

Agricultural Policy: Redesigning R & D to Achieve its Objectives



**NATIONAL ACADEMY OF AGRICULTURAL SCIENCES, INDIA
December 2002**

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Background

The National Agricultural Policy visualises technological upgradation of Indian agriculture as a core element of the agricultural development strategy. The goals of sustainable agriculture, food and nutrition security, risk management as well as growth and agricultural trade depend critically on improved R&D processes in the sector. Specifically, it endorses the concept of regionalisation of agricultural research based on identified agro-eco regions, (location-specificity), use of frontier sciences, participatory and proprietary approaches in R&D, strengthening research-extension linkages, and a “wellorganised, efficient and result-oriented agricultural research and education system to introduce technological change in Indian agriculture.” It calls for a redefinition of the partnership between central and state governments, assigning an upstream role for the centre. It also charts a pathway of incentives, support systems, investment imperatives and policy to “actualise the vast untapped potential of Indian agriculture.”

The NMS recognised that the Indian agricultural innovation system needs to prepare itself for the imminent changes in agricultural R&D and education systems necessitated by this challenge. Unlike other public support systems, the public R&D sector has had the tradition of being more open to reform. Several internal and external reviews have been undertaken over the last decade or two. In fact, for the central system—the ICAR, such scrutiny is mandatory at the level of each institute/centre at quinquennial intervals. Yet, in view of the rapid and far-reaching changes in the agricultural scenario, emerging pressures on public systems across the board, and indications of slackening tempo in research and transfer of technology, the Academy felt the need for an interactive dialogue for further reforms in the agricultural R&D system in the country in the changed scenario. The contours of Indian agriculture are changing and, the national system must also articulate new paradigms.

The NAAS, therefore, organised a workshop* to explore these implications. This policy brief brings out some of the critical findings and recommendations of this dialogue for larger public debate and policy action.

Elements of Change in Agricultural R&D

There is a felt need for insights into the relationship between agricultural science and policy in the Indian context. While the recent National Agricultural Policy document of the Government of India provides an immediate focus, there are larger questions concerning the capacity of R&D to identify and respond to the crucial and durable elements of agricultural policy on the one hand, and to contribute effectively to policy formulation itself on the other. The nature, extent and direction of changes in agricultural R&D, education, and extension demand detailed deliberations among the stakeholders—the community of professionals, farmers, NGOs, policy makers; both from private and public sectors.

* A two-day workshop under the Convenership of Dr. I.P. Abrol to explore these implications involving senior thinkers, leaders and others stakeholders in the national agricultural innovation system at New Delhi on 10-11 April 2002.

The objectives of the workshop were:

- To articulate and understand the context for change in agricultural R&D, education and extension in India, with a view to identifying some key issues that demand change in the institutional setting.
- To deliberate the challenges in and processes required for organising and managing R&D for sustainable agriculture.
- To examine the changing relationships in and new demands on technology development and diffusion components.
- To analyse the demand for change in two areas crucial to innovation for sustainable agriculture, i.e., agricultural education and natural resources research.

The sessions of the workshop were organised accordingly into four technical sessions, followed by a concluding session where the key strategies for change in R&D and the processes to guide this change were discussed. The following paragraphs discuss the key issues from the presentations and uninhibited discussion during each of these technical sessions, the highlights of the workshop's findings, the policy recommendations and strategic action points.

The Context for Change

- The past decade has witnessed significant changes in growth rates and trends in agricultural production/productivity, resource use in irrigated and rainfed agriculture, and gives us evidences of natural resource degradation. Agricultural R&D continues to appease itself with claims of past success, often limited to varietal release, while there is evidence of stagnation or even deceleration in TFP growth, and of declining productivity of disciplinary commodity-based knowledge in the face of deteriorating R&D environment and mounting agroecological problems. Other changes include increasing private sector presence and profit motives in agricultural R&D, an erosion of public sector commitment to basic and poverty oriented research, and the potential and uncertainties of emerging biotechnology and information technology regimes. The demand for sustainable agriculture and poverty alleviation, the need for introspection and evaluation in R&D, are other challenges demanding critical changes in R&D paradigms.
- Two other variables need to be factored in as we consider response of public R&D systems. The first emanates from globalisation of the economy—an accepted paradigm change in the NAP, and the other is growing pressure on public financial resources. The former brings in issues like global and regional comparative advantage and efficiency of production, while the latter underscores prioritisation and accountability concerns. The crucial importance of bridging the knowledge divide, which has grown in recent years was also highlighted in the workshop. The rhetoric of achieving growth, efficiency, equity and sustainability enunciated in the NAP will depend critically on adequate response of all public systems, including R&D, to these changes.

- Participants in the workshop emphasised the need for major paradigm shifts in agricultural R&D, education and extension systems and necessary structural and organisational changes therein. Factors like commodity/disciplinary orientation, centralised organisation and management, bureaucratic overload, inadequate accountability and incentive systems, non-existent internal and external linkages, etc. have been identified in earlier reviews of the agricultural knowledge system. These are generic elements of the context—several of which have been flagged since long. Workshop participants felt that goals and objectives are dynamic and evolving, but their functional rigidities need to be overcome to impart efficiency and accountability.
- Analytically the first step is to identify the main issues in the changing landscape of agricultural innovation and development that we need to tackle. What are the main changes that affect agricultural R&D, extension, education, and agricultural development in general? Once we have identified these changes, can we ask further questions about how each component and actor in the system has to change? These questions may have to do with the nature and extent of change, possible period or sequencing of change, or partners in change, new norms or rules (such as prioritisation, accountability, incentive and reward structure, natural resource accounting or poverty impacts).
- There are important milestones of success in green revolution technology. This success, however, must not perpetuate a 'business as usual' approach to the generation and utilisation of knowledge and technologies in the agriculture sector. The innovation system must now look for ways forward to the next stages of excellence in science and success towards agroecological and socioeconomic goals, towards an evergreen revolution in agriculture.

Organisation and Management of Research for Sustainable Agriculture

- The NAP is committed to build a well-organised, efficient and result oriented agricultural research and education system and more effective transfer of technology processes. There is a need for an analytical framework that can guide the transition of traditional and somewhat fatigued research, education and extension hierarchies to these goals. The participants were aware that there are rigidities, bureaucratic bottlenecks, and vested interests which undermine the ability of the system as it exists to affect needed changes.
- The changes in organisation and management of agricultural innovation that are needed to meet the policy goals of sustainable agriculture must begin with an understanding of the previous record of organisational changes. These changes were made to meet the challenges posed by technology generation and dissemination needs of the green revolution, during a phase of massive public sector expansion. Reorganisation of the ICAR (1966 and 1974), the establishment of the SAUs (since the 1960s), new programmes such as the AICRPs, etc. were some of the major organisational changes to achieve certain desired objectives, stated explicitly in policies such as those for national food security, development of rainfed agriculture, etc. The need to restructure the organisation of R&D has again become pressing in the national context of agricultural trade liberalisation, increasing

agricultural imports, mounting green critiques of conventional agricultural production practices and technologies, demand for sustainable agriculture using less of fossil fuels, and the emergence of biotechnology and information and communication technology regimes. What makes the current situation difficult is stringency of public resources including trained human resource. Innovative ideas are now needed to cope with this diverse and complex agenda. These are agenda-driven changes, and past record on this has been fairly impressive.

- Organisation of the R&D system needs a relook from the structural point of view as well. For the research system, decentralisation and debureaucratisation have been suggested time and again; but financial/administrative decentralisation and flexibility is not enough. The organisation and management of R&D now needs to be tailored to criteria and parameters of sustainability and comparative advantage that are location/region specific. If result oriented is to be read as income growth, poverty reduction or resource conserving agriculture, there must be organisational changes that increase both fundamental knowledge partnerships and understanding of rural livelihoods and ecosystems. Organisational change now necessitates getting out of the insular mode and working with stakeholder groups in rural areas as well as developing customer-contractor relationships with input industry, or processing industry. This calls for structural changes in organisation, focusing on state/zonal research units, redefining the roles of central/state institutions, and developing processes and mechanisms for participatory activities, and above all re-instilling the lost virtue of accountability.

Technology Development, Diffusion and Linkages

- The NAP enunciates that “application of science and technology in agriculture will be promoted through a regular system of interface between S&T institutions and the users.” The changes in the organisation and methods of extension, as well as the research-extension partnerships and linkages that enable the NARES to achieve the policy goals need detailed discussions and participatory analysis at different levels of the agricultural innovation system. There are several effective partnerships and coalitions in technology generation, development and adoption in Indian agriculture. In order to develop appropriate interface it is important, especially for public organisations mandated exclusively to generate technologies or to disseminate the technologies generated, to learn lessons from these successful partnerships in knowledge generation and utilisation.

The linear model of technology generation, diffusion and adoption in spatially and functionally differentiated organisations, must give way to a non-linear model of continuous participatory learning within the larger agricultural innovation system including private sector actors. The latter, the innovation systems approach, based on interactive learning and building partnerships with the relevant actors/agencies in the agricultural innovation system demands institutional and organisational changes promoting fusion of research and extension, greater control of stakeholders, multi-faceted structures (like ATMA) at local levels, etc.

- Finally, institutional learning to enable changes in agricultural R&D depends on the existence of adequate mechanisms in place for constant feedback and in-built

processes to affect necessary changes. It is amazing that the public research/extension systems have made little efforts in the past to learn from small but successful experiments undertaken by private sector or voluntary organisations. There is a need to strengthen social science research in agricultural innovation systems to enhance the social and ecological learning capacity of R&D organisations.

Addressing Sustainability Goals

- The term 'sustainability' figures prominently in the NAP document and pronouncements relating to agricultural research, extension and educational organisations. The central question in this regard is, "how have we modified, if at all, any or all these organisations to address our sustainability goals?" The NAP document states that sustainable agriculture is that which uses the country's natural resources—land, water and genetic endowment, in a manner that is: technically sound, economically viable, environmentally non-degrading, and socially acceptable. The immediate response of all concerned actors in the agricultural innovation system is to explore how the NARES can address these goals. At the outset, social scientists and natural science professionals need to explore whether 'economic viability' and 'environment friendly' criteria are inherently contradictory and, if so, how can these be reconciled. The NARES needs to identify and develop the sustainability criteria and parameters to assess (*ex ante*), the different ecoregional approaches in R&D and their (*ex post*) impact.
- It is evident that there are several institutional and organisational problems within public agricultural R&D that impede the larger goal of agricultural education, which is needed to produce the dynamic manpower required to address sustainable agriculture. The critical role of agricultural education in achieving transition to sustainable agriculture as well as in maintaining the dynamic nature and academic excellence of the training in agricultural sciences needs emphasis. The system should look for ways to improve the resources available for agricultural education, effectively reduce professional inbreeding and inefficient infrastructure in agricultural universities, and bring in more of basic sciences and social sciences that can provide a holistic agricultural education.
- A major component that can help identify and achieve the goals of sustainability in the agricultural system is the natural resources research sub-system to ensure sustainable use and conservation of natural resources. The natural resource management (NRM) perspective towards sustainable agriculture can draw from the successes of the green revolution with attendant widespread resource degradation and from rainfed areas where the poor quality and degradation of resources have posed a major constraint in enhancing productivity and improving livelihoods. Misguided policies that contradict scientific knowledge and farmers' wisdom about resource use and conservation have been the bane of Indian agriculture. There is a need for alternative policies and organisational formats that can help natural resources research in addressing resource management problems in different agro-ecosystems, using different technological options and partnerships with various actors in the innovation system. A strong social science component within the system is essential to address such concerns.

Issues Highlighted at the Workshop

- The NAP recognises the crucial importance of science in agriculture and the need to revamp public R&D system. Based on this premise, the workshop highlighted the following issues: Changes in agricultural R&D are imminent. The successes of the past, especially the green revolution, have been important, but the research system should now look for new ways forward to achieve new quantitative and qualitative milestones. This will need strong commitment on the part of the state in terms of support as well as flexibility.
- The agricultural innovation system of the country needs an internal thinking mechanism, and a more professional approach much like the TAC of the CG system to identify, steer and evaluate arenas for agricultural knowledge and technology generation and use. The traditional departmental approach of the Ministry of Agriculture is no longer tenable. Both central and state systems need to develop this mechanism.
- There was dissatisfaction with the productivity and efficacy of conventional disciplinary and commodity-based research. There is a need for a shift to trans-/multi-disciplinary, issue based research, with regionally differentiated strategies for each agro-ecological region and farming system. The R&D system needs to be reorganised in this mode. The present insular, uni-directional extension system needs to be replaced by a broad-based and decentralised agricultural innovation system.
- There was explicit demand to reduce the administrative overload and inefficiency in the ICAR and the SAUs, move towards more decentralised and flexible decisionmaking in research new norms of accountability to replace GoI regulations, and restore the thrust on quality to ensure excellence and globally competitive science.
- A framework of agricultural science oriented to the goal of sustainability is necessary to complement the production/productivity goal, if knowledge generation is to serve the cause of agricultural, ecological and socioeconomic sustainability. This would entail institutional and organisational changes in agricultural R&D.
- Overall agreement on the need to enhance basic sciences social science and interdisciplinary course contents to improve agricultural education with relevant professional training that suits the demands of agro-ecosystems, industry, and regional socioeconomic contexts.
- The goals, expectations, and mandates of R&D institutions may be determined, but their performance will be determined by the O&M structures at central (ICAR) and state (SAU) levels. In the context of the new challenges, these need to change in significant ways. As part of public systems, these institutions have been straightjacketed. There is need to unshackle these rigidities.
- The participants expressed serious concern about three issues—relevance, quality, and accountability in public R&D structures including extension systems at central

as well as state levels. These need serious and professional attention. Past record on bureaucratic effort has not been effective, if not counter productive.

Policy Recommendations

The policy regimes of the past, which had put in place a huge public R&D system, have changed. These systems themselves have started showing signs of attrition. This has far reaching implications for the future of Indian agriculture. Unfortunately, there is little indication of awareness or response on the part of the apex bodies in some cases ill-conceived and hasty response either at central or state levels. The deliberations of the workshop suggest following policy initiatives and action points to address this:

- The present departmental mode of organisation and management public systems in agricultural research and extension need to be moulded in an innovation system framework. This implies demolishing dichotomies like research/extension, plan/non-plan, centre/state, public/private, agricultural/rural, and so on. More effective mechanisms must be identified and developed to internalise stakeholder involvement in decisionmaking and improve partnerships across the board. There is need to shift from an hierarchical and linear technology generation-diffusion model to a non-linear and holistic learning mode.
- This will necessitate creating and nurturing a broad-base 'think tank' at the ICAR and SAU levels. The model of the Technical Advisory Committee (TAG) of the CGIAR with its own secretariat and loop in the funding process may be adopted with suitable modifications. At the level of institutes also, there is need to expand and back up bodies like the Research Advisory Committee (RAG), Governing Councils, etc. to play this role effectively.
- Bureaucratic and financial norms of functioning and accountability processes have proven inadequate for meeting scientific goals. These need to be replaced by more autonomous., flexible and performance-centred processes and management climate. The NATP illustrates changes and initiatives in this direction. These need to replace (not supplement) the existing system.
- A progressive and dynamic R&D system to address agroecologically relevant strategies demands decentralisation of ideas, approaches and power in the conduct of research. The agro-ecological paradigm also implies a shift from commodity-based organisation of applied agricultural research and development.
- Since the productivity of disciplinary/subject matter research has reached a plateau, a system oriented, inter-disciplinary, issue-based approach is now necessary. This will necessitate reorganisation of research at functional levels (institutes and research stations).
- Basic and strategic research is the precursor of productive applied research, a fact which is being lost sight of in the quest for relevance and visible impact. Policy makers and planners need to take note of this disturbing trend. Central research entities (in ICAR) need to push their research upstream and funding agencies

should accord priority to supporting basic and strategic discipline-based research also.

- Funding for public agricultural research extension and education continues to be stressed, more so at the state level, with conflicting policy signals. The government makes a commitment to raise public investment in R&D on the one hand, it enjoins ICAR and SAUs to mobilise their own resources on the other. This imparts uncertainty and inefficiency. It is high time that the issue of the level of investments, roles of public, private and international players, are discussed and sorted out in a consultative mode. Past efforts have been partial, *ad hoc* and ineffective.
- There is need for enhanced social science research capabilities both for policy analysis and to develop R&D strategies for specific agroecological regions and farming systems. There is need for greater interaction among natural and social sciences. This will help the R&D system to build bridges with policy making on the one hand and the endures (farms) on the other hand in interactive ways.

The Academy is deeply concerned about the erosion of scientific capabilities and performance in agriculture and rural science and technology, about growing public and policy apathy, and the farreaching adverse consequences which may ensue. The workshop reiterated the urgency of redesigning the agricultural innovation system in a new mode. We hope that this policy brief will lead to greater debate and, finally, action to address these concerns.