



# POLICY BRIEF

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## STRENGTHENING RESEARCH AND EXTENSION FOR RAINFED FARMING : ROLE OF SOCIAL SCIENCE AND INSTITUTIONAL FACTORS

### Introduction

The contribution and impact of Research and Extension in generation and transfer of appropriate technologies for rainfed farming need to be constantly improved because it is from these areas that further increases in production have to come to meet the growing demands of the population.

Rainfed areas account for 68% of India's net cultivated land and support about 360 million people which may rise to 600 million by 2020. Even after the realization of India's full irrigation potential by 2013, it is estimated that around 50% of India's net cultivable area of 142 million ha will remain rainfed. Research and Extension systems have to come up with technological options to provide improved livelihoods for this burgeoning population over the foreseeable future. The conditions which facilitated rapid technical change in high potential irrigated areas are largely absent from rainfed areas:

- agro-ecological conditions are widely diverse, even within small areas; irregular rainfall makes conditions risk-prone in many areas; nutrient-poor soils provide a weak basis for conventional agricultural intensification.
- farming populations have long been outside the political and economic mainstream. Levels of self-confidence and formal education are low, making it difficult for farmers to articulate their developmental and technology needs.
- the diversity of varieties, cropping patterns and farming practices in use means that markets for any individual input are small and fragmented. This, together with poor transport and communications infrastructure act as a powerful disincentive for the private commercial sector to become involved in input supply.
- public sector staff regard the more remote rainfed areas as difficult postings, so that the turnround of staff is very rapid and the proportion of vacant posts high.

Farmers' responses to these conditions include a number of risk-avoiding practices: avoidance of high use-levels of purchased inputs in case of crop failure (through, for example, drought); reliance on well-tried early maturing varieties that meet both grain and fodder requirements; cropping in mixtures or relays; heavy reliance on the biomass from off-farm sources (such as grazing and forest areas); and close integration between crop and livestock production. Technology generation and diffusion process for rainfed areas thus needs to be different from that of the irrigated areas.

### How adequately have research and extension hitherto responded to these characteristics?

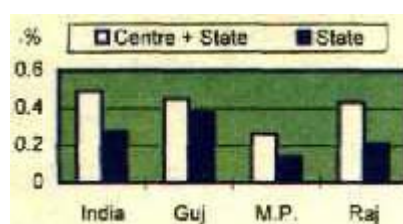
There is no comprehensive review detailing the proportion of technologies generated by rainfed farming research that have been taken up, compared with, for instance, irrigated areas. However, the informal evidence of low uptake of technologies is substantial.. Hard data are available in one specific area, viz the age of cultivars of the main crops grown by farmers (Table 1) ( Witcombe, J.R., Virk, D.S and Farrington J, (eds) New Seeds for Indian Farmers: Challenges and Opportunities for Change in the Regulatory Framework. Oxford and IBM, New Delhi (forthcoming).) which (with the exception of pearl millet) demonstrates an average age for typically rainfed crop cultivars to be much higher than that for crops usually irrigated (rice and wheat). This suggests a lower performance by the research system in replacing existing varieties by new ones in rainfed than in irrigated areas. This may be partly because of the failure on the part of the researchers in targeting, farmers' requirement

accurately and also due to the lower research intensity in rainfed states (Fig 1) (Pal, Suresh and Alka Singh, Agricultural Research and Extension in India: Institutional Structure and Investments, NCAP, New Delhi (forthcoming).)

Periodic syntheses, suggest that the reasons for weaker performance of research in the rainfed areas include the following:

- inadequate client orientation, specifically insufficient study of farming conditions, and inadequate perception of farmers' circumstances and their needs by scientists;
- conditions on research stations which differ widely from those on farmers' fields, and yet the continued implementation of practically all research on-station;
- excessive discipline-orientation among scientists; limited problem-focus or systems orientation;
- inadequate farmers' participation in the formulation of research and extension agenda, and in the assessment of research results and provision of feedback.

**Figure 1: Research and Education expenditure as % of Agriculture Gross Domestic Product (1992-94 average)**



**Source:** Pal et al (forthcoming)

Similarly in the case of extension, multiplicity of organisations who operate without co-ordination, concentration on dissemination of broad-based extension messages, with little attention to solving farmers' problems and severe lack of operational funds to effectively utilise the existing manpower, have greatly eroded its credibility.

In many ways, these are the symptoms of deeper malaise. For instance, farmers who have long been at the margins of social, political and economic change will have difficulty in articulating their requirements or working alongside researchers, without substantial external support. Furthermore, performance criteria for research staff provide little incentive to take on work unlikely to yield publishable material (eg: participatory fieldwork). The absence of any rigorous type of performance evaluation in the public extension system, higher spending of the research and extension budgets on fixed costs (especially salaries) leaving little for operational costs, issues of status and culture that makes it difficult for many researchers to engage in depth with farmers and primary concern of the public sector extension on information delivery on crop production activities with no specific programmes for group based resource management activities (such as management of common pool resources and development of microwatersheds [Box 1] or entrepreneurship development, all have resulted in underutilisation of the existing R&E system. Solutions to some of these underlying difficulties can only be found over the long term, but changes in the institutional arrangements for research, and in the skill-mix, offers prospects for early progress in other areas. These are discussed below:

**Table 1: Average age of cultivars of important crops (years)**

Crops	Region/States			
	All India	Gujarat	M.P	Rajasthan
Rice	11.5	17.1	13.3	12.5
Wheat	9.3	12.3	11.4	10.7
Pearl Millet	5.8	5.8	-	8.4
Maize	16.6	19.8	26.7	11.4
Sorghum	15.9	7.8	17.3	-
Groundnut	15.3	9.1	-	12.9
Chickpea	12.9	19.7	26.3	11.8

Source : Witcombe et al (forthcoming)

## What changes are necessary?

### A. Institutional Factors

#### Inputs from a wider stakeholder constituency in research.

In most cases, the research priorities are identified at the headquarters level as thrust areas. Based on these, projects are prepared by scientists belonging to the specialised disciplinary departments. The standard procedure is to evaluate these projects by a body comprising scientists from within. This has three adverse consequences: first, it is difficult to reject proposals in this forum, since to do so would cause the scientists to lose face in the presence of their peers; second, certain disciplines are likely to be under-represented within the institution: for most institutions employ only few, often junior, social scientists; third, clients are poorly represented.

Mechanism to obtain inputs from clients or outside experts rarely exist at present. It would be desirable to get critical, written evaluation of the projects from outside experts and also from clients, whether it is industry, NGOs or farmers organisations. One way of getting the views of clients is to ensure their participation in such review meetings. But that alone is not enough. Many of the NGOs are now playing an increasing role in articulating the needs of small, marginal and illiterate farmers. Opportunities to bring their input in selection of problems have to be provided. The private commercial sector is also emerging as one stronger client of agricultural research, ready to support research initiatives in line with their interest. However, viable and articulate farmers organisations exist only in very few crops. Extension agencies, with or without NGO support, have to take the lead in creating viable farmers organisations.

#### Box 1 .Microwatershed rehabilitation-the first step towards technological change

Microwatershed rehabilitation (MWR) is a rational strategy for making improvements in rainfed farming as it reduces soil and water run off, improves water percolation, increase availability of fodder and water for irrigation, resulting in introduction .of new crops and varieties. The resultant implications for the organisation and focus of research and extension are, first, technologies hitherto unfamiliar to farmers need to be introduced to take full advantage of MWR, second , watersheds represent natural resource systems and thus approaches should ideally be system-based, and third, social science skills must be brought to bear for proper understanding of technical change. These include, analysis of farmers treatment of risk, dynamics of joint action and equity and distributional issues.

Ensuring farmer participation in several stages of the research cycle is found to be the best way of developing relevant technologies. Experiences from farmer participatory research are given in Box 2.

#### Shift in balance between core and contract funding

The purpose could be facilitated by encouraging scientists to go for competitive grants (eg. AP Cess Fund, NATP) and reduce core funding. Preliminary evidence from the implementation of Johl Committee recommendations on consultancy, contract research and contract services by the I CAR has been encouraging. The decision to implement self-earning requirements on ICAR institutes has also brought good results. State Agricultural Universities are also expected to follow similar recommendations shortly. All these would help to make the system client oriented. State line

departments should be provided with adequate funds for engaging appropriate institutions for obtaining research / training /consultancy services for tackling field problems. This would enhance their capacity to respond to emerging problems, enhance their credibility and would also help to make the system demand driven.

### **Higher operational support**

Client orientation demands location specificity, on-farm experimentation and constant and meaningful interaction with farmers. In addition, the system should have enough flexibility to quickly respond to unanticipated field level problems. All these require more manpower, adequate field staff and support for travel and subsistence. Depleting contingency support is a major constraint.

In the public extension system, the situation is, if anything, worse; limited operational funds have resulted in inefficient utilisation of existing manpower. "Allocation for operating expenses in State Departments of Agriculture is around 15 % whereas a fully functional extension system should have 30-35% for operating expenses" (Swanson, B. (1996) Innovations in Technology Dissemination Component of NATP, Delhi, mimeo.).

### **Incentives and rewards**

Institutionalising client orientation in the system necessitates suitable changes in the incentive and reward structure. The present system has contributed to-the alienation of formal research system from farm realities. "In general, researchers do not perceive on-farm research as a vehicle for professional advancement on its own" (Jha, D, and Kandaswamy,A.(1994)Decentralising Agricultural Research and Technology Transfer in India, ICAR, New Delhi and IFPRI, Washington DC (mimeo).). Merit based promotion, redefinition of staff appraisal and performance criteria to reflect client orientation more strongly and its rigorous implementation are essential. Performance evaluation procedures are virtually missing in the public extension system. Appropriate evaluation procedures to promote innovations in participatory extension approaches should be designed and implemented.

## Box 2 Farmer Participation in Research: Experiences

Experiences on farmers participation in agricultural technology development from different parts of the world are presently available<sup>6-7</sup> Most of them are in varietal selection (eg. KRIBHCO Indo-British Rainfed Farming project, India) and plant protection (control of Cassava mosaic, Uganda). Some cases provide for farmers' involvement in trial design (eg. effect of body condition at calving and subsequent nutrition on health and productivity of Ndama cows) and in trial management (eg. community tsetse trapping, Kenya). Experiences of collaborative experiences are also widely reported. In India, for instance, Qayum (1995)<sup>10</sup> has reported a successful collaborative programme for non-pesticidal management of red headed caterpillar involving various research institutions, farmers and NGOs in Hyderabad. Attempts to organise farmer research groups are also reported, (eg: dryland Applied research and development Project, Kenya; Community Tsetse Trapping, Kenya). Reportedly, farmer participation in research has greater potential in varietal selection, working out beneficial rotations and other agronomic practices, developing soil and water conservation techniques, watershed management, disease recognition and assessment of susceptibility, biological control, integrated pest management etc.

Most of these initiatives reported in the literature are from NGOs. In much of South Asia, NGOs have taken the lead in promoting group management of common resources. Though better equipped with group formation and diagnostic skills, their technical expertise, capacity for experimentation and wide scale replication of approaches remain limited. The public sector must come forward and collaborate with these NGOs to address this weakness. Emerging policy implications are as follows.

A particular feature of many NGO approaches is that they are deeply empowering; they involve long-term face-to-face support by NGOs to farmers groups in identifying and addressing their problems, and help farmers to gain the confidence to take joint action in resource management and to articulate their demands on government services. This approach requires long-term concentration of resources in a few areas. By contrast, government services have to spread their resources more thinly, and the best way they can help to achieve a functional kind of participation in which enhanced interaction with farmers helps government to perform its mandated functions such as research and extension. Several conditions have to be met before public sector researchers can implement participatory approaches effectively. First, institutes should be committed to produce results which are of use to the identified clients. Second, the performance criteria, reward and incentive that favour delivering technologies that meet client needs, has to be provided. Third, scientists will need training in participatory methods.

## B. Social Science Skills

Within the ICAR, social sciences, policy and management sciences account for 7.5% of the personnel. In CGIAR institutions they constitute 18% ( CGIAR, (1996), Future Role of CGIAR in Policy and Public Management Research, CGIAR Secretariat, Washington.). Expansion of Social Science positions in the ICAR/SAU system should be a priority. Scientists and extension agents need to be updated with skills some of which are generic, but all are essential to research and extension in rainfed farming, such as,

- needs assessment technique, including the role of such techniques as Participatory Rural Appraisal
- understanding of farmers risk-averting practices and their implications for the design of research and extension and the formulation of recommendations
- modes of working in multi-organisation partnership with research and extension agencies within and outside the public sector
- management of the cycle of research projects, from preparation through implementation to review, including the conduct of participatory, on-farm research and eliciting of feedback from farmers
- the preparation and management of research and service contracts with commercial organisations and NGOs.

As many of the technologies for rainfed agriculture are knowledge-based and need community action (integrated pest management, integrated plant and soil nutrient management, management of

common property resources, etc.) farmers' groups have to be organised and sustained at the grassroots level. Apart from a sound knowledge in technical field, the following skills are going to be crucial for extension agents:

- group formation
- development of leadership skills
- conflict. resolution and negotiation between different interest groups
- management of common property resources
- use of different types of media
- communication, project preparation, data collection, analysis and documentation

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