



Research Into Use *sharing lessons to enable innovation in agriculture*

## **CHANGING CONTOURS OF RESEARCH AND DEVELOPMENT: LESSONS FROM SOUTH ASIA**

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### **Introduction**

Efforts at improving the relevance and contribution of agricultural research at addressing developmental challenges are more than three decades old. Better understanding of the limitations of the linear model of technology development and promotion led to experimentation with different research and extension models/paradigms. These include Farmer Participatory Research; Agricultural Knowledge and Information Systems; Public- Private Partnerships; funding research through competitive grants; privatization and decentralization of extension services; producer managed research and extension funds; and promoting linkages among varied stakeholders. However, progress in enhancing the development significance of research has been limited. Recent debates around putting new knowledge into use, enhancing agricultural innovation and agricultural research for development [AR4D] clearly reveal this.

Current donor policies increasingly emphasize funding for agricultural research in terms of its contribution to achieving Millennium Development Goals, such as poverty reduction and sustainable natural resource use. Putting new knowledge into use has become equally or more important as creating new knowledge. The need for client orientation and market responsiveness is emphasized more than ever. Research organizations are increasingly under pressure to expand their activities from knowledge generation to initiatives that focus on knowledge adaptation and use. Development and extension type organizations are increasingly valuing the importance of technical expertise in addressing many of the developmental challenges that requires technical adaptations to suit the local context. Experience indicates that the boundaries of research and extension, or in other words systems tasked with knowledge generation and its adaptation and use, have to increasingly blur if we are keen to promote innovation - the process by which new knowledge is generated, applied, adapted and used.

This paper discusses the experiences from seven such cases of on-going initiatives in South Asia that are trying to put new knowledge into wider use. These cases are from the Research into Use [RIU] programme funded by the Department of International Development [DFID], UK to promote knowledge generated through its investments from previous research initiatives. These seven cases of up-scaling knowledge address a wide range of developmental challenges and these include: promoting seeds developed through participatory crop improvement, strengthening value chains,

promoting adaptive collaborative approaches for sustainable and equitable natural resource use and strengthening micro credit and rural service delivery. Though these initiatives vary considerably with respect to their context, the problem, the commodity and the sector, there are a few things in common. Firstly, all these initiatives of promoting new knowledge are actually trying to enhance the capacity for innovation by networking with a wide range of actors. The research is contributing to this task but its role is actually changing. To do these, research needs to be embedded in networks of technology users, intermediaries and policy actors. Secondly, all the interventions are trying to deal with policy changes in various ways as these are critical for wider application of new knowledge. Thirdly, projects aimed at achieving impact at a wider scale often need a longer duration of funding than the conventional 3-year project cycles. This is also important for drawing wider lessons for policy.

The purpose of this paper is not to present the approaches adopted by RIU projects as a blueprint for enhancing the contribution of agricultural research to development. In fact there is no single approach being promoted here. It is more about promoting a diverse set of approaches to learn about ways of enhancing the contributions of research to development. The paper begins with a brief overview of the past and contemporary debates on enhancing the contribution of agricultural research for innovation. A brief outline of the RIU programme in South Asia is first discussed. This is followed by a description of select cases from RIU's South Asia portfolio. Finally, the key features of these cases with implications for enhancing agricultural innovation are discussed.

### **Organising agricultural research and extension for innovation**

The discussions on alternate paradigms of agricultural research started in the 1980s in response to the irrelevance of the linear, green revolution model of agricultural development for the complex diverse and risk prone agriculture [Chambers and Ghildyal, 1985] that is prevalent in large parts of the developing countries. Evidence that technological innovation comes from multiple sources, including farmers [Biggs, 1990], and the way the agendas of different stakeholders represented affects the 'appropriateness' of new technologies developed, also emerged during that period. Recognizing the importance of combining local knowledge and knowledge generated through research, several institutional innovations [new ways of doing] such as participatory plant breeding, farmer field schools and collaborative approaches for natural resource management emerged. With second-generation problems of promoting technologies (pest resurgence, unsustainable land management) becoming more evident, the importance of group action and therefore the need for platforms for interaction to promote innovation began to be increasingly recognized. The Agricultural Knowledge and Information System (AKIS) framework emerged in response to this thinking. It recognized the wider set of information sources and the value of creating systems that assist in the generation and dissemination of knowledge, especially in the context of sustainable agriculture and progress towards an ecological knowledge system [Roling and Wagemakers, 1998].

The increasing importance of the private sector in technology development and promotion in the 1990s led to increasing calls for public-private partnership in agricultural research and extension. [Byerlee and Echeverria, 2002]. Due to lack of appropriate institutional changes within the public sector organizations, the progress on partnerships have been less than ideal [Hall, 2005]. Another institutional innovations tried in the area of research governance include competitive research funds [Gill and Carney, 1999]. These have also been tried by the agricultural research councils in South Asia [Nepal, Bangladesh and India] with mixed impacts.

More recently, the application of innovation systems framework in agricultural development has provided several new insights. This framework offers more inclusive way of thinking about the actors and the institutional context in which the generation, diffusion and use of new knowledge takes place. This system of actors and process not only includes research and extension, but also technology users, private companies and non-governmental organisations and supportive structures such as markets and credit [Hall *et al*, 2001, 2004]. This framework, in particular, places emphasis on the importance of learning as a way of evolving new arrangements specific to local contexts. It also highlights the point that technical, institutional and policy innovations are interdependent. The challenge for promoting innovation therefore is to enhance the capacity of the different actors for interaction and collaborative action [World Bank, 2007]. However, there are no blueprints on how to do this and this has to be experimented in each context. Certain kinds of organizations can, however, play a very important role in brokering relationships between different organizations within the innovation system [Klerkx and Leeuwis, 2008].

Indeed, most of the innovations needed in present-day agriculture have ‘collective dimensions’, that is, they require new forms of interaction, organization and agreement between multiple actors (Leeuwis and Van den Ban, 2004). The food crisis and the increasing focus on climate change in recent years have brought attention back to extension both as an object of reform and an engine of innovation. As an object of reform, it is called upon to adopt, for example, innovative structural, funding and managerial arrangements, and as an engine for advancing innovation, it is called to take on new roles beyond traditional technology dissemination [Rivera and Sulaiman, 2009]. These include organizing rural producers, forging links with markets and playing a brokering role with other actors in the agricultural innovation system [Sulaiman and Hall, 2002].

There is now considerable evidence that indicates that undertaking research as an isolated and independent activity at one end of a delivery pipeline weakens the appropriateness of results and technologies, limits uptake and weakens impact on both social and economic development goals. The corollary is that embedding research in networks of technology users and intermediaries can promote adoption and productive use of research products [Hall and Sulaiman, 2008]. Evidence from DFID’s earlier RNRRS programme indicated that organizing research as part of a coalition of development, entrepreneurial and policy actors can improve impacts [Barnett, 2006]. Experience has also shown that when organizations with varied expertise network and start engaging in joint activities, it leads to organizational and institutional changes and enhances application of new knowledge. Moreover, the process also leads to raising new relevant research questions and triggers new demands for technical support [Hall *et al*, 2009].

There have been attempts to promote relationship between the different actors in the innovation system for wider impact of new knowledge at the field level. The National Agricultural Innovation Project [NAIP] in India and the Sub-Saharan African Challenge Programme [SSACP] are other initiatives that are experimenting with the twin challenge of generating new knowledge as well as putting it into use

One of the main conclusions of the regional consultations on agricultural research organized by GFAR [Global Forum for Agricultural Research] before the recently concluded GCARD 2010 conference [Conference on Agricultural Research for Development] was that the developing world’s agricultural research systems are currently insufficiently development oriented [Lele *et al*,

2010]. Two main characteristics for a more effective AR4D [Agricultural Research for Development] system identified by this conference are as follows:

- Facilitates the rapid generation of innovations in support of the spread of knowledge and technologies to smallholders and delivery of services to reach the poor
- Promotes effective use of collective capacities, particularly networks, by strengthening key relationships among research, development (extension, seed suppliers, the banking sector) and farmer actors

This concern is also reflected in DFID's research strategy, which calls for balancing emphasis on creating new knowledge and technology and getting technology - both new and existing - into use [DFID, 2008]. The cases analysed in this paper of putting research into use from three countries in Asia, namely Nepal, Bangladesh and India, provides some useful lessons on how to do this balancing better. It also illustrates the challenge of dealing with institutional and policy issues and how research should be embedded in the process of enhancing capacity of the wider innovation system.

### **Research into Use programme**

The Research into Use (RIU) programme was commissioned in 2006 by DFID. Its purpose is to get the best research results of past DFID supported research into widespread use in Africa and South Asia. RIU was conceived as an activity that would link together the many agents involved in innovation - the researchers, the users, the intermediaries and policy makers - to create a system that can help achieve wider uptake of new knowledge developed through the previous DFID funded RNRRS [Renewable Natural Resources Research Support]. Another objective of RIU was to draw lessons on the process of putting research into use or, in other words, "to tease out when and under what circumstances and settings a range of different approaches become more or less useful in making the best use of agricultural research as a policy instrument for development" [CRT, 2009].

The CRT re-organized the ongoing projects in Asia to provide a coherent set of experiments on putting research into use; ensuring that these have the critical mass of projects that have significant impact, at the same time delivering lessons on how to better put research into use. From South Asia, RIU selected 13 projects through a competitive grant process as part of its Innovation Challenge Fund [ICF] and the project interventions started in July 2008. Currently the Asia portfolio comprises of 11 projects.

## Case studies of select RIU initiatives in South Asia

### Theme 1: Establishing seed delivery systems and promoting capacities for participatory crop improvement [PCI]

There have been several attempts during the last three decades to involve farmers in different stages of agricultural research. Some of these initiatives, collectively called Farmer Participatory Research [FSR] or Participatory Technology Development [PTD], focused around strengthening the informal research and technology development carried out by farmers. In the area of plant breeding, these FSR/PTD initiatives led to the emergence of several approaches such as Participatory Plant Breeding [PPB], Participatory Varietal Selection [PVS], Client Orientated Breeding [COB] and Participatory Crop Improvement. Availability of good quality seed with preferred characteristics is critical for improving agricultural productivity. Participatory Crop Improvement is an umbrella term that includes not only the process of plant breeding [PPB], but also that of germplasm evaluation methods such as PVS and others like participatory seed production [Witcombe *et al* 1996].

The Plant Science Research Programme of DFID provided £15.1 million of funding between 1995-2006 to CAZS-NR [Centre for Arid Zone Studies-Natural Resources], University of Bangor, to help develop and implement PPB methodologies. Over the last decade, CAZS-NR mainly partnered with two NGOs in Nepal [Forward and Li-Bird] and three NGOs in India namely, Grameen Vikas Trust [GVT], Action for Social Advancement [ASA] and Catholic Relief Services [CRS], in this endeavour. Partnerships were also established with the Nepal Agricultural Research Council and the Department of Agriculture, Government of Nepal and with select state agricultural universities in India. This initiative produced several improved varieties of rice and legumes with multiple benefits for farmers such as high yield, superior grain quality and much higher on-farm income. In Nepal 14 PPB and PVS varieties have been released (and another four are under consideration), whose development involved public sector agencies in eight cases, NGOs in nine and collaboration in most cases [Conroy and Adhikari, 2009]. In India, 10 varieties of rice and legumes bred through PPB have been released [Conroy, 2009]. The programme also developed and validated the relevance of a new paradigm [institutional innovation] in plant breeding, that of PCI. However the uptake of this approach by public agricultural research organizations has been limited mainly due to a number of institutional and policy bottlenecks related to release and multiplication of new varieties.

Adoption of these improved varieties, however, remained poor initially due to lack of knowledge of these seed and also due to their lack of availability. In India, especially in Madhya Pradesh and parts of Eastern India, where varieties of upland rice developed through PCI have been promoted, the number of commercial seed suppliers was few and these agencies were only interested in selling hybrid seeds or seeds of transplanted varieties. So the project had to depend on NGOs to promote these seeds. NGOs such as GVT, ASA and CRS are currently addressing the supply of seed through seed production and distribution, encouraging farmer networks, forming grain cash seed banks and strengthening capacity of seed producer groups. These NGOs are also involved in promoting these seeds through demonstrations and distribution of publicity materials. In Nepal, the focus has been on awareness building [through mass media], distribution of new seeds in limited quantities [informal R&D kits], and strengthening the capacity of community-based seed producer groups [CBSPs] by way of training, quality seed production, business development, exposure visits and strengthening linkages with other stakeholders, especially the government agencies.

### *Case 1: Community based seed production in Nepal*

In the low altitude [terai] regions of Nepal, the commercial sector involved in seed supply is weak and so the CAZS-NR and its participating NGOs decided to work with seed producer groups. Initially the share of seeds of PCI varieties produced by these groups were low; there was too little demand for these seeds as only few farmers knew about these improved seeds. The agrovets, who are the main intermediaries involved in seed trade, were demanding only the seeds of old varieties for which there is a demand from farmers. The unfortunate situation was that “demand wouldn’t increase unless farmers could try the seed and seed wouldn’t be produced unless there was demand” [Witcombe *et al* 2009]. The programme soon realized the need for engaging with a wide range of actors in the innovation system, namely, seed producer groups, agrovets, farmer groups, District Agricultural Development Organisation [DADO], rice millers, traders and other NGOs, to make more actors aware about these varieties and to stimulate demand.

The project partners also realized the importance of forming and strengthening the technical, managerial, institutional and marketing capacities of community-based seed producer (CBSP) groups through training on seed production, enterprise development and development of business plans, exposure visits and stakeholder meetings. Li-bird and Forward, the two NGOs currently leading the PCI initiatives in Nepal, are working with 41 CBSP groups. During 2008, these CBSPs produced more than 550 tonnes of seed comprising rice and legumes. Due to project support, group cohesion, institutional, technical and seed businesses and marketing capability of the CBSPs have improved. Most of the groups have increased membership, share capital, group funds and set up their own buildings. In addition to rice and legume varieties, most of the CBSPs have started diversifying to seed production of other crops (wheat, maize). To create demand for improved seeds, seeds were distributed in small kits [IRD kits] to producers and media, especially FM radio, was used to disseminate information on the availability of improved seeds.

CAZS-NR and its partners also played an important role in changing the guidelines on varietal release and this resulted in a new seed policy that allowed NGOs and private sector to be involved in varietal development and promotion. Efforts are also being made currently to promote the good practices of CBSPs into the District Seed Self Sufficiency Programme through policy level meetings, interactions and formation of a task force with the Government of Nepal. During the current year, two seed companies will be established, one by LI-BIRD and the other by FORWARD, to upscale delivery of new seeds evolved through participatory crop improvement. Some progress has been made with respect to establishment of the company and the registration is expected to be completed before the end of May 2010.

### **Theme 2: Innovation in Value Chains**

Opportunities presented by large markets of poor people are leading the emergence of new types of innovation processes and products. Innovation along value chains is one such development. Worldwide there has been a lot of interest in value chain development and linking the poor to markets. There are three projects in Asia under RIU which follow a value chain approach for promoting innovation. The project implemented by the International Centre for Underutilized Crops (ICUC) in India and Vietnam is building a value chain through specific interventions to connect smallholder producers of underused crops [UCs] to markets. The IDE [International Development Enterprises] project implemented in Nepal, Vietnam and Cambodia is building and strengthening



linkages and partnerships among the market chain actors through promotion of the participatory market chain approach [PMCA]. In the third case, a consortium led by Rangpur Dinajpur Rural Services (RDRS) is developing a fish seed value chain by creating a role for smallholders as intermediary producers in the value chain for enhancing availability and quality of fish seed.

*Case 2: Diversifying incomes through underused crops in India*

The International Centre for Underutilized Crops (ICUC) is piloting a multi-pronged approach to support promotion of underused crops in India in partnership with BAIF, an NGO in India. BAIF has a long history of establishing horticulture/forestry orchards in farmers/private lands and processing facilities owned by the communities. The ICUC was established in 1992, with the objective of unlocking the potential of UCs to support rural livelihoods. In the initial stages, they were mainly involved in farmer participatory surveys, agronomic trials, development of post-harvest technologies and publishing extension literature in local languages. The Forestry Research Programme [FRP] of DFID was another agency that had been actively promoting R&D initiatives in under-utilised crops. The focus was on identifying locally important tropical and sub-tropical fruit trees and creating monographs on biodiversity, production, value addition and marketing of products.

During this process, the researchers realized that making knowledge available addressed only one part of the problem. There were other constraints for promoting under-utilized crops, such as lack of access to propagation materials, unavailability of post-harvest and processing technologies, and lack of linkages to market and other service providers. In the current initiative funded by RIU, the knowledge that was generated from all these previous efforts is being applied to promote a multi-pronged approach. The approach has three essential components, namely village crop fairs, community germplasm orchards and food processing parks.

The village crop fair [VCF], organized periodically, is the place where community members access information and discuss about potential UCs, their production and utilization. They also select germplasm of suitable UC. The community germplasm orchards take suggestions from the VCFs and multiply and maintain planting material of selected UC for supplying to interested producers. The food processing parks are integrated resource centres where producers can access services for post-harvest, processing and marketing of UCs. These parks contain infrastructure for post-harvest operations, knowledge and information about all aspects of UC, and facilitation services to connect producers to different service providers. The knowledge fairs, organized annually at the project locations, provide opportunities for showcasing project initiatives to diverse audience, scaling up/out of activities and policy advocacy.

*Case 3: Linking vegetable growers with markets in Nepal*

Since the early 1990s, IDE Nepal's key activities have been about participatory research to develop and provide appropriate micro-irrigation technologies, such as drip systems, micro sprinklers, treadle pumps (manual foot pumps) and water storage / distribution technologies, processing and distillation equipment etc. While engaged in these activities, they realized that there are tremendous opportunities for poor farmers in Nepal to rapidly increase their incomes by supplying high-value agriculture produce, especially vegetables, for the national and international markets. However, there were some constraints for that, such as unorganized nature of small farmers and

inefficiency in the existing value chain for vegetables, characterized by missing actors and insufficient connections between actors.

In order to address these constraints and support these small farmers to play an effective role in the vegetable markets, they promoted community managed collection centres (CMCC) for vegetables, which serve as a point of aggregation of vegetables to attract local traders. IDE has developed and refined a methodology to promote these CMCC and successfully developed about 100 of them. The Marketing and Planning Committees (MPCs) that run these collection centres provide a range of services to member farmers and represent them while negotiating price with traders.

However, MPCs lacked necessary capacities and skills to do so. While exploring opportunities to address this constraint, IDE came across the Participatory Market Chain Approach (PMCA)<sup>1</sup> as a useful methodology to move to the next level of market operations. The RIU interventions here are focused on building capacity of MPCs and strengthening linkages and partnership among the market chain actors through promotion of the PMCA. The implementation of the PMCA process is helping to breakdown misconceptions that stakeholders had about each other, particularly the view that traders were exploiting farmers. It has also increased the confidence and trust among collection centre management, farmers and traders and, due to increased trust, more farmers are selling through the MPCs and local traders, resulting in fewer farmers travelling long distances to reach markets to sell their produce directly, particularly in the terai plains. The project currently works with 20 MPCs in 5 districts. The project has formed a district level advisory committee comprising government officials, NGO and private sector enterprises.

#### *Case 4: Developing fish seed value chain in Bangladesh*

Development and refinement of technologies related to decentralized fish seed production [DSP] in Bangladesh could be traced back to a series of research and development efforts about developing appropriate hatchery system for freshwater fish by the Asian Institute of Technology [AIT]; WorldFish Centre, Institute of Aquaculture, University of Stirling UK; Bangladesh Fisheries Research Institute [BFRI]; Department of Fisheries, Government of Bangladesh; and several NGOs.

Seed (fingerlings or fry) represent perhaps the most critical input for aquaculture, yet the geographically clustered nature of hatchery and nursery operations means that seed is often transported over long distances, thus reaching farmers in poor condition; supply is often unable to keep pace with demand; and a few powerful individuals maintain a monopoly over supply chains. Decentralising the production and supply of fish seed through use of irrigated rice fields for common carp and tilapia fingerling production, and ponds for nursing riverine carps, provides a solution to many of these problems<sup>2</sup>. Lack of high-quality tilapia brood fish was found to be the

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<sup>1</sup> This methodology was developed by the Papa Andina programme, anchored by the International Potato Centre (CIP) in the Andes highlands of Latin America. It involves market chain actors in well-led three phase participatory process to identify, analyze and put in practice new commercial, technological and institutional innovations.

<sup>2</sup> During February farmers stock tilapia broodfish and common carp eggs in small ditches located in suitable corners of irrigated rice fields. Broodfish spawn, and eggs hatch, and the fry forage on insects and algal detritus in the shallow waters of the rice field. Seed production peaks during May and June, with fingerlings harvested by drawing down water levels to concentrate them in the ditch from which they originated, from where they can be retained and netted prior to sale or restocking in household ponds. Little or no additional irrigation or supplementary feed is required, and the fingerlings are ready for sale at the time of peak demand among pond farmers. Seed produced in this manner also tends



major constraint to the further 'organic' spread of DSP to areas in the vicinity of communities in which it had been promoted earlier through previous RNRRS research.

The RIU funded the scaling-up of this proven technology to new direct and indirect beneficiaries through delivery of training and support for improved tilapia broodfish supply. One of the interesting features of this initiative is the recognition of a value chain approach to promote this technology. International Development Enterprise [IDE], which has expertise on value chain development, is a strategic partner in this coalition and one of the main foci of this initiative is on building the value chain [broodfish producers, fingerling traders and table fish growers]. Table 1 presents some of the key features of the three cases.

**Table 1: Key features of the three cases promoting value chains**

Feature	CoDI case	IDE case	RDRS case
Assembly of the cluster of actors	Key stakeholders are organized in a coalition and involved in facilitating value chain building effort	Key components of the existing value chain are brought together through PMC approach	Key stakeholders are working as part of a loose network and are supporting development of fish seed production and distribution network
Approaches/ strategies for putting existing knowledge from RNRRS into use	Different streams of existing knowledge is appropriately mixed to continuously develop an approach for value chain innovations	Proven knowledge is being adapted and adopted in a different context for innovations around value chains	Proven knowledge is being scaled-up/out in a larger area through innovations around value chains
Mechanisms/ strategies for integration of research in the innovation process	Research organizations are part of the coalition and there is a two-way feedback and information sharing.	Small holders' organizations are capacitated to articulate need for research outputs to research agencies.	Research organizations are part of the network and there is two-way feedback and information sharing.
Features and ways of making the effort pro-poor	Focus on promoting cultivation of under-utilized crops and value addition of produce through development of germplasm orchards and establishment of food processing parks.	Focus on building capacities of small holders' organizations	Focus on developing small-holder rice field farmers and seasonal pond owners as producers of fish seed.
Produce in	Under used/ traditional crops	Main-stream fruits and	Fresh water fish species

to be healthier, larger, and more predator resistant than that from hatcheries, and less likely to have suffered physical damage as a result of transport over long distances.

consideration	(cereals, fruits and vegetables)	vegetables	that are self-recruiting
Status of the existing value chain	Mostly absent	Mostly present but with inefficiencies and missing links	Mostly present but with inefficiencies
Intervention in the value chain	Simultaneously building different components of the value chain	Building capacity of small holders' organizations to identify and respond to market opportunities. Linking small holders' organizations with different components of the existing value chain	Involving small holders in the fish seed production and building a value chain by integrating existing elements of the value chain
Facilitator of the effort	A non-profit making civil society organization	A not-for profit organization	A non-profit making civil society organization

Source: Reddy, VTS [2010]

The RIU projects led by RDRS and the CoDI/ICUC have emerged from the realization that research needs to be embedded in the wider innovation system and that research has to play an important role, if the findings of research [mainly technical and institutional innovations] are to be applied and used [or in other words for innovation to happen]. All three projects reveal clearly the need for continuous interaction and intermediation among the different actors in the value chain for building capacities.

**Theme 3: Innovation in NRM [Natural Resource Management]**

There is an increasing realization that active participation of communities and involvement of a range of stakeholders with different perspectives, skills and knowledge about managing natural resources is critical for effective and sustainable management of natural resources. This has led to several attempts at democratizing the governance and use of natural resources wherein the organizations of the users [often the poor who make a living out of accessing natural resources] are given the authority to manage natural resources [forests, grazing lands, watershed, flood plains etc]. However, several challenges still remain, the most important being the need for implementing an adaptive collaborative approach that builds on learning, collaboration and intermediation.

RIU has two projects that are trying to promote innovation in NRM. The first implemented by Forest Action, an NGO in Nepal, focuses on promoting innovations in internal group governance [visioning, hamlet-based planning and decision making and self monitoring] among community forest user groups [CFUGs] and introducing active forest management and sustainable harvesting technologies, including enterprise development. The second project, implemented in Bangladesh by Bangladesh Environmental Lawyers Association [BELA] in collaboration with the Flood Hazard Research Centre [Middlesex University, UK], is promoting innovations in managing flood plains in Bangladesh. Integrated Flood Plain Management [IFM] involves participatory action plan development, adaptive learning among the stakeholders, development and compliance of rights and legal framework for community based management of flood plain resources and resource management for fisheries and crop production.

### *Case 5: Up-scaling innovations in forest management in Nepal*

User group community-based forestry emerged in Nepal during the early 1990s. Villagers who depend on forests for their livelihood are organized into a CFUG and are entitled to manage and utilize part[s] of accessible national forests as community forests, as per their operational plan approved by the District Forest Office. FECOFUN, the Federation of Community Forest Users, Nepal, was formally established in 1995 in response to the need expressed by the leaders of CFUGs to have a platform to share and learn lessons and to promote and advocate the community forestry agenda and users rights over forest management. Establishment of CFUGs and FECOFUN improved the ability of forest users in negotiating with the Forest Departments on policies and approaches to forest management. However, due to the limited technical capacity of CFUGs [to undertake resource assessment and planning] and the continued dominance of CFUGs by local elites [leading to little say in decision making by socially excluded groups], the progress towards active and democratic forest management has been too slow [Ojha and Timsina, 2008].

DFID, IDRC and CIFOR [Centre for International Forestry Research] had supported several research programmes in the Nepal forest sector over the last two decades.

This has led to several technical and institutional innovations such as:

- participatory forest management techniques, including pro-poor and multi-product
- silviculture practices, improved harvesting techniques of medicinal plants, improved forest product utilization,
- innovative CFUG governance processes, including self-monitoring, hamlet based planning and decision making, joint reflection, social auditing and improved communication strategies
- adaptive collaborative processes focusing on multi-stakeholder policy analysis and learning to facilitate policy reforms.

Forest Action has been a part of many such initiatives and it realized that development and promotion of effective innovations depends by and large on a combination of governance related issues across levels [including clarity of rights and roles, sharing and balance of power, extent of participation and interaction of lower layers in decision making] and promoting planning and self monitoring processes in enterprise development and marketing of forest products and services by CFUGs.

Under the RIU project, Forest Action in collaboration with FECOFUN and NEHHPA [Nepal Herbs and Herbal Products Association] is trying to disseminate, adapt and utilize some of the above innovations by directly working with 60 CFUGs and drawing valuable lessons on how these innovations can be put to use. As media play an important role in disseminating good practices aimed at conservation and management of natural resources, the project is also partnering with the local FM radio stations and the Nepal Forum of Environmental Journalists [NEEFJ].

To make the CFUGs more relevant, representative and more responsive, the project formed and strengthened hamlet committees [all stakeholders at the ward level] and thematic committees within the CFUGs. These sub-committees were allocated specific roles and responsibilities and this facilitated these groups to play their role more effectively. The project interventions are focused around trainings [forest management and governance], cluster-level sharing, interaction with district level shareholders and organizing regular radio programmes. The project is also organizing several hamlet level meetings and meetings of thematic working committees to address the genuine concerns of all forest users and this has resulted in redress of grievances and resolving conflicts at the local level. Another innovation has been the use of local resource persons at the hamlet level; these resource persons have been playing a bridging role among CFUGs and its other committees.

To strengthen communication among and between local communities and the rest of the stakeholders, the project is testing a community-based resource centre that would serve as a meeting hall as well as a resource and documentation centre on all aspects of community forest management. The project is also assisting communities in developing community-based forest-based enterprises. One of the major insights that came out from the project has been the realization that these enterprises often do not have the autonomy for economic innovation due to excessive bureaucratic control and therefore these issues need to be taken up with the forest department.

#### *Case 6: Scaling up IFM through adaptive learning networks*

Flood plains cover about half of Bangladesh. Large areas of private farmland become common land for fishing when the land is inundated for up to half the year. Conflicts between farmers and fishers over dry season water are a common feature in flood plains. Integrated Floodplain Management [IFM], an approach that recognizes flood plains as a system, attempts to maximize floodplain productivity and returns by adopting a series of technical and institutional innovations. [Sultana and Thompsun, 2009] These innovations have the potential to improve agriculture, water use and fisheries management in ways that complement one another. IFM incorporates; profitable alternative dry season crops with lower water demand than irrigated rice to conserve more water for fish in the dry season; closed seasons for protecting breeding fish and fingerlings; shorter duration rice varieties to enable earlier sluice gate opening; modified sluice gate operation to balance needs of both rice and fish; dry season sanctuaries for fish; alternative jute retting [extraction of fibres which involves soaking jute stalks in water] to reduce problems of poor surface water quality in floodplains; integrated pest management; rehabilitation of locally rare/extinct fish species; and excavation of canals to restore water for fish and crops.

The approach and many of the elements of this approach arose from the earlier RNRRS research. One of the most important findings from many of the previous RNRRS research has been the importance of CBOs [community-based organizations] in effective and sustainable management of natural resources. Another innovation that was tested and proved effective in building consensus in favour of inclusive and pro-poor interventions is the process of Participatory Action Plan Development [PAPD]. This involves a series of local workshops in which different stakeholders participate to develop a management plan for the common floodplain resources. A pre-condition for this is the existence of CBOs with rights and responsibilities to coordinate management of floodplains and an adaptive learning network that operates through a cycle of workshops among

CBO leaders to coordinate and share experiences, lessons and plans. These options were tested and found effective as part of previous initiatives.

The RIU initiative is aimed at promoting or up-scaling the IFM approach through an adaptive learning framework by working with 250 CBOs. The interventions focus on building the capacity of CBOs, developing their linkages to other organizations, provision of support for legal cases and promoting different technological options in crop production, fish farming, water management and promotion of new enterprises. The project selects CBOs that have potential to take up IFM activities and provide technical support [demonstration, training, input support] to take up new initiatives. Though the technical and organizational capacity of CBOs have improved over the years, many have limited capacity on their own to take actions within administrative and legal systems to sustain their rights and responsibilities over flood plan resources such as leased water-bodies.

Wherever CBOs face threats and legal challenges from rural elites, BELA has been trying to provide support to face legal disputes. It is also providing advice and support to the CBOs for alternate dispute resolution [outside courts]. The project is trying to empower the CBOs to access relevant new knowledge and services and also links the CBOs to relevant policy actors who are critical for addressing various institutional, legal and policy issues of water resource management [e.g. Ministry of Land]. The CBOs supported by the project are also linked to the Society for Water Resources Management [SWRM], the federation of CBOs in Bangladesh.

**Table 2: Key features of the two cases promoting innovation in NRM**

Feature	Community Forestry Management	Integrated Flood Plain Management
Assembly of the cluster of actors	Key stakeholders are organized in a coalition around Community Forest User Groups [CFUGs]	Key stakeholders are organized in a coalition around Community Based Organisations [CBOs]
Main focus	Capacity development of the forest user groups at various levels to deal with institutional, governance and policy level challenges related to use of forests and support to community based forest enterprises	Capacity development of the CBOs to deal with institutional and policy level challenges regarding water use and improving productivity of the system through a series of technical interventions
Approaches/ strategies for putting existing knowledge from RNRRS into use	Knowledge on institutions [around effective and equitable governance] and technologies [sustainable forestry and enterprise development] are integrated at the level of CFUGs	Knowledge on institutions [participatory action plan development] and technologies [fisheries, crop production, water management and new enterprises] are integrated at the CBO level.
Features and ways of making the effort pro-	Formation of hamlet level and thematic committees at the micro level to bring the concerns and needs of socially excluded groups to the CFUGs	Special focus on including more women in CBOs and developing action plans in consultation with women.  Legal support and advice to address issues

poor		related to non-enforcement of rights
Influencing national policies	Working with FECOFUN, the national federation of community forest user groups FECOFUN. Apart from this the Forest Action, leading this initiative is represented in various national committees on forest management through which it bringing the lessons from the initiative to the policy making process	Linking CBOs under the project with SWRM, the federation of water resource CBOs. Apart from this, BELA the lead organization is represented in many important government committees entrusted with drafting policies and recommend legal changes

Both these projects use collaborative approaches and adaptive learning strategies to negotiate among the wide range of actors, building social capital and identify activities for sustainable use of natural resources. As institutions and policies determine access and use of natural resources to a great extent, both the projects had to find ways of pro-actively engaging with the national governments.

**Theme 4: Investing in institutions for rural service delivery**

In the past few years, savings-led microfinance through self-help groups [SHGs] has gained recognition as an effective way to bring low-cost financial services to very poor families in India. In India and in other South Asian countries, the majority of SHGs consists of women because in these countries, self-employment through microfinance is perceived as a powerful tool for emancipation of women [Ghosh, 2005]. Members save small amounts of money - as little as a few rupees a month - in a group fund. Members may borrow from the group fund for a variety of purposes ranging from household emergencies to school fees. As SHGs prove capable of managing their funds well, they may borrow from a local bank or a Micro Finance Institution [MFI] to invest in small business or farm activities. The MFIs stress on asset creation by the SHGs and extend loans for production. Some of the MFIs provide training for the same.

Though SHGs have been playing an important role in empowering women economically, there have been concerns that microfinance is not reaching the poorest sections of the society. In India, about half of SHG members and only 30% of MFI members are estimated to be poor [below the poverty line]. Only about 22% of the all poor households [about 75 million are currently receiving microfinance services, at least micro-credit [Ghatke *et al* 2007]. States in the central and eastern regions of India currently lag behind in the number of SHGs.

*Case 7: Promoting pro-poor livelihoods through micro-finance and promoting rural service delivery*

Existing constraints to delivery of community development and agricultural services to the extremely poor in rural locations include limited reach due to high transaction costs relative to the value of the businesses offering these services, the lack of financial products in the formal credit markets and agricultural services that meet the needs of the poor and socially disadvantaged. Previous research, funded by RNRRS in Bihar and Eastern Uttar Pradesh in India, explored the opportunities for integrated management of land and water resources for enhancing productivity and developed an effective community development approach called the dialectic approach. It



involves an iterative and dynamic process of engagement between small affinity groups and an external facilitator, via which self-help groups emerge and are stabilised. Central to the process is analysis of poor people's micro-level situations via repeated re-examination of positions and arguments, and review of available resources, capacities and opportunities. The approach focuses on the poorest and most socially disadvantaged in villages, without excluding others. No incentives or inputs are offered or provided, but self-help groups (SHGs) are encouraged to interact with each other and external agencies at will, and to negotiate with them [Gaunt and Sikka, 2005].

The RIU project is supporting the expansion of this approach by forming 10,000 groups in 2000 villages spread over 11 districts and intends to establish new input and service centres in rural areas. This project is implemented by GYA, UK in collaboration with CPSL [Centre for Promoting Sustainable Livelihoods], an NGO in Bihar and the ICAR research centre at Patna [India] among the poor and socially disadvantaged rural population of Bihar, Eastern Uttar Pradesh and Madhya Pradesh. The project called 'Rojiroti' attempts to reach the ultra-poor by using group saving as the starting point followed by access to microfinance, linked to agro-input centres, technical expertise and other financial products, such as insurance, as a way to promote technical knowledge generated by RNRRS in the same region. RIU investment has been used primarily to support the business plan of CPSL in promoting this approach.

The cost of the SHG formation process through this approach is significantly lower than other models in India. Existing group members are promoting new groups and are acting as volunteers and sometimes coordinators. It reaches the ultra poor in these regions and many of the SHGs start with saving as little as Rs. 1-2 per week. This ensured that the initiative stays with the members of the group and reduce chances of 'elite capture'. The small loans taken by the group members have enables the poor to invest in agriculture, small business, medical treatment, food purchase, livestock purchase, developing water resources etc. The data generated from the project has shown that SHG membership has led to less borrowing for food and less borrowing from moneylenders. The majority of loans in the first 6 months of a SHGs life are typically for medical treatment [with a result that days of family sickness falls by a third]. Subsequently an important use of loans is to gain access to land for sharecropping or leasing. Increased income security is reflected in a drop in forces asset sales [from 31% to 24% of SHG households].

To improve input supply, the project is establishing information and input supply centres [*Kisan Soochna Kendra*] and is linking the same with village service providers who operate at the village level. The members of the SHGs are also linked to insurance services. The research institute [ICARER] is facilitating the exchange and access to, new agricultural information and ensure convergence with existing agriculturally focused programme. The scientific expertise of ICARER is also used for preparing extension materials on different agricultural interventions and small enterprises. The project is trying to attract equity from other banks and MFIs for scaling up this model to other regions. The focus is on establishing institutions for rural service delivery to the poor that combine credit, insurance, inputs and technical support on a business model in places that are not served adequately by both the private and the public sector. However some of the existing and new regulations related to micro-finance are currently constraining CPSL's ability to raise more capital at reasonable interest rates. The project is trying hard to impress the policy actors on the limitations of existing norms and practices and creating a case for change in policies.

## Discussion

All the above cases discussed here have come out of projects specifically designed to promote new knowledge for impact with an intention to learn about relevant ways of promoting innovation. These cases also represent wide experience of promoting different kinds of technical and institutional innovations in varied context. Though these cases are works in progress, they offer several generic lessons on how agricultural research can better contribute to development or in other words, how to promote innovation - the process by which new knowledge is generated and applied more widely.

### *Shift in focus from research to capacity development*

All the technical and institutional knowledge that is being up-scaled in these projects have come out of several years of research wherein research organizations played a major role in developing and validating the new knowledge in the same or similar situations. The technologies developed [better and more relevant seeds; cultivation and post-harvest management practices of under-utilized crops; decentralized fish seed production; crop and fish production technologies in floodplains, value addition of forest products] were pilot tested and found relevant and the projects relied on demonstrations and training, often in partnership with NGOs, to promote these. Institutional innovations, such as PCI, user management of forests, flood plain management by CBOs, participatory market chain analysis, dialectic approach etc, were promoted through disseminating the relevance of these new approaches through publications, policy briefs and policy engagement.

Though these activities are useful, these approaches have often failed to expand beyond the areas where these have been promoted or pilot tested. As achieving impact was not considered the task of research and also because separate organizations exist to promote these, the research teams were not bothered about achieving large scale impacts of using this new knowledge. But when challenged to demonstrate sustainable large scale impacts [as in the case of RIU], the researchers realized the need for working with a wider set of partners and the focus in turn shifted to capacity building.

Though the initial focus was on building the capacities of the users or user groups [CBSPs, CBOs, CFUGs, SHGs, market committees, producer groups, SHGs] soon it became apparent that capacities of all other supporting actors in the network, including the researchers, needed upgrading. While developing new knowledge and promoting it through demonstrations and trainings were the core activity earlier, regular interactions and collaborative action with varied stakeholders became the central activity now. Research is playing a major role in adapting generic knowledge on new technologies [fish seed production, value addition, enterprise development] which had to be adapted to the varied situations. Similarly the assumptions and approaches underlying institutional innovations, such as community forest management, floodplain management, dialectic approach and rural service delivery, had to be modified and adapted to the wider policy and institutional contexts related to access, rights, regulations and existing inequalities.

In other words, these projects had to organize a wide range of activities and these include discussions, meetings, reflective workshops, village fairs, enterprise and business development training, value chain analysis, extensive use of media, presentations to policy makers, collaborate in formulating new laws and regulations, and linking different input and output markets. Media, especially FM radio, was used quite effectively in Nepal to create awareness of new seeds and its availability [in the case of PCI] and sensitizing communities on new ways of governing community managed forests [Forest

Action]. All these activities were aimed at enhancing the capacity of all the actors so that they could bring about innovation. This has clear implications for all those who are keen to learn how research could contribute to innovation and development and also for those funding agricultural research. If research has to contribute to development, the goal of research should be expanded to include capacity development of the wider system of which it is a part.

#### *Changing roles of research*

Research organizations are often not equipped to handle effectively all the tasks associated with managing coalitions of varied stakeholders that are critical for putting new knowledge into use on a wider scale. How then could research contribute better to such initiatives? It would be useful for research organizations to have these skills, but what is more important is the need to have a wide range of partnership strategies that could potentially work in different settings. In certain types of activities and in certain contexts, researchers could play the role of network co-ordinator. The findings from this research indicate that either research should partner with other actors who can effectively do this, or better partner with organizations that can better lead these set of activities. Research could then be in a better position to contribute to these initiatives as a technical partner. In all the seven cases discussed in this paper, except for ICUC, all the other initiatives are led by non-research partners. Research organizations are partnering in various capacities in many of these initiatives as members in the coalitions.

The findings from these cases also challenge the traditional approach of compartmentalizing problems of producers into research, extension and marketing issues and addressing the same separately in a sequential mode. In contrast, these cases are all about developing arrangements that could successfully integrate the different bits of knowledge from technology, social mobilization, dissemination and training strategies, business, credit delivery, marketing, policy etc, by bringing the right kind of partners and linking with others in the process. A coalition of actors with complementary skills and capacities addressing the various dimensions of a problem simultaneously is therefore important in putting knowledge into use. Though these projects were originally conceived by RIU as activities for putting previously developed research into use, what is increasingly clear is the need for continuous adaptation of this new knowledge if this is to be widely adapted. Or in other words, research should be a part of the process of putting knowledge into use.

#### *Learning as a key management strategy*

Reflection and learning have emerged as two key strategies adopted in all cases to find better ways of dealing with the challenge. The wide range of consultations mainly reviews, reflections, experience sharing workshops, negotiations among different groups, study visits, establishment of resource centres all point to the importance of learning as a management tool employed in all the projects. This is more evident in the natural resource management cases. In other cases too, the projects had to make changes in response to unanticipated constraints and new opportunities. In other words, projects meant for wider impacts should have adequate flexibility to deal with changing circumstances and should have an action research orientation. Donors funding research initiatives and managers who operate such projects should be aware about some of these and should facilitate the process of quickly responding to changes, wherever it is needed, if projects have to make impacts.

### *Explicit focus on engaging with the policy system*

As policies play an important role in the wider uptake of knowledge, all the projects are either collaborating with policy relevant partners or are looking for opportunities to engage with the policy actors at the national level. Most of these cases clearly reveal how policies disable new knowledge and approaches from being adopted and therefore the need to engage pro-actively with policy system. While PCI has to engage with rules and regulations related to varietal release, the IFM approach had to engage with policies related to lease of water bodies and need support to deal with legal challenges. Community-based forestry enterprises can succeed in Nepal only if the excessive bureaucratic controls exercised by the forest department could be relaxed. Similarly organisations promoting innovation credit and rural services for the poor, such as CPSL, can expand its approach only if it could influence the emergence of a regulatory regime that can appreciate the importance of serving the poorest in disadvantaged regions and relax some of the rules related to funding and operation of MFIs.

While disseminating findings of the policy research was the earlier practice, these initiatives currently work with policy relevant actors and those higher level organizations of users to deal with policy change. For instance, the federation of user groups, FEFUCON is an important partner in the community forestry project in Nepal. The IFM project in Bangladesh is working closely with the SWRM, the federation of water management CBOs to influence policies. Both Forest Action in Nepal and BELA in Bangladesh have several years of experience of working for policy change and are part of several policy level consultations. Rojiroti in India is working with the Sa-Dhan, the association of community development financial institutions, to promote the approaches emerging from the project. Similarly Li-Bird, Forward and CAZS-NR partner with the Nepal Agricultural Research Council and the Department of Agriculture, Nepal to bring about changes in their attitude and policies regarding NGOs role in breeding and release of varieties as well as promoting good practices from promotion of CBSPs into the government seed self sufficiency programme. An enabling policy framework is therefore important for promoting innovation and programmes aiming at wider uptake of new knowledge should have strategies to engage with the policy system.

### *Duration of projects*

Projects aimed at achieving impact at a wider scale often need a longer duration of funding than the conventional 3-year project cycles. Finalising working relationships among the partners, developing a shared understanding on the approaches, getting the right candidates for the tasks and the baseline surveys had taken almost one year, from the 3-year project duration. Addressing the kind of policy and institutional challenges being faced in all the cases would necessitate generating evidence of more production cycles. And new knowledge often needs to be generated during the process of uptake to deal with the secondary problems that emerge during the uptake process. All the cases discussed here have made reasonable progress in making impacts. The project discussed in this paper are directly working with about 0.2 million people. These initiatives are scheduled to end by mid-2010. However, these initiatives can have much wider impact, if some of the activities in these initiatives could be taken forward for another two years, by linking them to new sources of funding. Moreover this would also enable much better synthesis of generic lessons on operationalizing agricultural research for development.

## Conclusions

Agricultural research could contribute better to the process of putting knowledge into use, if it could be guided or coerced to be an active partner in the process of development. To do this the role of research needs to be redefined or expanded to include activities which are beyond its conventionally understood role as a source of new knowledge. To do this expanded role, research needs to be embedded in networks of technology users, intermediaries and the policy actors. This would mean that the conventional approach of separately funding, governing and even reforming the different actors has to be discontinued and in place of that a new arrangement that can ideally focus on research and capacity building together should emerge.

The preliminary evidence emerging from these projects clearly indicate that balancing the process of generating knowledge and applying it more widely is indeed possible in varied contexts. But this would need diverse approaches and careful selection of the right approach for different circumstances as well as some fundamental reforms in the way research is funded and the process of research is managed. RIU projects in Asia could offer more potential insights and lessons on how to do this as the projects progress during the coming months.

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