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**MISSING THE TARGET:
LESSONS FROM ENABLING INNOVATION IN SOUTH ASIA**

Rasheed Sulaiman V., Andy Hall and T.S. Vamsidhar Reddy

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DISCUSSION PAPER SERIES

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MISSING THE TARGET: LESSONS FROM ENABLING INNOVATION IN SOUTH ASIA

Rasheed Sulaiman V.¹, Andy Hall² and T.S. Vamsidhar Reddy³

Abstract

This paper reflects on the experience of the Research Into Use (RIU) projects in Asia. It reconfirms much of what has been known for many years about the way innovation takes place and finds that many of the shortcomings of RIU in Asia were precisely because lessons from previous research on agricultural innovation were “not put into use” in the programme’s implementation. However, the experience provides three important lessons for donors and governments to make use of agricultural research: (i) Promoting research into use requires enabling innovation. This goes beyond fostering collaboration, and includes a range of other innovation management tasks (ii) The starting point for making use of research need not necessarily be the promising research products and quite often identifying the promising innovation trajectories is more rewarding (iii) Strengthening the innovation enabling environment of policies and institutions is critical if research use is to lead to long-term and large-scale impacts. It is in respect of this third point that RIU Asia missed its target, as it failed to make explicit efforts to address policy and institutional change, despite its innovation systems rhetoric. This severely restricted its ability to achieve wide-scale social and economic impact that was the original rationale for the programme.

Key words: Research Into Use, Innovation Management, Agricultural Research, Innovation, Development, Policy, Value Chain Development, South Asia, Innovation Trajectory

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RIU DISCUSSION PAPER SERIES

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LIST OF ACRONYMS

| | | |
|--------------------|---|---|
| ADB | - | Asian Development Bank |
| AFP | - | Adivasi Fisheries Project |
| AID COMILLA | - | Agency for Integrated Development, Comilla |
| BAIF | - | Bharatiya Agro Industries Foundation |
| BARI | - | Bangladesh Agricultural Research Institute |
| BELA | - | Bangladesh Environment Lawyers Association |
| BFRF | - | Bangladesh Fisheries Research Forum |
| BFRI | - | Bangladesh Fisheries Research Institute |
| CARE | - | Cooperative American Relief for Everywhere |
| CAZS | - | Centre for Arid Zone Studies, Bangor, United Kingdom |
| CBOs | - | Community-Based Organisations |
| CBSPs | - | Community-Based Seed Producers |
| CFUGs | - | Community Forest User Groups |
| CGIAR | - | Consultative Group on International Agricultural Research |
| CIP | - | Centro Internacional de la Papa (International Potato Centre) |
| COB | - | Client Orientated Breeding |
| CNRS | - | Centre for Natural Resource Studies |
| CPHP | - | DFID's Crop Post-Harvest Programme |
| CPSL | - | Centre for Promoting Sustainable Livelihoods, India |
| CRISP | - | Centre for Research on Innovation and Science Policy |
| CRS | - | Catholic Relief Services |
| CRT | - | Central Research Team, RIU |

| | | |
|----------------|---|---|
| DAE | - | Bangladesh's Department of Agricultural Extension |
| DASP | - | Decentralization of Sustainable Aquaculture Project |
| DFID | - | Department for International Development, UK |
| DoF | - | Department of Fisheries, Bangladesh |
| DSP | - | Decentralised Seed Production |
| EBRM | - | Ecologically-Based Rodent Management |
| FAO | - | The United Nations Food and Agriculture Organization |
| FAVRI | - | Fruit and Vegetables Research Institute, Vietnam |
| FECOFUN | - | Federation of Community Forest Users, Nepal |
| FORWARD | - | Forum for Rural Welfare and Agricultural Reform for Development |
| GATE | - | Global Agritech Nepal Private Limited |
| GFRAS | - | Global Forum for Rural Advisory Services |
| GIFT | - | Genetically Improved Farmed Tilapia |
| GVT | - | Gramin Vikas Trust |
| GYA | - | GY Associated Ltd. |
| ICAR | - | Indian Council for Agricultural Research |
| ICF | - | Innovation Challenge Fund |
| ICLARM | - | International Center for Living Aquatic Resources Management (Renamed as the World Fish Center) |
| ICUC | - | International Centre for Underutilised Crops |
| IDE | - | International Development Enterprises |
| IPM | - | Integrated Pest Management |
| LI-BIRD | - | Local Initiatives for Biodiversity Research and Development |

| | | |
|----------------|---|---|
| LINK | - | Learning INnovation Knowledge |
| NEEFJ | - | Nepal Forum of Environmental Journalists |
| NEHHPA | - | Nepal Herbs and Herbal Products Association |
| NFEP | - | Northwest Fisheries Extension Project, Bangladesh |
| NGOs | - | Non-Governmental Organisations |
| NRM | - | Natural Resource Management |
| ODA | - | Overseas Development Administration (Renamed DFID) |
| PCI | - | Participatory Crop Improvement |
| PMCA | - | Participatory Market Chain Approach |
| PPB | - | Participatory Plant Breeding |
| ProSCAB | - | Promoting Sustainable Coastal Aquaculture in Bangladesh |
| PVS | - | Participatory Varietal Selection |
| R&D | - | Research and Development |
| RAAKS | - | Rapid Appraisal of Agricultural Knowledge Systems |
| RDRS | - | Rangpur Dinajpur Rural Service |
| RIU | - | Research Into Use |
| RNRRS | - | Renewable Natural Resources Research Strategy |
| S&T | - | Science and Technology |
| SHGs | - | Self-Help Groups |
| SWRM | - | Society for Water Resources Management |
| UK | - | United Kingdom |
| UN | - | United Nations |
| USA | - | United States of America |

1. INTRODUCTION

This paper reflects on the experience of the Research Into Use (RIU) programme in South Asia. RIU was commissioned by the UK's Department for International Development (DFID) in 2006 with two purposes: Firstly, to promote results from its previous research in order to achieve impact at scale and, secondly, to generate lessons on the process of putting research into use. To achieve this, the programme adopted different strategies in Asia and Africa. In Asia, the programme focused on funding 13 modest-sized projects to upscale research products developed under DFID's RNRRS (Renewable Natural Resource Research Strategy) programme. At first glance this "putting into use" aim of RIU has the appearance of the widely discredited transfer of technology approach. However, the experience from these projects reveals much more about the realities of using research (both the process as well as its products) as part of an innovation process. It also reveals the shortcomings of the approach adopted by RIU.

In terms of understanding the innovation process, the experiences of RIU in Asia reconfirm much of what has been known for many years about the way innovation takes place. Indeed, as this paper will discuss, many of the shortcomings of the programme in Asia were precisely because lessons from previous research on agricultural innovation were "not put into use" in the programme's design and implementation. However, having reconfirmed these lessons, RIU's experience has much to offer donors and governments who are struggling to make agricultural research an effective policy tool in international development efforts. Three points stand out:

i. Promoting research use is dependent on enabling innovation. Putting research results into use requires innovation to take place. However, dissemination of technology and other research products alone is not enough to stimulate innovation. Instead, putting research results (and research expertise) into use requires collaboration among a wide range of actors, including researchers, but also others. The RIU experience, however, also revealed that collaboration (and efforts to build that collaboration) is only part of the task of making innovation take place. In addition to this a range of what this paper describes as innovation management tasks are required; these include negotiating change, policy advocacy,

reflection and learning as well as familiar tasks already mentioned, such as helping farmers access technology and developing networks.

ii. Technology is not the only starting point for putting research into use. Research plays a variety of roles as the innovation process proceeds and unfolds over time — this paper refers to the trail of events as the innovation trajectory. There is no set sequence to this and research tasks such as problem solving, adaptation and generating new information can be required at any time as innovation circumstances dictate. In other words, putting research into use is not a post-research, information dissemination task *per se*. Rather, it is chiefly concerned with ensuring that research is a tool available and responsive to those marshalling resources and expertise to deal with the dynamic world where innovation trajectories play out. This means that technology is not the only starting point for efforts to make better use of research. Other starting points are the range of social and economic endeavours that emerge around different opportunities and challenges and act as a focusing device for change and innovation. In other words “into use” attention needs to shift from solely promising technologies to consider promising innovation trajectories

iii. Research use and innovation require explicit efforts to strengthen the enabling environment if long-term, large-scale impacts are to be achieved. The pace and direction of an innovation trajectory — and thereby its potential impact — is quite often dependent on how it modifies the wider shaping and enabling environment of policies and institutions so as to accommodate new approaches; this paper refers to this wider environment as the techno-institutional regime. Without having a clear strategy to deal with the policy and institutional environment, putting more resources and efforts to achieve direct household-level outcomes in a post-research situation is unlikely to lead to wider impacts beyond pilot scale, time-bound project activities.

The paper makes two main conclusions. Firstly, research use needs to be supported as an integrated process of innovation rather than a two-stage, sequential process of discovery (research) and application (technology adoption). In other words innovation trajectories need to be supported rather than trying to find homes for research results. Secondly, unless an institutional learning and change agenda is explicitly targeted and supported with specific

activities and resources, programmes promoting innovation will end up missing their target with little impact in the short and long-term and with limited chance of sustaining the introduced changes. This has an implication for the monitoring and evaluation of programmes supporting innovation. It suggests that a key performance indicator of such programmes will be about institutional changes associated with embedding research in the wider innovation process and changes in the techno-institutional regime that enable innovations to spread beyond pilot projects. Household-level impacts arising from a more effective innovation system will be measurable once institutional changes have had time to enable innovation. However, it makes little sense to try and attribute these impacts to research and research use as this is only one element of the wider process of innovation and impact.

The rest of the paper is organised as follows. Section 2 deals with the history of RIU in Asia and its assumptions. The main features of the process of putting research into use, as revealed by RIU, are presented in this Section 3. Section 4 discusses the results brought about by RIU in terms of impact and sustainability. The limitations of the approach are discussed in Section 5. Section 6 discusses the lessons from RIU in terms of its implications for policy and practice. The conclusions are given in Section 7.

2. RIU IN ASIA: A BRIEF HISTORY AND THE UNDERLYING ASSUMPTIONS

The RIU programme began by taking stock of the research products developed from the projects funded under the RNRRS programme. A database and short summaries describing 278 research outputs were prepared and widely disseminated. In Asia, the programme started with a country assessment study and policy actor network analysis. However, these were not used to develop regionally-led activities. Instead RIU in Asia adopted a challenge fund approach to select projects targeted at up-scaling knowledge generated previously. RIU's justification for adopting this approach was that "considering the relatively large number of validated RNRRS research outputs that are considered not to be adequately being got (*sic*) into use, and the very large number of potential organisations who might be able to play a role, a challenge fund would be a legitimate mechanism for addressing this opportunity" (RIU internal programme communication).

The programme emphasised the use of an innovation systems approach in its call for proposals. This was primarily understood in the programme as an approach that gave importance to partnerships and networking among a wide range of actors for horizontal and vertical scaling up and use of research results. The programme received 123 concept notes and finally selected 13 projects. These were referred to as the Asia Innovation Challenge Fund (ICF) projects. Started in July 2008, these were modest-scale projects (budgets in the range of £150-500,000 over three years), building on earlier research by members of project teams with the logic that a final "into use" phase could address the impact at scale objective of RIU.

As originally conceived there was no organising principle for the selection of projects or for lesson learning from the projects other than that they would put RNRRS research results into use. Following a review of the projects in June 2009, the project portfolio was reduced from 13 to 11. The review screened the projects on the basis of two criteria: (i) potential for achieving (household-level) impact at scale (during the life of the programme) and (ii) potential for learning lessons about putting research into use. The projects dropped were either too research-like with low potential for impact or they deployed implementation

strategies that showed little promise in terms of informing the programme about how research could be used for innovation. Recommendations were also made to close one further project and to focus another in only one country. These recommendations, however, were not acted upon by the programme.

Following this review and the subsequent appointment of a Central Research Team (CRT), which included authors of this paper, the remaining 11 projects were clustered for lesson learning purposes along the following lines:

- Participatory Crop Improvement Innovation
- Innovation in Value Chains
- Innovation in Natural Resource Management

The three projects under the Participatory Crop Improvement theme were refocused and clustered under what the programme referred to as a Best Bet from January 2010, although operationally this made very little difference. A brief description of all the projects is provided for reference purposes in Appendix 1. More details on projects can be found in Vamsidhar Reddy et al. (2011) and Sulaiman et al. (2010).

In early 2010 DFID undertook an annual review of the entire RIU programme. This review recommended a more detailed review of RIU's Asia portfolio to explore the extent of private/business sector participation. This took place during mid-2010 and observed that apart from a few most of the projects in Asia did not have adequate participation of the private/business sector and therefore were not viewed as sustainable. This review recommended early closure of five projects. Following this recommendation, the closing date of two projects was set forward by three months (from June to March 2011). Three projects were closed in May 2011 (one month earlier than originally scheduled) and the rest of the projects closed as scheduled on June 30, 2011.

As mentioned earlier, the Asia projects were by design "post-research" projects, trying to up-scale and out-scale research products developed through previous RNRRS research. There were broadly two types of research products being targeted: technological and

process/approach/institutional research products. Table 1 provides details on the types of these research products and the underlying assumptions in promoting these research products.

Table 1. Research products intended to be put into use in the RIU South Asia projects and the underlying assumptions

| | Types of RNRRS research Products intended to be put into use | RIU Hypothesis/ Assumptions | Implementation Hypothesis/ Assumptions |
|-----------|--|---|--|
| I | Technological artefacts | | |
| | Improved seeds of rice and legumes developed through Participatory Crop Improvement (PCI) | Increasing the availability of seeds will increase demand and thereby enhance further production and use of quality seeds | Subsidised mass production and distribution of seeds and its promotion through NGOs and community seed producers, Subsequently, establishing seed companies under NGOs |
| | GIFT (Genetically improved fish tilapia) and production of fish fingerlings in rice fields | Promotion of decentralised fish seed production approach will increase availability of quality seed fish | Establishing a new value chain and linking actors in this chain |
| | Ecologically-based rodent management | Increasing the supply of rat traps will reduce the rat population if communities are trained in community-based rat management | Local NGOs can train communities and companies can be encouraged to manufacture rat traps |
| | Technologies for coastal fisheries (crab fattening, mollusc culture, seaweed culture, improved fish icing, improved fish drying) | Training fishing communities in new technologies leads to wide scale use | Training and establishing enterprise groups by NGOs will connect fishing communities to markets and facilitate technology adoption |
| | Production and processing technologies in underutilised crops | Piloting community-based production, processing and marketing arrangements will lead to promotion and uptake of underutilised crops | Organise crop fairs and establish germplasm orchards and food processing parks at the community level to establish new value chains |
| | Multi-product silvicultural practices, Improved harvesting techniques of medicinal plants | Training communities in these new technologies will lead to wide scale use | Training communities on harvesting and value addition and linking them to market intermediaries and manufacturers of herbal products |
| II | Process/Approach | | |
| | Participatory Action Plan Development and | Training more community-based organisations in | Training community-based organisations and broker their links |

| | | | |
|--|---|--|--|
| | adaptive co-management and learning approach-joint reflections | integrated floodplain management approaches would lead to its scaling up | with technical, legal and policy expertise |
| | Improved and democratic governance in community forest user groups | Improved governance in community forest management can be achieved by training more groups | Training Community Forest User Groups for local level institutional development and using this evidence to influence macro policy |
| | Integrated delivery of services, mainly micro-credit and improved access to inputs and technical advice | Access to credit allows poor women to access production inputs and technology | Institutional development at the community level and brokering linkages to financial services and input agencies will create a demand pull for drawing new technical knowledge |
| | Participatory market chain analysis | An institutional innovation from Latin America can be adopted and widely applied in Nepal | Linking the existing actors in the value chain |

3. THE PROCESS OF PUTTING RESEARCH INTO USE: MAIN FEATURES

Many of the RIU Asia projects involved researchers from the earlier RNRRS projects. However, with a mandate to scale out promising research products for impact, the RIU projects had to undertake a different kind of an approach from their research-oriented RNRRS predecessors. The main features of this process are discussed in detail below.

3.1 Networking

The need for partnerships was emphasised in the call for proposals. However, the researchers from the earlier research phase initially struggled to identify the right kind of partners to help with the task of achieving sustainable large-scale impacts. In most cases the projects formed coalitions of partners, including new actors with whom they had not worked before. For instance, a project on promoting decentralised fish seed production, led by the NGO RDRS (Rangpur-Dinajpur Rural Services) and its partner the WorldFish Centre (an international research organisation) found that it needed a partner with marketing expertise. To fill this gap it brought in International Development Enterprises (IDE).

Similarly a project dealing with integrated floodplain management brought in the Bangladesh Environmental Lawyers Association (BELA) for its expertise on policy engagement in the natural resource management (NRM) sector. In both cases these were new and unfamiliar partners. All the initiatives in Asia engaged in further networking and partnership arrangements as the projects evolved further. For example, the projects dealing with value chain development had to broker relationships among a variety of market agents, input dealers and producers. The projects dealing with promoting seeds developed by Participatory Crop Improvement (PCI) had to network with seed growers, local agro-vets (agro-input sellers), millers and radio stations.

3.2 Diversity of Organisations

Many different kinds of organisations are part of the RIU initiative. These include international research institutes such as the Centre for Arid Zone Studies-Natural Resources (CAZS-NR) and the International Centre for Underutilised Crops (ICUC); non-governmental

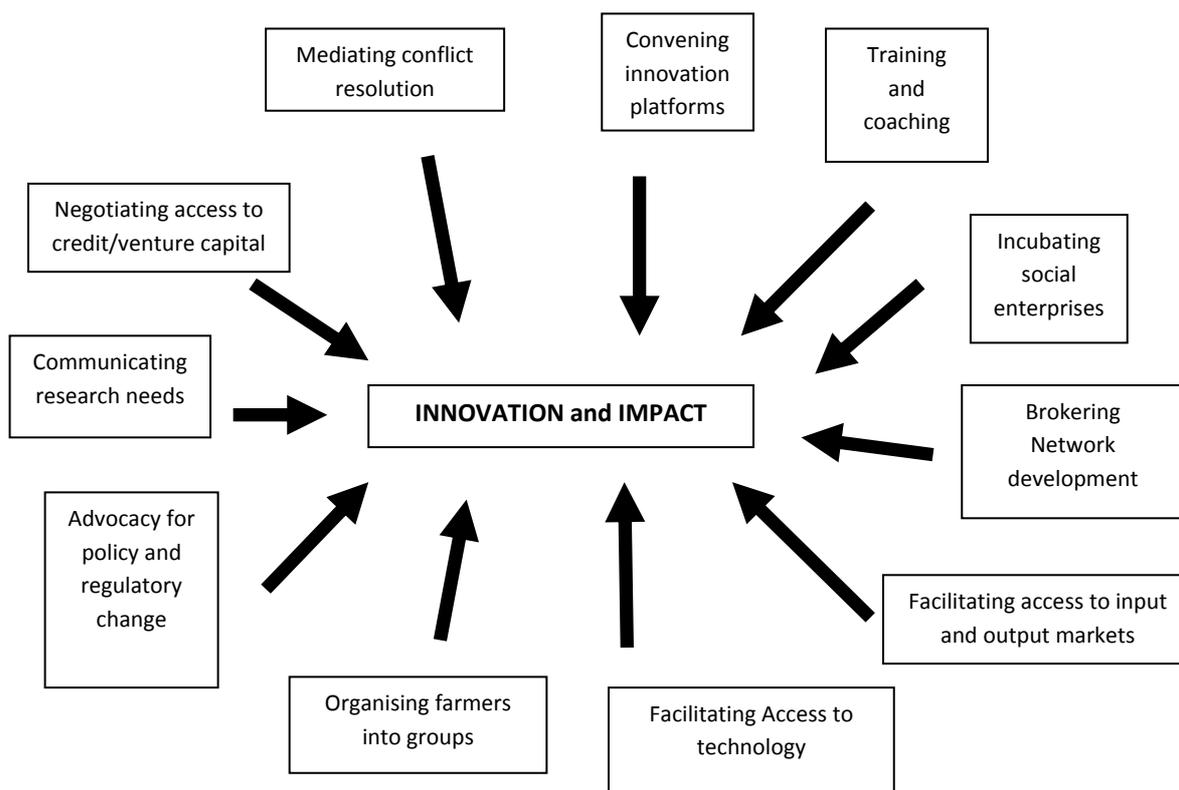
organisations such as Local Initiatives for Biodiversity Research and Development (LI-BIRD) and the Forum for Rural Welfare and Agricultural Reform for Development (FORWARD) in Nepal, Rangpur Dinajpur Rural Service (RDRS) and the Association for Integrated Development, Comilla (AID-Comilla) in Bangladesh; private consulting firms such as GY Associates (GYA) in the UK; specialist market brokering NGOs such as International Development Enterprise (IDE) in Nepal and Bangladesh; legal support NGOs such as Bangladesh Environmental Lawyers Association (BELA); policy think tanks such as Forest Action in Nepal; and sector co-ordination bodies such as Bangladesh Fisheries Research Forum (BFRF) in Bangladesh. The manner in which project coalitions were formed by such diverse organisations has partly to do with the history and evolution of the predecessors of the RIU projects over many years. It is this path-dependency that has led to the emergence of this wide diversity of organisational groupings convening and contributing to the RIU projects.

3.3 Innovation Management

Another reason for this diversity is the wide range of functions, activities and tools that are critical for enabling innovation — and hence putting research into use. Collectively these have been referred to as innovation management tasks (Sulaiman et al., 2010). (See Figure 1 on the following page).

Certain kinds of organisations have a comparative advantage in leading and undertaking some types of these tasks. In recent years such organisations have been classified as innovation brokers (Leeuwis, 2004; Klerkx & Leeuwis, 2009). For instance, a project promoting institutional and governance innovation in community forest management in Nepal required leadership by a policy think tank, Forest Action, which spanned grassroots initiatives and policy advocacy. In contrast another project in Nepal, which focused on strengthening the relationships among various actors in the value chain, required leadership from an organisation with expertise in marketing systems. While researchers led many of the previous initiatives that focused on the generation of new technologies and approaches, in most of the cases they played a secondary or supporting role in the RIU projects. This is because innovation management requires a broader, different set of expertise to research and research management.

Figure 1. Innovation Management Tasks



Source: Sulaiman et al. (2010)

Sulaiman et al. (2010) bundle these tasks under the term innovation management and identifies 6 key tasks. These tasks are presented in Table 2 along with the actions involved in these tasks and examples of the operational tools observed in the RIU Asia projects to perform these tasks.

Table 2. Innovation Management Tasks observed in the RIU Projects in Asia

| Tasks | Actions | Tools used in RIU to perform tasks |
|--|---------------------------|--------------------------------------|
| Networking and partnership building | Convening | Grain cash seed bank |
| | Brokering | Community-based seed producer groups |
| Setting up/strengthening user groups | Facilitating | Community-based user groups |
| | | Producer companies |
| | | NGO-led private companies |
| Training | Coaching | Market chain analysis |
| | | Market planning committees |
| Advocacy for institutional and policy change | Advocating | Community Germplasm orchards |
| | | Village Crop Fairs |
| Enhance access to technology, | Information Dissemination | Food processing Parks |
| | | Use of lead entrepreneurs |

| | | |
|---------------------------------------|-------------|--|
| expertise, markets, credit and inputs | Negotiating | Participatory Action Plan Development Community resource centres Policy Working Groups |
| Reflective Learning | Mediating | Thematic Committees Cluster-level sharing workshops Forest Policy Seminar Series |

There are a number of important points arising from this observation.

- Putting research into use involves a range of tasks beyond ensuring access to technology and information
- These tasks do not work independently and innovation is usually only enabled when a cluster of these tasks are performed together
- There is no set formula for which tasks need to be deployed together — sometimes network development will be more important, sometimes advocacy for policy change. The history and context of the innovation trajectory will largely determine this
- This view of how research is put into use does not deny that there is a role for the traditional extension task of improving access to new technology. What the RIU experience highlights is that this works best when it is bundled together with other supportive tasks (access to markets, convening consortia, etc.).

3.4 Support to Innovation Trajectories

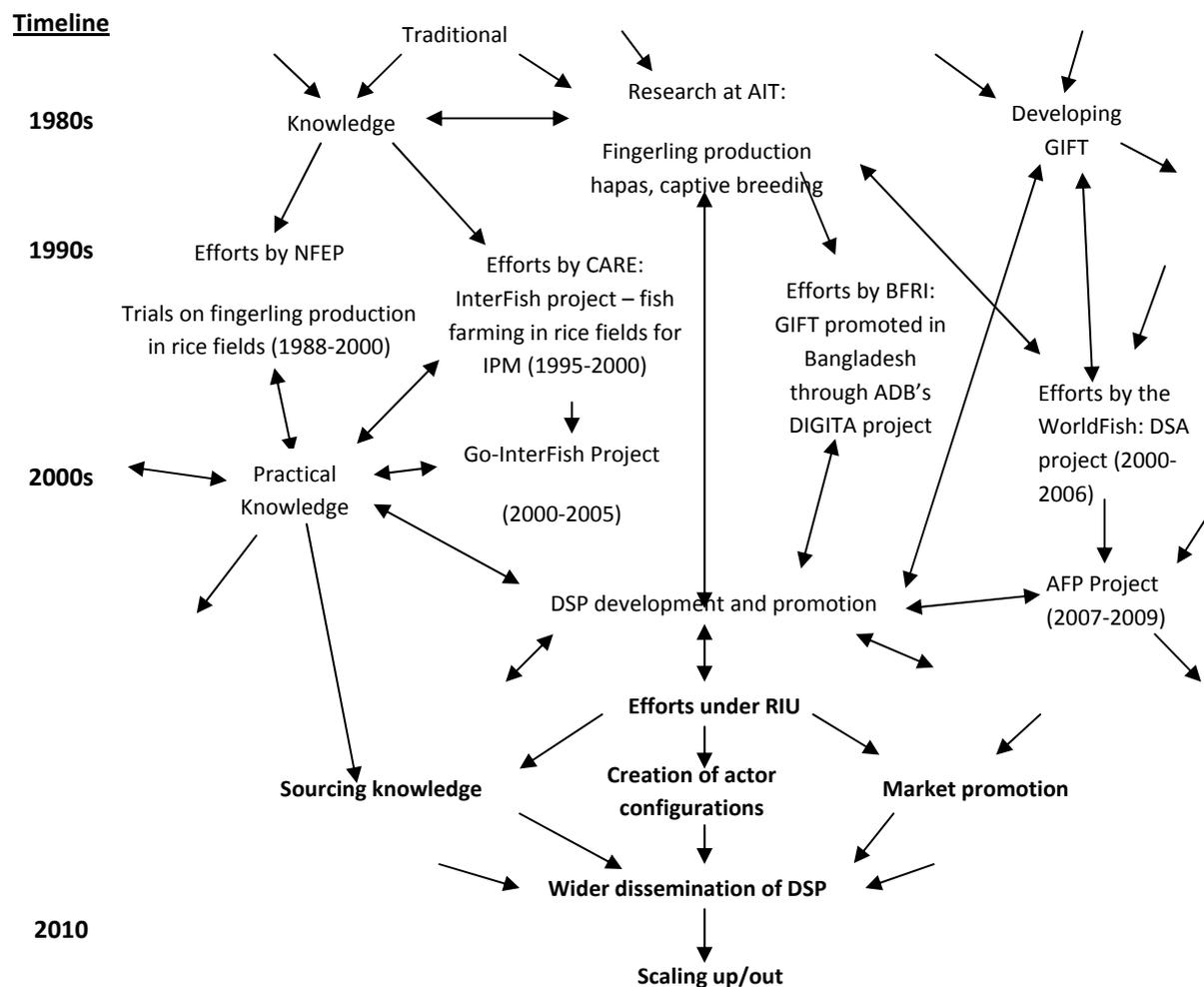
Recent debates about putting information (old and new) into use suggest that innovation is a process evolving over time, where events, projects and other actions support and shape the path that innovation takes (Nelson and Winter, 1982). Analytical perspectives aligned to the tradition of innovation systems also suggest that a sense of history is an integral element of this analysis. The reason for this is that the roles and configurations discussed above evolve over time and play out in an unfolding innovation trajectory, which responds to various economic, social and policy triggers in the wider environment. This innovation is, therefore, the domain that brings together research, development and other actors in an integrated way. As discussed earlier, all the projects that were funded under the RIU programme originated from several years of previous research and adaptation of information and ideas. The programme funded these researchers and other actors to take

research results to the next level. The lone exception was the IDE project in Nepal, which adapted the Participatory Market Chain Analysis (PMCA) approach — a research product developed in South America. Even then, IDE adapted this idea by linking it to a trajectory of value chain innovation it had created and nurtured as part of other project initiatives over a number of years.

Reddy et al. (2011) explored the innovation trajectory of the three RIU value chain projects in Nepal, Bangladesh and India. The authors found that these RIU projects emerged from pre-existing innovation trajectories that had themselves emerged through earlier collaborative actions of various actors — research and developmental, local and international.

For instance, the RIU project in Bangladesh focused on setting up a decentralised, micro enterprise-based supply network to supply fingerlings of an improved breed of tilapia, using an approach referred to as Decentralised Seed Production (DSP). The project, led by the NGO Rangpur Dinajpur Rural Service (RDRS), builds on an extensive history of research and development activities in Bangladesh and internationally. This innovation trajectory is illustrated in Figure 2 on the following page.

Figure 2. Innovation Trajectory for the Application of DSP under RIU



Source: Reddy et al. (2011)

Research continues to remain important in the innovation trajectory, but its role and importance changes as the innovation trajectory evolves. This is illustrated by a case study of the RIU project on promoting seed varieties developed by Participatory Crop Improvement/Client Orientated Breeding (PCI/CoB) in Nepal.

Case Study 1. From plant science research to agribusiness development

This project had its origins in DFID's Plant Science Research Programme, which provided CAZS-NR (Centre for Arid Zone Studies-Natural Resources), University of Bangor, with £15.1 million in funding between 1995-2006 to develop and implement PCI methodologies. PCI is an umbrella term that includes not only the process of participatory plant breeding (PPB),

but also that of germplasm evaluation methods such as PVS (participatory varietal selection) and others such as participatory seed production (Witcombe et al., 1996).

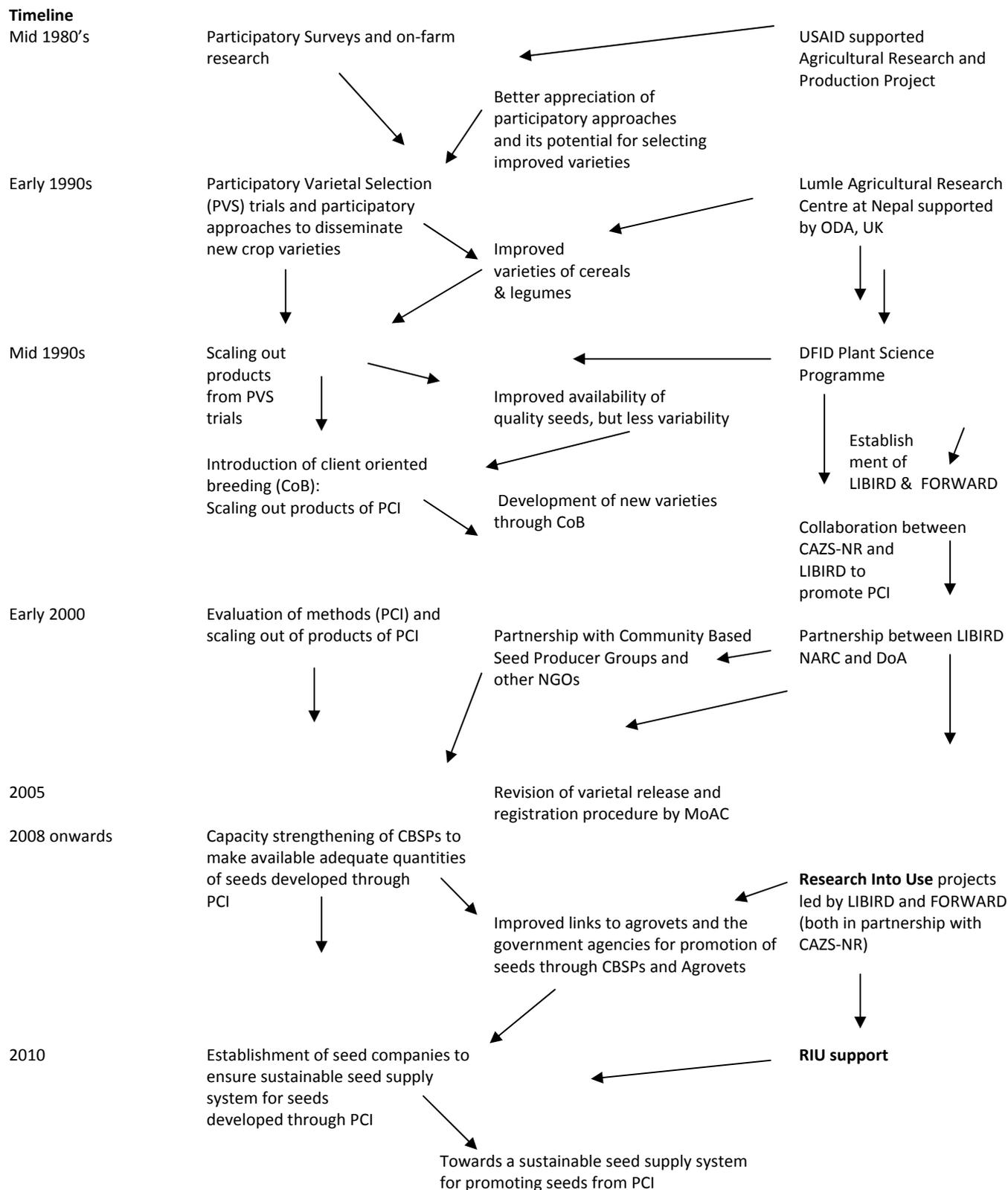
In Nepal, CAZS-NR worked with a local partner, LI-BIRD, under a DFID-funded research project on participatory crop improvement (PCI) in high potential production systems during 1996-2003. This was followed by two research projects on participatory plant breeding (1998-2005), the second of which also involved the National Agricultural Research Council (NARC) and the Department of Agriculture (DoA) as partners. Some participatory plant improvement work had already been done before 1996, particularly at Lumle Agricultural Research Centre (Conroy and Adhikari, 2009). For its Participatory Varietal Selection (PVS) activities CAZS-NR partnered with two local NGOs: LI-BIRD (an original partner) and FORWARD. Both NGOs were set up in the 1990s by former employees of research stations at Lumle and Pakhribas, which had been initially been funded by the UK government. When UK funding for these stations ceased in the 1990s they were transferred to the National Agricultural Research Council (NARC).

Over the last decade, CAZS-NR, LI-BIRD and FORWARD have been working with the Nepalese NARC and the Department of Agriculture to produce several improved varieties in rice and legumes with multiple benefits for farmers, such as improved yield, improved quality, reduced costs and earlier harvests (Witcombe et al., 2009). Fourteen Participatory Plant Breeding and Participatory Varietal Selection varieties have been released in Nepal, while another 4 are under consideration. Their development involved public sector agencies in eight cases, NGOs in nine and collaboration in most cases (Conroy and Adhikari, 2009).

In Nepal's low altitude (terai) regions the commercial sector for seed supply is weak. CAZS-NR and its partners, therefore, decided to work with seed producer groups. Initially the share of seed of PCI varieties produced was low, as there was too little demand and only a few farmers aware of the existence of these improved seeds. Agrovets, who supplied seed, preferred older varieties for which there was existing demand. 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). Project partners, thus, had to make an effort to change the guidelines on varietal release in Nepal in 2005, resulting in a

new seed policy that recognised the data generated in farmers’ fields to support the release of new varieties.

Figure 3. Innovation trajectory of Participatory Crop Improvement in Nepal



Project partners saw seed producer groups as essential in ensuring the supply of Participatory Varietal Selection and Client-Oriented Breeding varieties and, hence, their widespread use. Under the RIU initiative the same partners realised the need to engage with a wide range of actors in the innovation system — including seed producer groups, agrovets, farmer groups, the District Agricultural Development Organisation (DADO), rice millers, traders and other NGOs — to make them aware of these varieties and thus stimulate demand. The focus of the initiative has been on awareness building (through mass media), distribution of new seeds in limited quantities (informal R&D kits), strengthening the capacity of community-based seed producer groups through training in quality seed production and business development, and strengthening linkages with other stakeholders, especially government agencies, through exposure visits.

LI-BIRD and FORWARD worked with 41 community-based seed producer groups under RIU to produce more than 550 tonnes of seed of rice and legume varieties in 2008. With support from the project the groups improved group cohesion as well as institutional, technical, business and marketing capabilities. Most have increased membership, share capital, group funds and have built offices. Most have also diversified into seed production for other crops, such as wheat and maize.

Under RIU, project partners also raised demand for improved seeds by distributing informal research and development (IRD) kits to seed producers and the media and using FM radio as a medium to communicate information on the availability of improved seeds. Efforts are also currently on to promote the good practices of the community groups in the District Seed Self Sufficiency Programme through policy-level meetings, interactions and the formation of a task force with the Government of Nepal.

To continue and expand the participatory crop improvement work and make quality seed developed commercially available the project set up two private companies in 2010 — Anmolbiu Private Limited (led by LiBIRD) and Global Agri-Tech Nepal Private Limited (led by FORWARD). As a Best Bets initiative the project received RIU funding for initial start-up costs and for capital to set up the companies. Anmolbiu registered as a company with a 7-

member board of directors, developed a business plan, started hiring employees and began producing rice varieties in the main 2010 season. It now plans to produce seed for other crops apart from rice. Global Agri-Tech launched in October 2010 and, as per its business plan, began producing maize and lentil seed in the districts of Chitwan and Banke, while also buying rice seed from producer groups in Chitwan.

The innovation trajectory of Participatory Crop Improvement unfolded over a decade before RIU came along to support it. RIU's major contribution in this case is its support for the further evolution of this innovation trajectory. In other words, it supported the innovation trajectory to move along to the next level of greater commercial orientation and sustainability for wider impact. In the process, it brought in new actors (such as agrovets and seed business agents as company shareholders), new expertise (business and financial management) and new resources (share capital collected from company shareholders).

3.5 Role of Research in Evolving Innovation Trajectories

The innovation trajectories of RIU's projects in Asia have evolved and unfolded from previous events and actions, including earlier RNRRS research projects. Many of the researchers from those earlier projects were part of the RIU "into use" phase, which brings us to our next question: What is the role of research in this RIU phase?

In their study of three of RIU's value chain initiatives in Asia, Reddy et al. (2011) observed that research continued to play an important role in adapting results to suit specific local contexts. Research also has a role in training those involved in using these results. For instance, under the Decentralised Fish Seed Production initiative, researchers were responsible for training, troubleshooting and providing technical backstopping to satellite brood rearers, seasonal pond rearers and local entrepreneurs in the fish seed value chain. Researchers also devised compositions of fish species to be cultivated in rice fields, decided appropriate sizes of ditches and *bunds* and settled on appropriate feeding patterns based on specific farm conditions. However, it is important to note that technical backstopping and adaptation was just one facet of the diversity of tasks needed to enable innovation (see earlier discussion of innovation management tasks in sub-section 3.3) in this project.

While research organisations obviously played a lead role in the discovery-oriented RNRRS research projects, under RIU theirs has been a mainly supportive role. However, the nature and significance of the role of research appears to shift and change at different stages of the RIU project innovation trajectories. In the Participatory Crop Improvement project, plant breeders played an important role in the development of better seed in earlier initiatives. Under RIU they continued to play an important role, but one that supported the NGOs involved in promoting seed. Also, they no longer lead the direction of new activities; the innovation trajectory is now driven by the new two seed companies and the architecture they created of agro-vets, seed producers and producer groups. However, accessing new information on plant breeding techniques and new promising lines for varietal improvement are issues that continue to be critical for their future. Both seed companies plan to access this expertise by strengthening their existing networks and developing new links with other research organisations (such as CIMMYT, AVRDC, etc).

As the innovation trajectories evolve and research is adapted and more widely applied, new problems and opportunities arise. For example, the Integrated Flood Plain Management project in Bangladesh came up against one such challenge when community-based groups started producing sunflowers, which the project now had to figure out how to market. The project felt the need for market research to find how it could support producers earn greater profits through community or co-operative marketing. Some Integrated Floodplain Management options tried before, such as duck rearing, bee keeping and fish-friendly sluice-management, did not work as well as expected, raising the need for more studies on better adapting to local situations. This example illustrates the point that research continues to play an important role in supporting the innovation trajectory by developing new information and integrating it with local knowledge and as well as with ideas generated elsewhere.

3.6 Entrepreneurship and the Private sector

Entrepreneurs — those with a for-profit bottomline as well as those with a hybrid mandate of profit and social good — have emerged as important players in many of the RIU Asia projects. In the Bangladesh fish seed value chain project, the focus was on developing existing players — rice farmers, table fish growers and fingerling traders — into micro

entrepreneurs. The project selected and trained some farmers to act as lead entrepreneurs and drive the value chain. In Nepal Forest Action trained community forest user groups in bio-briquette production and timber processing and, in the process, created small-scale eco-entrepreneurs. A project partner, the Nepal Herbal and Herbal Products Association (NEHHPA), helped in the training. In the microfinance project in India, volunteers who initially helped with group formation ultimately transformed themselves into service providers and were paid by the group to help with account-keeping and accessing external funds. In the case of the crab fattening project (PROSCAB) in Bangladesh, two entrepreneurs have now come forward to set up crab hatcheries and support an emerging small-scale crab production and export industry.

The 2010 annual review of RIU criticised the Asia projects for not having adequate “private sector” presence and cited a lack of business plans to sustain activities beyond the life of RIU. However, the review seems to have missed the emergence of the kind of entrepreneurial activity described above. It is certainly true that there were no large-scale corporate enterprises involved in any of the RIU Asia projects. However, what appears to have been an important activity for most of the projects was the application of entrepreneurial principles (such as the marshalling of resources and people to add either market or social value). Often, this led to the emergence of new organisation types — for example, the NGO-established seed companies in Nepal or the micro-entrepreneurs in the fish seed supply chain. The RIU Asia projects supported and made use of these types of entrepreneurial activity in their pursuit of putting research into use. Also, importantly, they did not do this at the insistence of the programme, but for pragmatic reasons as this was a way of achieving the intended aims of using research in the process of development and change.

It is also important to note that in some settings there is little market-orientated entrepreneurial activity, such as the floodplains of Bangladesh or the forestry sector in Nepal. What appears to work in these areas are individuals and organisations (community-based or otherwise) that combine market and social entrepreneurship goals. This is likely to be the case in many areas of South Asia where the poor live. This is because social and market isolation has prevented conventional market-oriented enterprises organically. It is

also part of what keeps the poor poor. The real challenge for using research is to make sure that forms of entrepreneurship that do exist in these regions are engaged in the innovation process and the unfolding innovation trajectory.

A related point that the RIU review should have borne in mind is that the sustainability of interventions associated with a particular innovation trajectory is not entirely dependent on the presence or absence of the “private sector” and the incentives provided by the market. Some trajectories continue to need public investments by way of donor support as well as national programmes, policy changes, institutional reforms, etc., and may always do so. The combination of market forces and entrepreneurship is certainly a powerful force in putting research into use. It is, however, not a panacea that can absolve public policy and financing of its responsibility to support the use of research for innovation and development.

4. RESULTS BROUGHT ABOUT BY RIU

The RIU outcomes in Asia need to be reviewed at two levels: impact and sustainability. All projects were closed in June 2011. We understand that the RIU programme was extended for a further year, but no information is currently available on what activities will take place during this extension.

4.1 Outcomes and Impacts: Institutional or livelihood change?

It is important to preface this discussion with a couple of definitional points about monitoring and evaluation. The convention in evaluation practice is to follow the OECD DAC terminology (OECD, 1991; OECD, 1986; OECD, 2000). This distinguishes between *outcomes* as the achievement of a project during its lifetime and *impacts* as the final developmental result that occurs after the project as a result of its outcomes. A related clarification is that the outcomes of a project are the results that it agrees to deliver to its donor. Outcomes are dependent on the assumptions the project or programme makes about the link between its logframe outputs (not outcomes) and its logframe purpose (this is its theory of change). Impacts will only occur if assumptions outside the project or programme — that link the logframe purpose to its goal (this is the donor's theory of change) — hold true. Projects have a responsibility to track progress towards outcomes (usually referred to as monitoring). Donors have responsibility for tracking progress towards impacts (usually referred to as evaluation).

Lack of clarity over these points has been at the heart of confusion in the discussion of RIU “impacts” and, more fundamentally, its design. The tendency in the programme has been to use the term ‘impact’ to mean both household-level changes occurring as a result of RIU during its lifetime (or ‘outcomes’, to use the OECD DAC definition) as well as to mean final developmental (also household) results from the programme as a whole (or ‘impacts’, to use the OECD DAC definition).

In its final years the programme also indicated that its “impacts” (actually outcomes) would include institutional change — changes in the way research use and innovation are enabled by the practices and policies of international and national public and private investors,

(including DFID). The programme's theory of change included assumptions that impact (OECD DAC defined) would be achieved by the institutional changes RIU brought about, as these would improve the enabling environment for innovation. In other words, DAC-defined impact would occur by changing or disrupting the existing techno-institutional regime.

What this actually meant was that there were two programmes within the RIU design and logframe, each with different anticipated outcomes and impacts. The first programme — let's call it 'RIU Dev' — was a simple development assistance programme transferring resources and information to poor households (for example, the distribution of improved seed from the participatory crop improvement projects). The anticipated outcome of this programme was changes in household well-being (yield, income, food security, etc.). The anticipated impact of this project was that these changes in household well-being would be sustained beyond the programme.

The second project — let's call it 'RIU Cap Dev' — was a sophisticated capacity development project. Its aim was to stimulate the evolution and strengthening of the enabling environment with institutional changes at multiple levels that, over time, would improve the performance of the innovation system from a poverty reduction perspective. The anticipated outcome of this project was institutional and policy change. The anticipated impact was that these institutional changes would create household well-being beyond the life of the programme.

These two projects were well-defined in RIU plans, although they were not articulated separately — except in the logframe, which contained two separate purposes. On reflection, however, it is clear that in RIU Asia, only "RIU Dev" informed project design. There was no explicit set of activities either within projects, or as a separate activity outside them, that attempted to address the institutional change output of "RIU Cap Dev". As we shall now go on to explain, this missing of the institutional change target undermines the long-term final impact of RIU in Asia.

The 11 RIU projects in Asia together set themselves a target to work directly with 333,182 households during their lifetime. Based on this assumption, RIU estimated that the Asia

projects would “improve” the livelihoods of 1.6 million people, based on the assumption that on an average each farming household has 5 persons (more details are given at Sones, 2010). While this outcome figure was often erroneously used to imply impact, the programme’s level of DAC-defined impact in Asia was never predicted as far as we are aware. Moreover, during the later years of RIU there was some unease with the “impact” predictions of Sones (2010).

Indeed, as the natures of the projects revealed themselves in Asia in the period 2009 onwards, it was apparent that the projected household-level outcome at this level of intervention was rather ambitious. Partially this was an issue of scale of the projects, but more importantly it was related to limited time-frame of the projects. While the projects themselves had not begun with an implicit institutional change agenda, most had engaged in the relatively slow process of developing new relationships and linkages, both within the project coalition and between stakeholders in value chains or in spheres of community-based action. In other words for pragmatic reasons most of the projects were tackling the institutional environment in the immediate arena of their activities. So what started out as “RIU Dev” type projects in Asia — with simple theories of change about transferring resources, information and technology to farmers (see Table 1 and refer to Sulaiman et al., 2010 on the RIU Asia assumptions) — soon started to resemble “RIU Cap Dev” type projects, albeit with a fairly restricted view of the extent of institutional change needed.

This had a number of implications. First and foremost, it meant that the operational theory of change of the RIU Asia projects was much more complex than its initial assumptions had suggested. Importantly, it also meant that institutional change would need to take place before household-level outcome could be achieved. And, even though this change was in a fairly restricted arena, it meant that household-level outcome during the relatively-short period of the project would be limited. It also meant that the way these projects monitored their progress needed to change, as it was progress in institutional change (as an intermediary step on the way to household-level changes) that would be important.

Of course, with the benefit of hindsight it can be seen that things could have been done differently. For example, as suggested by the RIU programme, all the projects in Asia did a

detailed baseline study of rural households during their initial months. Although many of the projects were not convinced about the value of this exercise (personal communication during the 2009 Technical Review), these projects invested a considerable amount of time and resources during their first year to generate this information as it was a programme requirement. The rationale at that stage was that a resurvey would be done at the end of the project to measure the household-level impacts. For good reasons only very few projects did resurvey work. The projects (like any projects) were certainly responsible for collecting baseline information to track their progress towards outcomes. The problem really was that the nature of the outcome was largely institutional in nature. This should have been apparent before the inception of projects. Instead, projects were encouraged to collect data on household-level outcomes and in a way that was disproportionate to their need for information to manage their own performance. One is left with the impression — and the scale of baselining reinforces this impression — that the projects were being asked to collect impact data on behalf of the donor; i.e., as an evaluation task for which they should have not been responsible. Meanwhile no additional resources or advice were brought in to help re-orientate the monitoring systems of projects towards an institutional change agenda.

But the real issue is what kind of changes — and at what levels — should one expect from short projects such as the ones in RIU Asia? What is the nature of the impact pathway we are witnessing in these projects? As witnessed in all the Asian projects, the actual application and use of new knowledge happens through the interactions and knowledge flows among the wide range of actors involved along the innovation trajectory. RIU has triggered this interaction in the immediate arena of its projects by bringing the different actors together. If one has to look at outcomes, one should be looking at the nature of changes triggered at the organisational and institutional levels. Perhaps, an institutional baseline would have yielded more insights if we are keen on tracking the institutional changes triggered by RIU. The impact on the end user finally depends on the institutionalisation of these changes and how it breaks the existing techno-institutional regimes to accommodate, mainstream and further build new regimes.

Table 3 provides some examples of one kind of institutional change witnessed in some of the RIU projects.

Table 3. Institutional Changes from RIU Projects: A Case of Old Organisations Playing New Roles

| Old organisations playing new roles: Short description of example | Indicators of institutionalisation | Outcome indicators |
|---|--|---|
| I. New roles introduced by RIU | | |
| NGOs setting up seed companies: LIBIRD and FORWARD established two seed companies to expand the production and supply of seed developed through participatory crop improvement. Before RIU, these two NGOs promoted such seed through donor grants by working with seed producer groups | Seed companies start sustainable seed business and expand the quantity and types of seed used by farmers | Quantity of seed produced and marketed Profits generated and how these are ploughed back to expand the seed business |
| Community seed producer groups partner in seed business and invest in the seed company as shareholders: Before the initiation of the RIU project, community-based seed producers only marketed seed produced by them | The pattern of shareholding; number of groups who are now shareholders | |
| II. RIU supporting existing roles | | |
| Generating deeper and more systematic insights on addressing governance and access issues related to community forest management in Nepal: Although Forest Action has been involved in action research and policy advocacy on issues related to community forest management, RIU funding allowed it to perform these tasks better by forming a wider coalition and generating lessons from a wide range of sites, and then undertaking a more systematic documentation and analysis to influence policies better | New insights shared as publications and policy briefs and the number of policy dialogues where these systematic lessons are shared | Forest use policies developed through a consultative process using insights from policy research |
| Market planning committees that run vegetable collection centres in Nepal are getting federated and accessing national and international markets: Before RIU, the planning committees worked independently. With RIU support they have formed working relationship with other similar committees, thus, allowing them to access markets in neighbouring countries for the sale of horticultural produce | Number of committees becoming federated and new markets being accessed through these | Quantity sold and prices received |

While some of these new roles were introduced by RIU, the project strengthened some organisations to play their roles better. As finding evidence of impact at the level of institutional change itself would take time, one can visualise the time gap that would be

required to see household-level impacts. The point we are making is that while understanding impacts is desirable, it is too early to discuss household-level impacts from RIU at present (by the end of the 3rd year). The way to address this is to commission a team sometime in the future to further track the institutional and organisational changes and link these to indicators for household-level impacts. This is now seen as evaluation good practice, with approaches such as Theory-Based Impact Evaluation (White, 2009) being used not only to quantify impacts but also to link that impact to process and institutional changes and pathways.

RIU's own internally commissioned "impact/ evaluation" process had not reported at the time of writing.

4.2 Sustainability

Will these initiatives sustain post-RIU? This question perhaps needs to be put differently as sustainability is concerned with measuring whether the benefits of an activity are likely to continue after donor funding has been withdrawn (OECD, 2000). The real issue should be to understand what happens to the innovation trajectories that the projects were associated with rather than the projects, *per se*. After all, by definition the projects were time-bound pilot activities that should have catalysed wider sets of changes to enable innovation and the more effective use of research to achieve desired outcomes. In all likelihood the trajectories of innovation will continue. What is not known is what direction these will take. This is determined by whether there is sufficient interest from various stakeholders and how they can attract support (public or from the market) from other sources.

For instance, IDE Nepal received funding from another DFID programme to take forward the innovation trajectory of promoting the Participatory Market Chain Approach. Ironically this was a project that the Annual RIU review recommended be cut because it was unsustainable, presumably by the market. This, of course, would be a reason to support it with public funds if it showed promise for social returns. The Integrated Flood Plain Management approach has already been incorporated in the GIZ-supported Wetland Biodiversity Restoration Project in Bangladesh with the Department of Fisheries, based on support for project design, planning and monitoring from the Flood Hazard Research Centre,

and ongoing implementation through the Centre for Natural Resources Studies (CNRS), Bangladesh. In Nepal the shareholders in the seed companies seem likely to continue to produce seeds developed through participatory crop improvement. The micro-credit activities will continue as it works on a self-sustaining model, although the integrated business model of Centre for the Promotion of Sustainable Livelihoods (CPSL) may have to wait for some more time until it can mobilise further resources.

RIU's contribution to the sustainability of the trajectories it has been associated with should be seen as its support to brokers — the individuals and organisations who undertake innovation management tasks discussed earlier. Among these tasks is the development of new networks or the strengthening of existing ones to stimulate collective action to take the trajectory forward. The RIU Asia experience suggests that the market will not pay for this brokering service (this is also the finding from studies of this function beyond RIU; see Klerkx et al., 2009). Take for example the brokering role of IDE in the value chain projects in Bangladesh and Nepal. It is inconceivable that the stakeholders in the value chains they are dealing with could pay for IDE's services. Yet it is also clear that IDE is playing a critical role in strengthening value chains and, in Nepal, bringing this approach to the attention of national planners for further expansion.

This means that none of the activities that RIU has contributed to (supporting innovation management, brokers, catalysing others) will be sustained by the market. However, as indicated above many will be sustained by different forms of public support, which will, in turn, help entrepreneurial activity to play its role for innovation processes important to poor people.

5. MISSING THE TARGET: LIMITATIONS OF THE RIU APPROACH

As discussed previously, RIU was set up, firstly, to promote results from earlier research to achieve “impact at scale” and, secondly, to generate lessons on the process of putting research into use. On impacts (in terms of numbers of poor people benefited by the research products promoted under RIU in Asia), there is probably not much worth celebrating, although the support has pushed the pace and direction of the innovation trajectory in most cases. While many of the projects have had some effect on the institutional environment in their immediate arena of activity, none of them have addressed the wider enabling environment for innovation. And nor were they designed to. This design fault severely restricts the ability of these projects to result in “impact at scale” in the future.

An enabling environment — which broadly includes policies and institutions that are conducive for further uptake of knowledge — is critical for innovation on a large scale. In other words, the scaling up of many of the approaches depends on changes in the current techno-institutional regime. The Strategic Niche Management (SNM) literature (Caniels et al., 2006; Kemp et al., 1998) argues that innovations tested and refined in protected niches managed by researchers, civil society organisations or the private sector will not have wide-scale impacts until they can exert sufficient influence so that the old regime is overthrown and replaced by a new one that supports innovation in the niche. For instance, the current regime in plant breeding has little sympathy for the Participatory Crop Improvement varieties that the RIU Asia projects have been promoting. This is constraining the institutionalisation of the PCI approach within CGIAR and the NARS in the Asian countries and constrains the further development of new and improved seeds from PCI. Regime changes in terms of seed release and certification policies and professional norms among plant breeders are critical for PCI to have larger impacts. Figure 3 explained how the innovation trajectory of promoting seeds developed through PCI progressed and where it is currently getting stuck for want of change in the techno-institutional regime.

Similarly, further expansion of the Integrated Flood Plain Management approach in Bangladesh depends on ensuring continued access for the community-based organisations

to public water bodies, which otherwise may expire shortly. The project did engage with the Ministry of Land over this issue. However, the ministry was not open to meaningful discussion on its policies — either over the community-based organisations that have enjoyed access rights and responsibilities or over the many other public water bodies in the country. Further expansion and evolution of the micro-credit business model promoted by the RojiRoti project in India critically depends on CPSL’s ability to leverage debt finance to support its micro-finance activities. Current regulations in the microfinance sector in India constrain CPSL from raising additional resources and the crisis in the microfinance sector in India has further disabled CPSL from obtaining more debt finance to expand its model.

While the idea of innovation systems (which RIU talked about initially) recognises the importance of the enabling environment for putting research into use, the programme did not provide sufficient attention to address this challenge. During the inception phase, even though RIU claimed that “it will not fund stand-alone research projects, but instead will link with, and add value to, existing national or regional programmes, processes and other initiatives undertaken by development partners” (RIU, 2007), it ended up funding 13 disjointed projects in Asia — which has more of a “transfer of technology” agenda than a policy influencing agenda.

But some projects did try to do address institutional and policy changes at their own levels in the arena of their project activities. The PCI initiative changed the varietal release mechanism in Nepal, although this happened before RIU. But in spite of this legal provision for the private sector to engage in plant breeding and the seed trade, the national seed board created hindrances on the release and registration of crop varieties. The projects on integrated flood plain management, community forestry management, participatory market chain analysis, microfinance, etc., did engage with policy actors. However, these didn’t have much impact as these were mostly project-level activities performed towards the end of the project and very little time and resources could be invested in these activities. These efforts were useful, but were not sufficient to influence the institutional and policy inertia in South Asian countries.

RIU seemed to be aware in its initial days of the need to engage with policy if it was to achieve impacts. For instance, it commissioned policy network mapping and opportunity analysis in Asia during the inception phase to identify strategic partners and policy champions in the region and also to understand policy windows and opportunities for direct engagement in the process of policy change. But the findings from these studies were not followed up once the innovation challenge fund programme was initiated.

An open challenge fund approach that focused on promoting research products also didn't help. Identifying promising innovation trajectories and influencing its direction to specifically address the policy challenges would have been a better strategy in achieving the RIU agenda.

In hindsight it appears that a small number of projects with a specific institutional change agenda, with more resources and a longer duration (minimum 5 years with possibilities for extension), would have been more appropriate to the RIU ambition of "impact at scale". Spreading resources thinly across a number of disconnected projects over three years did not help RIU in achieving its aims. Nor did the dominance of the "RIU Dev"-type project design help. By and large these were projects that failed to comprehend the systems nature of the task they had to tackle and the RIU programme provided no relevant guidance. And this is where RIU really missed the target of addressing institutional and policy change. This failure took place despite the programme's rhetoric of an "innovation systems approach". Furthermore, this failure took place despite the presence of a number of senior advisors in the earlier years of the programme, who must have realised that an ambition of "impact at scale" would not be achieved unless serious consideration was given to the institutional change agenda.

6. IMPLICATIONS FOR POLICY AND PRACTICE

An analysis of the RIU projects in Asia reiterates many things that are already known about the nature of the innovation process, but it also provides useful lessons for policy and practice on putting new knowledge into use. These are as follows:

(i) The process of agricultural innovation involves a wide range of actors who bring complementary expertise; therefore, identifying these actors and developing networks of relevant actors is a necessary pre-condition for putting research into use. Identifying such actors and developing a network of these actors was the initial activity performed by all RIU projects. Similar findings came from empirical studies conducted under the RNRRS Crop Post Harvest Programme (CPHP) (Hall et al., 2004) and evaluation of this programme (Barnett, 2006). Experience from RIU suggests that networking and brokering relationships and working arrangements among a wide range of partners will not happen on its own in most cases and, therefore, has to be facilitated. Investing in this critical function could be a way to enhance capacity for innovation, which, in turn, would help make better use of research.

(ii) A wide range of innovation management tasks is required to enable the innovation process that puts research into use — providing access to technology and markets, network building, organising producers, training, conflict resolution, etc. RIU's experiences suggest that these are most effective when bundled together. This has a very important implication for policy. It means that putting research into use requires projects, organisations and/or initiatives whose chief characteristic is not primarily being a conduit to technology but rather one of being able to undertake this much wider range of innovation management tasks. This mirrors findings about RIU's Best Bet projects, in which new types of enterprises servicing economic and social goals are performing these roles as a pragmatic part of their business model (Hall et al., 2010)

(iii) Innovation is rarely the result of a two-stage process of discovery (research) and application (technology adoption) as independent tasks. Instead research is used most effectively when discovery and application are well integrated. Identifying perfected research results or products and supporting the creation of a network to push these, as

practiced by RIU in South Asia, is not the best way to promote research use. Finished knowledge products waiting for universal adoption is a myth perpetuated by research, extension and dominant policy perspectives and institutional frameworks. Each research result or product needs further research and adaptation to suit specific contexts. This suggests that separation of research projects from development projects should be less watertight.

(iv) Research continues to be important in the innovation process, although its significance and role changes as per the requirements of the innovation trajectory. Research supports innovation not merely as the originator of ideas, but also in adapting and integrating the same with knowledge from other sources as well as addressing new knowledge gaps that arise from new challenges and opportunities. For instance, research played a major role in adapting knowledge on fish seed production and value addition of forest products. Similarly assumptions and approaches underlying institutional innovation, 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. What is important is the creation of an architecture that integrates all the different actors — such as research, intermediaries, users and the enablers — for innovation to occur.

(v) While building new networks could be a starting point in some cases, identifying the existing innovation trajectories that show promise and supporting them to evolve to the next stage may be the best in other cases. The role of policy, therefore, should be to find the best ways to embed research in these trajectories and take on board a capacity development approach to improve the collective dynamics of each innovation trajectory. As long as research remains isolated from these innovation trajectories, the new research results will either remain on the shelf or wouldn't expand beyond the specific niches where they are experimented or promoted. For instance, the inability to deal with regime changes is currently constraining the wider adoption of PCI as an alternate paradigm in Asia. Addressing the bottlenecks in the innovation trajectory might often need changes in the techno-institutional regime and this would require engaging with policy on a continuous basis.

(vi) If policy has to support promising innovation trajectories, how is it to identify them in the first place? An open challenge fund approach as organised under RIU does not seem to be the answer for this. Perhaps the potential trajectories need to be first shortlisted through in-country and regional consultations before they are supported with resources. The coalitions should have the freedom to articulate what kinds of baseline studies have to be organised and what learning and evaluation frameworks they should adopt, considering the kind of interventions and innovation management tasks they are likely to use. They should also have the flexibility to drop and pick approaches as the trajectory evolves. Promoting innovation is about managing change and what is needed is an action research orientation, which is important not only for the innovation process, but also for learning lessons on how to organise innovation better in future.

7. CONCLUSION

The experience from RIU Asia provides yet more evidence that a serious rethink is needed about what international development assistance projects are really trying to achieve. There can be few who would dispute that the development project should move on from the days of transferring resources and technology to the poor and when it can, instead, be more usefully deployed in strengthening capacities that can sustain change processes into the future. Yet here is a programme that, despite its rhetoric on pursuing the latter, has largely missed this target and fallen back into doing the former. The case for taking a systems perspective on research and innovation is well-founded in the scientific literature and is no longer contentious. Perhaps it is just that those who have adopted the innovation systems rhetoric have failed to read what has already been written. Let us hope that if RIU achieves anything it is that it provides yet another opportunity to make a written plea for taking a systemic view of innovation and change and does so in a way that does not just cherry pick the most palatable aspects of this challenging perspective. This plea lies at the heart of the conundrum of putting research into use and of the missed opportunities of RIU in Asia.

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APPENDIX 1. THE SOUTH ASIA PROJECT PORTFOLIO

The following provides a brief description of the South Asia projects:

Cluster 1: Participatory Crop Improvement in Asia

(i) Improving Livelihoods in South Asia through Sustained Access to New Technologies in Rainfed Agriculture (India)

This initiative, led by the Centre for Arid Zone Studies (CAZS), Bangor, UK, focuses on promoting the uptake of upland varieties developed through Participatory Crop Improvement in Central and Eastern India. It partners with two NGOs — namely, Gramin Vikas Trust (GVT) and Catholic Relief Services (CRS) — to disseminate these seeds widely. It focuses on strengthening the capacity of seed producer groups, with the main mechanism deployed being the grain cash seed bank. The initiative is now planning to set up a producer company to commercially produce and market quality seed evolved through Participatory Crop Improvement.

(ii) Poverty Reduction through Crop Intensification into Rice Fallows in Nepal

This initiative led by the Forum for Rural Welfare and Agricultural Reform for Development (Forward) — an NGO in Nepal — focuses on promoting rice and legume seeds developed through Participatory Crop Improvement by strengthening the capacity of community-based seed producer groups to produce these seeds and then disseminating these seeds as small kits. In this project, it partners with another NGO — Local Initiatives for Biodiversity Research and Development (Li-Bird) — and CAZS, Bangor. Forward has now set up a seed company called Global Agritech Nepal Private Limited (GATE) to produce and market these seeds.

(iii) New Rice and Legume seed from Client-Oriented Breeding (Nepal)

The NGO Li-Bird leads this initiative in collaboration with Forward and CAZS. It also has similar objectives, such as strengthening community-based seed producers and achieving

the wider dissemination of seeds developed through Participatory Crop Improvement as seed kits. Li-Bird has also established a seed company, called the Anmolbiu Seed Company Private Limited, to produce and market quality seeds of rice and other crops produced.

Cluster 2: Value Chain Innovation

(i) Linking Farmers with Markets for Rural Prosperity

This initiative, led by International Development Enterprises (IDE) in Nepal, Vietnam and Cambodia, is about building and strengthening linkages and partnerships among market chain actors through the promotion of the Participatory Market Chain Approach (PMCA)⁴. In Nepal the project is focusing on building the capacity of market planning committees and developing trust among various actors in the existing value chain, including the management of collection centres, farmers and traders.

(ii) Coalition to Diversity Income through Under-Utilised Crops

The International Centre for Underutilised Crops (ICUC) is piloting this multi-pronged approach in India and Vietnam to promote underused crops by supporting community services for production, post-harvest and marketing of underused crops and improving access to the market for the rural poor. In India it is partnering with the NGO Bharatiya Agro Industries Foundation (BAIF) and in Vietnam with the Centre for Agrarian Systems Research and Development (CASRAD) and the Fruit and Vegetables Research Institute (FAVRI), two national research centres.

(iii) Developing Fish Seed Value Chain in Bangladesh

This initiative, led by the NGO Rangpur Dinajpur Rural Services (RDRS) in Bangladesh, is about developing a fish seed value chain (brood fish producers, fingerling traders and table fish growers) by creating a role for small-holders as intermediary producers and thereby

⁴ The PMCA is a research and development approach for fostering pro-poor, market-led innovation in commodity chains, through active participation of private and public market chain actors. CIP's Papa Andina Initiative (<http://papandina.cip.cgiar.org>) and partners began to develop PMCA in 2001 as a means to reduce rural poverty in the Andes by linking small farmers to new market opportunities. The PMCA built on the "Rapid Appraisal of Agricultural Knowledge Systems" (RAAKS) which stimulates networking for innovation (Engel and Salomon, 2003).

enhancing the availability and quality of fish seed. WorldFish Center and International Development Enterprises are partners in this initiative.

Cluster 3: Innovation in Natural Resource Management

(i) Reducing Poverty through Innovation Systems in Forestry

This initiative, led by Forest Action — a policy think tank NGO in Nepal — focuses on promoting innovations in internal group governance (visioning, hamlet-based planning, decision-making and self-monitoring) among community forest user groups and introducing active forest management and sustainable harvesting technologies, including enterprise development. To implement this initiative, it partners with FECOFUN (Federation of Community Forest Users, Nepal), NEHHPA (Nepal Herbs and Herbal Products Association) and the Nepal Forum of Environmental Journalists (NEEFJ).

(ii) Scaling up IFM through Adaptive Learning Networks

The Bangladesh Environmental Lawyers Association (BELA) is leading this initiative in collaboration with the Flood Hazard Research Centre (Middlesex University, UK). It focuses on promoting innovations in managing flood plains in Bangladesh. This approach, called Integrated Floodplain Management (IFM), involves participatory action plan development, adaptive learning among stakeholders, development and compliance of rights and developing a legal framework for community-based management of floodplain resources and resource management for fisheries and crop production.

Others

(i) Promoting Sustainable Livelihood Development (Roji Roti)

This project attempts to reach the ultra-poor in Northern and Eastern India through forming groups of poor women and establishing a sustainable rural support delivery system to support the poor in their efforts to improve their livelihoods. This approach, called the ‘dialectic approach’ by the project team, relies on group saving as a starting point, which is then followed by access to microfinance and links to inputs, technical expertise and insurance. This project is led by GY Associated Ltd. (GYA), a UK-based consulting company, in

collaboration with a Bihar-based NGO CPSL (Centre for Promoting Sustainable Livelihoods), and the ICAR (Indian Council for Agricultural Research) research centre in Patna, India.

(ii) Rat Management for Rural Communities

This is an initiative that uses a transfer of technology approach to control rats in Bangladesh. It involves training rural communities and implementing agencies — mainly NGOs and other extension agents — on community-focused and Ecologically-Based Rodent Management (EBRM), all the while producing and distributing improved rat traps. The initiative is led by AID-Comilla, an NGO in Bangladesh, in collaboration with the Bangladesh Agricultural Research Institute (BARI), the Bangladesh Department of Agricultural Extension (DAE) and the Bangladesh Natural Resources Institute.

(iii) ProSCAB or Promoting Sustainable Coastal Aquaculture in Bangladesh

This is an initiative for dissemination of 5 coastal fisheries technologies (crab fattening, molluscs culture, seaweed culture, improved fish icing and production of pesticide-free dry fish) through training and enterprise promotion. This initiative is led by the Bangladesh Fisheries Research Forum (BFRF), a professional alliance of researchers and practitioners involved in research, development and commercialisation of the fisheries sector in Bangladesh. The main tasks involved in this initiative are: training, enterprise promotion and establishing links to input and output markets.

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