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Working Paper Series

#2011-076

**Putting agricultural research into use:
Lessons from contested visions of innovation**

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UNU-MERIT Working Papers

ISSN 1871-9872

**Maastricht Economic and social Research Institute on Innovation and Technology,
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This document is an output from the Research Into Use Programme (RIU) funded by the UK's Department for International Development (DFID) for the benefit of developing countries. The views expressed are not necessarily those of DFID.



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PUTTING AGRICULTURAL RESEARCH INTO USE: LESSONS FROM CONTESTED VISIONS OF INNOVATION

Andy Hall¹

Abstract

This paper is a synthesis of research undertaken as part of the Research Into Use programme (RIU) to explore the question of how agricultural research can be used more effectively to improve agricultural production and farmers' livelihoods in developing countries. Many of the challenges the programme encountered were a result of contested visions of the way agricultural research should be used for innovation. The paper suggests a number of novel entry points for projects promoting research into use. However, it also argues that the effectiveness of RIU was undermined by its failure to productively manage contested visions of research and innovation within the programme and between the programme and its donors and other international champions of the dominant view on agricultural research and development.

Key words: Research Into Use, Innovation, Innovation Systems, Innovation Management, Institutional Change, Agricultural Research, Development, Policy, South Asia, Africa

JEL Codes: L26, L31, L33, N5, N55, N57, O13, O19, O21, O22, O31, O32, O33, O53, Q13, Q16

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TABLE OF CONTENTS

LIST OF ACRONYMS	5
1. INTRODUCTION	8
2. THE RESEARCH PROCESS AND ITS LIMITATIONS	10
3. GENESIS AND MAIN ELEMENTS OF RIU	12
BOX 1: A TYPOLOGY OF RNRRS RESEARCH PRODUCTS	16
4. THE MULTIPLE RIUS AND THE VALIDITY OF THEIR ASSUMPTIONS	19
FIGURE 1: PROPORTION OF RNRRS RESEARCH PRODUCTS FOUND SUITABLE FOR TAKING TO SCALE AFTER RESEARCH WAS COMPLETED	21
FIGURE 2: THE NATURE OF LINKAGES IN THE MALAWI FISH PLATFORM	26
TABLE 1: INNOVATION MANAGEMENT TASKS OBSERVED IN RIU PROJECTS IN ASIA	30
FIGURE 3: INNOVATION MANAGEMENT TASKS	34
TABLE 2: KEY FEATURES OF SELECTED HYBRID ORGANISATIONS/ INITIATIVES	37
5. HEADLINE LESSONS FROM RIU	43
6. POLICY AND PROGRAMMING IMPLICATIONS	48
7. CONCLUDING DISCUSSION: MANAGING CONTESTED VIEWS OF RESEARCH INTO USE AND INNOVATION	52
REFERENCES	54

LIST OF ACRONYMS

ADB	-	Asian Development Bank
ARCN	-	Agricultural Research Council of Nigeria
BAIF	-	Bharatiya Agro Industries Foundation
BELA	-	Bangladesh Environment Lawyers Association
BFRF	-	Bangladesh Fisheries Research Forum
CABI	-	CAB International (Formerly Commonwealth Agricultural Bureax)
CARE	-	Cooperative American Relief for Everywhere
CAZS	-	Centre for Arid Zone Studies, Bangor, United Kingdom
CBOs	-	Community-Based Organisations
CBSPs	-	Community-Based Seed Producers
CGIAR	-	Consultative Group on International Agricultural Research
CIP	-	Centro Internacional de la Papa (International Potato Centre)
COB	-	Client Orientated Breeding
CPHP	-	DFID's Crop Post-Harvest Programme
CRISP	-	Centre for Research on Innovation and Science Policy
CRS	-	Catholic Relief Services
CRT	-	Central Research Team, RIU
DEVREs	-	Development-Relevant Enterprises
DFID	-	Department for International Development, UK
DSP	-	Decentralised Seed Production
EU	-	European Union
FAO	-	The United Nations Food and Agriculture Organization

FARA	-	Forum for Agricultural Research in Africa
FIPS	-	Farm Input Promotion Services
FORWARD	-	Forum for Rural Welfare and Agricultural Reform for Development
GFRAS	-	Global Forum for Rural Advisory Services
GIFT	-	Genetically Improved Farmed Tilapia
GTZ	-	Deutsche Gesellschaft für Technische Zusammenarbeit, now called the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
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)
ICTs	-	Information and Communication Technologies
ICUC	-	International Centre for Underutilised Crops
IDE	-	International Development Enterprises
IPM	-	Integrated Pest Management
KIT	-	Royal Tropical Institute (Koninklijk Instituut voor de Tropen)
LI-BIRD	-	Local Initiatives for Biodiversity Research and Development
LINK	-	Learning INnovation Knowledge
NERICA	-	New Rice for Africa
NGOs	-	Non-Governmental Organisations
NRM	-	Natural Resource Management
ODA	-	Overseas Development Administration (Renamed DFID)

OECD	-	Organization for Economic Cooperation and Development
PAID	-	Partnership for Agricultural Innovation and Development
PCI	-	Participatory Crop Improvement
PMCA	-	Participatory Market Chain Approach
PPB	-	Participatory Plant Breeding
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
UK	-	United Kingdom
UN	-	United Nations
USA	-	United States of America

1. INTRODUCTION

This paper is a synthesis of research undertaken as part of the Research Into Use programme (RIU) to explore the question of how agricultural research can be used more effectively to improve agricultural production and farmers' livelihoods in developing countries. RIU was established as a flagship programme by the UK's Department for International Development (DFID) to tackle the weak performance of investments in agricultural research as a development aid tool. The programme has a turbulent history, with a programme reorganisation and a new management team established at the midway point. Many of the challenges the programme encountered were a result of contested visions of the way agricultural research should be used for innovation. While these were never entirely resolved, RIU, nevertheless, provides some valuable insights into ways of making better use of research for development purposes.

After 5 years of operation RIU is at a point where it can take stock of what it has learnt so far. This paper is part of that stock taking process².

The main findings are as follows:

1. There are a number of different starting points for RIU-like interventions that include new technology, but which could also include a variety of different entry points in the innovation process. Selecting promising innovation trajectories and then prioritising key bottlenecks in these would be one way of putting this finding into practice.
2. RIU experiences point to two different organisational vehicles for RIU-type interventions: Innovation support services and modes of entrepreneurial activity addressing market and social objectives.
3. There are dangers involved in cherry picking from the innovation systems approach. RIU experiences suggest that there has been a "technology transfer" of elements of an innovation systems intervention and this has greatly undermined its potential for impact. Ideas such as partnership, entrepreneurship and innovation support services have been parachuted in without recognising that research-into-use interventions need

² The paper complements an independent programme evaluation, led by Dermot Shields and his team, and research on the Africa Best Bets component of RIU, led by Norman Clark and his team.

to involve both technical and institutional innovation and that the institutional and policy adaptation required are needed at all levels. This has meant that there is also an underlying flawed assumption that high-level institutional and policy learning will take care of itself. This lack of attention to the wider institutional change agenda severely restricts the potential of RIU-type interventions for impact.

While these insights are useful, the paper argues that the effectiveness of RIU was undermined by its failure to productively manage the contested vision of research and innovation within the programme and between the programme and its donors and other international champions of the dominant view on agricultural research and development. This paper concludes by outlining the main features of innovation projects of the future. However, it cautions that the policy door is only half open and that further institutional changes will be needed before this sort of approach can flourish.

2. THE RESEARCH PROCESS AND ITS LIMITATIONS

The research reported in this paper is based on the research of RIU's Central Research Team. The team, led by the author of this paper, consisted of a research coordinator for Asia based in India, an Africa country coordinator based in Rome and 8 research fellows (2 in India, 1 in Nepal, 3 in Kenya, 1 in Malawi and 1 in Nigeria). The research fellows included 3 doctoral students and 2 post-doctoral fellows. The Nigeria-based research fellow also acted as the coordinator for RIU's activities in that country. The research of the Central Research Team including five pieces of research commissioned on the African country programmes, undertaken by the Royal Tropical Institute (KIT) and by an independent consultant.

The activities of RIU formed the main empirical basis for the research itself, although reviews were used to locate the research in wider debates and to fill gaps not covered by RIU (notable biotechnology regulatory policy and the use of information and communication technology in putting research into use). Also, the Nepal-based research fellow did not undertake research on RIU, but undertook an extensive collation and analysis of international experiences of putting into use adaptive collaborative management approaches in natural resource management.

In the course of its research the Central Research Team documented a range of mechanisms that make use of research expertise and research-derived information. The primary target audience of the research — and of this paper — are public policy-makers responsible for making more effective use of agricultural science and technology in the development process. The research has also explored conceptual and operational aspects of the research-into-use conundrum in order to develop its policy messages. The research has been written up as a series of discussion papers that can be accessed at: <http://www.researchintouse.com/learning/learning40discussionpapers.html> and http://www.innovationstudies.org/index.php?option=com_content&task=view&id=260

While all research has its limitations, there are a number of issues that need to be highlighted here — and these concern both the nature of the programme and the research itself. A brief history of the programme is provided in the subsequent section. It is sufficient at this point to say that activities on the ground were delayed by mismanagement of the programme in its

first three years (see Barr et al., 2008 for the Mid-Term Report) and that many RIU interventions ran for little more than two years. The management of the programme was changed following its mid-term review. The research began three and a half years into the programme. It had no role in selecting interventions and, therefore, there was no opportunity to create an experimental design to aid the analysis of similar and contrasting interventions in different contexts. Retrospective attempts to achieve this proved problematic.

It is also important to recognise there has not been one RIU, but multiple RIUs. This has arisen both as result of the distinct phases of the programme, but also due to a range of programme stakeholders that viewed it in different ways and who worked with different sets of assumptions about what the problem of research-into-use entailed and how it should be addressed. These interpretations enriched the experience, but have also clouded analysis and meant the programme has had multiple and contested meanings. This paper is structured around a discussion of these different RIUs, the assumptions these were based on and the lessons these provide for future attempts to make better use of agricultural research for developmental purposes.

3. GENESIS AND MAIN ELEMENTS OF RIU³

RIU, launched by DFID in 2006 with a budget of £37.5 million, was conceived as an entirely new sort of programme. As a successor to DFID's 10-year, £200-million Renewable Natural Resources Research Strategy (RNRRS), RIU's objective was to extract impact from excellent but underused agricultural research. The starting assumption of the donor, DFID, was that the RNRRS legacy must contain maybe as many as 30 high-performing, research products that had yet to reach their full potential.

In retrospect this “technologies to be put into use” starting point held many of the seeds of the difficulties that RIU was to encounter. As discussed below, these 30 “waiting to be put into use” technologies proved not to exist, or at least not in the way initially conceived by the donor. Perhaps more fundamental was that before the programme began there was already compelling, published evidence that argued that the use of research ideas was not a post-research task. Rather, it was argued that research use took place when it was coupled with user demand during the research process itself, and when research and research use were part of a wider network of players and actions involved in the innovation process (Chambers et al., 1989, Biggs and Clay, 1981; Biggs, 1990; Rolings, 1992; Hall et al., 2001, Barnet, 2006; World Bank 2006). These ideas had gained prominence during the RNRRS era with the adaptation of the innovation systems ideas as a way of drawing attention to the institutional dimensions of the research and innovation process (see, for example, the Crop-Post Harvest programme's coalitions approach discussed by Barnet, 2006).

The initial RIU management team and its advisors were well aware of this perspective on research use. This can be seen in their adoption of an “innovation systems approach” as a core element of RIU's strategy (see www.researchintouse.com). This, however, meant that the programme was caught between two conceptually opposing perspectives. On the one hand the donor's perspective was about looking to transfer technologies for impact; on the other hand RIU was bravely attempting to design a new type of programme that used an innovation systems perspective. This second perspective should have squarely placed its emphasis on stimulating the institutional changes needed to build capacity for innovation

³ An earlier version of this section appeared in Hall et al. (2010a)

through a process of learning and change and ultimately make research more responsive to the innovation process. However, RIU's design was hampered by the need to address its donor's appetite for making better use of past research investments and "proving" impact.

What this meant in practice was that RIU was being driven by two quite different views of what research use and innovation entailed in terms of an intervention. The first view was of a technology transfer-type project. The implicit assumptions included: research products were the starting point and innovation was a research and technology driven-process, with the key task involving making information and technology available for use. This implied that existing and new delivery mechanisms would need to be supported, but since this was a post-research activity the assumption was that this did not need to be investigated experimentally. Measures of the success of such projects would be rates of adoption of information and technology and impact at the household level. Key lessons from these types of projects would be about the effectiveness of different types of delivery mechanisms. These assumptions were never stated explicitly, but these were implicit in the desire of the donor to "promote" research from the RNRRS-era projects and in the impact monitoring and evaluation criteria that were imposed.

The second view was of innovation projects. This is a much more complicated proposition. The implicit assumptions included: research products and expertise were just one source of information, and the key task involved coupling and enabling technical, institutional and policy change. Central to this type of project vision is that in any given situation there is no blueprint for how the research into use process should proceed. This implied that all interventions would need to be experimental and that key actors in the process would need to learn their way into new configurations and ways of working that would enable innovation. In other words research into use and innovation would require a combination of technological, organisational, institutional and policy learning and change. Measures of success of such innovation projects would be the extent to which these different forms of learning were taking place and, particularly, the institutional and policy dimensions of this. The key lessons would be about the way this learning and innovation process could be facilitated and nurtured. Again, these assumptions were never explicitly stated in this detailed way in RIU's strategic and planning documentation, but these were, nevertheless, the

assumptions implied by it in the innovation systems rhetoric that the programme adopted in its early years.

While it is easy to be critical with hindsight, the tension between these two perspectives in the early years of RIU made an already difficult task all the more challenging. A large and unwieldy management structure, populated with staff with professional backgrounds in research management rather than development, entrepreneurship or innovation management, added to these challenges — many of the management team had been research managers under the previous RNRRS programme. As a result, the programme was slow to start, got bogged down in trying to define itself and hit a number of dead-ends.

The tensions between these different visions of what RIU was about were partially resolved with a change of management team 3 years into the project. However, the overarching vision of the programme continued to be contested and this became apparent in the increasingly divergent perspectives of the Director and his management team and advisors, the Central Research Team, the communication team, the programme evaluators, the donors and last but not least those implementing individual projects.

For example an annual review sponsored by the donor demanded the termination of projects in Asia that the Central Research Team felt promised good lesson learning potential. However, the wider programme showed no appetite to challenge this recommendation. An evaluation team was appointed with the approval of the donor, but the evaluation perspectives adopted suggested that they viewed RIU as a standard development project. This led to direct conflicts with the Central Research Team, which viewed RIU as an applied policy experiment. To placate the evaluation team the RIU Director's advisor developed an alternative conceptual framework (published as Clark and Maudlin, 2010) to the one developed by the programme's Central Research Team. This signaled that once again separate visions were operating within the programme. With no formal articulation of RIU's vision and limited opportunity to debate what it might be that the programme was trying to achieve (or how this was to be achieved) within RIU and between RIU and the donor, dissatisfaction and fragmentation once again haunted the programme.

This fragmentation was resolved in the third post-Central Research Team phase of RIU by appointing a different evaluation team and exploring alternatives to a Central Research Team to develop knowledge products. This paper raises these issues here of contested visions of RIU as we believe it reveals the generic challenge of putting research into use. Ultimately the issue is not about the utility of a better way of using research. Rather it is about the nature of the political economy that surrounds the debate and practice of these ideas and the hegemony of the technology-led perspective and its derivatives. We return to this point in our final discussion section.

But what did RIU put on the ground? In its initial phase RIU made considerable efforts to both create a database of the 1,600 RNRRS projects and 280 research products (see www.researchintouse.com/index.php?section=16) and to scan these for candidates for wide-scale transfer into use. At this stage only 2 candidates stood out: a livestock health approach to sleeping sickness control, which subsequently was selected as an African Best Bet project (see below); and a client-orientated plant breeding approach that had developed a number of rice and legume varieties and which, subsequently, became the sole Asian Best Bets project.

But there were few, if any, other stand-out candidates. Box 1 illustrates the types and distribution of RNRRS research products. Many of the research products were process, policy and institutional innovations that had been developed and piloted to help sharpen the poverty relevance of RNRRS's more technical research. This orientation reveals much about how the RNRRS programme had evolved during its 10-year lifespan, moving away from its original disciplinary, technology development research roots to its delivery of a diversity of research products. A major legacy of RNRRS was the knowledge and social capital embodied in research teams and networks that had been built over many years. This, however, was not explicitly perceived as a product to be put into use.

Clearly, with a scarcity of blockbuster research products, extracting impact from putting this sort of legacy into use needed serious rethinking.

Box 1: A Typology of RNRRS Research Products

Technological Artefacts: Blockbuster new varieties, disease and pest control products and methods, new equipment. Least common among RNRRS products and those that did exist were inseparable from the other forms of products listed below.

Accumulated Knowledge Products around Significant Problem Areas: Knowledge associated with a series of linked projects conducted over many years addressing major problem areas. No single solution developed, but expertise built-up and research dead-ends identified. Modest number of major themes in RNRRS, mostly closely aligned with the original 10 RNRRS disciplinary programmes.

Mosaic or Composite Products: Research product clusters that provide a menu of options for different development themes. No one overarching research product that is likely to have significant impact. Many examples in the RNRRS programme, including the range of technical and institutional developments around post-harvest/ marketing systems or natural resource management.

Policy Analysis and Planning Frameworks: Common in RNRRS. Examples include; stakeholder analysis, agricultural innovation systems approaches; market analysis tools, etc.

Institutional and Process Products: New ways of working developed to improve impact or target specific social groups. Examples include: participatory approaches; farmer field schools; social forestry; partnership approaches; institutional learning and change approaches. Common in RNRRS.

Products Embedded in Expertise and Knowledge Networks: Knowledge, social capital and capacity embedded in the expertise and networks that had emerged in and around its research projects. Not formally recognised, but the most pervasive type of RNRRS research product.

Source: Author

The RIU Interventions

Under significant pressure to get something up and running RIU established its first two interventions in putting research into use in 2007/2008. The first was its **Asia Challenge Fund**. Projects funded tended to be of a rather modest scale, focused around RNRRS-era project teams and themes, with the logic that a final ‘into use’ phase could extract the elusive impact desired (see Sulaiman et al., 2011a for a detailed discussion of these projects). These projects were not very much different from RNRRS predecessors. Their selection was very much a reflection of the research management perspective that still held sway in the RIU management team at the time.

The second type of intervention was the establishment of 6 **Africa country programmes** (ACP) in Tanzania, Rwanda, Malawi, Zambia, Nigeria and Sierra Leone. The emphasis in this intervention was to establish offices to incubate clusters of research, development and enterprise organisations around development opportunities and, in doing so, put RNRRS and other research into use. The assumption underpinning this intervention was that there was a need to build systems that could respond to opportunities and challenges by mobilising ideas and expertise, including research. A key approach was the idea of an innovation platform. This tended to be a suite of processes to get people talking to each other, rather than necessarily involving the setting up a formalised body — although in some cases a formal body was established. This played out differently in different countries — although there were initially attempts to standardise this across countries that, fortunately for the sake of diversity and context-relevance, failed. (See Nederlof et al., 2011 for detailed institutional histories of the development and performance of the Africa country programmes).

A third type of intervention was established in 2009 after a number of reviews helped readjust RIU towards a more explicit focus on private sector-led innovation. Known as the **Africa Best Bets**, this used a venture capital investment-style selection process to identify business models and public-private sector partnerships that centred on the delivery of research-derived products and services to the poor. RIU support helped incubate these business models and partnerships, often by helping create awareness among the poor for products and services that companies could then sell to them. Some aspects of this experiment involve encouraging civil society organisations to behave more like private companies (for a preliminary analysis of the Best Bets see Hall et al., 2010b and Adwera, 2011). A description of the Best Bets can be seen in Clark (2010) and at <http://www.researchintouse.com/bestbets/index.html>. The Africa Best Bets include the following projects:

- The control of sleeping sickness in Uganda
- Safe and affordable armyworm control tools for poor farmers in East Africa to protect their crops against devastating armyworm outbreaks
- Promoting yield improvement through farmer-applied bio control seed treatments in maize, sorghum and millet

- Transfer and dissemination of emerging agricultural technologies of New Rice for Africa (NERICA); Improving access to quality seed through public-private partnership in Uganda
- Farm Input Supply (FIPS). Empowering millions of small-holder farmers throughout East Africa to put research into use: a private sector-led extension service to address climatic threats to food security
- Shujaaz. Disseminating advice to farmers and village youth through a comic strip and radio programme

An Asia Best Bet was created out of a cluster of projects promoting crop varieties from client-oriented breeding. Although these projects had an initial focus on seed promotion, the emphasis later transferred to the establishment of NGO-owned private seed companies (see Sulaiman et al., 2011a for more details).

4. THE MULTIPLE RIUS AND THE VALIDITY OF THEIR ASSUMPTIONS

The previous section on the historical development of RIU reveals how the broad vision of the programme evolved. However, to understand RIU it is important to recognise that there has not been *one* programme, but *multiple* RIU programmes that have existed in sequence and simultaneously. These multiple RIUs have been premised on different sets of assumptions. These arose through coalitions of interest around certain ideas; different starting points in different countries and regions, and different personal and professional interests of key individuals in the programme. As already mentioned these different RIUs emerged out of different and often contested visions of what RIU was about. While some of these assumptions, in retrospect, may seem naïve, they were all valid assumptions⁴ to pursue within the framework of an experiment to learn lessons on how to put research into use. The following commentary uses evidence from RIU to interrogate the validity of those assumptions. This provides a foundation for the final sections of the paper, which deal with major lessons and ways forward.

RIU 1. Post-research activities make better use of research

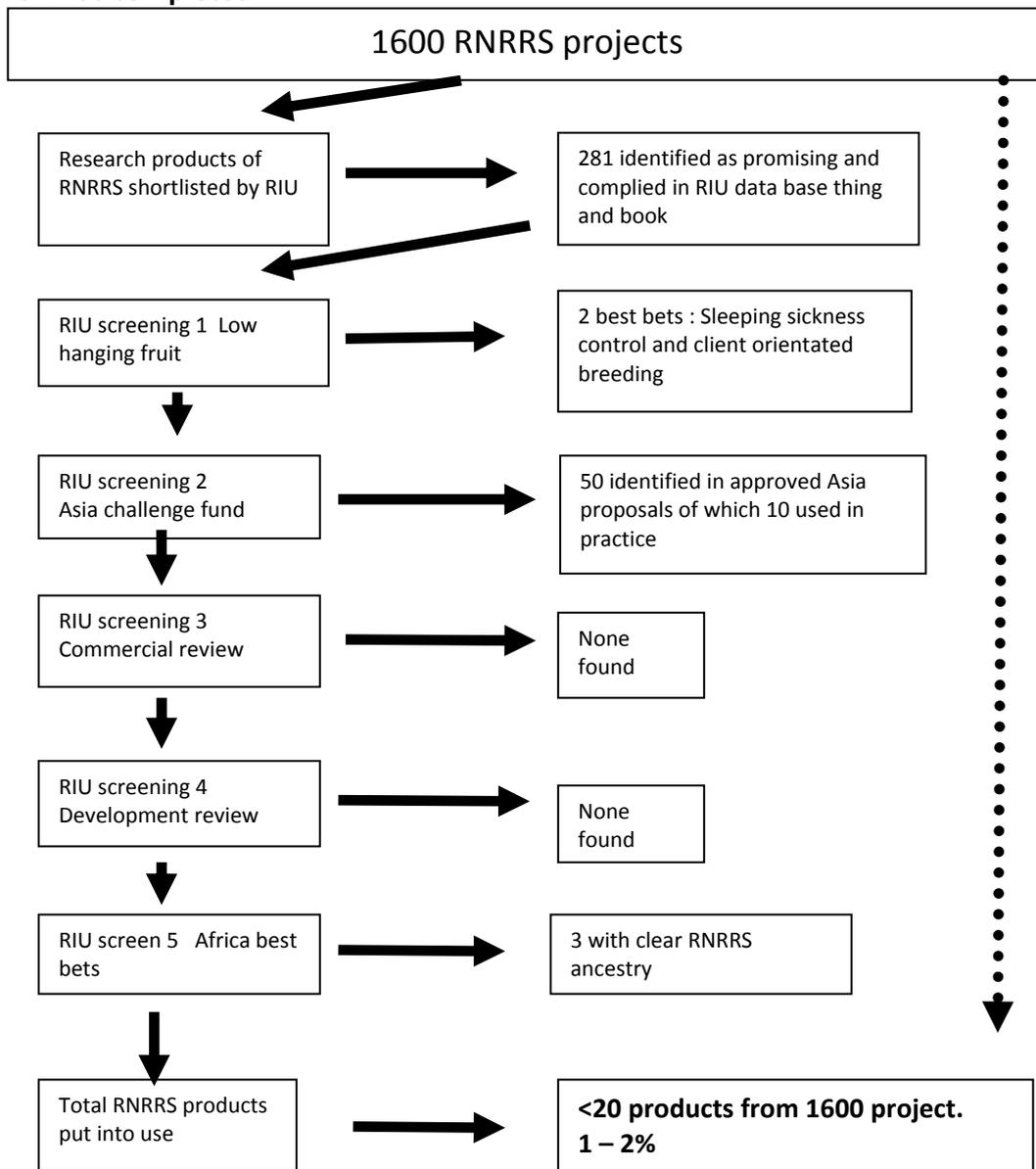
As can be seen in the genesis of the RIU programme its original conception was based on the assumption that the task of putting research into use can be undertaken separately after research has been completed. This assumption would be consistent with a technology transfer-style intervention. The Asia Challenge Fund projects and Best Bet projects are all centered on specific research findings or new technologies as their starting points. There is evidence from some of these projects that research findings or new technology can, indeed, act as a starting point for research-into-use activities. For example, in the Africa Best Bets, the development of striga bio control agents was clearly a necessary precursor for activities to make more use of this idea. The same is true of army worm control and prediction techniques that form the starting point for the Best Bet on that topic.

Leaving aside, for the moment, the fact that it was the coupling of technology and entrepreneurial activity that helped make use of these technologies, two issues stand out. The

⁴ It must be noted that some of these assumptions operated simultaneously in the same projects, both antagonistically and in synergy.

first is the relative scarcity of technologies that are amenable to this type of post-research promotion. As already discussed, RIU initially struggled to find such Best Bet technologies in the RNRRS portfolio of research results. Figure 1 presents an illustrative analysis of the number of such technologies in the RNRRS portfolio. This suggests that as few as 1-2% of identified technologies from the 1,600 RNRRS projects were suitable to form the starting points for RIU-type projects. While one can argue over the precision of this 1–2% figure, even in the best case scenario it is in the order of magnitude of less than 5%. This means that as much as 95% of research investment would fail to result in innovation and impact if it relied solely on post-research interventions based on the assumption that new technology is the starting point.

Figure 1. Proportion of RNRRS research products found suitable for taking to scale after research was completed



Source: Martin Bell, personal communication

The second point that stands out is the observation that *research* and *into use* activities need to take place alongside each other and that into-use activities often lead to new research questions. Morton's 2010 description of the trajectory of sleeping sickness control shows the long-term unfolding of research on different topics that came together to form the knowledge base for control techniques. He also shows the way research was shaped by the political and practical context of control of the disease and the way that, at times, the bottlenecks were technical and at other times political, although not necessarily in that sequence. This suggests a strong interplay between research, its context and its use, where its iteration rather than sequential steps that are at play.

Reddy et al. (2011) explored the “when and where” of research in the Asia RIU projects by looking at innovation trajectories — the historical trail of events from which innovation emerges. Their analysis of the fish seed project in Bangladesh, for example, shows that even though the project took a specific technical breakthrough as its starting point, research itself was a critical element of the process of putting research into use as there were a number of technical and marketing bottlenecks which needed further research. Reddy et al. (2011) also note that in the fish seed innovation trajectory there are both research and development-orientated activities that set the foundations of the RIU phase of this activity. They conclude that research plays different roles at different times and successful innovation trajectories are ones that can bring in research and development activities at any point in time as circumstances dictate. They illustrate that RIU's projects are just one small phase of the longer trajectory and that research has a continuous, albeit changing role in this trajectory.

This evidence from RIU suggests that the separation of research and research-into-use into a two-stage process may only be appropriate in a small proportion of cases and that the integration of research and developmental activities might be more productive. Alternative starting points for interventions are discussed below.

RIU 2. Research communication puts research into use

Very closely related to the assumption in RIU 1 above is the assumption that better research communication helps its use by making it available to research users. Again this implies a technology transfer-style intervention. RIU followed this approach in two of its activities: website-based material, including a database of RNRRS technologies (see

www.researchintouse.com/index.php?section=16) as well as lessons and stories about RIU; and a Best Bet project — Shujaaz — disseminating advice to farmers and village youth through a comic strip and radio programme. The Zambia country programme also initially developed an information dissemination platform, but this was later dropped (Dorai, 2011b).

The research reported in this paper has not explored the effectiveness of RIU's web-based research communication, so a commentary cannot be made on that. An external review of Shujaaz commissioned outside RIU concluded that only very simple messages were remembered and used. In most cases people using Shujaaz did not have a statistically significant better knowledge of messages compared with those who had not used Shujaaz (Lehmann, 2010).

Sulaiman et al. (2011b) undertook a review of the use of ICTs to explore experiences in Asia of the effects of better communication of research to farmers. This review argues that contemporary perspectives on communication view this task not just as an information dissemination one, but as a whole range of communicative tasks related to intermediation between the different players involved in innovation — helping build networks, helping access different resources, helping negotiate change and resolve conflicts, articulating demand for research and new technology. The review found that the case studies of ICT applications in Asia, despite considerable hype, have performed poorly in putting research-derived and other information into use and have rarely been sustained beyond specific projects. The review argues that the cause of this failure is that ICTs are mostly used to support traditional communication tasks — such as information dissemination and training. In other words ICTs are used to support supply-driven research communication — which has a long history of failure in agricultural extension — rather than using them to create user-driven, interactive systems to exchange information and negotiate change. Sulaiman et al. (2011b) conclude by saying that the power of ICTs for putting research into use will only be exploited when the task of communication is understood in its contemporary sense and interventions expand beyond the “necessary but not sufficient” task of disseminating research results.

RIU 3. Better input supply systems put research into use

Ensuring that supply systems are in place to deliver technology embodied in seeds, pest control agents and fertilisers, or complementary services such as credit, is an assumption with practical resonance. On the one hand this is an assumption that has elements of a technology transfer-style intervention; after all, it could be seen as a supply-led approach. On the other hand, however, such supply systems could be viewed as a way of mediating between suppliers and the demands of producers for different products.

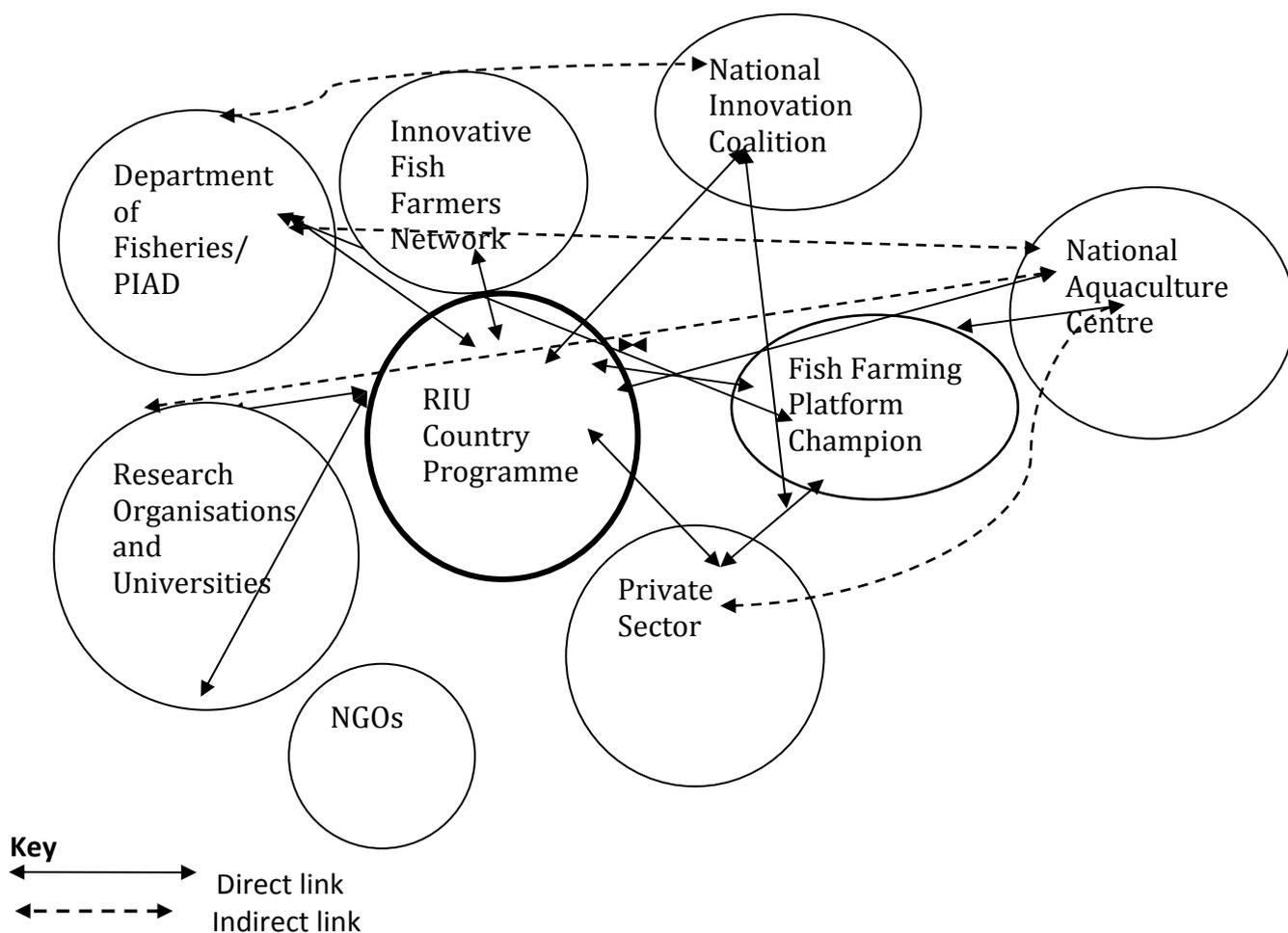
A number of RIU activities focused on setting up such systems. For example, one of the African Best Bets projects supported Farm Input supply (FIPS) — a non-profit company that specialises in making fertiliser and seed available to smallholder farmers in Kenya (see Hall et al., 2010b for a description). Another Best Bet on bio-control of striga supported a company (Real IPM) with a view to manufacture and sell the control agent to smallholder farmers, also in Kenya. In the Asian Best Best project, activities were supported to multiply and distribute seed from rice and other crop varieties improved through client-orientated breeding. This relied on a combination of producer seed companies, village multiplication strategies and, later, the establishment of 2 NGO-owned seed companies. One of the Asia challenge fund projects focused on developing a micro-credit system as a way of helping the poor access technology. Another of the African Best Bet projects worked with the private sector to bulk up NERICA rice seed. The fish seed project in Bangladesh established a supply chain made up of micro-entrepreneurs.

The evidence on how successful these supply systems have been in getting research into use in RIU is difficult to gauge. Hall et al. (2010b) positively reviews the FIPS Best Bet, highlighting the way FIPS acts as an intermediary in brokering access to seeds and fertiliser on behalf of farmers. A comment by Javier Ekboir (pers. com.) on the Hall et al. (2010b) paper, however, raised the question of why despite 10 years of apparently successful FIPS activities there were there no perceptible changes in maize yields in Kenya. This is a difficult question to answer. It does, however, suggest that improved supply systems, even if they help articulate the demand for inputs by farmers, may be only part of the solution to using research and new technology to improve agricultural productivity.

Evidence from Asia suggests that RIU (and earlier) efforts at promoting seed of rice and other crops developed through client-orientated breeding has led to widespread farmer adoption (Witcombe et al., 2009). But experiences also indicate that the supply system for seeds was only one part of the problem of promoting the benefits from the client-orientated breeding approach that led to the development of these seeds. The other bottleneck concerned the issue of how to institutionalise the approach in national, regional and international plant breeding programmes. RIU's Best Bet has approached this by establishing 2 NGO-owned private seed companies. This does address this issue to some extent as it has the potential to create both a variety development capacity as well as a supply system. Wider institutionalisation remains a considerable challenge and one that RIU has not made many inroads into (Sulaiman et al., 2011a).

Madzudzo (2011) investigated the RIU Malawi country programme's efforts to improve the fish fingerling supply system to support *chambo* fish production. The study explains the way large commercial companies were used to multiply and distribute fingerlings. However, as Figure 2 shows the supply system emerged through negotiations and inputs from a wider set of organisations. This included the development of a platform to champion the sector; it involved negotiation with government to allow licensing of the sex change technology used in fingerling production; it required research inputs from the local university and it required the involvement of NGOs to help in promotional activities and organisation of production of feed for fish. Madzudzo (2011) concludes that it is too early to determine the impact of the supply system put in place. However, what is clear is that the input supply arrangements were only part of a wider and more integrated system that allowed effective use of the new fish technology involved.

Figure 2. The Nature of Linkages in the Malawi Fish Platform



Note: Double-headed arrows relate to flows of information and not necessarily equality
Source: Madzudzo 2011

In fairness the research on this topic in RIU has not generated enough evidence to make definitive conclusions on the supply system assumption. A tentative conclusion would, however, seem to be that strengthening supply systems — both in terms of delivery, but also in terms of better articulating demand for inputs — can make an important contribution to making better use of research. However, it would seem that there is a wider set of issues that need to be addressed if these supply systems are to help put research into use. Another way to look at this is to recognise that input supply arrangements only work effectively as

mechanisms for making better use of research when they are embedded in a wider set of arrangements that resemble an innovation system. This seems to include linkages to research expertise and mechanisms for institutional and policy change needed to support the introduction and use of new technology and of the smallholder sector more generally.

RIU 4. Innovation support services can put research into use

The establishment of the Africa country programmes put forward a bold assumption that comes directly from the innovation systems perspective and its implication for this style of intervention. The underlying assumption is that research use is part of a wider process of innovation and that innovation emerges from networks of interacting players and associated policy and institutional developments that support chains of actors. The more specific assumption of the country programmes was that these multi-actor processes and their supporting contexts cannot rely on self-organisation and instead require some form of facilitation to make them happen. RIU made the assumption that this required some form of specialist innovation support service — the Africa country programmes — and that explicit mechanisms would be needed to give operational focus to these multi-stakeholder processes; in other words, innovation platforms. This type of intervention also represents a more general assumption that in order to put research into use it is necessary to strengthen innovation capacity. This involves linking up different organisations, tackling policy bottlenecks and creating policy and institutional conditions that enable innovation processes and make them more responsive to economic, social and environmental ambitions of society.

The experiences of the RIU country programmes have been extensively studied. Dijkman (2010) provides an analysis of the main processes at play. Nederlof et al. (2011) developed an institutional history of the Tanzania, Rwanda and Malawi programmes. Hirvonen (2011a, b, c) presents a detailed analysis of the Malawi, Nigeria and Zambia country programmes. Ugbe (2010 and 2011) details the nature of the Nigeria programme and presents a comparative analysis of the Sierra Leone and Nigeria programmes. Madzudzo (2011) gives a detailed account of the fish innovation platform in Malawi. Dorai (2011a, b) explored highlights of the Sierra Leone and Zambia programmes.

Leaving aside for the moment the precise nature of the way the country programmes operated, the studies mentioned above provide good evidence that specialist innovation

support services can facilitate the multi-actor processes that bring about innovation and which make use of research within that process.

For example, Nederlof et al. (2011) document a successful rice value chain in Zambia, where a focus on the marketing and promotion of traditional varieties has used research on the characterisation of these varieties. Hirvonen (2011c) explains the way the Zambia country programme's work on local varieties has been used as a way to leverage discussion with internationally-sponsored interventions on the introduction of NERICA rice. This has meant that local variety promotion is seen as part of the country's overall rice development strategy.

In Rwanda, Nederlof et al. (2011) explain the way the focus of the maize platform evolved over time from production to post harvest issues and how facilitating this process of change underpinned its success. The platform first focused on maize production as the main bottleneck, but quickly found that marketing became a constraint. This triggered the initiation of a maize trading company, with producers and local traders as shareholders. Other successful platforms include the poultry platform in Tanzania (see Dijkman, 2010 and Nederlof et al., 2011), which has established a decentralised farmer-operated local poultry production operation; the fish platform in Malawi discussed earlier (see Madzudzo, 2011); and the cowpea platform in Nigeria (Ugbe, 2010) that has successfully introduced a new pest-resistant packaging technology.

These glimpses of the country programmes' activities reveal that their primary focus was about making innovation happen — in other words, creating social and economic value — rather than putting research into use, *per se*. Although there are notable exceptions, such as the fish platform that built on a very specific technological opportunity (sex change technology), the country programmes have not been driven by new technologies. Instead they have most often have been involved in making opportunities out of existing ideas. This has quite often been achieved by incubating enterprises. The poultry platform in Tanzania is a good example of this; the technologies used, such as hatcheries equipment and poultry disease control, have distant research origins. The majority of the innovation, however, concerns the business model used to deploy these and the political and market negotiations associated with the initiative that have allowed it to take off.

A further type of innovation support service was observed in Sierra Leone (Ugbe, 2011; Dorai, 2011a). Here the country programme began by trying to establish innovation platforms around different commodity chains and developing a computer-based agricultural information system. It soon found, however, that the main bottlenecks to research use and innovation were policy issues in the enabling environment for innovation. Attention switched to developing a platform of policy-makers and entrepreneurs to push through key changes, such as changing interest rates and revising import duties in order to kick-start entrepreneurial activity. This group, PAID, registered itself as a company. The location of the Sierra Leone country programme in the Ministry of Agriculture was key in helping negotiate these sorts of changes and facilitating the role of PAID.

Nederlof et al. (2011) noted that other country programmes, notably Rwanda, also recognised that links to policy-makers were needed to address policy and institutional dimensions of innovation and research into use. A national innovation coalition was established to fulfil this role in Rwanda, but without an organisational home close to government this failed to flourish (ibid). A key limitation observed in some of the other country programme was that while they were effective in facilitating multi-stakeholder processes, this was done in a fairly restricted sphere of activity. Often this was not dissimilar to conventional development projects, with insufficient attention given to addressing the wider policy and institutional environment that would enable innovation in a general sense and, in particular, in a poverty reduction-orientated fashion (Hall, 2012). The Tanzania programme, for example, operated as a business incubation project rather than attempting to address more fundamental dimensions of the innovation capacity in the country. In contrast Nigeria, with its strong links to the country's Agricultural Research Council, was able to leverage the RIU experience in discussions about the ongoing reform of the NARS (Ugbe, 2011).

Much of the analysis of the RIU country programmes has conceptualised their role in terms of innovation brokering. In other words, their role has been viewed as one of brokering relationships between different organisations and negotiating between different stakeholders, brokering access to inputs, credit and technology, helping articulate demand for research, information and technology, and brokering wider institutional and policy changes (for example, the PAID case in Sierra Leone).

The evidence presented in the studies of the country programmes mentioned above indicates these are indeed roles that are being played across the programme as a whole and there are indications that this is helping bring about innovation and, with it, research use.

But does RIU’s assumption hold true that a specialist innovation support service is needed?

Analysis by Hall et al. (2010b) of the process involved in the Africa Best Bets, and studies of the a range of development initiatives and advocacy groups (Kilelu et al., 2011 and Kingiri and Hall, 2011) suggests that brokering is a pragmatic tactic deployed by a number of enterprises and development projects as a way of marshalling organisations and resources to bring about desired change. Kilelu et al. (2011), for example, explains the way this takes place in development interventions that address value chain development. Hall et al. (2010b) illustrate the way entrepreneurs use brokering as part of their business models and the way this can involve activities as diverse as developing consortia in the case of armyworm control and tackling regulatory change in the case of bio-control of striga. Kingiri and Hall (2011) describe the existence of specialist policy brokers who are active in the negotiations around biotechnology regulation and use and show that brokering is usually a means to an end rather than the end in itself — it is a tactic, not a service.

Sulaiman et al. (2010) discuss the wide set of brokering functions under the header of innovation management and identifies 6 key tasks this may involve. These tasks are presented in Table 1, along with the actions involved in these tasks and examples of the operational tool observed in RIU Asia projects to perform these tasks.

Table 1. Innovation Management Tasks Observed in 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
	Information	Food processing Parks

Enhance access to technology, expertise, markets, credit and inputs	Dissemination	Use of lead entrepreneurs
Reflective Learning	Negotiating	Participatory Action Plan Development
	Mediating	Community resource centers
		Policy Working Groups
		Thematic Committees
		Cluster-level sharing workshops
		Forest Policy Seminar Series

Sulaiman et al. (2010) argue that 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.)

The evidence from RIU suggests that there is a role for innovation brokering. In some cases it might be useful to establish specialist innovation support services to play this role. This is probably true in situations where entrepreneurs and civil society are not well-developed or where the prevailing policy and institutional environment restricts their ability to undertake intermediation and brokerage functions. In other situations it might be possible to use existing pragmatic brokerage that is taking place in development programmes, enterprises and advocacy networks. RIU support of such types of activity through its Best Bets projects provides an operational alternative that could exploit the brokering skills inherent in entrepreneurship to help put research into use. This is discussed further below.

RIU 5. Partnerships can put research into use

One of the least contested and most consistently applied assumptions in RIU was the prominent role of partnerships in putting research into use. For example, the Asia Challenge Fund projects were encouraged to include partnerships between research, development and private sector organisations. The Africa country programmes were founded on the rationale of facilitating multi-actor processes where innovation platforms were expected to incubate operational partnerships in support of innovation and research use.

The Africa Best Bets made less explicit demands for partnership-based approaches, but as Hall et al. (2010b) observe they are critical in these projects. This, it is noted, partially reflects the fact that some of the initiatives are working at the interface of public responsibilities and private interest and, so, there is a need for public-private sector partnership — for example, the private sector supply of pheromones for control of the migratory pest army worm, or the use of self-employed vets for sleeping sickness control. Other cases illustrate the way partnerships are used to bring together different ideas and expertise — for example, the way the Real IPM Company has brought in scientific partners who have expertise and informal proprietary rights to technologies.

Hall et al. (2010b) go on to observe the way the personnel working on the Best Bets, with their blended backgrounds of enterprise, research and development, have wide professional networks and feel quite comfortable in all three domains. This appears to reduce barriers to partnership and allows them to take advantage of such collective approaches.

However, while partnership does seem to be an important tactic in research use and innovation, Sulaiman et al. (2011a), in an analysis of the Asia projects, point out that partnership is not a simple panacea. It is argued that partners need to be carefully selected and that this required some time to work out who is needed and how to work with them. It was often the case that unfamiliar partners had to work together for the first time.

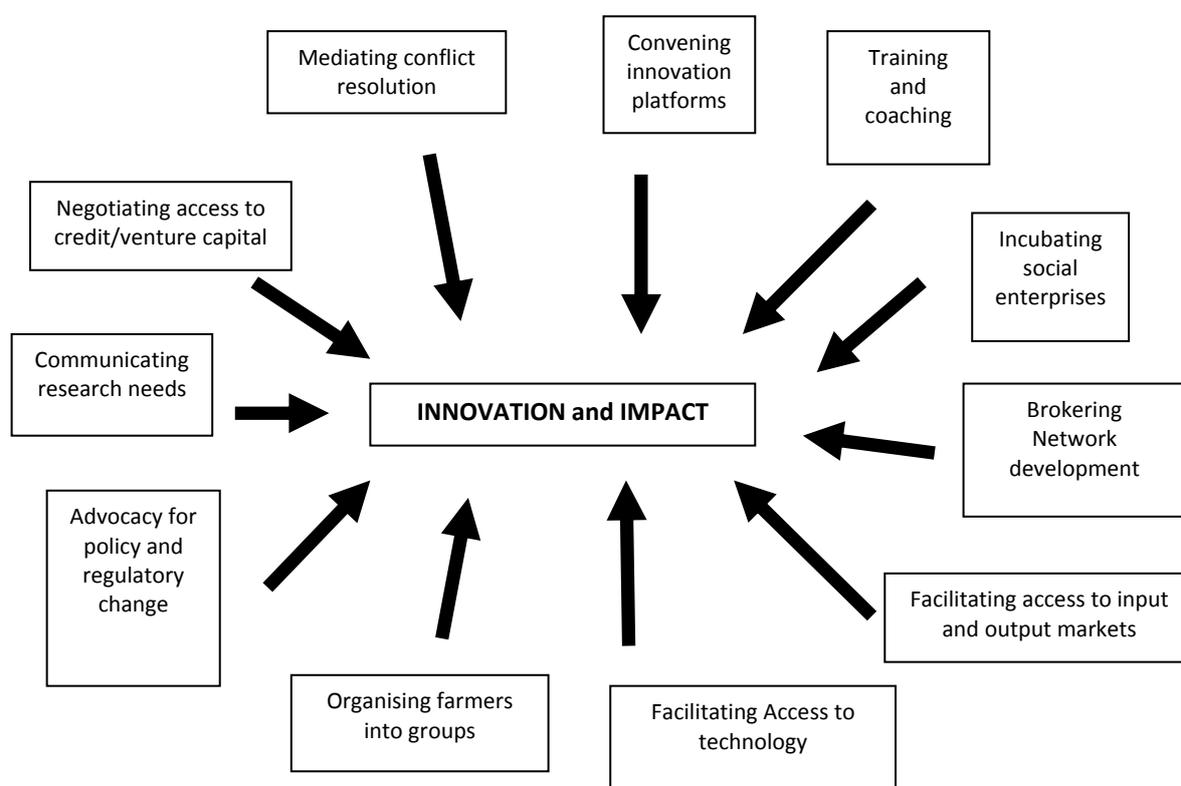
So, for example, a project on promoting decentralised fish seed production, led by RDRS (an NGO) and its partner the WorldFish Centre (an international research organisation) found that it needed a partner with marketing expertise. To fill this gap it brought in International Development Enterprises (IDE).

Similarly, a project dealing with integrated floodplain management brought in the Bangladesh Environmental Lawyers Association (BELA) for its expertise related to policy engagement in the Natural Resource Management sector. In both cases these were new and unfamiliar partners. All the projects 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.

This same analysis of the Asia projects highlights the diversity of partners involved —from research organisations, NGOs and policy think tanks to lawyers’ associations and entrepreneurs. It also explains that the particular grouping of organisations is not just dependent on needs, expertise and resources of particular projects, but owes its historical origins and evolution to 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 in Asia.

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 3 and refer to earlier discussion on innovation management tasks).

Figure 3. Innovation Management Tasks



Source: Sulaiman et al. (2010)

Evidence from RIU certainly appears to confirm its assumption on the role of partnerships in putting research into use and stimulating innovation. This evidence also highlights that partnerships are important at two levels. At the level of managing the intervention this might be the consortium of partners needed to tackle the second set of partnership development activities, such as developing partnerships around a value chain or around the policy change. These two groups of partners need not be mutually exclusive, but as the analysis in Sulaiman et al. (2010) suggests, the first group is much more concerned with performing innovation management tasks. These nuances need to be considered when the idea of partnership is used in programming.

RIU 6. The private sector can put research into use

From its inception — and particularly because of its association with innovation systems ideas — RIU had an implicit assumption that the private sector had an important role in research use and innovation. In the latter half of the programme and starting with the Best

Bets projects, this assertion was strengthened within the programme with a general view that the private sector should be leading research-into-use activities. This new assumption manifested itself in the 2010 annual review of the programme, where the degree of private sector participation and the existence of business plans in projects was a key criteria used to judge their value. The Asia projects, having been established under different assumptions, fared particularly badly, with several projects being cut for failing to meet these criteria (Sulaiman et al., 2011a).

Clearly the “private sector” is a broad category of organisation but is commonly understood to mean for-profit companies who provide goods and service via the market. The evidence from RIU shows that companies in this strict sense have played a role in the research-into-use process. For example, the Real IPM Company led the Best Bet project on striga control. The Tanzania country programme incubated a local chick company — albeit a farmer-operated company. The Malawi country programme brought commercial hatcheries into the fish innovation platform. The fish seed project established a chain of micro-businesses to help form an input supply system. And there are many other examples from RIU where the private sector can be seen to have an important role within wider efforts to put research into use.

But the experience from RIU also shows that other types of organisations have been important and have ably led initiatives that have been successful. For example, FIPS is a non-profit organisation. In East Africa CABI, an international development agency leading the armyworm project, played an important role in convening a consortium of mainly public organisations and NGOs, but which also included a private company. The Asia projects illustrate the importance of community-based organisations that often play critical roles in allowing poor people to participate in value chains. A study by Reddy et al (2010) of the Asian projects argues that one of the roles of these non-market-based companies is to help maintain a pro-poor agenda. However, what seems to have been important in such projects was that entrepreneurial principles (the marshalling of resources and people to add either market or social value) were clearly applied. Often this led to the emergence of new organisational types — for example, the NGO-established seed companies in Nepal or the micro-entrepreneurs in the fish seed supply chain in Bangladesh.

The RIU Asia projects supported and made use of these types of entrepreneurial activities in their pursuit of putting research into use. Sulaiman et al. (2011a) argue that they did this not at the insistence of the programme, but for the pragmatic reason that this was a way of achieving the intended aims of using research in the process of development and change.

In some locations in which the RIU Asia projects worked there is little market-orientated entrepreneurial activity; for example, the floodplains of Bangladesh and the forestry sector in Nepal. What seem to be important in these areas are individuals, community-based and other types of organisations that combine market and social entrepreneurship. This is likely to be the case in many areas of South Asia where the poor live. The reason for this is that this is where social and market isolation has prevented conventional market-oriented enterprises emerging. It is also part of what keeps the poor *poor*.

One of the more useful observations from RIU has been that what is valuable in putting research into use is not the role of the “private sector”, *per se*, but the role of entrepreneurship (Hall, 2010c). The definition here is important as entrepreneurship is understood to concern the marshaling of resources, people and ideas to add either market or social value. These are the familiar processes associated with innovation and hence their relevance to putting research into use.

This definition of entrepreneurship would suggest that there are two categories: market entrepreneurs and social entrepreneurs. Hall et al. (2010b) argue that many of the organisations pivotal in the success of the RIU Best Bets have business models that blend entrepreneurial skills and perspectives with mission statements that seek to both serve the needs of poor customers and address their welfare. The ethos here, they argue, is both “bottom-up” and “bottom-line” and they suggest that these organisations can be thought of as *Development-Relevant Enterprises (DevREs)*.

In an analysis of the Africa Best Bet projects Hall et al. (2010b) highlight three characteristics of these organisations:

- Origins that blend research, enterprise and development expertise

- Blended bottom-up/bottom-line business models that recognise the existence of large markets of poor people
- An explicit self-employment agenda for poor people associated with the business model

It is important to point out that these are not entirely new types of organisations. What is valuable about the RIU experience is that it highlights the way these types of organisations can play an important role in the research-into-use and innovation processes. Of particular value is the explicit focus on poor people and the use of market mechanisms to service their needs for technology and information services. Referring to these as hybrid entrepreneurs, Adwera (2011) explored the prevalence of these organisations in Kenya and noted examples of such initiatives in the health, sanitation and banking sectors as well as other agriculture-related ventures.

Reddy et al. (2010) explored the effectiveness of different types of enterprise-led opportunities for putting research into use in India. The study compared contract farming, organised food retailing, social business enterprises and social venture capital funds. The study concluded that social business enterprises (see Table 2 for examples) can outperform contact farming and organised retailing both in terms of effectiveness of providing demand-led access to research and in terms of poverty relevance. The authors also point out that social venture capital funds are an important complementary resource that are currently promoting these types of social business enterprises.

Table 2 provides some key features of these initiatives.

Table 2. Key features of selected hybrid organisations/ initiatives

Name	Background of founding entrepreneur	Coverage	Type of activities	Value chain activities
Earthy Goods	A marketing professional from a reputed management college	Many states (through partners)	Capacity building and infrastructure to help small farmers produce marketable produce	Post harvest, processing, marketing
e-Farm by Matchbox Solutions	A software engineer with 10 years of working	Primarily Tamil Nadu	Infrastructure to help small farmers connect to consumers	Marketing

	experience			
Digital Green	An aeronautical engineer trained in the US to be a space scientist	Primarily Karnataka	Dissemination of locally-relevant production technology — identified, developed and distributed by farmers	Production
Agricultural Terminal Markets Network Enterprises of IMFR Trust	A banking professional	Piloted in Gujarat	Provides efficient and transparent market infrastructure	Marketing
Minimandi/ Mandi on wheels	A management graduate with two years of experience in a high-paying corporate job	Cities in Gujarat	Alternative value chain for vegetables	Marketing

In summary, one of the more useful contributions of the RIU experience has not been to refute or support the assumption about the private sector’s role in putting research into use and innovation. Rather the evidence of RIU has helped unpack that assumption and focus on entrepreneurship rather than just focusing on the organisational manifestation of those skills in for-profit companies.

RIU 7. Innovation studies can lead to institutional changes that help put research into use

In the first phase of RIU, it was viewed as a development project and not a research project. In the second phase it categorically identified itself as a research programme and made a considerable investment in innovation studies research to help draw lessons from the programme. The assumption here was that lessons from the research could help influence the way DFID and other international organisations and donors organised their investments in agricultural research and innovation.

To launch this research the Central Research Team (led by the author) developed a conceptual framework for its research (Hall et al. 2010a). There were three central assumptions in this framework.

The first assumption was that research use needs to be understood as part of the wider process of innovation. The second was that research into use was about making use of research products and research expertise. The third assumption was that there are a number of generic ways of organising innovation, some that resemble a delivery pipeline, some that resemble a network, some that are led by research, some that are led by the private sector and others that are driven by the poor themselves. These were articulated as 6 innovation narratives⁵. The research was premised on the idea of exploring the circumstances under which these different types of innovation processes were most appropriate. Another aspect of the research design was the recognition that policy and institutional factors represented the framework conditions for innovation and that if new and more effective ways of using research for innovation were to take hold existing policy and institutional regimes needed to be disrupted. A key question was, therefore, the extent to which RIU was contributing to that disruption.

The research was rather ambitious and it ran into problems from the start. The first problem was that the innovation narratives were misunderstood by the wider programme as a blueprint for how projects should operate. In reality they were merely a heuristic to help sort information about what was working under different circumstances.

The second problem was that the conceptual framework was criticised for being too difficult to understand. This was mentioned by the evaluation team (pers. com. Tim Robertson) and there was a suggestion that this was feedback from the donor, although the research team never had any verbal or written feedback. The Central Research Team viewed its research as public policy research, but the evaluation team was highly critical, suggesting that the private sector should be the main audience for the research (pers. com. Robertson). The programme responded to the “difficult to understand” criticism by commissioning an alternative conceptual framework (Clark and Maudlin, 2010). This was neither discussed with the Central Research Team nor was the document used in any research planning that we are aware of. It did, however, mark the beginning of a rift between the Central Research Team and RIU’s management and considerably undermined the credibility of the research team within the programme and perhaps further afield also.

⁵ The innovation narratives were: a) Poor user-led innovation b) Public-private partnership-led innovation c) Capacity development-led innovation d) Below-the-radar-led innovation e) Investment-led innovation and f) Communication-led innovation

After developing its conceptual framework and recruiting its team, the Central Research Team continued its work for 12 months. This produced a considerable body of analysis and documentation of RIU experiences and reviews of wider trends (<http://researchintouse.com/learning/learning40discussionpapers.html>). The question remains about its impact on the institutional environment at the international level. Although it is clearly too early to make definitive judgments about this, it is probably safe to say that the impact has been minimal. One of the key audiences of the Central Research Team was DFID itself — after all, it was DFID that had initiated a programme to learn how better to put research into use. However, the Central Research Team failed to develop an interface with DFID. A planned brown bag seminar series petered out after the first seminar. Further communication with DFID was via the RIU management team and was focused on the negotiation of an extension of the programme rather than more fundamental discussions of what putting research into use actually meant.

With a weakly developed interface with its main client, the Central Research Team continued to conduct policy-relevant research on the research into use and innovation process, even though the lukewarm responses to this should have suggested that something was amiss. Too late in the day it became apparent to the Central Research Team that DFID's interpretation of evidence about putting research into use meant collecting impact evidence. In retrospect, if this had been clear from the start, the Central Research Team should have been equipped with a different professional profile — impact evaluation rather than innovation studies.

Elsewhere in the international community, the Central Research Team was able to use case study material in publications for the World Bank (World Bank, 2012) and OECD (Hall, 2012). Overall, however, the impact of the RIU research at the international level has, to date, been disappointing.

At the national level, the Central Research Team's research did help document institutional changes associated with RIU projects. However, the team had no role in national debates about institutional and policy change. This was probably an oversight that arose due to ambiguity about the role and organisation of the Central Research Team. An initial plan was that each of the Africa country programmes would have its own research fellow to explore

the institutional and policy dimensions of the RIU-supported activities. This proved not to be possible for staffing reasons. The Central Research Team also had an Africa and Asia coordinator, but these were designated as research roles and, as a result, the coordinators did not have any proactive role in the institutional and policy debates that surrounded RIU projects.

In conclusion, the Central Research Team did make a significant contribution to advancing the understanding of research into use — hopefully this paper is evidence of that. However, its inability to develop an active interface with the rest of RIU, with its donor and other national and international agencies undermined its ability to stimulate institutional and policy change. This was a major failure in a programme with a theory of change that stated that household level impact in the long term would arise from policy and institutional change.

RIU 8. Evaluation can promote research into use

From its inception measuring impacts has been a major interest of RIU. In its first phase 30% of funding was dedicated to this activity. Assumptions at that time were that RIU activities would lead to large-scale measurable impacts at the farm-level. Extensive household surveys were undertaken to create a base to measure this. The wider and implicit rationale of the evaluation at this point was that if RIU could prove to be working then further investments by the donor and others would be justified.

In the second phase of RIU a rather different evaluation approach was adopted. The programme's reorganisation envisaged a research team investigating research into use and innovation processes complemented by an impact team investigating outcomes. The assumption here was that the impact work would be able to substantiate the value of institutional innovations that were found to be helping put research into use. When the impact team was finally appointed its role and underlying assumptions evolved significantly from this original vision. The team assumed a much more broad-based evaluation role, exploring the effectiveness of the RIU programme as a whole.

It is difficult to be definitive about the underlying assumption of this new evaluation approach, although it drew inspiration from the emerging perspective of Theory-Based Impact Evaluation. However, a number of things became apparent about the evaluation teams

vision of the RIU programme. The first was that it viewed RIU as a standard development project. For example, it did not recognise the various RIU activities as experiments investigating putting research into use (pers. Com. Robertson and John Wyeth). It viewed a key task of the research team as measuring household level impacts of the RIU activities (pers. com. Gerard Gill). It recognised institutional change as one of a number of outputs of RIU. However, discussions with the evaluators indicated that their view of institutional change primarily concerned incentives in the value chain (pers. Com. Robertson and pers. Com. Shields).

Irrespective of the validity of these assumptions, increasing tensions arose between the evaluation team, the RIU projects and country programmes being evaluated, the Central Research Team and the management of RIU. At the heart of this was a contested vision of what RIU was about and how it should be evaluated. The evaluation team report was rejected by both the RIU management team and by the donor (pers. Com. Andy Frost). No further comment can be made on this as the report, as of the time of writing, has not been circulated beyond these two parties. All that can be said is that divergent views on RIU remained unresolved and the evaluation process did not help put research into use. RIU has appointed another evaluation team in its third phase.

5. HEADLINE LESSONS FROM RIU

A discussion of the key lessons emerging from RIU has to be prefaced by the caveat that it is far too early to assess what the final outcomes and impact of the RIU programme will be. This review has explored some of the processes that current thinking on research use and innovation predicts them to be. What is missing is detailed evidence that proves the causal link between the processes observed and the achievement of the social and economic impact that RIU was designed to contribute to. The evaluation exercise commissioned by RIU pointed out that it is too early to judge what these final outcomes will be (pers. com. Dermot Shields). This issue has also been clouded by the conflict between the ambitions of the donors to see wide-scale household-level impacts during the life of the programme and the realities of a programme that will have its greatest impact in the medium and long-term through institutional policy changes that strengthen agricultural innovation capacity (Sulaiman et al., 2011a). The best that can be achieved here is to draw lessons on the basis of the evidence and analysis available.

Bearing this in mind the following major lessons appear important.

(i) Different starting points

In a sense many of the tensions about RIU concerned the most appropriate starting point for an intervention of this sort: Technologies, Supply Systems, Value Chains, the Private Sector, Innovation Support Services, etc. These have played out in the assumptions of the multiple RIUs discussed above. What is clear from the preceding analysis is that all of these starting points, while valuable under certain circumstances, have drawbacks under other conditions.

An alternative perspective on this is presented by Reddy et al. (2011) and Sulaiman et al. (2011a), who suggest that the starting point should be the innovation trajectory — the range of social and economic endeavors that emerge and evolve over time around different opportunities and challenges and acts as a focusing device for change and innovation. While this idea might sound somewhat abstract, what it really means is that there is a need to identify themes around which there is an interested group of stakeholders who have already achieved some momentum in working around those themes. For example, in RIU sleeping sickness control was obviously a strong focal point. In Asia the fish seed project identified a

topic around which a lot of efforts had already been invested by a range of different organisations. The same is true for the fish fingerling work in Malawi and the client-orientated breeding projects in Asia. Pest control and access to inputs are two further examples from the Best Bets in East Africa.

Once these broad themes have been selected then the most appropriate entry point can be chosen. This entry point might be the promotion and introduction of a new technology — for example, bio control agents in the case of Real IPM Best Bet. In other cases the entry point might be providing innovation support services to link up a group of organisations that are not currently working together but have broadly complementary interests and resources. In other cases business incubation may be the most appropriate entry point to take forward existing ideas and market opportunities — for example, the poultry platform in Tanzania. In different permutations new research might be the entry point needed to tackle technical and policy bottlenecks in the innovation trajectory — the experiences of the Forest Action project in Asia would be an example of this. Tackling incentives in the value chain or establishing new financing arrangements might be another way of oiling the wheels of the innovation trajectory.

If one takes the perspective that there are different entry and starting points to move the innovation trajectory forward this provides a menu of operational options to help enable innovation and tackle better research into use (these are discussed in more detail in the next section which illustrates the contours of a stylised innovation project). This sidesteps the problem of becoming wedded to one particular approach. It also points to the need for more eclectic types of interventions aimed at enabling innovation and research use.

The related lesson from RIU is that whichever entry point is selected it is merely the point of departure. For example, RIU shows that tackling input supply arrangements only is often not enough and that there are additional tasks that are required to support this. Similarly a number of technology entry point-type projects illustrated the way new technology had to be coupled with entrepreneurial incubation and even policy change. The important lesson here is that the many aspects of the innovation process need to be kept in mind in an intervention. If these are ignored they will simply emerge later on as new bottlenecks.

(ii) A range of organisational vehicles for interventions

Interventions still require an organisational focus and this, to a certain degree, is dictated by the type of entry point that is chosen. RIU provides useful insights into two distinctly different organisational vehicles that are effective in promoting research use and innovation. The first category comprises organisations providing innovation brokering and support services, as typified by the Africa country programmes. It seems quite clear from RIU's experience that organisations playing this type of role are currently absent from the organisational landscape of many African countries. Nederlof et al. (2011) suggest that it is unlikely that the market will pay for the services provided by these types of organisations because while their services are valued they are also intangible. This confirms wider research on this topic (see Klerkx et al., 2009). This suggests that public support of organisations playing this role is justified.

The second category of organisational vehicles concerns hybrid enterprises that span market and social objectives. Evidence from RIU suggests that the value of these organisations is that they perform many of the same innovation management tasks of specialist innovation support services. However, these are not provided as a service but are undertaken as pragmatic tactic to achieve social and economic goals. Of particular attraction of this type of organisational vehicle is that very often they have a strong focus on the demands of poor people and, as such, can shape the innovation process they are associated with in this direction.

Interventions designed to make use of these hybrid organisations could operate in two ways. Firstly innovation support services could be used to establish and incubate such enterprises. Once established they could be provided financial and technical support while they establish sustainable revenues from the market. Alternatively, existing hybrid enterprises could be chosen for financial and technical support. Adwera (2011) and Reddy et al. (2010) suggest that significant and growing numbers of these organisations exist. A word of caution on this approach, however, is that this could easily slip into business development territory, which is already a common mode of development assistance. A safeguard against this is to ensure strong links to research (relatively uncommon in most business practice) and to make sure that innovation capacity building (in the system sense outlined earlier) is part of the support package to these sorts of organisations.

(iii) The dangers of cherry picking innovation systems ideas

It would be an omission to suggest that RIU has not been without problems and disappointments. The seeds of this disappointment come from the fact that while its early rhetoric promised an innovation systems-style intervention, many of the assumptions in its design and expectations of its outcomes point towards a technology transfer-type of intervention. The reality was that these two styles of interventions were often mixed together. In Asia, for example, partnership approaches were used to attempt to scale out existing technologies. In Africa the laudable idea of establishing innovation support services was initially marred by attempts to replicate the same model in all countries (Nederlof et al., 2011) rather than adapt this idea to prevailing country contexts. The value of entrepreneurship was recognised but only the private sector was seen as the best way of injecting this into projects. Institutional and policy change was recognised as the causal link to impact, but very few efforts were made to address this in project design.

Sulaiman et al. (2011a) make strong arguments that RIU's focus on local innovation processes and institutional development only in the immediate sphere of the project activities severely undermined RIU's potential for large-scale impacts. Giving the example of the barriers to wider institutionalisation of client-orientated plant breeding, Sulaiman et al. (2011a) argue that unless the techno-institutional regime is disrupted, interventions such as RIU will remain as pilots that are unlikely to sustain changes after the projects.

A review by Ojha et al. (2011) of the global experiences of promoting adaptive collaborative management makes a similar conclusion. This review explains that the core of the Adaptive Collaborative Management (ACM) approach is about stimulating adaptations at all levels of the innovation systems (local, organisational and policy) through a process of reflective learning. In practice, learning-based approaches work well in the sphere of community action but usually hit roadblocks at wider levels of organisations and policy — even when the same organisations and policy bodies have initially supported the idea of ACM. This greatly restricts the potential these approaches have for impact (*ibid*).

These experiences suggest that there has been a “technology transfer” of elements of an innovation systems intervention. In other words ideas such as partnership, entrepreneurship

and innovation support services have been parachuted in without recognising the need for research-into-use interventions to involve both technical and institutional innovation or that institutional and policy adaptation is required at all levels. And, with the assumption that high-level institutional and policy learning will take care of themselves.

Of course it is easy to see this with the benefit of hindsight and designing interventions that take this multi-level adaptive learning perspective is challenging. But that is what RIU, with its innovation systems rhetoric, was designed to address. The fact that it struggled with this should be seen as a warning for others of the danger of cherry picking elements of an approach without adopting whole-heartedly the philosophy that the approach implies. Our discussion in the final section addresses the question of this failure to address institutional change on a broader front. It is the central failing of RIU and it will undermine the sustainability of its impact.

6. POLICY AND PROGRAMMING IMPLICATIONS

This section summarises the policy messages from the preceding analysis in order to present an illustration of what an idealised and stylised research into use programme could look like. We aim these policy messages at national and international investors in agricultural sector development. RIU provides a glimpse of what a new era of innovation support projects could look like. These could be funded by competitive grant mechanisms or through the establishment of specialist innovation support services as discussed above. The following is based on the RIU experience and summarises the key features of these new innovation support projects.

- The primary focus is not on conducting research, but on finding ways that research products and expertise can be used productively for social and economic impact.
- The purpose is not just to transfer technologies, but on coupling access to technology and expertise with access to markets, credit and other inputs and creating the institutional arrangements that make these links responsive to the needs of stakeholders in the innovation process.
- The scope of projects can go beyond agriculture and include related issues in education, health, energy, commerce and industry, and financial sectors.
- Different types of organisations, including development organisations, private enterprises, and research organisations, advisory and other support service organisations from the public and private sector can lead such projects. Leadership depends on the theme being addressed. Projects usually involve a coalition of different sorts of organisations working together.
- Projects will usually address issues at multiple levels. This may involve technological change, but they usually also involve addressing issues in institutional arrangements (how things are done, incentives, etc.) as well as in the policy domain that frames activities and innovation.

- Different projects will, however, impact at different scales; some will impact on individual communities or enterprises. Some will impact value chains. And some will impact at regional and national scales.
- Projects are inherently process-driven — promoting innovation in different and dynamic contexts always needs to be learned and improved through trial and error. This means that learning-oriented mentoring systems are a key management tool in these projects.
- Projects will have an explicit capacity development agenda. They provide space for organisations to work in new ways and with different partners. Such projects anticipate that institutional lessons (how to work differently for impact) are an important outcome.
- In these types of projects scaling out is not concerned with replication, but with linking together similar initiatives to promote lesson sharing and wider innovation. Scaling up is not concerned with formulation of recommendations for policy, but on linking experiences and lesson learning to debates that shape wider policy and institutional frameworks and the nature and direction of development pathways.

Innovation projects will have entry points along a continuum of research to development activities. These include:

- *Technology adaptation and troubleshooting.* Adapting technologies to different contexts of application and conducting research to resolve “second generation” technical constraints encountered during application.
- *Strengthening technology delivery systems.* Creating viable demand-responsive delivery systems for new technologies, such as improved crop varieties, but also providing training in new production and marketing techniques and regulatory compliance. This may be done through the market or through public or civil society organisations providing advisory services.

- *Strengthening value chains.* Creating viable and equitable value chains that link smallholders to local, national and international markets. This might be in response to a new market opportunity. It may also be driven by new technological opportunities, such as new types of storage or value added agro-processing.
- *Strengthening social organisation.* Creating farmer or commodity groups and enterprises as a way of improving production, process and marketing. This may also be used as a way of better accessing inputs, such as seeds or credit, and as a way of collectively articulating demand of research services and advisory support.
- *Strengthening innovation brokering.* Supporting service organisations to use facilitation, intermediation and communication to help build coalitions of partners around emerging opportunities. This might involve undertaking research and/or setting up innovation platforms to identify new opportunities and bringing partners together to exploit these.
- *Enterprise incubation.* This often involves providing start-up capital and technical assistance to enterprises involved in the commercialisation of new technologies or services to smallholders. It may also include mixed revenue business models, where products and services are paid in part by the market and partially from public or private subsidy.
- *Policy and institutional change.* This involves generating, synthesising and communicating information to policy-makers to change the framework conditions for a particular innovation pathway. It may involve support to specific interest group agencies; for example, an organic produce organisation. Alternatively it might mean supporting policy think-tank organisations to link development practice experiences with the policy process.

It needs to be stressed that these are only entry points for projects. The RIU experience suggests that innovation projects work best when these different types of entry points are clustered together to address the different types of bottlenecks that projects encounter as the innovation process unfolds.

Currently the door is half open for these sorts of projects to become a reality. There is evidence to support their value. However, considerable institutional innovation is required in donor and implementation bureaucracies before projects can be implemented in this way. Issues such as evaluation, flexible financing, and sector-defined projects and line agencies are priority issues that need to be tackled. The emergence of these projects will also be dependent on how effectively programmes manage the contested views of agricultural research and innovation, which continue to shape much of agricultural development practice today and which, as RIU has demonstrated, continue to frustrate the emergence of new ways of promoting innovation.

7. CONCLUDING DISCUSSION: MANAGING CONTESTED VISIONS OF RESEARCH INTO USE AND INNOVATION

RIU has certainly provided some valuable insights into the research into use process. It also has to be acknowledged that many of these insights merely confirm what has been found elsewhere and in other sectors or have been predicted by conceptual studies of innovation. This is not a new field of study and much of this was published before the inception of RIU. Of course, RIU provides an invaluable operational perspective of how these things play out in a donor-sponsored intervention. Yet if so much was known about underpinning ideas about innovation why did the RIU programme prove to be so difficult in practice? Remember, this was a programme that was found to be so fragmented and lacking in direction in its first phase that it narrowly escaped closure at its mid-term review. The second phase made better progress, but was still characterised by divergent and contested views about its vision and meaning, both within the programme and between the programme and its donor. At the time of writing a third phase is underway and this may prove more coherent.

We believe that at the heart of these issues is a clash of two, and maybe more, fundamentally different views about innovation and the role of research in that process — one vision that was research and technology-led and the other that was driven by learning and institutional change. The problems that RIU faced were not that one view was better than the other — successful innovation often combines these processes. Rather the problems that RIU faced were how it managed the tension between these two different positions and the way the institutional environment of donor-funded projects and development practice constrained the negotiation of a new and more appropriate vision of the research into use process.

At its most simplistic this is an institutional environment with donor notions of accountability and evidence of impact shaped by a vision of scaling out research products to farmers. It is an institutional environment where the key stakeholders in programme management are agricultural research professionals or research managers with professional perspectives that give primacy to research. It is an institutional environment where funding imperatives provide limited scope for negotiating fundamentally different visions with the donor. And, at a wider level, in both national and international arenas, it is an institutional environment with powerful and influential champions of the technology-led vision of innovation.

If RIU was going to succeed in developing and operationalising a radically different approach to putting research into use it had to negotiate and defend that vision against this countervailing institutional backdrop. Our view is that RIU failed to do this. It failed to challenge the donor on its initial premise for investing in RIU. It failed to challenge the impact logic of the evaluations it was subjected to. It failed to challenge the probity of cutting projects on reviewers' recommendations. It failed to use its research to engage and influence champions in national and international arenas. And it failed to communicate the new and exciting vision of research into use that its mandate and innovation systems rhetoric promised. But its greatest failure was that at its inception RIU naively failed to recognise that its main task was to find an effective way of productively managing these contested views and making inroads into the institutional edifice that supports the "business as usual" vision of transferring research finding into use.

This was no ordinary development programme. It needed visionary leadership with the determination, tact and diplomacy to negotiate the space to test that vision and mobilise support for an entirely new way for using agricultural science and technology for development. The implications for future investment in promoting agricultural innovation speak for themselves. This also explains why RIU has disappointed so many of those associated with its initial starting point and who believed that it was genuinely a new direction in harnessing agricultural research for innovation and development.

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