

new technologies are important, these inevitably need to be adapted to local circumstances of application and this in its self will require collaboration with scientific organisations. The flexibility of the scheme seems to help by allowing creative use of the schemes resources. Perhaps this is recognition of the inevitable messiness of putting knowledge into use and the unforeseen obstacles that this process throws up. So while the scheme is certainly concerned with applying technology in rural development, its long term objective and vision is of capacity development. In this context it means both building the skills of the S&T-based NGO's as well as building their linkages to scientific organisations.

The SMPMA is almost the antithesis of the STARD scheme. It is explicitly focused on technology transfer. It is structured to do so in a way that does not allow for deviation from either the types of technologies to be transferred or the prescribed way of achieving this. It has no focus on building the relationships and linkages that will promote innovation in the future. We don't have any field based evidence for how well this scheme is performing in terms of introducing IPM technologies to farmers. However, the innovation systems perspective would suggest that this would not be a very effective way of organising a knowledge-based rural development initiative. In fact, it could learn a lot from the STARD scheme.

Comparing two government schemes that use science and technology interventions for rural development		
Key features	STARD Scheme (DST)	SMPMA Scheme (DA&C)
Objectives	To develop S&T capacities and skills in field groups/NGOs and to make technological interventions for rural development	To transfer integrated pest management technologies and practices through conventional extension departments and NGOs
Focus	Generation, dissemination and application of rural technologies and knowledge for rural development	Transfer of IPM approach for selected crops and pests, mainly through demonstration and training programmes
Technology options	Selected by the NGO receiving Core Support in consultation with the Science and Society Division of Department of Science and Technology	Selected by DA&C and approved by the Directorate of Plant Protection and Quarantine
Technology choice	A range of technologies developed and adapted by various organizations (including formal S&T organizations, NGOs, rural women, etc.)	20 IPM Package of Practices (PoPs) developed by ICAR/SAUs, Central Directorate of Plant Protection, Pesticide Industries and State Department of Agriculture/Horticulture + 31 new IPM PoPs developed specifically for Horticultural Crops.
Operational flexibility	As approved by the Science and Society Division of DST based on the advice from time to time, of the Advisory Committee constituted for each Core Group supported under the Scheme.	As given in the guidelines set by the Directorate of Plant Protection, and monitored by the national Scientific Advisory Panel.

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The next edition of the RIPWiG Reporter will focus on the challenges of financing rural innovation
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Introduction

This is the first edition of the RIPWiG reporter. Its purpose is to share discussions from a policy dialogue group known as the Rural Innovation Policy Working Group (RIPWiG), an expert advisory group established by UNU-INTECH and its partners in India as part of a DFID funded research project "New insights into promoting rural innovation: Learning from civil society organizations." The mandate of RIPWiG is to facilitate dialogue between the project team and decision makers from Government and civil society organisations with responsibility for planning and implementation of science and technology-based rural development initiatives.

The RIPWiG has so far held two meetings. In the first meeting it advised the project to look at how Government Schemes worked as these are the key public intervention mechanisms in the rural sector. In the second meeting, the Chairperson and other members of the RIPWiG have challenged the project to develop key lessons arising from its work that can help the Government promote rural innovation. (We explain what we mean by rural innovation in four boxes below.)

In this first edition of RIPWiG Reporter, we present a brief overview of two contrasting Government Schemes that seek to promote rural innovation. But first we present the ten commandments of rural innovation, a summary of principles emerging from recent research by the project team.

<p>What do we mean by rural innovation?</p> <ul style="list-style-type: none"> Rural innovation is not new technology or new information, but the changes that take place in rural areas when knowledge, technology or information is made available and is put into socially and economically productive use. Promoting rural innovation is not just about promoting knowledge, technology and information, but about developing the capacity to access, adapt, and apply this knowledge in a particular context. 	<p>Rural innovation is.....</p> <ul style="list-style-type: none"> Both the adaptation and use of food processing technology in agro-processing enterprises as well the novel business models that make these enterprises pro-poor. The combination of new designs and new marketing strategies that allow tribal weavers from the North East of India to sell their garments in Europe and USA The development of and use of bio-mass based dryers for high value spices in areas without reliable access to electricity. The novel grouping of organisations required to design, test, manufacture and supply improved packaging material to small-scale producers of high value horticultural produce.
<p>Where does knowledge for innovation come from?</p> <ul style="list-style-type: none"> The sources of knowledge needed for innovation come from scientific research organizations, policy making bodies, commercial and development organizations, as well as rural people themselves. Using these knowledge sources and bringing about these changes involves the concerted efforts of actors from the whole spectrum of public and private, voluntary and commercial sectors in both rural and urban areas. 	<p>Why is Innovation Important?</p> <ul style="list-style-type: none"> New knowledge adds value to existing practices, resources and knowledge creating social and economic outcomes. While Invention only delivers new technology, innovation delivers social and economic change – sometimes known as development!!

The ten commandments of rural innovation.

- Invention is not always required for innovation.**
 Invention and innovation are often wrongly thought to mean the same thing. Inventions are things new to the world and are often technological – plant and animal varieties, machines and production inputs. Innovation on the other hand refers to the changes that take place when knowledge, information and technology are put into use in ways that are new in a particular location. This might involve the adoption of new technology; the production of new crops or products; or new processes such as marketing strategies which are more efficient or equitable.
- Transferring technology to rural areas does not necessarily promote rural innovation.**
 Better technologies can help poor people. Technologies can help them transform their lives through innovations in agriculture, health care, transport, energy, rural industry and

communication. However simply transferring technology is not the answer. Innovation involves putting together different pieces of knowledge, information and technology in ways that create novelty and change in a particular location. If new technology is simply delivered, innovation will not necessarily take place. Instead technology needs to be integrated with other sources of knowledge – farmers' knowledge, market knowledge etc – to allow it to be used in locally relevant ways. New technologies are obviously important, but until they can be put into productive use they can't be considered innovations.

- Inventions created by rural people are not inherently superior to scientists' inventions.**
 Recently a lot of attention has been given to inventions created by rural people – often mistakenly called indigenous innovations. Yes, these inventions are suited to the particular locations and socio-economic setting of the rural people that created them, and yes, in those locations these technologies have led to socially beneficial innovations.

However, transferring these same technologies to other rural settings will not necessarily help other poor people who have different needs and contexts. Just as scientifically derived knowledge and technology has to be integrated into different sources of knowledge in a particular location, so too indigenous inventions need to be integrated as part of range of sources of knowledge that promote innovation. However, what can be transferred across locations is knowledge about how to stimulate the local creativity that leads to innovation.

4. Capacity development for rural innovation is not the same as training.

Capacity development is often mistakenly thought to be about giving people new skills. That is because innovation is presumed to involve technical training. However, in addition, a major part of promoting innovation involves helping integrate different sources of knowledge. In practice, this means stimulating interaction and learning among different individual and organisations that hold this knowledge. Interventions seeking to develop the capacity to innovate therefore need to concentrate on facilitating the development of the right kind of knowledge-based networks relevant to different technological and livelihood options in the rural sector. These networks also need to include policy actors as they have an important role in creating an environment that supports knowledge use and innovation.

5. Even though the Government has successful science and technology-based schemes for promoting rural innovation, it fails to learn lessons from these.

Long ago, the corporate sector realised that learning how to put knowledge into use more effectively was a sure route to the innovations needed for business success. Rural development and the rural innovations needed to drive development is also a knowledge intensive business. Learning how to make better use of knowledge is just as important for the rural development sector as it is for the corporate sector. The only difference is that government science and technology and rural development programmes can continue whether they learn how to exploit knowledge in new and better ways or not. That is a shame because some Government programmes have been very successful in supporting the development of good networks of knowledge producers, intermediaries and users needed to promote rural innovation. It is time the Government started to actively learn from its own triumphs.

6. NGO's need money, but they are donors of knowledge about how to approach rural innovation.

The great thing about NGO's is that they can try out alternative ways of working and can adapt mid-course when things go wrong. This turns out to be a perfect strategy for trying to workout how to connect the different players and pieces of knowledge needed to bring about innovation in the messy rural sector. This often involves ways of working that could never be dreamt of in a government organisation. As a result, NGOs are a rich source of inspiration on different working practices that could guide others pursuing knowledge-based development. While government programmes are rarely aware of lessons from NGOs, these NGOs themselves also devote too little energy to documenting and promoting lessons.

7. Converting promising models of rural innovation into Government schemes kills them.

Developing dense networks of knowledge producers and users in order to promote rural innovation is a messy business of trial and error. There is no set formula, only broad principles. Successful models have their own dynamics, often flexibly responding to changing

opportunities and contexts and continuously learning how knowledge can better be accessed, integrated and made productive. This often requires intuitive skills and local knowledge to shepherd the process along. In contrast, Government schemes rely on providing comprehensive guidelines that can be applied uniformly across a large range of social, physical, and institutional settings by staff without the skills or the mandate to act responsively. This is usually the death knell for replicating successful models. In reality, this is a contrast between two different approaches to development – one a learning-based approach and the other a prescriptive approach.

8. Participatory development with the poor is not enough to promote rural innovation.

Participatory technology development was once thought to be the answer to the rural innovation conundrum. Often misinterpreted by practitioners, this promising approach ended up trying to make poor people's knowledge more important than scientist's knowledge; the argument being that poor people were best suited to identifying their own problems (often true, but not always) and developing solutions to solve their own problems (rarely true). It was certainly necessary to recognise the poor as an important source of context specific and traditional knowledge. The mistake was to privilege this above all other sources of knowledge, which, together with the knowledge held by the poor, are required to bring about rural innovation. The challenge is integrating these different sources in socially inclusive ways, and not placing individual sources and methods on pedestals!

9. Pro-poor rural innovation requires collaboration with all the traditional enemies of the poor.

In the past, market middlemen, the private sector, financial institutions and even the State have been seen as enemies of the poor. It is now becoming ever more apparent that not only do all these actors play an important role in the rural economies on which the poor depend, but also, these actors are all important sources of knowledge and resources needed to promote rural innovation. Of course, the poor can and do get exploited by the unscrupulous in society. The task for development is to find the incentives and penalties to encourage collaboration rather than exploitation. This means that the traditional enemies of the poor must be integrated as important players in the process of rural innovation, even if it initially involves some adjustments by both them and by the development agencies that will need to work with them.

10. Rural innovation does not need new investments, but new ways of working.

It is easy to throw more money at difficult problems like rural innovation and poverty reduction. It is much more difficult to change the way government programmes, NGO's, research organisations and others work. This concerns everything from the rules of government schemes; how research priorities are set; rules governing professional advancement; the functioning of funding arrangements; and much more. Yet it is all too clear that collectively the development sector needs to recognise that different ways of working could help make major advances in promoting rural innovation. All those involved in science and technology-based development have a responsibility to explore how knowledge can be used more effectively in the process of rural innovation, identifying which working practices are stopping this happening. This is the challenge of not just doing the right thing, but doing the thing in the right way and continuously assessing how well its been done.

Principles of innovation systems thinking

Innovation is a process of not only creating knowledge, but also making this knowledge available and putting it into use.

- This usually involves combining different sources of knowledge held by scientists, entrepreneurs, farmers, rural artisans, development practitioners and policy organisations.
- The process of innovation relies on interaction between these different sources of knowledge. Developing these networks of diverse stakeholders is central to promoting innovation
- The working practices – or institutions – of different organisations determine the extent to which they can engage in interactive processes. The wider policy and institutional environment also shapes this process through the incentives and norms that it exerts. Creating the right institutional setting is essential if innovation networks are going to operate effectively
- Organisations through their interaction with others and with the wider environment (policies, markets, technology, and society) learn and change. These changes lead to new ways of working and in this way new capacities to innovate build-up incrementally over time.

Using Science and Technology for rural development: A comparison of two government schemes

The RIPWiG requested the project team to review two science and technology-based rural development schemes of the Government of India. The request from RIPWiG was very specific. It asked that since the project team is using the concept of an innovation system to identify new insights for promoting rural innovation, then the project team should critique selected government schemes from the perspective of innovation systems thinking. One member of the project team, Dr. Rajeswari Raina, from the Centre for Policy Research took up this challenge and her analysis is presented below.

The schemes reviewed were:

- The Science and Technology Applications for Rural Development (STARD) of the Department of Science and Technology (DST);
- The Scheme for Strengthening and Modernization of Pest Management Approach in India (Scheme SMPMA) of the Department of Agriculture and Cooperation (DA&C)

Both schemes focus on development (rather than research); the important role of civil society and NGOs; and emphasise support for technology transfer, training/demonstration. Yet the two schemes have approached this in very different ways.

Scheme I: The S&T Applications for Rural Development (STARD) Scheme of the Science and Society Division of the DST provides support for the development of promising S&T-based NGO's and technological interventions for rural development. The Core Support programme of the Scheme identifies and provides long-term support – 5- 10 years -- to civil society organizations to nurture them to become Centres of Excellence for Rural Development. Selected recipient organisations are expected to have some scientific expertise that can then be built upon. The support is for "activities connected with the generation, demonstration and application of rural technologies on an integrated and continual basis." In other words, the support is to help S&T based NGO's develop linkages and long-term relationships with research organisations, thus underpinning future efforts to bring about rural innovation.

NGOs that have received this Core Support have used it to make technological interventions in the priority areas identified by DST (for example water technologies and management, construction, agriculture, animal husbandry, aquaculture, horticulture, rural industries). But the Scheme is designed in such a manner that the NGOs can make both technological

interventions and social or process interventions: For example:

- they can facilitate dialogues (between organizations and individuals involved in technology generation, equipment manufacture, transport or rural infrastructure, farmers, women, primary health centres, extension departments, etc);
- influence R&D by suggesting research topics;
- participate in R&D programmes; organize meetings/ technology demonstrations/ learning exercises; and
- develop markets for rural value added products produced using new or modified technologies.

A major element of these process interventions involves the NGO developing linkage with R&D organisations. So while the programme seeks to strengthen the capacity of selected NGO to be centres of excellence, the development of linkages with the science base is also seen as part of the task of creating this capacity. Over the past two decades, the Scheme has provided Core Support for 28 NGOs for periods ranging from 5 to 15 years.

Scheme II: The Scheme for Strengthening and Modernization of Pest Management Approach in India (Scheme SMPMA) of the Department of Agriculture & Cooperatives (DA&C) provides support for popularizing the Integrated Pest Management (IPM) approach among the farming community. The Scheme, initiated in 1992 as the Scheme for Promotion of IPM in India, operates through 31 Central Integrated Pest Management Centres (CIPMCs) located in various States. The CIPMCs conduct several activities: for example, regular pest surveillance and monitoring exercises; rearing and multiplying bio control agents; conservation and promotion of naturally occurring bio agents and bio pesticides; development of human resources in IPM by training extension workers, master trainers, and farmers (through Farmer Field Schools (FFS)); and training pesticide dealers, NGOs, private entrepreneurs, graduates, etc. The Scheme sets targets for number of and crops for demo-cum-training programmes each year. Since 2002-03, the role of NGOs in these training programmes, both as trainees and trainers has been enhanced. From 1994-95 through to 2004-05 the Scheme conducted 9,111 FFS and training of 32,188 Agricultural Extension officers and 23,443 farmers in the use of IPM technologies in 28 States.

From this review of the two schemes it can't be said which one is performing better than the other, at least not in the sense impact on rural development indicators. But from the perspective of the innovation systems concept it can be seen that one scheme – STARD – embodies many of the principles that this perspective would value. It focus a lot of its attention on strengthening S&T based rural development organisations and helping to link and network them with scientific organisations. The scheme recognises that while