

DIIS REPORT

**SUPPORTING LOCAL INNOVATION
FOR RURAL DEVELOPMENT**ANALYSIS AND REVIEW OF
FIVE INNOVATION SUPPORT FUNDS*Esbern Friis-Hansen and Henrik Egelyng*

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Executive Summary

The aim of this study is to follow up the 1st GRA-World Bank workshop on innovation systems at the community level, “Touching the Hearts of the People”, held in Kuala Lumpur 6-8 February 2006. By resolution, this workshop recommended that a ‘review of existing innovation support funds and outline of a global mechanism to foster community level innovations’ should be undertaken. The study is also, in part, a response to a recent report from the World Bank’s Indigenous Knowledge for Development Program, which calls for the establishment of an “innovation fund to promote successful IK practices” (Gorjestani, N., in WB 2004; 45-53).

This desk study reviews five innovation support funds (ISFs) or funding concepts: the Indian ‘National Innovation Fund’ (NIF) and its associated web of institutions; the GTZ-funded ‘Small-Scale Project Fund’ (SSPF); the NGO concept ‘Promoting Local Innovation in ecologically oriented agriculture and NRM’ (PROLINNOVA); the FAO’s project, ‘Promoting Farmer Innovation-Farmer Field Schools’ (PFI-FFS); and the ‘Local Agricultural Research Committee’ (CIAL) in Latin America.

Local innovations are broadly perceived as constituting a major under-utilized potential for development and rural poverty reduction, and ISFs contribute to this potential more effectively. Local innovators continue to experiment and generated knowledge within a broad spectrum of areas, including improved mechanical tools for agriculture, natural resource management, medicinal and agricultural practices, and innovative ways of organizing and doing business. The significance of local innovators as a source of knowledge and well-adapted solutions is high among the poorer sections of rural society, many of whom cannot afford, nor have access to, relevant advisory services.

There is growing recognition that a whole range of different actors and organizations are required to stimulate widespread local technological development. New products and processes are brought into local economic and social use through networks of organizations, which are often referred to in the abstract as the innovation system. The key challenge is not perceived in terms of devising new technologies, e.g. *doing different things*, but in bringing about changes in how the innovation system works, e.g. *doing things differently* (Phila 2005).

Our comparative analysis of the five reviews listed above draws twelve preliminary conclusions:

(i) NIF is globally the largest and most advanced ISF. However, although the other four ISFs are more limited in scope and focus, they can all contribute valuable experiences, complementary to those of NIF. *In our assessment, the effectiveness of investing in innovation support could be enhanced if existing complementary experiences were exchanged and acted on in a systematic manner.*

(ii) ISFs understand innovation as a matter of both processes and products, the latter varying from hard mechanical implements to soft institutional innovations. ISFs support both innovators and their links with public institutions and private entrepreneurs, and groups of rural producers, as platforms for innovations and as their links with innovators. *It is our assessment that all ISFs could benefit from a more balanced mix of the two areas of innovation support.*

(iii) ISFs' understandings of who the innovators are varies. NIF celebrates the qualities of individual, small-scale entrepreneurs with a proven record of being innovative, while the remaining ISFs place their efforts in facilitating poor rural producers and users of innovations to learn to become 'researchers' in their own right. *It is our assessment that supporting both types of innovator is likely to increase the development outcomes of ISFs.*

(iv) A general lesson learned by all ISFs is that innovations have to be understood in their context. ISFs currently differentiate between innovations on the basis of the types of issues they are concerned with (e.g. soil and water conservation, biological pest management, etc.). *It is our assessment that it would be useful if the ISFs could instead distinguish between innovations in relation to (i) the relevance of formal property rights; (ii) public/private goods; and (iii) market/non-market value.*

(v) When using a 'learning selection' analytical framework for rural innovations for development, the focus shifts away from simply understanding innovators as inventors and rural producers as the users of innovations towards a focus on how innovations are continuously improved upon through interaction between the various actors. *In our assessment, the facilitation of cycles of 'learning selection' involving innovators, entrepreneurs and innovative adopters is a potential area of activity for ISFs that could contribute to scaling out use and the commercialization of rural innovations.*

(vi) Understanding capacity development as ‘the ability of an organization to produce appropriate outputs (e.g. services and products) helps clarify the aim of capacity development efforts in these ISFs. ISF-supported efforts are centered on the one hand on building effective mechanisms for identifying, documenting, vetting and promoting innovations, and on the other hand on ensuring organizational and financial sustainability.

(vii) The ISF funds reviewed here have a decentralized management structure linked together by a central management unit or committee. The Indian NIF has the most formalized and well-established governance structure, including a national Governing Board that coordinates activities among the web of independent organizations, each with different functions and foci. Coordination of activities is less visible in the case of CIAL and PFI-FFS, as most management decisions in these organizations are taken at the farmer-group level and at the district-level networks of these groups. The PROLINNOVA concept provides a refreshing mix of centralized and decentralized decision-making management.

(viii) None of these ISFs have a comprehensive system for monitoring outcomes and assessing the impact of support activities. Since none of the M&E systems differentiates between different social categories, one potential development impact of ISF activities has not been documented. ISF documents are also unclear in their understandings of the social and economic mechanisms through which support for local innovations result in improved levels of well-being for poor people.

(ix) The review reveals a diverse picture of Innovation Scouting, from none or implied (PROLINNOVA,) via criteria-based (SSPF), the village walks and student scouts of the NIF, reliance on grassroots “champions” and/or use of extension workers (FFS), to the structured group innovation process encoded in the CIALs. The use by NIF of students who return to their villages during their vacations to scout for innovations seems to be a successful approach that may be replicable in other areas where university students come from rural areas. The availability of comprehensive standardized forms and criteria that the students can easily apply has contributed to the success of this approach. An unintended side effect has been changes in student’s own attitudes to rural development.

(x) Most of the funds reviewed made few if any attempts to support any genuine commercialization of local innovations. The exception is NIF, which we found to be more advanced in this sense. NIF includes both formal and informal sector

commercialization. While primarily focusing on innovations of a public-good nature with a view to informal commercialization or information-sharing, NIF has developed a proven capacity to work with innovations of a rival good or excludable nature, in other words, those with the potential for commercialization based on standard or sui-generis IPRs. The other funds focus mostly (CIAL) or almost exclusively (FFS) on non-excludable and non-rival goods. In the latter cases, most or all the innovations they support are likely to be of a public-good nature.

(xi) Three complementary forms of innovation vetting are practiced by the ISFs, each with their merits. One of the funds reviewed rely on two separate innovation “review” committees, one “scientific”, and one by peers among innovators (NIF), while another used joint experiments involving both external facilitators and researchers (CIAL). Vetting by potential users (e.g. rural producers) is widely practiced in PFI-FFS.

(xii) The approach to learning varies within the ISFs, from the highly complex and elaborate learning programmed for at all levels, through a wide array of instruments and forums (NIF), to a far more specific and scoped adult or joint learning model (CIAL, FFS), to the rather more amorphous “collective learning” envisioned by the PROLINNOVA concept.

A global innovation facility (GIF) could play a role in compiling existing documentation of experience, initiating cross-country studies, and assisting in ensuring that these experiences are made available and exchanged in a systematic manner among the existing ISFs. The mission of such a GIF could be to enhance the effectiveness of existing ISFs and the global expansion of activities by facilitating institutional learning, the exchange of experience between existing ISFs and the provision of technical assistance.

Resumé på dansk

Dette litteraturstudie af fem fonde der støtter lokale innovationer er en opfølgning af en workshop, der blev afholdt i Kuala Lumpur i 2006. Studiet viser, at lokale innovationer udgør et underudnyttet potentiale for økonomisk udvikling i landdistrikter. Overalt i udviklingslandenes landdistrikter findes der lokale opfindere, der eksperimenterer med at kombinere lokal og videnskabelig viden, for at finde bedre (dvs. billigere, mere tilgængelige eller mere brugbare) løsninger på lokale problemer.

NIF i Indien er den største og bedst udviklede innovationsfond, med veludviklede procedurer for brug af studerende som "innovationspejdere"; internetbaseret dokumentation af lokale opfindelser; modificerede patentsystemer, der beskytter ny viden og giver ikke-materielle belønninger for lokalt anvendelige, men kommercielt urentable opfindelser; og netværk mellem lokale opfindere, forretningsfolk og ledere af småindustrier. Andre innovationsfonde i Afrika og Latinamerika har opbygget erfaring med at påskynde småbønder til selv at eksperimenterer og frembringe nye måder at udnytte lokale naturressourcer. NGO-innovationsnetværket ProInnova eksperimenterer med nye former for partnerskab mellem civilsamfundet, staten og lokale grupper af fattige småbønder.

En komparativ analyse af de fem innovationsfondes metoder viser, at de kan lære meget af hinandens erfaringer og foreslår at en global koordineringsenhed vil have god mulighed for at skabe synergi mellem eksisterende tilgange og udbrede succesfulde aktiviteter.

List of Abbreviations

ATIRI	Agricultural Technology and Information Response Initiative
CARE	Catholic Action Relief
CDCS	Centre for International Cooperation Vrije Universiteit Amsterdam
CIAL	Local Agricultural Research Committee
CIO	Chief Innovation Officer
CIRAD	La recherche agronomique au service des pays du Sud
CP	Country Programs
CSO	Civil Society Organizations
DGIS	Directorate-General for International Cooperation (The Netherlands)
DIIS	Danish Institute for International Studies
ETC	Action Group on Erosion, Technology, and Concentration
FAO	Food and Agriculture Organization
FFS	Farmer Field School
FI	Farmer Innovation
FSG	Farmer Support Group
GATE	German Appropriate Technology and Ecoefficiency Programme
GFAR	Global Forum on Agricultural Research
CGIAR	Consultative Group for International Agricultural Research
GIAN	Grassroots Innovations Augmentation Network
GIF	Global Innovation Facility
GPL	General Public License
GTZ	German Agency for Technical Cooperation
IARC	International Agricultural Research Centers
ICT	Information Communication Technology
IIED	International Institute for Environment and Development
IIM	Indian Institute of Management
IIRR	International Institute for Rural Reconstruction
IK	Indigenous Knowledge
INTI	International Network on Technical Information
IPM	Integrated Pest Management
IPR	Intellectual Property Rights
ISAT	Information and Advisory Service for Appropriate Technologies
ISF	Innovation Support Fund
IST	International Support Team

ITDG	Intermediately Technology Group (Now renamed: Practical Action)
KARI	Kenya Agricultural Research Institute
LEC	Local Extension Centre
LEISA	Low external input sustainable agriculture
LI-BIRD	Local Initiatives for Biodiversity, Research and Development
M&E	Monitoring and Evaluation
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries, Uganda
MIDNET	Natal Midlands NGO Network
MoU	Memorandum of Understanding
MVIF	Micro Venture and Innovation Fund
NAADS	National Agricultural Advisory Services (Uganda)
NGO	Non-Governmental Organization
NIF	National Innovation Foundation
NRM	Natural Resource Management
NSC	National Steering Committee
PFI-FFS	Promoting Farmer Innovation – Farmer Field School
PIC	Prior Informed Consent
PID	Participatory Innovation Development
POG	PROLINNOVA Oversight Group
PROLINNOVA	Promoting Local Innovation in ecologically oriented agriculture and NRM
PTD	Participatory Technology Development
R&D	Research and Development
SCAI	Students Scouts for Augmenting Innovations
SIR	Statutory Invention Registration
SME	Small Medium Enterprises
SRISTI	Society for Research & Initiatives for Sustainable Technologies & Institutions
SSMP	Sustainable Soil Management Programme
SSPF	Small Scale Project Fund
T&V	Training and Visit extension approach
TOR	Terms of Reference
ToT	Training of Trainers
UNDP	United Nation Development Program
UNSO	United Nations Office to Combat Desertification and Drought Supporting Local Innovation for Rural Development

I. Introduction

The World Bank commissioned the Danish Institute for International Studies (DIIS) to carry out the present study in early 2006. The study is in part a follow up to the 1st GRA-World Bank workshop on innovation systems at the community level, “Touching the Hearts of the People”, held in Kuala Lumpur 6-8 February 2006. This conference brought together a comprehensive group of global stakeholders involved in supporting local innovations. The conference agreed on a joint resolution (see Annex 1), which recommends that a ‘review of existing innovation support funds and outline of a global mechanism to foster community level innovations’ be undertaken.

This report presents the findings of a desk-study review of five innovation support funds or funding concepts: the Indian ‘National Innovation Fund’ (NIF) and its associated web of institutions; the GTZ-funded ‘Small-Scale Project Fund’ (SSPF); the NGO concept, ‘Promoting Local Innovation in ecologically oriented agriculture and NRM’ (PROLINNOVA); The FAO’s project, ‘Promoting Farmer Innovation-Farmer Field Schools’ (PFI-FFS); and the ‘Local Agricultural Research Committee’ (CIAL) in Latin America.

RATIONALE FOR SUPPORTING LOCAL INNOVATIONS

At the turn of the new millennium, donor programs, research institutions, NGOs and CBOs worldwide started to support indigenous knowledge (IK) and local innovation.¹ From a donor point of view, the “business case” for using IK rested on the premise that understanding local contexts would permit better adaptations of global knowledge, and using local knowledge sources would increase ownership, improve results and sustainability. Building on locally embedded knowledge systems will help the empowerment of communities and foster a sense of equity vis-à-vis external agencies.

The Indigenous Knowledge for Development Program of the World Bank formulated a six-point agenda, including targeted interventions to enhance the capacities of local communities to develop, share and apply their IK (#2); to

¹ For instance, a Promoting Farmer Innovation in Rainfed Agriculture (PFI) project was developed by UNSO and piloted in Kenya, Uganda and Tanzania with funding from the Netherlands (Free University of Amsterdam, Centre for Development Cooperation Services). Partnerships: INADES-Formation (TAN), IFSP-E/GTZ, Kenya), and SIDA and UNDP country offices.

develop innovative protocols for the validation and protection of IK (#3); to establish an “innovation fund to promote successful IK practices” (#5); and to organize a global IK conference to promote this agenda (Gorjestani, N, in WB 2004; 45-53).

Rural people throughout developing countries are observing, adapting, experimenting and innovating as part of their daily work and in response to changing economic and social situations. Throughout history, local communities and individuals have developed technological and institutional solutions that satisfy their socio-economic needs and conditions of production. Local innovators have played a crucial role in the evolution of knowledge and practice. Dynamic local communities are characterized by an interaction between innovators and users or adaptors of technologies through a series of learning cycles.

Industrialization and the spread of science-based agriculture significantly reduced the importance of local innovators for social welfare and economic growth in rural areas. Over the past three to four decades, many traditional crafts and skills have been replaced by industrially produced machines, tools and means of production (e.g. fertilizers and pesticides replacing local landraces and biological pest management). State institutions may have contributed sometimes to diminishing the respect for local innovators (and local knowledge) through the promotion of ‘modern’ farming practices.

However, in spite of their reduced importance and status in the eyes of the state, local innovators have continued to experiment and generate knowledge within a broad spectrum of innovations, ranging from the mechanical to the institutional. The relevance of local innovators as a source of knowledge and well-adapted solutions is high, particularly among the poorer sections of rural society, many of whom cannot afford to use external inputs.

Today, competition for resources is increasing, and local adaptation is not able to keep pace with the resulting challenges. New knowledge is urgently needed to enable small-scale farmers to participate successfully and sustainably in the economy. However, scientific research results produced by on-station research do not always meet small-scale farmers’ requirements for the complex environments in which they live and produce.

These challenges also pose new questions related to processes of agricultural innovation. How can the gap between research methodologies and farmers' realities be narrowed? Is it possible to orient researchers or organizations towards the realities farmers are faced with? Can new modes of interaction between different knowledge systems such as local knowledge and scientific knowledge lead to more relevant research? What contribution can this interaction make to generating new understandings of Low External Input and Sustainable Agriculture (LEISA)? Can farmers' own networks or social groups play a role in validating innovations for a specific location?

The World Bank learned lessons from integrating indigenous knowledge into Bank-supported projects, including:

- (i) IK helps an interdisciplinary development approach to be developed, which again helps empower local communities;
- (ii) IK is highly context-specific, and not easily replicable unless adapted to or leveraged with other knowledge systems;
- (iii) Specific protocols for the validation of IK are necessary to confirm the impact and value of replication;
- (iv) A key challenge is to develop innovative approaches to protect IPRs associated with IK.

Innovation can be seen as an important component in *development strategies* for rural communities in a globalizing world (Barkin 2005).² Along with the UNDP-supported workshop and program³ on the promotion of farmer innovation, for the past five years, an "Indigenous Knowledge for Development Program" of the World Bank has promoted Indigenous Knowledge (IK) for Development, also in an African context.

In parallel, academic literature on the role of IK in development has evolved, and reviews and reflections on the concepts and history of indigenous knowledge have benefited from critical analysis, including Briggs (2005). Practical experiences

² *Rural Development Programs* in the industrialized countries are perhaps not planned as instruments of innovation, but are often perceived as interventions that are expected to play a role in innovation processes; cf., for instance, the latest EU RDP.

³ Reporting on the UNDP program, Critchley mentions as "methodological precedents (p. 7) Zimbabwe's Kuturaya project and a 1994 project in Uganda taking the process through a "full routine" from identification through verification to value addition and dissemination.

supporting and promoting IK and local innovation have been obtained by other actors as well, including outside Africa.⁴ One important outcome of the African program activities, though, has been the *decision to establish an innovation support fund* (ISF) to “promote successful IK practices” (# 3 above, World Bank. 2004). A 2004 WB report, providing for a “five-year-milestone” for the WB IK for Development Program, outlines an IK philosophy, building on the (1996) World Bank vision of becoming “a Knowledge Bank”. Conceptually, the report distinguishes between global and local knowledge systems and therefore acknowledges the need for a strategy to empower poor people as contributors of knowledge and the protagonists of their own development. Indeed, the IK for Development Program and its file of cases builds on the notion that communities are eager to “combine global knowledge and modern technology with their IK and institutions to obtain better results” (World Bank 2004; vii). More than 300 case studies of IK as “Local Pathways to Global Development” have been recorded in a database and studied, and lessons have been learned from each of these cases, as well as from analyses involving the same experiences.⁵

Charged with a challenge eventually to provide an outline for an *institutional design* of the above-mentioned ISF, the authors of this paper were invited to undertake a review of existing experiences with funds supporting local innovation, with a view to establishing a basis for a global innovation support fund design. The *analysis* and *review* presented below were thus planned and implemented with a particular purpose in mind, namely to provide a *knowledge base* to design a global innovation support fund or mechanism.

⁴ These actors and experiences include the National Innovation Foundation (NIF) of India, the Small-scale Project Fund of GTZ, the concept of PROLINNOVA and Farmer Field Schools.

⁵ According to another World Bank study, three vital questions are: 1) How IK, IK practices and innovations enhance livelihoods in an ecologically sustainable, economically viable and socially acceptable manner, including the availability of, access to and use of food? 2) Who drives IK innovations or adaptations? and 3) What circumstances foster or constrain scaling up or large-scale adoption? The same WB study finds some answers in a case study: the *Jatropha Curcas* Plant Project in Mali. Building on local practice, this project demonstrated multiple uses of the *Jatropha curcas* plant, erosion control and property delineation. It linked ecological sustainability with economic development and encouraged use of (value added to) local raw materials (WB 2004).

2. Analytical Framework for Understanding Local Innovations

One important step prior to undertaking this review was to clarify conceptually the notion of “innovation” in the context of the African region and developing countries and the particular context of rural development.⁶

THE CONCEPT OF INNOVATION

There is a growing recognition that a wide range of different actors and organizations is required to stimulate widespread local technological development. New products and processes are brought into local economic and social use through networks of organizations, often referred to as the innovation system. The key challenge is perceived not in terms of devising new technologies, i.e. *doing different things*, but of bringing about changes in how the innovation system works, i.e. *doing things differently* (Phila. 2005). Once one accepts that rural people have potential answers to rural problems, then it becomes logical to seek out and stimulate the local innovative processes that are inherent in local communities. In this, one important role for innovators is to import technologies from outside system boundaries, often with a new role for outsiders as catalysts and facilitators (Critchley 1999).

It is commonly agreed that a well-functioning national innovation system is a system in which not only the actors (see Figure 1, below), but also the links between them, perform well. An innovation system can be defined as “a network of organizations within an economic system that are directly involved in the creation, diffusion and use of scientific and technological knowledge, as well as the organizations responsible for the coordination and support of these processes” (Dantas 2005).

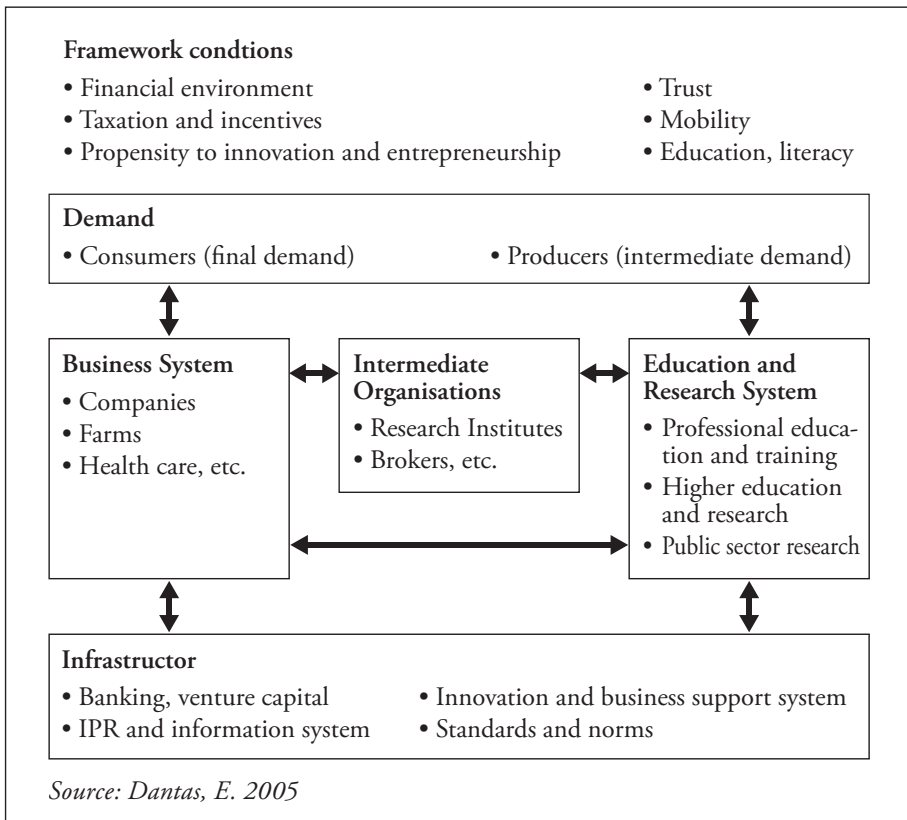
The novel aspect of the concept of innovation systems is that it emphasizes the importance of linkages and their complexity, leading to a focus on multiple feedback loops instead of linear flows of information (Adolph 2005). Innovation becomes an interactive process between many actors, and individual organizations rarely possess all the knowledge necessary for the whole process of innovation. As

⁶ Conceptual clarification has been undertaken here and is reported on in the section, “The concept of innovation in a development context”.

a result, local innovation systems draw on a combination of scientific, operational and local practical knowledge from different sources.

In the context of industrialized countries, innovation is sometimes defined with the implicit understanding that it takes place mainly in the private sector or public research, where companies and universities “innovate”, i.e. use a new process or introduce a new product or service in the market. More often, though, and fortunately, innovation is perceived as taking place within a system of actors, public and private organizations. Within a company or organization, innovations may be of different types – incremental or dramatic – and they may result from a conscious effort or not, that is, be explicit or implicit. Thus, innovation activities may be strategically or tactically guided and formalized, or else they just happen informally, as result of day-to-day operations.

Figure 1: An innovation system model



Given the broad variation between activities and the foci of different ISFs, a contextualized or “tailored” definition of “innovation” is called for. This new conceptualization takes into account the possibility that what an innovation support instrument may decide to support may not only be innovations or innovators per se, but also the promotion of a culture of innovation and learning in local communities with a view to the empowerment of resource-poor people and their communities.

While we acknowledge that poor rural people’s livelihoods are based on a variety of sources (Carney 1998) and do not wish to limit our concept of innovation context to one of agriculture and NRM, we do wish to stress that – in African rural areas, at least – most economies are still agriculture-based. Therefore, any new, tailor-made framework will also have to take into account the fact that the great majority of “innovations” supported by the IK program, the Indian NIF and most of the other funds reviewed here are mostly in the field of *small-scale agriculture* and the *use of natural resources*, and therefore in the public domain. Topics of relevance may thus include, for example, herbal veterinary medicine, but may otherwise mainly be agriculture-related topics such as pest management, mechanical agricultural (or agro-industry) devices, energy conservation or generation.⁷ In this respect, it is noteworthy, for instance, that *Farmer Field Schools* are largely based on applying knowledge in integrated pest management (IPM), i.e. knowledge with a direct impact on farm yields and therefore on farmers’ incomes and incentives.⁸

Another “model” for understanding innovation is Douthwaite’s (2002). In addition to explaining why top-down innovation and development do not work,⁹ Douthwaite

⁷ For other examples of such contextualized innovations – “ecologically sound and productive farming practices” – see, for instance, www.farmingsolutions.org, or the Honeybee database.

⁸ In a context of industrialized agriculture, local extension centers (LECs) are the most important source of knowledge for farmers. Small farmers in particular rely on innovations “imported” from such sources or embodied in technologies. Even in industrialized nations farmers rely primarily on local sources, not national knowledge sources. In agriculture, most productivity increases stem from the knowledge content in agricultural inputs. In horticulture, knowledge agents play a more significant role in raising productivity than they do in primary agriculture. Much agricultural innovation, however, is gradual and implicit. The great majority of SMEs in Danish agro-industry, for example, do not use a formalized approach to innovation and largely innovate “reactively” to defend market share.

⁹ Douthwaite (2002) provides rather solid proof as to why innovation approaches matter so much: not only does he tell the absurd story of how authoritarian rule in Burma tried and failed to diffuse or transfer particular agricultural equipment (rice stripper-gatherers), but he also adds a theoretical explanation and, along with James C. Scott, Everett M. Rogers and others, explains why top-down innovation and development do not work, but often lead to millions of dollars being wasted instead (Douthwaite 2002: 9-11).

provides an alternative to the “three big [innovation] theories of yesteryear”, i.e. the agricultural treadmill, the diffusion of the innovation model, and the transfer of technology model (Röling 2002, in Douthwaite 2002). In contrast, Douthwaite’s “co-development” model¹⁰ focuses on *the innovation process: a complex adaptive multi-agent system*, where, consequently, innovation management relies on multi-actor learning and selection (Röling 2002: XV-XVI). Outlining a mental map of the innovation process, Douthwaite distinguishes between “novelty generation”, selection, diffusion and promulgation, eventually naming his resulting innovation model “learning selection”. In this model, he draws on the founder of modern social psychology, Kurt Lewin, to define the outcome of learning as a “function of the interaction of the people involved with their environments” and, with Everett M. Rogers, he describes innovators as “venturesome, enjoying the technical challenges posed by new technologies and actively seeking them out”. Adding to the model, Douthwaite draws on Peter’s and Waterman’s analysis of America’s Best-Run Companies, revealing the one critical factor that marked every failure: the absence of a zealous, voluntary champion (and also showing that, as factors, market potential and project economics came in a distant second and third respectively). A consequence of the same analysis was the subsequent need for R&D teams to leave their laboratories in order to market their technologies. In effect, levels of stakeholder participation change during innovation processes, where, in the development phase, R&D team ownership is high towards a phase in which a more “equal” partnership evolves, after which, passing a point of “sustainable adoption”, key stakeholders take the lead.

From a somewhat different theoretical and methodological tradition, Pretty (in Uphoff 2002) presents a framework for analyzing “social processes for sustainable innovation” in which he stresses why farmers and communities must be “allowed, indeed encouraged, to change and to adapt what they are doing” and thus why sustainable agriculture is not a model or package to be introduced, but “more a process for learning”, and one that “depends on and builds up social and human forms of capital” (Pretty, in Uphoff 2002: 54).

In our view, and in the context of this review, the implication of these contemporary perspectives on innovation is a need for a broad focus on innovation systems and on processes of innovation-related learning in local communities.

¹⁰ Following an analysis of the “fossil record” of agricultural machinery innovations, Douthwaite concludes that the most successful researcher-developed technologies were those that the key stakeholders – that is, the people who built, bought or used the technology – modified the most.

IMPORTANT ASPECTS OF LOCAL INNOVATION

Agriculture

The largest collection of local practices worldwide is probably in agriculture. A major factor constraining agricultural producers from capitalizing on the modernization of agriculture has been weaknesses of modes of technology transfer. Another lesson, a *Boserupian* one, about innovation is that farmers innovate in technologies within the scope of their resources and within a short- to medium-term perspective. Their primary interest is to address their typical biophysical constraints: pests, diseases and weeds, which is why half of their “innovations” are pest-, disease- or weed-control practices. An environment conducive to the evaluation and promotion of IK signals to communities that their contributions to S&T are valuable and may induce more innovative creativity. Challenging the incorporation of IK into research and rural development, however, is the fact that IK practices are localized and may not always be easy to scale up (Aluma, J., WB 2004: 24).

Institutional Development

Communities observing fishing seasons through local ceremonies are examples of IK practices for sustainable resource use. Contrasted with modern institutions such as forest acts, traditional institutions such as sacred natural sites are important biodiversity reservoirs. One lesson here is that state and conservation agencies, policies and laws overlooked and undervalued such traditional institutions. For a local practice to survive, it has to be put into the context of contemporary social, economic and social change, as well as endure the test of adapting to new conditions. Combinations of IK with formal science, and amalgamations of IK practices and institutions with formal regulations and structures, are critical in this respect. The challenge is how to do it (Steiner, A., and Oviedo, G., WB 2004).

One approach to providing a wider understanding of the institutional environment for innovation is the concept of Learning Alliances, which aim to foster innovation through interlinking Learning Platforms (see box, next page).

The CGIAR Innovation System Legacy

CGIAR centers initially worked within a top-down, ToT model, until counter-currents evolved (Rhoades' and Booth's 1982). From the early 1980's, therefore, how to integrate “upstream” research and “downstream” extension emerged as an issue (Douthwaite 2002: 239). Even earlier, of course, ground-breaking work had been done (such as Boserup's) that changed the understanding of farmers'

Box 1. Learning alliances:

- Are groups of individuals or organisations with a mutual interest in solving an underlying problem and scaling-up solutions.
- Bring together a wide range of partners with capabilities in implementation, regulation, policy & legislation, research & learning, documentation & dissemination etc.
- Represent part of the bigger whole, and thus capture some of the organisational complexity - warts and all - that constitutes the day-to-day realities of the innovation system.
- Comprise partners who are typically clustered at different 'administrative' (e.g. national, regional, district) levels – stakeholder platforms – within the innovation system.
- Aim to identify and breakdown the barriers that constrain learning, both across platforms (i.e. horizontally) and between platforms (i.e. vertically).
- Promote flexible and adaptive working practices, and share responsibilities, costs and benefits.

Source: Mike Morris

technology use, from a perception of poor, smallholder farmers applying very extensive and perhaps simple methods out of ignorance, towards an understanding of farmers as rational in their choice and use of technology at a given level of contextual (market and infrastructure) or institutional development. Despite this, however, parts of the ToT model have survived in some of the CGIAR-center innovation “architecture”.

As of today, little consensus exists on the role of CGIAR centers in the innovation systems of developing countries. Thus, for instance, some analysts in a recent meta-evaluation of the CGIAR stressed the importance of IARCs concentrating on their comparative advantage in upstream advanced science and abandoning activities perceived as too far downstream or location-specific. Others argued that the CGIAR – at least its NRM centers – does need to accept some “developmental” responsibilities, including greater efforts on connecting throughout innovation

systems, whether in terms of more private-sector collaboration or development partners (cf. Egelyng 2005).

In any case, the architecture of agricultural research, particularly in Africa, is currently undergoing rapid change. Therefore, the innovation *system*, in which indigenous knowledge and formal science will meet, is changing rapidly too. Simultaneously, the use of systems of innovation theory to understand and reform innovation processes in agriculture is growing. African agricultural research is increasingly discussed in the general debate on innovation, technology, institutions and development (Sumberg 2005).

Why IPR may be less of a concern

For the purpose of this review, the term “innovation” is broadly understood to include new or improved methods that may or may not be characterized as public goods.¹¹ In the present context of rural development, small-scale agriculture and NRM in developing countries, most innovations of relevance are probably non-excludable and therefore most likely applicable to producing public goods and destined for dissemination through the public domain say from farmer to farmer. The institutional environment we are working with here, therefore, is *not primarily* one attracting venture capitalists and is not a very inviting environment for business incubators and science parks. Therefore, the ideal institutional design we are theoretically pursuing, of a global innovation support mechanism of some kind, may not be so concerned to promote innovations with a view to hard commercialization in world markets, but rather to promote the institution of an *innovation culture* among the rural people and communities it will serve.

In our context, in other words, “innovation” and innovation theory are not often of a kind and order that stock markets support. Stock markets prefer innovations that lend themselves to proprietary use or formal “protection” by “hard” intellectual property rights such as patents and formal plant-breeder’s rights. Instead, the innovations being supported here are mainly to be disseminated freely as new knowledge or “open source”-type methods that may well help those who adopt

¹¹ According to global goods theory, a public good is characterized by non-rivalry and non-excludability. Classic examples of public goods are a lighthouse or air to breathe: normally at least, consumption of these goods by one consumer does not leave less to be consumed by others (non-rivalry) and once it has produced, it is difficult to prevent others from consuming it (non-excludable). In the present context, more relevant examples would include improved seeds (if non-hybrid) and the great majority of agricultural methods applied in smallholder environments.

them generate income. Still, IPR institution- and awareness-building, including the setting of specific standards, agreed protocols, ethics and more systematic approaches, will help validate local knowledge and value traditional practitioners, as illustrated by the narrative of the natural anti-obesity agent, P57 (Sibisi, Sibusiso, in WB 2004).

What we would like to stress here, in effect, is how an old lesson may be playing out in our context, namely that institutions do evolve to meet the changing needs of communities.¹² While IPRs may be one category of institutions that will come to be of increasing relevance to rural NRM communities too in the developing world, currently other kinds of property institutions are much more significant in governing rural economies and resources in these areas.¹³

Therefore, we would like not to over-emphasize the analysis of IPR issues in this particular context of local agriculture-related and NRM innovations by rural people in developing countries. What we do wish to stress here is that, when discussing IPR issues, it is always advisable to be very clear about who is to protect what from whom, how and why (Egelyng, 2005a: 14). Furthermore, it is important to understand the nature of (would-be) innovations or inventions in terms of the theoretical distinction between “public goods” and (prospective) “private goods”.

In his synthesis of “how to catalyze innovation”, Douthwaite (2002: 232) stresses that, as far as his “learning selection” model is concerned, “people co-operate with each other because they believe that all will gain if they do”. Learning processes may thus be damaged if one person or group tries to acquire intellectual property rights over what is emerging.

Douthwaite, acknowledging the importance of top-down innovation and IPRs such as patents in the drugs industry, for instance, continues to present methodologies for use within the reign of learning-selection innovation, such as “copy *left*” registration, the mode under which Linux was originally registered, which protect users’ rights to copy, change, use and pass along the technology. Today,

¹² This old lesson is explored, for instance in Meinzen-Dick et al. (2002: 15), by Boserup’s “induced innovation model” (1965), and it conforms, we believe, to North’s view of institutions (1992).

¹³ A recent scholarly publication on “Innovation in Natural Resource Management: The Role of Property Rights and Collective Action in Developing Countries” (Meinzen Dick et al. 2002) contains very little, *if any*, analysis of *intellectual* property rights (IPRs). The reason for pointing this out is not to suggest that a chapter on IPRs is missing. On the contrary, it is to suggest that IPRs may not be the most relevant of institutions to study in the context of smallholders and NRM, the same context in which most ISFs operate.

several types of such open source licenses exist, including notably the General Public License (GPL¹⁴).

In all of this, Douthwaite perhaps foresaw that the open source movement and paradigm would increase its impact and reach beyond the information technology sector, with commercial and creative successes challenging conventional understandings of technological change and affecting organizational, regulatory, institutional and economic aspects of innovation, with clear implications for intellectual property rights and business models (www.developmentgateway.org/knowledge).

From a development perspective, one important result of the new institutions that are emerging from and being created by the open source movement, perhaps, is new patterns of collaboration involving the private sector, and the latter's willingness, interest and capacity to adopt "soft" modes of protecting innovations – such as the GPL – that allow individual citizens and NGOs to use the "protected" innovation or product as a public good, while at the same time reserving some strong and conventional IPR protection for certain kinds of commercial exploitation.

Because rural environments in developing countries are generally characterized as having less formal markets, institutional innovativeness of this kind, – as currently developing with in the open source movement, could prove of major relevance and interest to any new global innovation support mechanism.

¹⁴ For further information on this license, see, for instance, <http://en.wikipedia.org/wiki/GPL>

3. Criteria for the Review of Innovation Support Funds

The basic analytical framework guiding this review (section) emanated from a TOR of 31 October 2005 and its call for authors to help strengthen the knowledge base for identifying and drafting “suitable mechanisms for the management and implementation” of an “innovation fund for the promotion of local innovation”. This same TOR provides a set of descriptors to be used for both review (this paper) and design (a future task). These descriptors are listed in Box 2 below.

Box 2. Review Criteria

The reviews presented in this report are based on a common analytical framework designed to help analyze the “mechanisms” of existing and emerging innovation support funds. Put briefly, the analysis aims to:

- identify the fund management system
- identify the fund implementation system
- compare systems for fund management and implementation

These broader objectives have been operationalized and will be pursued for each fund, using the following concrete and detailed parameters:

- Governance
- Monitoring and Impact
- Implementation
- Transaction Costs
- Flexibility
- Beneficiaries
- Innovation Scouting
- Replenishment Strategy
- Selection Criteria and Procedures
- Commercialization
- Learning
- Access to and Control of Resources
- Partners and Stakeholders

Further operationalized, *Governance* has been analyzed in terms of the fund charter, organizational structure, management and accountability arrangements; *Monitoring and Impact* in terms of M&E systems and impact assessments; *Implementation* in terms of concrete experiences (case studies); *Transaction Costs* in terms of administrative or overhead arrangements and costs in relation to results; *Flexibility* to including adaptability; *Beneficiaries* in terms of identifying primary target groups; *Innovation Scouting* as identification and vetting strategies for innovations; *Replenishment Strategy* as a plan for economic sustainability; *Selection Criteria and Procedures* as a matter of application procedures and selection criteria, including the question of whether these include competitive arrangements; *Commercialization* in terms of mode of dissemination of innovated products, whether through brokerage involving the public or private sector, and any IPR such as patents; *Learning* as a matter of learning and sharing systems, including documentation and dissemination; *Access to and Control of Resources* in terms of access and control by beneficiaries, especially local communities; and finally *Partners and Stakeholders* as a matter of partnership approach and stakeholder involvement.

4. Review of the Indian National Innovation Fund

Four Indian organizations provide the cornerstones of India's support for local innovations today. These organizations have evolved gradually over two decades within the Indian society.¹⁵ The oldest is the Honey Bee Network, which was founded in the late 1980s and has since created a platform for grassroots innovations and traditional knowledge-holders from different parts of India. Honey Bee is an Indian-based movement of grassroots creativity and innovation, a network running an online database of 12,000 entries of documented innovations and traditional practices (www.sristi.org/honeybee.html) and an international newsletter of the same name. The newsletter is meant to serve five functions: documentation and dissemination, validation and value addition (of knowledge, innovations and practices), protection of IPRs, provision of incentives, and policy advocacy to serve grassroots innovators.

SRISTI (the Society for Research and Initiatives for Sustainable Technologies) was "born" in 1993 essentially to support the activities of the Honey Bee Network to respect, recognize and reward creativity at the grassroots level. SRISTI is a registered charity devoted to "empowering the knowledge rich-economically poor people" by adding value to their contemporary creativity and traditional knowledge. Its objectives are to document, disseminate and develop grassroots innovations in a systematic manner, providing protection for intellectual property rights to grassroots innovators, working on the in-situ and ex-situ conservation of local biodiversity, and providing venture support to grassroots innovators. SRISTI manages the Honey Bee database of innovations and supports the publication of the Network's newsletter in three languages, English, Hindi and Gujarati.

GIAN (the Grassroots Innovation Augmentation Network), founded in Gujarat in 1997, seeks to bring presumably marketable inventions to the attention of venture capitalists and small-scale entrepreneurs. GIAN is a business incubator charged with incubating and marketing high-potential grassroots innovations as market-ready products. GIAN's target group is the large consumer sector in developing

¹⁵ Detailed information on the NIF is available at www.nifindia.org; the history of the Indian local innovation movement is well documented (www.goodnewsindia.com). This review aims to analyse and briefly present the essence of NIF according to the descriptors listed above. With a view to serving the authors' institutional design objective, a critical perspective is applied in order to focus on lessons learned, challenges not yet overcome, and experiences that may be unique to the Indian context.

countries who are facing problems for which solutions are either not available or not affordable (west.gian.org). Three additional regionally based GIAN organizations have emerged since 1997, modeled on the experience of Gujarat.

The Department of Science and Technology established the National Innovation Foundation (NIF) of India on 1 March 2000. As a publicly supported organisation, NIF has a coordinating and supporting role in relation to NGO organisations, in particular the Honeybee Network and Society for Research and SRISTI, as well as regional organisations such as GIAN in Gujarat. NIF today is the most advanced national system in the world that supports local innovations and is the focus of the review of the Indian experience.

Governance

The charter, organizational structure, management, governance and accountability arrangements of the NIF are analysed and presented in this section. The National Innovation Foundation (NIF) of India was established in 2000 with a charter for it to provide:

“Institutional support in scouting, spawning, sustaining and scaling up grassroots green innovations and helping their transition to self-supporting activities”

The NIF’s mission statement is *national* in scope:

“the time has come to unleash the creative potential of our scientists and innovators at grassroots level. Only then we can make India truly self-reliant and a leader in sustainable technologies [and] propose a national foundation for helping innovators all over the country. This fund will build a national register of innovations, mobilize intellectual property protection, set up incubators for converting into viable business opportunities and help in dissemination across the country.” (<http://www.nifindia.org/>)

NIF pursues the following objectives:

- Help Indian society be creative and inventive and a global leader in sustainable technologies
- Promote the evolution and dissemination of green grassroots innovations

(our emphasis).

- Provide institutional support with a view to self reliance.
- Build linkages between formal (scientific) and informal (knowledge) systems and create networks linking various stakeholders.
- Strengthen awareness.

Organizational structure

Organizationally the NIF is thus part of a broader institutional structure, including the Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI), the Honeybee Network and the Gujarat Grassroots Innovations Augmentation Network (GIAN), which all aim to scale up innovations collected in the Honey Bee–SRISTI database of innovations.

Management

The management of the NIF has been carried out by a rather small unit, but has now reached a “critical mass” in terms of the number of professional staff occupying distinct functions. From a modest start with a first year without staff and a second year with two national coordinators, the NIF has now a Chief Innovation Officer and a number of National Coordinators.

Accountability

The accountability of the NIF rests, first and foremost perhaps, on the Indian democratic tradition, both formally and informally. In addition to formal dimensions of accountability being achieved through the institution of a highly inclusive Governing Board¹⁶ representing a broad cross-section of society, accountability is rooted in the history of the Honeybee movements, India’s Gandhian tradition and the cultural heritage of an elite connecting with the rural hinterland through concrete project-oriented activities and campaigns, including marches (Shodh Yatra’s walks through villages, summer and winter) and of course also the historical Indian development model of import substitution. One important ingredient in this “magic” formula is leadership and vision among individuals who are motivated by the challenges and innovative resources of the rural poor.

¹⁶ The NIF Governing Board consists of Indian government representatives (Ministry of Science & Technology, Council of Scientific and Industrial Research, Ministry of Finance), regional government representatives (states of Gujarat, Rajasthan), the academic sector (Indian Institute of Management, Jawaharlal Nehru University, ICAR, Administrative Staff College of India), CSOs (Self-Employed Women Association, Four Eyes Foundation), the private sector (ICICI Ltd., IDFC Asset Management Co. Ltd., Mahindra & Mahindra Ltd.), civil servants (State Election Commissioner, Government of Rajasthan) and an NIF staff representative.

Monitoring and Impact of the NIF

M&E systems

The NIF does not appear to employ a formalized M&E system but implicitly seems to regard knowledge-sharing and working as a learning organization to be an adequate measure of self-analysis and reflection.

Impact assessments

Assessment of the developmental impacts of rural innovations faces very major methodological challenges. *Attribution* is one of these challenges. The authors of this review cannot really examine how far the marketing of innovations such as the water-cooler can be attributed to the NIF, but we note that examples of innovations ascribed to the existence of the NIF-Honeybee complex include local innovations licensed within India such as the water cooler inventor, “Arvindhai”, receiving Rs. 350,000 as payment for a license for a foot-operated spray pump sold (by M-cam.com) to a US company. Without the NIF-SRISTI-Honeybee network, it is likely that the number of marketed and patented mechanical innovations would have been fewer, and the countryside sharing of other innovations and know-how would have been significantly limited (cf. below).

Implementation Experiences of the NIF

The NIF is rich in implementation experiences. There are lengthy lists of innovations supported by the NIF and through the GIAN networks, and the respective narratives accompanying each completed case bear witness to the workings of the NIF-GIAN-SRISTI-Honeybee network as an innovation *system* or innovation complex. GIAN analyses inventions in terms of novelty, value and market potential, and the list includes cases of “projects” that have been dropped as insufficiently innovative. GIAN also files patents and registers designs, as well as organizing “clearing house sessions” and exhibitions for showcasing to potential entrepreneurs.

From “innovative ideas” to business plans and profit sharing, the roles of individuals and other stakeholders through the value chain is outlined and operationalized by the NIF, which holds 59 patents filed in India and has submitted four applications in the USA.

Through the Honeybee network, the NIF has a record of promoting tradition-inspired solutions to local problems and thus of “blending” the traditional and the modern. Examples include use of *Verbena officinale* (*hamuk*) to heal wounds,

leading to the development of a viable drug, and “balling” paddy seeds as a reserve or “plan C” for when broadcasting and transplanting fails.

Transaction Costs

The authors do not have sufficiently detailed and specific information on administration, overheads, etc. with which to present a very specific conclusion about the *cost efficiency* of the NIF. Based on the information we do have, however, on the indirect reliance on volunteers and students and the extended network structure, we estimate that the cost efficiency of the NIF is probably relatively *high*. Similarly, we believe that, in relation to results, the *administrative costs* of the NIF are likely to be reasonably *low*.

Flexibility

Given the varied nature of the NIF in terms of the various categories of innovations it supports (from herbal medicines to agricultural implements) and its broad representation of various types of innovators as well, we assess the *flexibility* of the NIF as being *high*.

Adaptability

Based on the evolutionary nature of the NIF and its underlying civil society agencies and network, we would characterize the *adaptability* of the NIF as *high*.

Beneficiaries

Judged by the geographical source of “entries” into the year 2000 NIF competition, the Indian states of Gujarat, Kerala, Tamil Nadu, Assam and Karnataka formed the geographical basis of the early NIF.

Primary target groups

Most winners of NIF awards have been people from rural areas with little formal education. The narratives of each of the winning innovations bear witness to the fact that their selection as winners was based significantly on the merits of their inventions.

Innovation Scouting

Identification

Identification of innovations is implemented through networks of students, volunteers and civil society organizations. For strategic scouting, the NIF undertakes

national campaigns and has recently announced its “Fourth National Campaign to Scout Grassroots Unaided Technological Innovations”. Historically, students involved in the Honey Bee network have played an important role in the identification process. Now, student clubs for augmenting innovations or SCAIs are emerging with a broader mandate than innovation scouting, including also market research, the development of business plans and the exploration of licensing opportunities (scai.org.in).

The first countrywide competition for NIF awards in 2000 featured five categories, with three prizes in each totaling fifteen prizes of Rupees 25,000 to Rs. 100,000.

From 24 states, 948 entries were received, featuring a total of 1600 innovations and examples of IK, mostly in relation to herbal medicine, herbal veterinary medicine, plant protection, mechanical devices and agricultural practices. The second competition, in 2002, had 6228 entries and 13533 innovations and IK examples.

Students, rural colleges, vocational training centers, grassroots functionaries in rural development and other departments, teachers, development workers and what have been termed Non-Governmental Individuals all play a part in the documentation and dissemination of the NIF “system”. About a hundred student volunteers of “Ghandian” institutions are selected annually by the Honeybee network to scout for innovations and IK during their summer vacations. The scouting process is formalized, with survey forms and incentives for scouts, including prizes and trophies.

Vetting strategy

A Research Committee has been set up, with two sub-committees, one consisting of institutional scientists, designers and technologists, the other including “informal” grassroots innovators and traditional knowledge-holders.

Replenishment Strategy

In its first three years, the NIF complex was sufficiently successful in mobilizing enough monetary resources (from the government) to fund the cash prizes handed out to reward the winners of the annual competitions, as well as to develop and expand the network (Honeybee, SRISTI). During this period, activities were largely based on volunteer work by activists and professionals.

In October 2003, the NIF received funding of USD 1 million, which has been placed in an endowment fund, since when NIF activities have been financed out of the interest earned by this fund. Although this therefore represents a strategy of sustainable replenishment, the available funds have been limited and have led to a biased mix of activities. Expensive tasks such as the validation and improvement of herbals for therapeutic use, nutraceuticals and pest management agents have been significantly restricted, and the bulk of NIF activities have therefore focused on mechanical devices, which are much cheaper to validate.

A performance audit carried out by the Department of Science and Technology in January 2006 recommended that the Indian government make an additional substantial investment in the NIF endowment fund.

NIF Criteria and Procedures

Application procedures

The NIF uses advanced decision-making flowcharts to guide the “incubation” process, from initial agreements via the submission of proposals for MVIF assistance, prior art search [not clear], market research, to IPR protection and possible licensing.

Selection criteria

The NIF has set itself the goal of serving the interests of economically poor people who are rich in knowledge. Among the activities the NIF will undertake in pursuance of this goal is prior art search and the mobilization of pro-bono legal services to help grassroots innovators file for protection of their innovations, i.e. patents and trademarks and other forms of IPR. For this purpose, the NIF has recently established an IP section, with a National Coordinator and “fellows” conducting prior art searches. Patent applications in the US have been filed through SRISTI and a US law firm.

Commercialization

NIF actively pursues the “commercialization” of NIF-supported innovations through various channels, including MoUs with scientific research organizations and through support for business development, including the operations of the Micro Venture and Innovation Fund (MVIF) supporting “incubation”, i.e. the transformation of innovations into commercial products.

In a formal sense, commercialization includes issues such as brokerage to the private sector and the use of intellectual property rights (IPR), including patents. The NIF has proved an advanced facilitator of intellectual property rights. First and foremost, perhaps, it has successfully secured formal IPRs for a number of inventors who have channelled their inventions through the NIF – GIAN system.

When scouting for new innovations, the innovators are given “explanatory notes” that outline formal intellectual property rights regimes and how the NIF and the Honeybee network are seeking to operationalize and institutionalize the protection of innovations that do not qualify for formal patents. This is done by asking the innovators to sign a Prior Informed Consent form (one for Traditional Knowledge and another for Technological Innovations and Ideas). This unique system allows innovators to share their innovations without fearing that their ideas will be unfairly exploited.

Some of these arrangements – common property infrastructure, micro-venture funds, an naming streets after innovators – may be described as institutional innovations in their own right. From this perspective, the PIC forms and notes seem valuable, and NIF-Honeybee experience in using PIC is constantly accumulating. NIF documents bear witness to the fact that these experiences are being critically analysed and reflected on, – indicating that the NIF is a learning organization.

Learning System

The NIF learning system may be described as an open-ended and highly connected system. The fact that the broader NIF innovation complex comprises a varied network of institutions, including universities and business academies, may provide some of the explanation as to why the NIF system features as a learning organization. The continuous learning process within the NIF has identified a number of “challenges before NIF”.

Sharing system

One indication that NIF-supported innovation is being shared is that about half of the IK holders who participated in the NIF’s second competition had given their PIC for use of their innovations or knowledge free of charge to individuals.

The NIF has established a facility for online bidding for technologies, which assists dissemination. An innovation portal (indiainnovates.com) and other websites (srsti.org, gian.org) reflect a conscious and deliberate knowledge-sharing strategy.

Access and control of resources

NIF documents bear witness of an organization deeply rooted in an institutional perspective on development:

“The technology can only change the ratio of inputs and outputs, but how outputs are shared [and], whether inputs are used within sustainable limits and to what extent the environmental ethical and equity considerations are kept in balance will depend on the institutions” (NIF Document. www.nif.org).

Partners and Stakeholders

In the case of India’s NIF, the partnership approach relates to an innovation *system*, with partners including public-private and civil society collaboration.

Stakeholder involvement includes the Indian Government and CSOs such as GIAN-SRISTI-Honeybee.

Conclusion

As of today, the NIF-SRISTI-Honeybee local innovation complex does appear to have been institutionalized to the point at which it might become sustainable in the future. One important factor to acknowledge, however, is that the success of the NIC innovation complex is benefiting from the enthusiasm of one “zealous champion”, a man who has become something of an institution himself. In the absence of volunteers like him, who are both entrepreneurial and able to catalyze concrete action and agency, the *NIF-SRISTI-Honeybee experience may not be easily replicable outside India and Asia*.

One other notable observation is that the unique capacity in the Indian case, compared to Africa, is India’s proven capacity to use ICT as development tools (for information on ICT in the African context, see infodev.org/content/highlights/detail/2568).

5. A Review of a Small-Scale Project Fund

Set up in 1986 and operational from 1987, the SSPF of the GTZ has now completed 373 projects covering a wide array of themes, and regionally encompassing a total of seventy countries across Africa, Asia and Latin America.

Governance

Under this heading, the charter, organizational structure, management, governance and accountability arrangements of the SSPF will be analysed and presented.

Charter

The Ministry of Economic Cooperation and Development (BMZ) made funds available through GTZ to support self-help groups to test and apply “small” innovations and keep them informed of technological options and experiences with proven technologies. The SSPF has specialized in the following technological fields:

- appropriate construction technology
- renewable energy systems (including solar)
- sustainable land use and NRM
- processing technologies (agricultural products, crafts)
- technologies for waste recycling.

Organizational structure

The SSPF was organized as a donor program within the GTZ and administered by one of the GTZ’s own offices.

Management

The SSPF was managed by and through the GTZ GATE office, specialized in administration, tendering and selecting applications, and M&E of development projects. The GATE office has a proven record of more than twenty years of development project management experience, drawing on GTZ regional and sector experts, as well as on its regional offices. Represented in 130 countries, 60 of them with their own offices, the GATE funds management has access to a vast global network.

Accountability

To ensure that funding was used and accounts settled according to contract terms, the SSPF relied on standard GTZ procedures rather than the project liaison networks of people known to the GTZ, who had (other) important roles to play.

Monitoring and Impact of SSPF

M&E systems

M&E was secured through a set of guidelines and writers' guides on reports to be submitted to the Small-Scale Project Fund. These included both interim and final reports, the latter both summarizing and analysing project methods and immediate results, as well as any successes in terms of goal achievement and long-term impacts.

Impact assessments

The writers' guide to SSPF project and evaluation reports outlines a format for the reporting of impacts on work, production, health and nutrition, schooling and vocational education, housing, access to infrastructure, and the social, legal and environmental situations, in each case through a set of more detailed indicators.

Implementation Experiences of the SSPF

The SSPF was completed by the end of 2005. As of yet, and given the timeframe, resources and scope of this review, it has not been possible to provide in-depth analysis of the SSPF's experience with *implementation*. Any such analysis will have to be referred to a separate study.

Transaction Costs

Administrative and overhead arrangements

SSPF grants seldom exceeded USD 20,000 and were intended for individual, specific, relatively uncomplicated measures that could be completed within one or two years. Applications were usually processed in three to four months.

Assessment of cost efficiency

The administrative costs of the SSPF will have to be evaluated against a ceiling of USD 20,000 per grant and an average grant size below the ceiling. The fund, in other words, may have provided sound donor investments and effectively helped its beneficiaries – indeed, this is what it has been known for. It does not neces-

sarily follow, however, that its successes have been cost efficient. The relatively small portions allocated per grant are an indication that cost efficiency may not have been high, if one counts all the costs, including those incurred in GTZ headquarters.

Flexibility

Flexible support for locally sustainable initiatives is the very motto of the GATE funds management. We include this observation here because we believe that many of the institutional traits of the SSPF had been devised to allow flexibility. Whether flexibility was achieved in the actual implementation experience of the SSPF is another matter, one that goes beyond the scope of this brief review.

Replenishment Strategy

The SSPF did not have a replenishment strategy. Originally devised as a one-off grant, all its available funds have been used up, no new proposals have been accepted and the fund is regarded as having been completed as of 2005.

SSPF Criteria and Procedures

Application procedures

The SSPF application procedure prescribed the involvement of a Project Liaison Person (PLP), an independent expert known to GTZ and named at the time of the application. The role of this PLP was to assist communication between the executing organization and GTZ and to advise on issues of accountability. The procedure demanded that implementing institutions had to be already operating in the application and dissemination of appropriate technology, be in a position to carry out the project in close coordination with the target group, and document the results.

Selection criteria

The SSPF evaluated applications against a set of selection criteria, including the following:

- Self-sufficient ability and potential for innovation and dissemination.
- It should include a significant technological component, which has to be executed in an appropriate and innovative way.
- It must help improve the living conditions of the poor and strengthen their self-help potential, e.g., by providing a sustainable source of income or by

protecting the environment.

- It must be clear that the target group and the executing organization will carry out as many of the activities as possible on their own locally.

The SSPF has considered technology appropriate when employing “on-site resources optimally and in an environmentally friendly manner”, and when it is “suited” to a country’s socio-economic, ecological and cultural circumstances. It has been a premise for the SSPF that “appropriate technology fosters sustainable development” (www.gtz.de).

Commercialization

In a formal sense, commercialization may include issues such as brokerage to the private sector and the use of intellectual property rights (IPR).

Learning System

Project experience was pooled in the Information and Advisory Service for Appropriate Technologies (ISAT), where it was evaluated and made available to interested parties through various channels, including co-publication by the British journal *Appropriate Technology* (www.appropriate-technology.com), the International Network on Technical Information (INTI) and a Question & Answer Service database.

6. Review of the PROLINNOVA ISF Concept

PROLINNOVA was conceived in 1999, when GFAR, the NGO Committee of CGIAR (the Consultative Group on International Agricultural Research) and the French Ministry of Foreign Affairs convened a meeting of southern and northern NGOs and a small number of international researchers in Rambouillet, France, to discuss how participatory approaches to R&D could be scaled up. At this meeting, ETC EcoCulture was asked to facilitate the launching of the PROLINNOVA initiative. The first efforts involved key stakeholders in agricultural R&D in Uganda, Ethiopia and Ghana, who met to share experiences, analyse them and plan their own country-level initiatives. IFAD (the International Fund for Agricultural Development) provided a small grant for this country-specific planning. A group of organisations (Misereor/Germany, World Bank, DGIS, CTA and GFAR) financed a meeting of these and other emerging CPs in Ethiopia in early 2004. By this time, funding from DGIS allowed the three initial countries to start realising their plans and further countries – Cambodia, Nepal, Niger, South Africa, Sudan, and Tanzania – to start up similar processes. The PROLINNOVA initiative received strategic funding support from GFAR and is considered a Global Partnership Programme (GPP); it is therefore itself part of an even larger global initiative to demonstrate the value of partnership-based approaches to R&D undertaken via a multi-stakeholder route (Gonsalves 2006).

Governance

This section describes and analyses the charter, structure, management, governance and accountability arrangements of the PROLINNOVA ISF *concept*. Under the GFAR umbrella, and operating in nine countries, PROLINNOVA seeks to demonstrate the effectiveness of user-led innovations for sustainable development. It has instigated a participatory country program design process through workshops with country stakeholders and a number of action plans with common elements. These elements include drawing up inventories and databases of local innovations, innovators and organizations working with innovators.

Charter

PROLINNOVA exists to “develop and institutionalize methodologies and partnerships that promote processes of local innovation in environmentally-sound use of natural resources”. Driven by a vision of a world where farmers play decisive

roles in research and development for sustainable livelihoods, its mission is to help foster a “culture of mutual learning and synergy in local innovation processes in agriculture and natural resource management”.

Using the concept of “local innovation” in the broad sense of an acknowledgement of the contributions of farmers and other local community members to development and encourage them to continue to innovate and add value to existing efforts and technologies has helped PROLINNOVA carry out its charter. Different PROLINNOVA partners have understood the concept of local innovation slightly differently, using culturally appropriate terms.

Organizational structure

PROLINNOVA is organized as an apex program working through independent country program workplans. In Nepal, for instance, five organizations (LI-BIRD, ITDG, SSMP, CARE and the Eco Service Centre) share the day-to-day implementation of PROLINNOVA. A National Steering Committee (NSC), with members drawn from government agencies and research institutes, oversees the country program. A similar institutional set-up exists for South Africa, where a Farmer Support Group (FSG) and a network of NGO’s in sustainable agriculture and rural development (MIDNET) forms part of PROLINNOVA’s own networked structure, along with representatives of research councils and government agencies. Coordinating the PROLINNOVA country program for Uganda is Environmental Alert (an NGO), which has a core team with representatives of the Ministry of Agriculture (MAAIF), Advisory Services (NAADS) and donor development programs and networks. An NSC has supervised the program since 2004. PROLINNOVA has also set up or is setting up country programs along similar lines in Ghana, Ethiopia, Tanzania, Niger, Sudan and Cambodia.

Management

PROLINNOVA has a record of managing DGIS theme-based co-financing funds according to formats developed by the ETC group in the Netherlands. Operating through Country Programs, with a National Steering Committee or NSC made up of representatives of government and research organizations in each case, management is partly decentralized. Within each CP a local NGO “hosts” the NSC, and each CP has a secretariat or core team as its management unit, responsible for ensuring that specified tasks are implemented and for providing technical support and training through its members.

Accountability

The ETC group has existed as a development organization for thirty years and demonstrated accountability vis-à-vis its donors in the same period. As for PROLINNOVA, since 2004 a seven-member PROLINNOVA Oversight Group (POG) with three external members has worked to ensure program effectiveness, transparency and accountability.

Monitoring and Impact of PROLINNOVA ISF concept

M&E systems

PROLINNOVA has put in place a system enabling it to report on its main achievements and results regarding country program activities. In Uganda, for instance, one result for 2004 was a survey of local innovations producing fifty documented entries, of which ten were then selected for PID pilot projects. A survey report was produced as a tangible means of verification. In addition, links between farmers and researchers were strengthened, a workshop identified thirty new PID facilitators, and meetings with policy-makers were held. Similar results exist for the other country programs (Annual Report 2004: Table 1, pp. 14-16). Yet PROLINNOVA considers its M&E system as one to be “operationalized in different contexts at different levels [and thus one for partners to view as] work in progress” (Espineli and Waters-Bayers 2005: 6).

A greater emphasis on the monitoring and evaluation (M&E) agenda surfaced primarily as a result of partners’ requests at the Entebbe international meeting in June 2005. Subsequent changes in programming have taken place, and country-level self-assessments, electronic M&E discussions and internal assessments are now regular features of PROLINNOVA. The international meetings provide PROLINNOVA stakeholders at different levels with opportunities to access progress and needs jointly. The partners identified a list of reasonably well-thought-out and relevant M&E indicators (Gonsalves 2006).

Impact assessments

PROLINNOVA distinguishes between Country Program-level objectives (such as PID/PTD capacity-building) and International Level objectives (such as “international recognition” of PID/PTD). Also, PROLINNOVA is aware of the fundamental difference between outputs (deliverables), outcomes (changes resulting from output use) and impacts (long-term benefits). Based on these objectives and differentiated understandings of outputs-outcomes-impacts, PROLINNOVA is

building a highly elaborate system of objective-output indicators (Espineli 2005: 10-15) with a view to their adoption as an à-la-carte M&E system by partners in varying contexts of country program M&E “focal points”. PROLINNOVA itself points to the data collection gaps that already exist as well as those envisioned and the challenges that this evolving system may face (Espineli 2005: 16).

A recent external review of PROLINNOVA identifies the increased stakeholder awareness of the value of local innovation and the better appreciation of the process of innovation development and promotion as a significant accomplishment across countries. However, at the Cambodia meeting in February 2006, participants themselves expressed the need to move beyond the innovation identification and documentation stage to ensure that activities are operationalized on the ground.

Implementation Experiences of the PROLINNOVA ISF Concept

The implementation of the PROLINNOVA ISF concept has only recently begun (FSG 2005). The programme has the ambition to pool resources to be put in the hands of farmers, which are “directly accessible by local innovators to further develop their innovative work, and to draw in and pay for the support of research and extension workers” (Annual Report 2004: 19). An update on implementation experience may be found at www.prolinnova.net website.

As the PROLINNOVA concept comprises a set of principles rather than a fixed plan of operation, the activities it support vary greatly from country to country, depending on local needs.

Transaction Costs

Administrative and overhead arrangements

PROLINNOVA follows administrative and overhead arrangements in accordance with the standard of its main donors, first and foremost the DGIS.

Assessment of cost efficiency

In relation to results, the administrative costs of the PROLINNOVA ISF concept appear potentially high, assuming that grants dispersed for the program country partners appear to be relatively low (USD 10,000-60,000 per country) compared to overall PROLINNOVA program costs.

Flexibility

The flexibility of the PROLINNOVA ISF concept is assessed as very high. This is due to the networked nature of the PROLINNOVA organization, with country programs financed and implemented independently of PROLINNOVA by independent organizations (NGOs).

Adaptability

The adaptability of the PROLINNOVA ISF concept is assessed as high. Our analysis of PROLINNOVA's various country programs indicate that although the basic country program model is the same, its implementation varies with each country.

Beneficiaries

In the first instance, the beneficiaries of the PROLINNOVA ISF concept are first and foremost local organizations in program countries. The *primary target group*, however, is local farmers.

Innovation Scouting*Identification*

PROLINNOVA's 2004 Annual Report records the identification of more than fifty potential innovations in one country (Uganda) and more than a hundred existing innovations in another country (Cambodia).

Replenishment Strategy

In the case of the PROLINNOVA ISF concept, the strategy for replenishment is a matter of the various program partners pursuing new funds at different levels and for different components of the overall network.

Thus, during its backstopping missions, PROLINNOVA's International Support Team (IST) helps program partners raise local funds in respective countries. At the same time, the IST itself pursues funds at the international level to support country programs and/or international level activities.

Learning System

The PROLINNOVA International Support Team (IST) plays a pivotal role in the PROLINNOVA ISF concept learning system. The PROLINNOVA M&E system was developed as a framework not only for program reporting, but for collective learning as well (Espineli and Waters Bayers 2005: 5). Efforts are also

being made at the country program level learning. A specific learning agenda for PROLINNOVA country programs, including a “purposive design for learning as a basis for data collection and documentation of experiences at various levels”, is a still unfulfilled need (Espineli 2005; 17).

Sharing system

The PROLINNOVA website (<http://www.prolinnova.net/>) indicates a strong record for sharing among partners, including documentation and dissemination of lessons learned, through various electronic learning and exchange mechanisms, including electronic newsletters, website development, inclusion of information about/links to PROLINNOVA at other websites (agropolis, CIRAD, ELDIS, IIED, CGIAR, GFAR etc.) international workshops and training events, and ordinary paper publications.

Access and Control of Resources

In the case of the PROLINNOVA ISF concept, access to and control of resources by beneficiaries should be achieved through support to local communities, channeled or mobilized by local support funds such as LI-BIRD.

Partners and Stakeholders

In the case of the PROLINNOVA ISF concept, the partnership approach is both innovative and conventional at the same time. It is innovative in that it pursues a model that has aspects of a decentralized and networked style of organization, involving existing and local stakeholders as PROLINNOVA partners. At the same time, PROLINNOVA is organized with country *programs* and local partner *organizations*, and regularly visited by (IST) teams from the apex organization. *Ownership of some core PROLINNOVA components such as the emerging M&E system, therefore, does not seem to be emerging from below, but remains a “challenge” for PROLINNOVA to “stimulate”* (Espineli and Waters-Bayer 2005: 17).

7. Review of the CIAL

CIAL is the Spanish acronym for Local Agricultural Research Committee. Originally developed in 1987 and promoted by CIAT from around 1991, CIALs are designed as “research services” managed and owned by local communities. CIALs are therefore rather specialized or well scoped, focusing on participatory research agenda prioritization/setting, and subsequent implementation of the same research agenda. CIALs design experiments for farmer participants to carry out – scaled to minimize risk, and with a view to building social capital in their own communities – in the form of a permanent local research service with links to the formal research system.¹⁷ In concrete terms, what CIALs do is help participating farmers develop elementary experimenting skills, such as simple ranking techniques, control and replication functions, and record-keeping.¹⁸

The history of CIALs is well documented, as is the success of CIALs in terms of their replicability beyond Columbia, where they were first introduced, across several countries including Bolivia, Brazil, Ecuador, Honduras, Nicaragua and El Salvador, and their growth in numbers from around 50 in 1995 to about 275 by 2002 (Ashby et al. 2005; www.ciat.org/ipra/ing).

CIALs feature a set of general principles, including a public good commitment, risk-sharing, and systematic comparison of alternatives, mutual respect and experimentalism.

The funding strategy of CIALs is to seek funding from formal research organizations or extension services, as well as from CBOs or through self-funding.

Governance

Under this heading, the charter, organizational structure, management, governance and accountability arrangements of the CIAL are analysed and presented.

¹⁷ For discussions of experiences linking informal and formal agricultural research systems to do “Participatory Technology Development”, see, for instance, Hocdé, Henri and David Meneses. Undated. The Meeting of Two Worlds: Constructing Processes of PTD in Huetar Region Northern Costa Rica.; Jonfa, Ejigu et al. Undated. Institutionalization of Farmer Participatory Research in Southern Ethiopia: A Joint Learning Experience; Ampofo, J.K.O et al. Undated. Participatory IPM Development and Extension: The Case of Bean Foliage Beetles in Hai, Norther Tanzania - www.iirr.org/PTD/Cases).

¹⁸ For a description of the diagnostic and participatory method, see Ashby 2001: 74FF.).

Charter

Although a total of 249 CIALs are claimed to be active in eight Latin American countries, the CIAL is really a concept rather than a particular organization. Its charter may therefore best be described in terms of how this concept is presented by its “inventors”, namely as a matter of farmer empowerment¹⁹, and more particularly as a new kind of institution through which resource-poor farmers take ownership of agricultural research to the benefit of themselves and their communities (Ashby et al. 2001: 25).

Management and accountability

A facilitator initiates and leads a CIAL through its first phase of defining its precise nature and purpose, including a diagnostic process addressing the initial question of what to investigate or improve in terms of farming.

CIALs are governed by a committee with a minimum of four members: leader, secretary, treasurer, and communicator of the committee.

Transparency is achieved through open community meetings.

Accountability is pursued through CIAL groups' reports on their experiments and use of resources in regular community meetings and with record books kept open (P. Horne, A. Braun, J. Caldwell and O. Ito 2002: Presentation for a 2002 workshop on participatory research. ISBN 0-473-08578-X).

Monitoring and Impact of CIAL

Impact assessments

Given that there are many types and degrees of participation with very different cost-benefit implications, Kaaria et al. (2005) selected CIALs in order to evaluate the empirical question of whether and to what extent CIALs alleviate poverty. Their conclusions were as follows:

- CIAL farmers have higher levels of schooling than farmers in the control group.
- CIAL members enjoy significant social and human capital benefits from their participation in a CIAL.

¹⁹ Poder para los más Pobres. Ashby et al. 2005, p. 25.

- These benefits include acquiring agricultural knowledge, building experimental capacities, and improving communication skills and relationships, both inside and outside their communities (Kaaria et al. 2005).

More detailed documentation of the impact of CIALs includes *comparative survey results* (of communities with and without a CIAL) of food security impacts and degree of experimentation. Generally, *CIAL communities experiment more and suffer less* from food insecurity (Ashby 2001: 153-159).

Implementation Experiences with CIALs

The CIAL implementation experience may be and has been evaluated as a means of devolving adaptive research to the farming community and of cutting costs while increasing the impact of research. Despite encouraging results as reported below, a recent “status” report regards the CIAL young “movement” as having an uncertain future.

Typical research themes include “Varietal evaluation of field beans”, “Evaluation of green fertilizers for maize”, an IPM of the Andean potato weevil and “Disease control in onions”. For more examples of research themes pursued by CIALs in various countries, see www.ciat.cgiar.org/ipra/ing

Transaction Costs

Administrative and overhead arrangements

CIALs have very low administrative costs (see below).

Assessment of cost efficiency

CIALs were invented as institutional mechanisms to increase the efficiency of agricultural research and technology development through the integration of farmers into the research and the technology development process.

The administrative costs of the CIAL appear to be low and rapidly decreasing, from about USD 670 in the first year of existence down to about a hundred dollars per CIAL in the sixth year.

Against this background, the cost efficiency of CIALs is assessed as very high.

Flexibility and Adaptability

CIALs were invented as institutional mechanisms to increase the efficiency of agricultural research and technology development through the integration of farmers into the research and technology development process.

Adaptability is built into the CIAL design. The methodology is laid down as follows: the ‘change agent’ (e.g. extensionist, agronomist) trains committee members in basic research principles, i.e. research designs with controls, replicates, systematic evaluation etc. The respective CIALs adapt the principles to their own context and purpose.

Beneficiaries

The beneficiaries and primary target groups of CIALs are distinct: CIALs target small-scale, but productive farmers through a “self-targeting” mechanism, i.e. their research records focus on crops research (both cash crops and staples) and on productive improvements: varieties, manures, integrated pest management and erosion control.

Innovation Scouting

In the CIAL model, identification and vetting strategies are internalized into the work model or cycle of each CIAL.

Replenishment Strategy

One study (Wheatley 2002) has identified the resource mobilization options available to CSOs using CIALs as a case study and discussing strategic options for replenishment and long-term sustainability. The study concludes that CSOs such as CIALs with missions related to poverty and the environment in rural areas have a wide range of enterprise options, as well as a very wide range of funding options. The enterprising options include agricultural production, seed supply, small-scale manufacturing and eco-agro-tourism and service provision.

In addition to enterprising options, these include supply chain relations, service fees, project grants, membership dues, volunteering, corporate philanthropy, debt reduction, hiring out underused assets and many others. Based on these, a whole set of implied options for CIALs to replace externally provided resources were identified (see box 3). The indications are that many CIALs have followed such strategies, being involved in seed sales, micro-credit provision and other small busi-

nesses. Estimates of the returns on investments made in developing and applying the CIAL approach are that the returns are positive: after three years of investment returns start flowing in the fourth year, and already by the fifth year net benefits beyond USD 3000 turn the original investments of less than about USD 1500 into profit (www.ciat.cgiar.org/ipra/ing - accessed on 3rd October 2005).

CIAL Criteria and Procedures

Application procedures

The CIAL concept involves partnerships with external facilitators and donor or facilitator agencies. Funding strategies are not standardized, and every would-be CIAL develops its own funding strategy along with the facilitators. While this may in some cases involve applications being submitted to donors for funding, such procedures are not a formal part of the eight-step CIAL work mode.

Selection Criteria

The CIAL concept does not involve competitive arrangements as such, but partnerships with external facilitators and donor or facilitator agencies. Indirectly such donors may apply an implicit set of criteria for selecting which communities to work with.

Commercialization

In a formal sense, commercialization may include issues such as brokerage to the private sector and the use of intellectual property rights (IPR), including patents. CIALs do not focus on commercialization in this sense, but as far as basic commercialization is concerned, CIAL training does include basic skills that farmers need in marketing their produce (see, e.g., Ochoa-Pelaez, Diana. Undated. "Las Cuentas Claras", Chapter 11, Kellogg-sponsored CIAT IPRA training manual (Cartilla) # 262).

Learning system

The CIAL learning system is highly integrated into the very concept and working mode of the CIALs, as programmed in existing manuals of operation. The work mode involve eight steps from motivation (step 1), through diagnosis (3) to experimentation (5) and feedback (8). For a full list of CIAL manuals, see Ashby et al. (2001: 198-202). This includes the planning, implementation, evaluation and presentation of experimental results.

Sharing system

The CIAL sharing system, including the sharing of documentation and the dissemination of experimental results, are widely shared through open community meetings and, across regional boundaries, through networks of second-order associations.

Access and Control of Resources

In the case of the CIAL, access to and control of resources by beneficiaries, especially local communities, is secured through explicit rules requiring the presentation of accounts and budgets in open community meetings.

Partners and Stakeholders

In the case of the CIAL, stakeholder involvement is characterized by a (slight) majority of NGOs among CIAL facilitators, with government organizations supporting about a quarter of the 249 existing CIALs, “consortia” of organizations supporting a fifth, and universities supporting only 4% of the existing body of CIALs. A detailed and full list of CIALs across countries, with columns on locality, research themes, stakeholder support and dates of establishment, has been published by Ashby et al. (2001: 177ff.).

In 2006, CIAT founded the Rural Innovation Institute in Colombia. Based on CIAT’s experiences with farmer-participatory research in CIALs, the institute focuses on fomenting agro-enterprise development. This is done through supporting networks of experimenting farmers’ groups with an aim to link them to local entrepreneurs and private-sector markets. This is done by applying new information and communications technologies (ICTs) to rural innovation and the formation of learning alliances. For further information, see (<http://www.ciat.cgiar.org/riiweb/about.htm>).

Box 3: Options for CIALs to replace externally provided resources

That the current requirements for external funding for each CIAL organization are modest (USD 500/year).

- That agricultural and NRM research has a long time frame and requires resource mobilization mechanism compatible with this (Bebbington and Mitlin 1998).
- That accessing additional local (financial and in-kind) resources of members and others in the community could reduce this amount, so long as the CIAL mission of improving livelihoods and NRM through agriculture is important to them (i.e. has a high centrality).
- That several CIALs have already established small/micro-enterprise activities capable of generating income for the organization (as well as for members individually), based on the results of previous research activities. There is significant potential to expand both the number and scale of these activities. As these enterprises mature, it may be possible to develop closer supply chain linkages with other enterprises (traders, input suppliers, supermarket chains etc.) that can help access non-local resources.
- That the potential exists to formalize the ownership of intellectual property, including indigenous knowledge, resulting from both technological and methodological innovations to which the CIALs have materially contributed (e.g. selection of new varieties, development of new participatory R and D methods), and to generate income from royalties, licenses and franchises based on this, in partnership with others as appropriate for each innovation.
- That second-order organizations (especially) have the potential to develop income-generating services (e.g. establishment of new CIALs, quality control/accreditation of farmer experiments, training in methods and tools used by CIALs etc.).
- That corporate partnerships are probably inappropriate, especially with firms in the agricultural sector, since this could compromise the independence and impartiality of the farmer experimentation process.

- That contracts from local government bodies for agricultural service (extension) provision could be sought, for well-established CIALs and second-order federations.
- That indigenous foundations concerned with poverty, the environment, rural areas or in fostering urban-rural linkages could be targeted for philanthropic gifting programs or specific projects.
- Potential exists to organize out-migrants from the home community to donate and invest in the area.
- That horizontal linkages can be made with other CSOs operating in the local area to form partnerships, joint ventures etc in pursuit of agreed objectives through a variety of mechanisms including preparation of joint proposals for external funding and the establishment of new enterprises and services. Local government agencies could also be included as partners here.
- That more opportunities can be created for voluntary contributions from within the local community and for external advisors/mentors/specialist expertise, as considered appropriate.

Existing voluntary contributions (e.g. time dedicated by farmers to field experiments and organization meetings) need to be explicitly valued and recognized.

- That a reserve fund could be established. The existing external donor could be approached to assist in the establishment of the fund, which supports the sustainability of the organizations in which the donor has already invested.
- That a strategy for resource mobilization is developed as part of a wider strategic planning process, involving all relevant actors.

Source: Wheatly 2002: 38-39

8. Review of Promoting Farmer Innovation: Farmer Field Schools (PFI-FFS) Kenya

The PFI-FFS project reviewed in this section is an ongoing UNDP-funded project administered by the FAO.²⁰ The project was initiated in 2001, and its methodology is to amalgamate two complementary approaches: the Promoting Farmer Innovation (PFI) project, and the Farmer Field School (FFS) project. The PFI project aimed to create an awareness of local innovators and the relevance of their innovations and indigenous knowledge for their communities. According to Critchley, the effects of this support in terms of the wider spread and adoption of local innovations and new uses of indigenous knowledge among poor farmers has been limited (Critchley et al. 1999).

The strength of the Farmer Field School approach is claimed to be its creation of an institutional platform enabling groups of farmers to experiment with the aim of developing technical solutions suited to their context. A recent review synthesizes the results of 25 FFS impact evaluations. Citing studies on the broader development impacts of FFS, it identified “remarkable, widespread and lasting development impacts” (Berg 2004). So far, what have been demonstrated as the most successful among FFS activities are Integrated Pest Management (IPM) programs *based* on the FFS approach. Berg (2004) recommends that the FFS field-school approach be broadened to embrace, for instance, education and environmental protection. One critical line of exploration that could be added to this analysis is whether the strong focus of the FFS on adapting and implementing a single, production-oriented, innovative method (IPM) is the most important factor in the success of the FFS.

Gustavson (2002) considers that the grant mechanism of Kenya’s FFS one-time learning grants has worked well, with only a few management problems. He sees the grants as informal rural equivalents to fellowships for higher education at a university and also judges the sustainability of FFS to be high, since most

²⁰ Farmer Innovation was first supported in East Africa by projects implemented by the Kenyan, Tanzanian and Ugandan authorities over a three-year period (1997-2000). The project was called Promoting Farmer Innovation (PFI) and was funded by the Dutch government, coordinated by UNSO and backstopped by CDCS, Free University of Amsterdam. The PFI project aimed to identify farmer innovators and innovations and then to disseminate them through farmer-to-farmer extensions and farmer exchange visits.

FFS graduates continue to meet, being self-financed (Gustavson 2002: 3). Part of the institutional environment of Kenyan field schools is the World Bank-funded Agricultural Technology and Information Response Initiative (ATIRI), whose grants cover technology acquisition (e.g. planting materials), exchange visits, visits by KARI staff, and other “costs of seeing, learning and adopting technologies”. Allegedly, the introduction of on-the-shelf technologies such as treadle pumps and bucket-drip irrigation had a “surprisingly large and quick impact” (Gustavson 2002: 5).

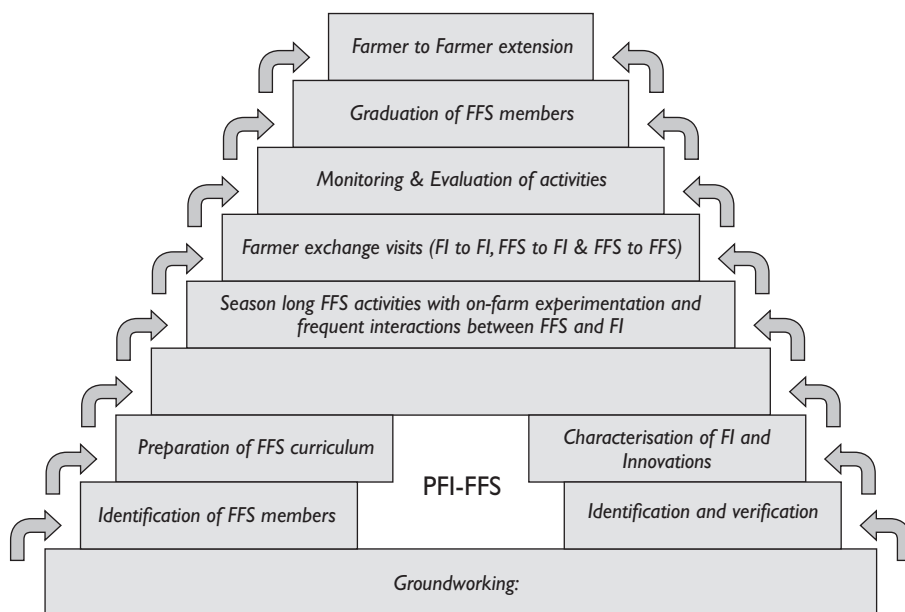
Governance

Governance of activities is decentralized. The PFI-FFS project is implemented by the FAO Kenya office, and activities are implemented through local government employees, the farmer field school groups and higher level networks. The PFI-FFS objective is to increase the uptake of “improved” technologies related to land husbandry by facilitating increased interactions between innovators and FFS groups and contributing to rural poverty reduction by stimulating a process of innovation and discovery among farmers. An additional aim is to test the possible synergies between the two approaches and develop an integrated PFI-FFS approach.

Interaction between identified and supported local innovators and FFS groups take place in three ways: (i) by stimulating innovators to become members of FFS groups; (ii) by using local innovators as external facilitators and resource persons for FFS groups; (iii) through study visits by FFS groups to the farms of local innovators; and (iv) through the documentation and dissemination of innovations. The PFI-FFS project is *implemented* through Kenyan government district staff and is currently active in nine districts. Limited but essential international back-up and facilitation is carried out by FAO staff. Coordination of the farmer innovator aspects of the project is carried out by a Kenyan agricultural researcher. The integrated PFI-FFS approach is illustrated in Figure 2.

The *methodology* includes most of the steps and activities of a normal FFS cycle, but it has added some elements of the PFI approach; in particular, the extension elements of the PFI approach have been taken over by FFS. The PFI has thus been integrated into the FFS rather than vice versa. The approach has, moreover, been expanded to capture a wider range of innovations and initiatives in the areas of land and animal husbandry (Duveskog, Mburu and Critcheley 2002).

Figure 2: The "Promoting farmer innovation in Farmer Field Schools" methodology



Source: Deborah Duveskog, Charles Mburu, Will Critchley 2002. *Harnessing indigenous knowledge and innovation in Farmer Field Schools*

An innovation is defined by the PFI-FFS project as ‘better or modified traditional or introduced systems or initiatives, or something new, tried and tested or currently under experimentation’.

The innovators are defined as ‘farmers or land users who innovate, test and try new methods of conservation or production, on their own initiative, often using ideas from various sources’. As a result of the merging of methodologies, interaction between innovators and FFS group members has allegedly been improved. This is held to have led to many FFS members becoming innovators in their own right (Duveskog et al. 2002).

M&E is a continuing process in which relevant data about activities is collected and analysed. Staff at the FAO Nairobi office have collected and analysed primary data on a case study basis, which has resulted in high-quality relevant statistics becoming available. A participatory M&E system will start operating in 2006.

It will include a baseline survey and a form of poverty assessment based on rural producers' own perceptions of well-being. While one FFS project report²¹ *concludes* that 'there is no doubt that local innovations can be as effective, if not more, as research generated technologies in improving livelihoods of rural poor', no formal impact assessment has yet been carried out. There are plans to include an assessment of poverty impacts as part of the M&E system.

Implementation Experiences of FFS-K

When the PFI project was terminated in 2000, it had identified, recognized and supported network activities between a number of local innovators in Tanzania, Uganda and Kenya. The PFI project is well documented (Critchley et al. 1999) and followed a unified methodology comprising a ten-step guideline of field activities, shown below.

Steps in the PFI guidelines:

1. Identification of farmer innovators and their innovations
2. Recruitment of farmer innovators and verification of innovations
3. Characterization and analysis of farmer innovators and their innovations
4. Formation of clustered networks of farmer innovators
5. Establishment of an M&E system
6. Visits among members of farmer-innovator networks
7. Study tours for farmer innovators
8. Supporting farmer innovators in experimenting and developing new technologies
9. Farmer visits to farmer innovators
10. Use of farmer innovators as trainers

Some 1500 FFS groups were initiated within the first five years of the PFI-FFS project, the majority of which were farmer-facilitated. Around two thirds of FFS group members are women. Overall experience with implementation has been summarized as the enhanced use of innovators as a resource for development (Duveskog et al. 2002). The integration of innovators into FFS activities is believed by some scholars to be a highly effective way of facilitating technological development among farmers. Many of the innovations that have been taught by innovators to FFS groups have allegedly been adopted by FFS members through a continual process of trial and error (Duveskog et al. 2002).

²¹ Duveskog, Mburu and Critcheley 2002: 14.

Studies have shown that a fusion of external science-based and local innovations and experience-based knowledge takes place in the FFS groups. The same studies reveal that FFS group members experience higher levels of adoption when new technology options are introduced by farmer innovators. The focus on local innovations is claimed to have increased the technology options available to FFS groups and sharpened the skills of FFS members in terms of experimenting and assessing innovative technical solutions to their agricultural problems. This is claimed to have enhanced the sustainability of farmer-facilitated FFS groups.

The project has included innovators as regular members of FFS groups. The innovators have played a role in their respective FFS groups as resource persons within their area of expertise and in respect of their experience with on-farm experimentation and local technology development. Scholars report that interaction seems particularly successful when the innovators are the 'hosts' of the FFS group (e.g. that the FFS field is on land belonging to the innovator).

Transaction Costs

Transaction costs are likely to be low, as most activities are planned and implemented by the local government staff of FFS groups or networks. Put differently, a high proportion of the overall budget is spent on the actual activities of FFS groups. The cost of implementing an extension worker-facilitated season-long FFS group is around USD 800. A farmer-facilitated FFS group can be implemented for USD 300, or around USD 10 per participant. The current rate for a half-day session in an FFS group with a local innovator is USD 7, equal to twice the current rate for casual labour.

Flexibility

PFI-FFS governance is designed to be decentralized and participatory. As a consequence, perhaps, the project has been able to redirect its focus and approaches as experience on the ground has moved forward. Planning and the prioritization of decisions involving farmers and innovators are largely done by the FFS groups. The actual content of experiments and choice of enterprises is a process of continuous adaptation on the basis of the collective experience within the group to the ever-changing economic and market context.

Beneficiaries

No thorough ranking of well-being has been carried out among members of FFS groups, formation of which is based on the principle of informed self-selection. What binds group members together is (i) a desire to learn; (ii) a willingness to commit time and responsibility to the group's activities; and (iii) integrity as rural producers. The self-selection mechanism aims to ensure that "free-riders" and individuals who are more interested in access to external resources than gaining new knowledge are excluded from these activities within the first six months of the FFS cycle. Studies of FFS groups in neighboring Uganda have revealed that they reflect the social composition of the community and therefore are inclusive of the poorest and not biased towards the better off (Friis-Hansen 2005).

The PFI-FFS project has two target groups: the farmer innovators, and rural producers involved in FFS groups. The latter is the primary target group in terms of both numbers of beneficiaries and effort. The emphasis is thus on enhancing use of innovators and their innovations in the development process, rather than simply supporting innovators in their own right. Farmer innovators are defined by the PFI-FFS project as "farmers who innovate, test and try new methods of conservation or production, on their own initiative, often using ideas from various sources". Many of the innovators identified by the PFI-FFS project are middle-aged men from non-poor households.

Innovation Scouting

The innovators and their innovations are identified by the National PFI coordinator together with the district extension staff, who act as facilitators for the FFS groups. Potential innovators are screened by collecting information about them from various stakeholders, including farmers, local government staff, NGO staff etc. In practice, the coordinators often consider additional criteria for including an innovation in project catalogue, such as that it is perceived as "genuine" and important in terms of its potential to bring benefits to groups of rural producers. The project supports a wide diversity of "innovations", ranging from crop production to animal health and agro-processing. A hard-copy catalogue of some four hundred innovations from nine districts has been compiled, though there is no electronic form. The identification process has proved time-consuming, and its success can largely be subscribed to staff enthusiasm. FFS groups are exerting high but positive pressure to perform on local extension staff, who function as external facilitators and therefore may tend to place less emphasis on identifying new

innovators and vetting and characterizing their innovations. There is no formal strategy for vetting innovations. Since the aim is to ensure that the innovations presented to FFS groups are appropriate and relevant, the PFI-FFS project staff include agricultural researchers and subject-matter specialists (extension officers). However, the real test is whether the innovations are adopted by FFS group members after a season being tested out on their joint experimental plot. No study of results in this respect has yet been performed.

Replenishment Strategy

The PFI-FFS project started out with finance for 2001-2003 only, but since then it has managed to attract additional finance in order to continue its activities. The project has tried to promote the organizational and financial sustainability of the activities it supports at the local level. The FFS group comprises the spinal core of activities, with three sets of approaches being aimed at organizational and financial sustainability: (i) along with the wider FFS movement in Kenya, the PFI-FFS project is experimenting with a self-financing FFS model, in which new farmer-facilitated FFS groups are initiated on a loan basis; (ii) established (graduated) FFS groups are engaging in a wide range of joint enterprises that are using the knowledge and innovations acquired to generate a common income to finance continued FFS group activities, including using farmer innovators as external facilitators and grass-root advisors; and (iii) established FFS groups in several districts are in the process of establishing FFS networks at the district and sub-district levels. This organizational process is largely being driven by the FFS groups themselves, though being carefully nursed by the PFI-FFS project staff. The indications are that FFS groups continue to interact with local innovators after the initial project funding has ended.

PFI-FFS Criteria and Procedures

The PFI-FFS project has no application procedures. The status of farmer innovator and subsequent support is granted through selection by PFI-FFS staff and one's reputation within the community. There is also no application procedure to become a member of an FFS group.

Commercialization

There have been few if any attempts by PFI-FFS to market the four hundred-plus innovations that have been identified and entered in a catalogue. A general perception seems to exist among PFI-FFS programme staff that local or national private entrepreneurs, who could potentially market the innovations, would simply

“steal the ideas without recognizing or remunerating the innovators” (personal communication with one PFI coordinator). To our knowledge, there has been no attempt by PFI-FFS project staff to assist local innovators to protect their rights through systems of ‘prior content’ or patent applications.

A quick review of the catalogue of innovations in Kenya reveals that the vast majority of the innovations are not likely candidates for commercial products. This is certainly the case for innovative knowledge-based methods of soil, water and pest management. While the innovations are clearly relevant to and desired by FFS group members, the latter are unwilling to pay for the use of such innovations beyond, in some cases, paying the innovator to act as a community-based extension agent.

Learning System

The FFS approach is locally recognized as an effective system of farmer learning (Duveskog et. al. 2002). Before adding the PFI component to the FFS programme, some FFS groups said they experienced problems because of the absence of indigenous knowledge from the field school curriculum, as they were facilitated by local extension workers with a ‘transfer of technology’ mindset (Duveskog et. al. 2002). Integrating the PFI and FFS approaches has gone a long way towards solving this problem. The PFI-FFS approach is meant to stimulate and facilitate an institutional platform for experimentation and innovation in which FFS group members develop solutions and answers to the problems facing them. The learning system is based on learning sessions being held in the fields instead of in a classroom and on a form of pedagogy inspired by principles of informal adult education. Through support for innovation processes, the PFI-FFS project assists farmers to develop the skills required to adjust and adapt their farming activities to the ever-changing production environment, thus becoming less dependent on external service provision, which farmers perceive as ineffective (Duveskog et. al. 2002).

The PFI-FFS project has contributed to the classic FFS approach by integrating local knowledge into all stages of the FFS curriculum. This aims to ensure a more dynamic blend of technologies developed by formal agricultural research institutes with those developed by local innovators. Short Training-of-Trainers (TOT) courses for FFS facilitators are undertaken to introduce them to the FFS approach and the concept of local innovation. During TOTs, information that has been collected is used by the participants to formulate intervention trails to address the problems identified by farmers. Two-day training courses are carried

out for local innovators with the aim of enhancing their presentation skills and ability to interact effectively with FFS groups. Local innovators are further supported in networking with each other.

9. Comparative Analysis of Existing ISFs

In the following comparative analysis of the five reviews, a number of preliminary conclusions are drawn. The section seeks to relate the findings of the comparative analysis to the introductory chapter on the rationales for supporting local innovation, as well as to the broader theoretical framework discussed in Chapter two.

1. Scope of support and implementation experience. There are considerable differences in the scope and size of the ISFs being reviewed here. The NIF is globally the largest ISF: it has a national scope in a very large country (India); a strong institutional structure, including government organizations, independent foundations, universities and grassroots organizations; the political support of the current president; sustainable funding from an endowment fund; and is comprehensive in content, with elaborate methods of scouting and vetting innovations, recognizing innovators, protecting property rights, documenting and sharing information about innovations, and linking innovators and private entrepreneurs. However, although the other four ISFs reviewed here are much more limited in scope and focus, they can all contribute valuable experiences, complementary to those of the NIF in India.

In terms of implementation experience, there is a spectrum from PROLINNOVA (in this study, reviewed as a concept only) via the relatively recent integration of the Promoting Farmer Innovation and Farmers Field School approaches, to the two decades-long experience with CIAL and NIF.

While there are considerable differences in scope and implementation experience between the ISFs, *it is our assessment that there are many complementary experiences between the existing ISFs, and that their respective levels of effectiveness could be enhanced if this expertise was exchanged and acted on in a systematic manner.*

2. What to support: individual innovators and/or drivers of innovation processes?

The underlying understandings of innovation and the rationales for support recognized by the five ISFs are not made explicit or explained well in project documents. All five ISFs seem to understand innovation as a matter of both processes and products, the latter varying from hard-core mechanical implements to soft institutional innovations. One can distinguish two key areas of support: (i) innovators and their links with public institutions and private entrepreneurs; and (ii) groups

of rural producers as platforms for innovations and their links with innovators. The two areas of support are clearly complementary, and all ISFs include elements of both, but their respective emphases are very different. At one end of the scale, the activities of the NIF are almost entirely focused on supporting individual innovators and their interactions with external markets while deliberately nacking away from “extension activities”.²²

At the other end of the scale, the emphasis in PFI-FFS is clearly on facilitating platforms and networks involved with experimentation, although individual innovators are also supported. PFI-FFS support for individual innovators in Kenya is largely guided by their relevance as a resource for the community: less emphasis is placed on capacity development among innovators and their links with private-sector entrepreneurs.

The difference in emphasis may in part be explained by differences in context. Rural India has a wide variety of local entrepreneurs, strong public-sector extension services and a competitive private-sector input market there are therefore arguments that the scaling up of innovations should be left to the private sector. The Kenyan context is very different, with widespread rural market failures for private-sector agricultural input (and output) markets, and a very limited tradition for local entrepreneurs to engage in the manufacture or sale of inputs for rural producers. The PFI-FFS project therefore also has good arguments for its particular emphasis.

It is our assessment that all ISFs could benefit from a more balanced mix of the two areas of innovation support. On the one hand, NIF has the potential to become more effective in disseminating non-commercial innovations by applying lessons from PFI-FFS in Kenya. On the other hand, the NIF has valuable experience in bringing innovators together with local entrepreneurs, from which the other ISFs could benefit.

3. Who are the innovators? The five funds have somewhat different understandings of who the innovators are and their characteristics, from a broad concept of entrepreneurial rural people (NIF, SSPF) to experimenting rural producers (PRO-

²² During an interview, Professor Anil Gupta, a key champion of innovation support activities in India, made a sharp distinction between supporting innovation processes and promoting their use. He also made it clear that use of innovations is a matter for extension services, not a task for the NIF umbrella organisation.

LINNOVA, CIAL, PFI-FFS). While the NIF celebrates the qualities of individual small-scale entrepreneurs with a proven record of being innovative, the latter ISFs place great efforts in facilitating poor rural producers and users of innovations to learn to become “researchers” in their own right. *It is our assessment that supporting both types of innovator is likely to increase the development outcomes of ISFs.*

4. Typologies of innovation. A general lesson learned by all ISFs is that innovations have to be understood in their respective contexts. The ISFs currently differentiate between innovations on the basis of the types of issue they are concerned with (e.g. soil and water conservation, biological pest management, etc.). *It is our assessment that it would be useful if the ISFs instead could distinguish between innovations in relation to (i) relevance of formal property rights; (ii) public/private goods; and (iii) market/non-market value.* While the Indian system of prior informed consent is highly commendable and provides a firm foundation for forging partnerships between innovators and local entrepreneurs, the fact is that the most local innovations are essentially public goods which are unlikely to be taken up and marketed by for-profit companies. We would be deceiving ourselves to think that market forces alone can ensure that relevant local innovations are widely used and contribute to the development of rural communities. A better distinction between different innovations in relation to their public-private character would therefore be very helpful in designing different strategies for the spread and uptake of identified and vetted innovations, depending on their market value.

5. Supporting innovative processes: from individual inventors to innovative partnerships. Douthwaite understands the innovation process as consecutive cycles of “learning selection” (see Section 2 of this report). If we apply this analytical framework to rural innovations for development, the focus shifts away from simply understanding innovators as inventors, and rural producers as users of innovations, to a focus on how innovations are continuously improved upon through interaction between the various actors involved. One may identify six partners in the learning selection process: (i) rural innovators; (ii) early users of innovations; (iii) non-users (iv) local entrepreneurs; (v) scientists from public institutions; and (vi) national coordinating and facilitating organizations.

ISF-supported activities are largely confined to the identification and documentation of innovators and their innovations and to enhancing the spread of innovations through either commercial markets (local entrepreneurs) or community networks (groups and networks of users). Support for learning cycles

involving dialogue between different actors has not yet been undertaken in a systematic manner.

While NIF supports various interactions between innovators and entrepreneurs, the scope of commercialization of local innovations remains limited. This may in part be because local innovations are often not as non-marketable as the NIF may implicitly assume: e.g. they may not have reached a form in which they can be manufactured and distributed as a product and require further modifications. The innovation literature emphasizes that ‘finishing’ a technology, particularly if organizational, requires a process of learning selection that of necessity involves users, as when rural producers invest their hard-earned cash and are committed to making it work (Douthwaite 2002: 53). *In our assessment, the facilitation of cycles of ‘learning selection’ that involve innovators, entrepreneurs and innovative adopters is a potential area of activity for ISFs that could contribute to scaling out the use and commercialization of rural innovations.*

A major strength of PFI-FFS and CIAL is their ability to transform average farmers into adopters of local innovations by creating what could be termed ‘organizational platforms of innovation’. However, in the PFI-FFS approach cycles of learning selection are limited to taking place within the individual FFS group, and there is currently no provision for the systematic feedback of experience to the innovators and/or entrepreneurs.

6. Capacity development: organizational effectiveness and sustainability at what level? Capacity has been defined as “the ability of an organization to produce appropriate outputs (e.g. services and products)” (Boesen and Therkildsen 2005). Using this definition of capacity development, wide differences in the respective aims of capacity development efforts in the five ISFs become clear. One can distinguish between capacity development support at three levels: (i) grassroots (organizations of rural producers into platforms of innovation); (ii) NGOs and civil society organizations; and (iii) publicly funded (by central or local government) organizations with a certain amount of independence. ISF-supported efforts are focused on the one hand on building effective mechanisms for identifying, documenting, vetting and promoting innovations, and on the other hand on ensuring organizational and financial sustainability.

The Indian case study stands out among the five ISFs as having the most comprehensive organizational structure, comprising a web of different types of or-

ganization. The achievement here is that, while each of the organizations has its own focus and internal dynamics, they all manage somehow to coordinate their activities for a common goal. Such institutional development is highly context-specific, and it is difficult to draw clear lessons for replicating this experience elsewhere. Three general lessons can, however, be drawn from the Indian ISF experience: (i) to ensure legitimacy and effectiveness, ISF organizations must retain a high degree of independence from vested interests; (ii) complex independent institutional settings may need to evolve slowly and gradually if organizational sustainability is to be ensured at both the local and national levels; (iii) support for local innovations starts with a strong “spirit” and “engagement in the course” by a champion (an individual or group of people) with a high degree of personal integrity. This contributes to building trust and confidence within and between the various institutions involved.

The capacity-building support of PFI-FFS and CIAL emphasizes organizational sustainability at the farmer group level. In particular, FFS has been highly successful in establishing organizationally strong and viable farmer groups, which over two decades have spread to 75 countries world wide. Key lessons behind this success include (i) formation based on self-selection (and exclusion); (ii) a transformative learning approach through which members learn to experiment and innovate; and (iii) a highly decentralized management structure. The institutional integration of local innovators with FFS groups and networks has created a durable approach to replicating and adapting the use of (non-commercial) local innovations.

7. Governance. The ISF funds reviewed here all have a decentralized management structure linked together by a central management unit or committee (with the possible exception of SPPF, which started with a central, donor-managed governance structure and subsequently evolved into a series of regionalized programmes). The NIF in India has the most formalized and best established governance structure, including a national Governing Board that coordinate activities among the web of independent organizations, each with their own functions and foci. Coordination of activities is less apparent in the cases of CIAL and PFI-FFS, as most management decisions in these organizations are taken at the farmer group level and the district level networks of such groups.

In terms of governance, the PROLINNOVA concept is at the same time centralized and highly decentralized, but promotes a decentralized and participatory governance structure for national ISF programs through (i) a design process involving

many stakeholders, (ii) a National Steering Committee (NSC), with members drawn from government agencies and research institutes, and (iii) an apex type of organization involving several local implementing agencies.

However, the PROLINNOVA concept also includes highly centralized elements of governance, as all the national ISF programs are closely interacting with the PROLINNOVAs International Support Team (from the ETC group in the Netherlands), which provides technical support through back-stopping missions. The centralized functions relate to questions regarding (i) the operationalization of the PROLINNOVA concept, (ii) fund-raising assistance to national partners; and (iii) support for M&E and IA.

8. Development Monitoring and Impact Assessment. None of the five ISFs have a comprehensive system for monitoring outcomes and assessing the impact of support activities. In particular, none of the M&E systems differentiate between different social categories. One potential development impact of ISF activities has therefore not yet been documented. ISF documents are also unclear in their understanding of the social and economic mechanisms through which support for local innovations result in improvements in the well-being of the poor.

The review identified great variability in how ISFs go about monitoring and impact activities. At one end of the scale, one finds formalized guidelines for project reporting (SSPF) and a formal study comparing villages with and without CIALs. The advantage of such formal M&E systems is that they are systematic, with clear monitoring indicators developed from a logical framework. The drawback is that the assumptions on which such indicators are based often prove to be biased and inadequate. The purpose of such systems is to satisfy external funding agencies rather than create feedback loops to ensure dynamic project management.

PROLINNOVA carried out internal evaluations among its partners in 2004 and 2005. These were processed electronically and involved two rounds of questions, the second round being based on an initial assessment of the responses to the first round. This evaluation has a very iterative design, deriving questions from the initial analysis, then probing further, and later arriving at a synthesis. The results were presented to the network by e-mail and during the annual international meetings. Valuable feedback is being provided to the IST and POG, and there is enough evidence to indicate that programmatic decisions are being based on the feedback from this internal evaluation process (Gonsalves 2006). The shortcoming

of such an approach is that it is only based on the subjective views of implementing partners and unlikely to reveal major conflicts.

The FFS-PFI program in Kenya is currently embarking on a comprehensive impact-monitoring system that combines continuous participatory monitoring with social science research-based qualitative and quantitative external surveys. This approach is likely to produce valuable results.

Major variation is also found between ISFs with regard to the targeting of beneficiaries and perceptions of how ISF interventions benefit the latter. Targeting varies from the broad segments of population groups targeted by the nationally scoped NIF through the broad rural groups targeted by the SSPF and the more specifically defined beneficiaries of the CIALs and FFS – (poor) farmers – to the national NGOs and government agencies that PROLINNOVA works with. Different funds also pursue different development mechanisms. For example, NIF (and SSPF) rely on private-sector entrepreneurs to market innovations to potential beneficiaries. PFI-FFS and CIAL support capacity building within the community that will assist in the non-commercial spread of innovations to potential beneficiaries.

9. Approaches to identifying and supporting local innovations. The review reveals a diverse picture of Innovation Scouting – from none or implied (PROLINNOVA,) through to criteria-based (SSPF), the village walks and student scouts of the NIF, reliance on grassroots “champions” and/or use of extension workers (FFS), to the structured group innovation process encoded in the CIALs. The use by the NIF of students who return to their villages during their vacations to scout for innovations has proved a highly successful approach that could be replicable elsewhere where university students come in from rural areas. The availability of comprehensive, standardized forms and criteria that students can easily administer has contributed to the success of this approach. One unintended side effect has been changes in students’ attitudes to rural development.

CIAL is the ISF that is most focused on how to select participants in support activities, with clear procedures for informed self-selection and diagnostic procedures for farmer group activities. The farmer group formation process in the FFS-PFI program has many similarities to that of the CIAL. However, when it comes to selecting innovators, the FFS-PFI programme relies on scouting by the programme coordinator, with assistance from district extension workers.

The NIF is the only ISF that uses annual competitions among innovators as a system for identifying outstanding innovations. PROLINNOVA has few standard selection criteria and procedures: decisions are made by individual projects and national activities.

10. Dissemination and use of innovations. Most of the funds made few if any attempts to support any real marketing of local innovations. The exception is the NIF, which was found to be advanced on this score, since it includes both formal and informal sector marketing. While primarily focusing on innovations of a public good nature with a view to informal marketing or information sharing, the NIF has developed a proven capacity to work with innovations of a rival good or excludable nature, and thus with innovations with the potential to be marketed based on standard or sui-generis IPRs. The other funds focus mostly (CIAL) or almost exclusively (FFS) on non-excludable and non-rival goods. In the latter cases, the majority or all of innovations supported are likely to be of a public good nature.

11. Three complementary forms of *innovation vetting* are practiced by the IFSs, each with their own merits. One of the funds, NIF, relies on two separate innovation “review” committees, one “scientific”, the other by a peer group of innovators. Another fund, CIAL, uses joint experiments involving both external facilitators and researchers. Vetting by potential users (e.g. rural producers) is widely practised in PFI-FFS, graduated by farmer groups’ review-selected innovations using experimental skills acquired during FFS. In SSPF, vetting of projects is done through expert review in Germany.

The best documented system of vetting is the review of local innovations by scientists from national research organizations. The most systematic scientific vetting is done in India. However, such vetting is expensive, and as funding is scarce, it is largely limited to innovations that are relatively easy and inexpensive to review (e.g. mechanical innovations). Scientific vetting of innovations within the area of herbal medicines is rarely carried out, in spite of their huge commercial potential, as it is very expensive.

Vetting by farmers who have undergone a season-long period of informal adult education in FFS or CIAL groups is a highly effective way of screening for development relevance and potential demand from rural producers. This is an example of potential synergy for NIF by learning from the smaller ISFs.

12. The approach to learning varies between the five ISFs, from a very complex and elaborate learning programme for all levels, through a wide array of instruments and forums (NIF), to a far more specific and scoped adult or joint learning model (CIAL, FFS), to the somewhat more amorphous form of “collective learning” envisioned under the PROLINNOVA concept. The experience of the various ISFs with different approaches to learning for different stakeholders is clearly complementary.

10. Outline of Roadmap to Establish a Global Innovation Facility

INTRODUCTION

The first GRA-World Bank workshop on innovation systems at the community level, “Touching the Hearts of the People”, held in Kuala Lumpur from 6-8 February 2006, brought together a comprehensive group of global stakeholders involved in supporting local innovations. The Kuala Lumpur resolution calls for a global mechanism to foster community level innovations to be drawn up.

The present section discusses an outline for a roadmap for the establishment of a Global Innovation Facility (GIF).

RATIONALE

Local innovations constitute a major but under-utilized potential for development and rural poverty reduction, and ISFs support the use of this potential more effectively. Our review of existing ISFs revealed that a wealth of activities are taking place in support of local rural innovations. The scope of ISF activities have increased considerably since the turn of the century, and this global momentum can be seen as part of a wider search for more cost-effective ways of supporting economic growth and poverty-reduction in marginal rural areas characterized by low density and volumes of commercial demand for industrially produced inputs for rural producers.

The ISF review shows that support for the generation and use of local innovations can play an important role in development and poverty-reduction among rural producers. The review identifies three areas of ISF support:

- local innovators
- establishing local innovative cultures
- promoting the spread of local innovations.

The review also finds that experience with successful support for these three areas is complementary among existing ISFs and constitutes the primary rationale for establishing a GIF. However, this experience is currently not being analysed or made available in a consistent manner that would permit mutual learning among existing ISFs. A global innovation facility could thus play a role in compiling existing documentation of experience, initiating cross-country studies and ensuring

that these experiences are made available and exchanged in a systematic manner among existing ISFs.

PROPOSED MISSION, FUNCTIONS AND ORGANIZATIONAL SETTING OF GIF

The mission of a GIF is to enhance the effectiveness of existing ISFs and the global expansion of activities by facilitating institutional learning, exchanges of experience between existing ISFs and the provision of technical assistance.

The GIF being proposed here would be a membership apex body with a small professional secretariat governed by a steering committee elected from its members and representatives of funding agencies.

The functions carried out by the GIF secretariat include, but are not necessarily limited to, the following:

- Facilitate institutional learning and exchange of experiences among national and local ISFs.
- Provide technical assistance and encouragement for the establishment and emergence of new national ISFs.
- Provide technical assistance to fund-raising for emerging and existing national ISFs.
- Organize annual global meetings for ISF staff and stakeholders.
- Provide technical assistance in the design and data-processing of participatory M&E systems.
- Carry out (poverty) impact assessments.
- Create awareness of the development potential of innovation support among donor agencies and the general public.
- Review and analyse successful practical approaches that support the generation and use of local innovations.
- Undertake other activities as directed by the steering committee.

The secretariat may either be located in one physical location (e.g. linked to one of the existing ISFs, research institutes or NGOs), or it may be virtual, with its (possibly part-time) staff being located in various institutions.

The GIF is envisioned as a facility, not as a funding agency. However, it is foreseen that it may play a pivotal role in facilitating contacts and interactions between ISFs and funding agencies.

TIMETABLE AND APPROACH TO DESIGN OF GIF

It is suggested that the guiding principles for the GIF be developed through a participatory planning process that may involve all categories of global stakeholders. The planning process could be facilitated by the authors of the ISF review (DIIS) and take the form of two or more externally facilitated workshops. Based on the outcome of this planning process, the external facilitators (possibly DIIS) should, on behalf of the participants, prepare a proposal for financing GIF during an extended period, to be submitted to appropriate donor agencies.

	NIF	CIAL	PROLLINOVA	SSPF	PFI-FFS
Aim and Scope.	National: to help India become inventive and creative	Enhance farmers' ability to carry out experiments in collaboration with external scientists. Increase effectiveness of agricultural research.	International: partnerships that promote processes of local innovation	Make funds available to self-help groups to test and apply "small" innovations.	Enhance farmers' access to and benefit from local innovations
Concept of Innovation.	Process: Institutional support. Product: Green innovations, sustainable technologies. Development impact?	Process: Participatory Research Methodology. Educating farmers to become (group) innovators. Enhanced spread and benefits by farmers.	Process: institutionalization of methodologies and partnership. Product: environmentally sound use of natural resources.	Process: "appropriate" technologies available for self-help groups. Product: construction, renewable energy, NRM, agricultural processing and waste recycling.	Process: improvement of methods of production or conservation through experimentation. Development impact: enhanced agricultural learning and benefits to farmers.
Notion of who the innovators are: characteristics.	Grassroots: rural entrepreneurs, including farmers.	Farmer groups.	Rural people, including farmers.	Groups or individuals in rural areas.	Farmers, most of whom are middle-aged, well-off and male.

	NIF	CIAL	PROLLINOVA	SSPF	PFI-FFS
Thematic focus.	Rural Development (agriculture, NRM, health, SMEs).	Agricultural production and natural resource management.	Agricultural and NRM.	Construction technologies, renewables, recycling, NRM, agro-processing.	Agricultural production, soil conservation and use of natural resources.
Governance.	Governing Board, representative of society (cross-section).	International apex organization with national committees. CIAL groups governed by elected committee.	International apex organization with National Steering Committees representing NGOs, research and government.	SSPF managed by GTZ GATE office.	Coordinated by UN organization, implemented by district extension staff, decentralized governance of farmer groups.
Monitoring and Impact monitoring.	Informal (grassroots network), M&E	Impact documented by CIAT researchers.	Participatory M&E system implemented in different contexts at different levels.	According to GTZ established project Reporting Guidelines (in German).	Case studies carried out by UN organization. Participatory M&E system planned.

	NIF	CIAL	PROLINOVA	SSPF	PFI-FFS
Implementation.	Implementation through GIAN networks and bi-annual countrywide competitions (with three prizes within each of five categories, totaling fifteen prizes).	Number of CIALs increased from a few in 1987, to 50 in 1995, to 27/5 several Latin American countries. Implementation experience used to further develop concept.	During the production of this report PROLINOVA was scarce. For updated information see www.prolinova.net	Intended as a one-off event, SSPF evolved in a longer programme developing new modalities of innovation support, to small (USD 20,000) projects of 1-2 years' duration.	Activities largely undertaken by farmers groups, sometimes facilitated by district extension staff and with occasional back-up from UN staff.
Costs per unit of innovation activity supported.	Probably low.	Low.	High. At the current level of field activities, overhead costs are high compared with the funding of farm-level activities.	Probably low.	Low.
Flexibility.	Through its collaboration with SRISTI and the Honeybee network of grassroots and university students, NIF achieves a high degree of flexibility.	High in terms of identification of problems and design of experiments.	Decentralized and highly flexible, as the PROLINOVA ISF is a concept that many different programs may fit into.	Flexibility and speed is a key principle of SSPF.	Decentralized decision-making combined with participatory implementation suggests high flexibility.

	NIF	CIAL	PROLLINOVA	SSPF	PFI-FFS
Beneficiaries.	The NIF aims to help a broad group of beneficiaries, from its national scope to local innovators in rural India. No explicit poverty focus.	Smallholder farmers in Latin America. Implicit poverty focus.	The beneficiaries are currently national NGOs and government structures. However, the stated primary target group is local farmers. No explicit poverty focus.	Rural people. No explicit poverty focus, but implicit within the overall context and institutional affiliation of the project.	Users of innovations are the primary beneficiaries; innovators supported with an aim to enhance their usefulness to the community. Two thirds of beneficiaries are female. Implicit poverty focus.
Innovation Scouting.	Systematic identification through student scouts and village walks.	Support for group-based innovation processes. Each CIAL produces 1-3 innovations within a 2-4-years period.	No systematic approach to innovation scouting. Likely to be done by NGO staff and local extension workers.	No scouting. Support on demand; systematic evaluation, publication of successful innovations.	Identification by project champion and extension workers.
Replenishment Strategy.	Activities to be financed from proceeds of endowment fund.	Participatory agricultural and NRM research requires long-term funding mechanism. In place to the extent that CIALs are an integrated part of national research budgets.	Various national programme partners apply for funding from available donor sources with assistance from IST.	Project-based donor funding. As a pioneering programme, SSPF may have helped nurture sustainability indirectly, through its demo effect.	Project-based donor funding. Sustainable self-financing farmer-group model.

	NIF	CIAL	PROLLINOVA	SSPF	PFI-FFS
Selection Criteria and Procedures.	Selection criteria and procedures are formalized and being used to award prizes and to select which innovations to help commercialize.	An external facilitator leads a CIAL through its diagnostic phase to identify what questions to ask and issues to improve. CIAL groups are formed, using principles of informed self-selection.	Few systematic selection criteria and procedures. The PROLLINOVA concept is applied differently from project to project.	Innovators apply for funding and are selected by GTZ unit in Germany following standard criteria and expert review.	Innovators selected for the development benefits of their innovations.
Commercial links.	Include both formal sector and informal sector marketing.	New rural Innovation Institute seeks to facilitate links between CIALs and rural entrepreneurs through production of how-to-do manuals.	Few if any current attempts to support the marketing of local innovations.	Sporadic in selected successful cases, but no systematic approach; many applicants were micro-entrepreneurs, hence marketing often implicit	Little, if any progress or plans for commercial use.
Focus on innovation of Excludable and Rival Goods?	Significantly inclusive of innovations with potential for possible marketing based on standard or sui-generis IPRs.	Little, if any focus on excludable and rival goods. Innovations with commercial potential are not protected by IPR.	No implementation experience.	No information available.	Little, if any focus on excludable and rival goods. Innovations with commercial potential are not protected by IPR.

	NIF	CIAL	PROLLINOVA	SSPF	PFI-FFS
Focus on marketing (innovation of non-excludable, non-rival nature).	Majority of innovations probably remain innovations of a public good nature with a view to informal marketing or information sharing.	Majority of innovations supported are likely to be of a public good nature.	Majority of innovations supported are likely to be of a public good nature.	No information available. Any successful innovation was published, hence had some "public good" element.	Vast majority of innovations are of public good nature.
Bottom-up, top-down or multidisciplinary and joint "peer review" of potential innovations?	Two separate innovation "review" committees, one "scientific", one by peers among innovators.	Vetting is carried out through joint experiments involving CIAL groups, external facilitators and agricultural researchers.	Little, if any systematic vetting in place.	Initially, selection by donor administrators who consulted technical experts (evaluating on technical, economical and social criteria). Subsequently, more of a peer review process by local NGO partners.	Vetting done by project staff in consultation with stakeholders, including FFS groups. No systematic use of scientific institutions.
Learning.	Learning is programmed for at all levels through a wide array of instruments and forums.	Farmers are taught basic scientific principles for undertaking experiments. Innovations are developed by CIAL groups through joint systematic learning processes that mix science and indigenous knowledge.	The PROLLINOVA APEX is engaged in collective learning processes, during which the concept is implemented.	Proponents learned through experience; the wider community through knowledge sharing within the often technically oriented networks.	Eternally facilitated informal adult education in FFS groups, which function as institutional platforms for innovations. Integration of innovators is by FFS groups.

	NIF	CIAL	PROLLINOVA	SSPF	PFI-FFS
Access to and control of information.	A newsletter made available in a number of local languages is meant to provide "village India" with access to innovation resources. Web-based database of innovations. PIC (Prior Informed Consent) forms provide local innovators and their communities with control over their knowledge resources.	Experiences well-documented in both Spanish and English.	No implementation experience.	While not systematically documented, successful innovation cases were published (in a quarterly newsletter, GATE) and eventually recorded electronically too. Most information is in German, but some is available also in French.	A printed catalogue documenting innovations distributed to facilitators. No IPR system in place. Good access by FFS groups to innovators and innovations. Limited rewards to innovators.
Partners and Stakeholders.	The NIF model features an inclusive and wide network of partners and stakeholders, including both formal (governmental) organizations and informal and grassroots organizations.	Local partners are NGOs, government research institutions and international research bodies (CIAT).	Country programmes and local partner organizations regularly visited by ISF teams of apex organization.	Regional partnerships established, with technical partnerships with sector-specific NGO networks such as SIATA, for West Africa, and later similarly for Asia and Latin America.	Farmers groups are partners. Government institutions at district level and below well integrated into project. UN organization continues to play a strong role.
Overall development impact.	Focus on support for innovation processes and links to local entrepreneurs. Rates of adoption and poverty-reducing impact not documented.	According to the literature on CIATs, including a comparative study on CIAT versus non-CIAT villages, high adoption rates of innovations developed by CIAT groups and impact in terms of improved productivity.	Potential impact depends on quality of national programme and implementing partners. Little if any explicit poverty focus.	Studies on development impact of SSPF yet to be published.	High adoption rates of local innovations among FFS groups.

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Annex I. KUALA LUMPUR RESOLUTION

In the United Nations Millennium General Assembly, September 2000, the world's leaders adopted the UN Millennium Declaration, committing their nations to alleviate poverty, improve health and promote peace, human rights and environmental sustainability.

The 1st Innovation Systems Workshop at community level took place in Kuala Lumpur, Malaysia, from 6-8 February 2006. The meeting was hosted by SIRIM-Berhad under the auspices of the World Bank and the Global Research Alliance, supported by the Ministry of Science, Technology and Innovation, Malaysia, and the Swiss Development Corporation. Yb Dato' Sri Dr Jamaludin Dato' Mohd. Jarjis, Minister of Science, Technology and Innovation, chaired the workshop. Fifty delegates from fifteen countries, representing scientific institutions, practitioners, governmental and non-governmental agencies and multilateral institutions, participated in the workshop.

At the heart of this initiative are innovation systems by communities.

Actions resulting from the workshop include:

- 1 The Global Research Alliance, in consultation with appropriate organizations and associations, will prepare a paper for submission through Dato' Lee Yee-Cheong to Prof. Jeffrey Sachs, Chairman of the UN Millennium Project, on project ideas to be undertaken by the science, technology and innovation community to assist in meeting the MDGs. The proposal will be submitted to Prof. Sachs before the end of March 2006.
- 2 Undertake a Case Study of innovation systems at the community level in the brassware handicraft sector in Malaysia, with parallel studies in, for example, South Africa and India, which will lead to the development of common methodologies for fostering community-based innovation. SIRIM to lead on this project within a two-year time-frame.
- 3 Identify, document and promote community innovations through three initiatives – Idea to Market – institutionally driven (SIRIM interim report in 6 months); Village 2020 – community-owned (SIRIM through MOSTI

12-month time-frame); twin project Village 2020 replicated in another country (GRA next 12 months).

- 4 Capture, analyse and share the underlying logic of community innovation success stories around the world and discover their underlying logic such that they can be applied in situations elsewhere. SIRIM will lead this initiative and prepare a draft document for the S&T forum in Washington.
- 5 Review of existing innovation support funds and outline of a global mechanism to foster community level innovations. World Bank to lead and produce review by April and outline of global mechanisms in September.
- 6 Promote South-South cooperation with partner countries and institutions to share knowledge and expertise and identify projects for collaborative partnerships, for example, TRAMIL, the programme for medicinal plants. TRAMIL/SIRIM to lead; outline in April.
- 7 Review and propose amendments to mandate existing institutions to enable community-based innovation. MOSTI, with input from Prolinnova.
- 8 Organise a second, follow-up Innovation Systems at Community Level workshop to review progress and identify further action before 2008.