

Farmer Participatory Research and Learning on Integrated Pest Management: Frequently Asked Questions

CGIAR SP-IPM, CGIAR PRGA, GIPMF, CABI, SDC

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2 Introduction

Farmer Participatory research and learning – what are they?

What is farmer participatory research? What is farmer participatory learning? In dialogues among professionals working in Integrated Pest Management (IPM) many different views were expressed, for example:

- Researchers often perceive participatory research as farmer participation in their research
- Field-based professionals often see participatory research as participation by researchers in farmers' experimentation
- Some see farmer experimentation as a way for farmers to experience the benefits or advantages of the improved practices that they recommend.
- Others see participatory research as a way of generating new technologies and practices that are more relevant to and practical for farmers than technologies emanating from conventional research.
- The key purpose of participatory learning is often viewed as a means for farmers to enhance understanding of agroecological, production and marketing systems through experiential approaches
- Participatory learning is seen by some as an effective way for farmers to learn how to apply new practices.
- Some see participatory research and learning as separate processes, others perceive them as inseparable aspects of a broader innovation process.

A key understanding underpinning this publication is that research undertaken for the purpose of improving farming is more likely to yield useful results for farmers if it takes place with their participation. Participatory Research and Participatory Learning are seen as a family of approaches that are complementary, closely related and mutually reinforcing. Along with conventional agricultural research, they are key elements of a broad process of agricultural innovation and development.

Why another publication on participatory research and learning?

When we were invited to develop this publication as a synthesis of cross-project study tours and a joint workshop on lessons learned, we asked ourselves what kind of publication could

provide added value to the large volume of existing resources. We noticed that a broad overview of participatory research and learning for agricultural innovation was lacking in the Integrated Pest Management literature, and decided to focus on highlighting key questions and critical issues around this. Accordingly, this publication is structured around frequently asked questions (FAQs) about participatory research and learning, and some answers to these, complemented with highlights from case study examples and tips for IPM professionals and others involved in agricultural innovation and development.

The document is addressed to

- **researchers** seeking to understand the strengths and weaknesses of participatory research and learning approaches
- **development practitioners** searching for insights on the practice of participatory research and learning,
- **programme managers** requiring a clearer understanding of how participatory research and learning can help in the identification and development of practical opportunities for improved livelihoods,
- **policy makers and donor representatives** seeking arguments for investment decisions on projects involving participatory research and learning processes

We assume that readers are familiar with the basic concepts of participation, participatory research and participatory learning. If you are a newcomer to participatory approaches in agricultural innovation we recommend that you first consult literature that deals with basic concepts.

Context

In 2001 representatives of the partner organisations (The CGIAR Systemwide Programs on Integrated Pest Management and on Participatory Research and Gender Analysis, the Global IPM Facility, CAB International, and the International Center for Tropical Agriculture) met to search for ways to capitalize on the array of participatory research and learning experiences in Integrated Pest Management. They chose to focus on different kinds of farmer research groups and Farmer Field Schools (FFS), with a view to exploring how these two approaches complement each other. Mentored exchange visits were organised involving key staff of programmes working with farmer research groups and programmes implementing Farmer Field Schools in several Asian, African and Latin American countries (Bolivia, Honduras, Kenya/Tanzania, Vietnam, Indonesia, Philippines). In some of the participating programmes Integrated Pest Management (IPM) is the central focus; others take a wider view focusing on crop management, integrated production and pest management or even whole production and marketing systems.

After the study tours a joint learning workshop was arranged, involving all the study tour participants, their mentors, representatives from the initiating partner institutions and from other programmes/organisations involved in participatory research and learning. This publication is an effort to round-off the learning process with insights useful to a wider audience. It is largely based on experiences of the participating projects, the analysis and deliberations during the workshop, complemented by the personal experience of the authors.

3 Navigating The Complex Landscape Of Farmer Participatory Research and Learning

The roots of the participatory methodologies in agricultural development can be traced to endeavours in education, psychology sociology, health, community and organisational development and particularly to the work of Kurt Lewin in the 1930s and 40s and Paulo Freire and Orlando Fals Borda in the late 1960s and early 1970s.

Lewin, Friere and Fals Borda and other early pioneers catalysed the evolution of education and innovation development towards a more participatory and transformative role. They contributed several key concepts to education and innovation development including:

- The iteration or repeated cycling of reflection and action;
- A shift from treating people as objects of research to supporting them as subjects (or actors) of change;
- Rejection of passive knowledge transfer in favour of active knowledge acquisition and generation;
- The development of critical consciousness.

Box 1. The alphabet soup of farmer participatory research and learning

Agroecosystems Analysis (AEA), Beneficiary Assessment (BA), Development Education Leadership Teams (DELTA), Diagnosis and Design (D&D), Comité de Investigación Agrícola Local (CIAL); Diagnosis, Investigation & Participation (DIP); Diagnostico Rural Participativo (DRP), Farmer Field Schools (FFS); Farmer Participatory Research (FPR), Groupe de Recherche et d'Appui pour l'Auto-promotion Paysanne (GRAAP), Methode Active de Recherche et de Planification Participative (MARPP), Participatory Analysis and Learning Methods (PALM), Participatory Action Research (PAR), Participatory Extension (PE); Participatory Research Methodology (PRM), Participatory Rural Appraisal (PRA), Participatory Rural Appraisal and Planning (PRAP), Participatory Technology Development (PTD), Participatory Urban Appraisal (PUA), Planning for Real, Process Documentation, Rapid Appraisal (RA), Rapid Assessment for Agricultural Knowledge Systems (RAAKS), Rapid Assessment Procedure (RAP), Rapid Assessment Techniques (RAT), Rapid Catchment Analysis (RCA), Rapid Ethnographic Assessment (REA), Rapid Food Security Assessment (RFSA), Rapid Multi-perspective Appraisal (RMA), Rapid Organisational Assessment (ROA), Rapid Rural Appraisal (RRA), Samuhik Brahman (Joint Trek), Soft Systems Methodology (SSM), Story Methodology (SM), Theatre for Development, Training for Transformation, Visualisation in Participatory Programmes (VI PP), Zig-Zag; Zielorientierte Projektplanung (ZOPP)...

Source: Peter Horne

These pioneers also catalyzed an enormous surge of methodological development resulting in an “alphabet soup” of acronyms (Box 1). Navigating the ocean of methodologies can be a difficult and confusing challenge, especially for new practitioners.

In this section we aim to aid navigation by clarifying:

- some key differences between participatory and “conventional” approaches to innovation and learning

- some key differences between participatory research and participatory learning, extension and education
- the question of who owns the participatory learning and research processes and how this influences the ways that different stakeholders interact in these.

We hope these clarifications will shed light on the complementarities of several methodologies that have been widely applied by development professionals supporting the process of agricultural innovation for integrated management of pests & diseases, crops and production systems.

Box 2. The origins of farmer participatory research and learning.

Paolo Friere was appalled by the situation of the illiterate poor in Brazil and conceived of education as tool for changing the structure of society. He equated knowledge with power, and observed that knowledge was traditionally monopolized by an elite that sought to protect its own interests. Freire organized a multidisciplinary team to develop educational materials that would stimulate the poor to reflect on their lives and on the underlying causes of their conditions. People were organized in "cultural circles" to recover their identity and indigenous knowledge. Dialogue on controversial issues such as land tenure rights was the central process, followed by reflection and then action. Friere used thought-provoking photographs to initiate this process, which he called "conscientização", a word that implies a liberating process, whereby oppressed people evolve towards a state of critical consciousness.

Colombian sociologist, Orlando Fals Borda also sought to construct a new social order. He and a group of university intellectuals went out into rural areas to "bring science to people". At first, communications barriers and differences between their concepts of reality caused farming communities to reject Fals Borda's group. Moreover, the technological solutions developed by the researchers were not applicable to rural conditions. After a process of deep reflection, Fals Borda radically reoriented his work, no longer treating rural people as passive "objects", but encouraging them to become active "subjects" or agents of their own liberation. Fals Borda tried to improve local access to technical and scientific knowledge by providing systematic feedback to researchers about people's needs. The establishment of feedback mechanisms between local people and researchers, and the awakening of intellectuals to new perspectives on the realities of rural life were among the most valuable outcomes of his work.

For more information >>>>>

Vella, J. 2002. Learning to Listen, Learning to Teach: The Power of Dialogue in Educating Adults. Jossey-Boss.

Braun, AR and H Hocdé. 2000. Farmer Participatory Research in Latin America: Four Cases. pp. 32-53 IN: W.W.Stur, P.M. Horne, J.B.Hacker and P.C. Kerridge (Eds.)

Working with Farmers: The Key to Adoption of Forage Technologies. ACIAR Publication PR095. 325 pp.

What are the differences between conventional and participatory approaches to agricultural innovation?

Conventional (or traditional) and participatory approaches to agricultural innovation do not exist as neatly definable and independent concepts. These terms refer to collections of approaches and experiences, bundled together out of convenience and necessity.

In IPM and related agricultural practices, both local and 'external' actors are generally involved in some way in an innovation process. Some would argue that *the* fundamental dimension of difference between traditional and participatory approaches to innovation is the issue of 'who controls and makes decisions' about these processes. This dimension is reflected in the well-known typology of participation developed by Steven Biggs in 1989, and in more recent literature; however, traditional and participatory approaches can be distinguished on several other significant dimensions. These are summarized in Table 1 and can be envisioned as the "ends" of spectrum or as different "views" of innovation development.

A key difference between the conventional and participatory views is that in the conventional view, the component processes of research, and education (or the socialisation of knowledge) are treated as discrete steps. In the participatory view, they are treated as inseparable aspects.

Table 1. Dimensions of conventional and participatory approaches to innovation development in agriculture described as the ends of a spectrum

<i>Dimension</i>	<i>"Conventional"</i>	<i>"Participatory"</i>
Assumptions	Reality is "out there" in nature to be discovered through detached, value-free observation	Reality is socially constructed and interpretations are filtered through prevailing cultural values, and social, political, financial and resource-access contexts; the research process itself influences outcomes
Objectives	Enhanced understanding, prediction and control by discerning general laws or principles Widespread adoption of scientific outputs Increases in productivity, profitability and environmental sustainability	Expanded flexibility and choice of options for sustainable livelihoods and natural resource management; Improvements in local sites and broader impacts/influence Increases in production, food security, income security, equity and environmental, institutional and financial sustainability Empowerment of communities to identify and address their own priorities
Approach to Research	Rigorous, controlled experimentation and statistical analysis Focus on problem-solving Emphasis on standardization, replicability, quantitative analysis, disengaged objectivity, representativeness, reduced bias; statistical significance	Intertwining of research/learning with action through a conscious, iterative, adaptive process that cycles between action and critical reflection Balances problem-solving with identification and development of opportunities Analysis is predominantly qualitative (sorting, scoring, ranking, weighting, drawing); Analysis is iterative and optimizes tradeoffs between needed information and representativeness. Accepts that many problems are site specific and that statistically significant, generalizable conclusions may not be possible.
Approach to learning	Knowledge banking or transmission of knowledge generated by scientists to local stakeholders	Research and learning are viewed as a single integrated process
Roles of scientists	Objective and impartial observers who gather information for diagnosis, planning and evaluation; share outside information and mediate between parties.	Facilitators and co-learners, active participants in supporting local processes of change and empowerment
Roles of extensionists	Creators of extension messages and strategies for diffusing them to local stakeholders	Facilitation of active learning by local stakeholders; supporting local processes of change and empowerment
Roles of local stakeholders	Clients/users are passive recipients of the research results	Local people become researchers, co-learners and experts and educators and are involved in decision-making at each step from identifying priorities, defining the research objectives, planning approaches, evaluating results to the socialization of the findings
Research methods	<ul style="list-style-type: none"> • Controlled experimentation • Modeling • Formal Surveys • Key informant interviews • Semi-structured interviews • Participant/site observation • Analysis of secondary 	<ul style="list-style-type: none"> • Formal and informal experimentation • Semi-structured interviews, personal histories • Focus group discussions • Facilitated discussions (reflection on situations, issues and possible actions) • Learning workshops and facilitated

	information <ul style="list-style-type: none"> • Ecological statistics, population dynamics, meta-population theory and landscape ecology; analysis of water and soils, and crop agronomics • Can use participatory rural appraisal tools as a means of generating data for scientists 	stakeholder meetings <ul style="list-style-type: none"> • Participatory mapping and modeling • Participant/site observation • Records/document checking • Mother-baby trials • Social diversity (eg. gender, wealth) analysis • Sustainable Livelihoods analysis • Support to local initiatives • Analysis of secondary information
Extension methods	Training and Visit	Research and extension elements are integrated into a single process
Socialisation of Knowledge, adoption and impact pathways	<ul style="list-style-type: none"> • Application generally occurs after several seasons of testing, analysis and interpretation of results, followed by a process of relaying these translated messages through a separate extension service. • Publication in journals, websites and books; Emphasis on “getting technology out” to target groups over wide geographical areas. • Research and its application are separate processes with weak inter-dependencies 	<ul style="list-style-type: none"> • Application can be immediate at research site since the user-experimenter owns the research. Generates insights relevant to similar situations; if successful, other user groups take up new ideas once clear benefits are noted • Farmer-to-farmer dissemination (externally facilitated and/or through traditional communication mechanisms). • Emphasis is on institutional processes and learning among networks of stakeholders • Research and its application at community level are one continuous (often cyclical) process

(Source: adapted from McDougall and Braun 2003)

Table 1 shows how the ends of the spectrum reflect different assumptions and priorities. We can see a difference in the complexity and activeness of roles and a shift from single to multiple perspectives and types of knowledge; and from single level/linear to multiple levels and directions of dissemination. Another point of interest is the greater degree of overlap in research methods compared to the other dimensions. Many people assume that any research that uses some participatory methods cannot be ‘conventional; and that ‘participatory’ research cannot apply ‘traditional’ scientific tools. Methods are less important in distinguishing these approaches than the other dimensions or the degree of control over decision-making.

Reflection on the different assumptions and priorities shows that it is meaningless to think in terms of a right or wrong amount of participation, nor a single ‘best type’, or ‘best place’ on the spectrum. Whether their focus is more on supporting the research or education aspects of innovation, the challenge for development professionals is to *consciously navigate* the spectrum, in order to maximize the effectiveness and positive contribution of their efforts.

How are conventional and participatory and approaches complementary?

One way to approach this question is to consider the strengths and weaknesses of participatory approaches relative to four prerequisites for successful innovation development (Table 2):

1. ensuring relevance by asking the “right” research questions
2. integration of local and scientific knowledge;
3. effective communication;

assuring that costs of innovation development and their distribution are acceptable to local stakeholders and to service providers.

Table 2. Strengths, weaknesses & risks of participatory approaches to innovation.

Condition	Strengths	Weaknesses & Risks
Research relevance	<ul style="list-style-type: none"> • Diverse local people provide direct feedback on relevance of interventions • Diverse local people provide a ‘reality check’ on labor and economic constraints of technology development, and accuracy of information • Needs of poorer and marginalized people can be addressed 	If focus is only on community units and immediate concerns, then the management of larger natural units (e.g., watersheds, coastal or ecological zones), or larger scale issues (eg. climate change, epidemics, transnational pollution), or long-term concerns (e.g. soil fertility decline, resource degradation) may be neglected
Integration of knowledge from multiple sources	<ul style="list-style-type: none"> • Formal research is linked to farmer experimentation • Research is more inter-disciplinary and holistic • The joint learning process benefits both farmers and researchers 	<ul style="list-style-type: none"> • Increased complexity and challenges of integration • Important external forces may be ignored • Early recognition of future problems may be limited • Interdisciplinary team members must be flexible and capable of negotiation and compromise. • Dependence on the willingness of political systems to give communities more power to manage local resources
Effective communication	<ul style="list-style-type: none"> • Participatory research and education processes creates forum for dynamic communication among development professionals, farmers, and the general public • Obliges researchers to learn to communicate better with farmers and the general public 	Scaling up is challenging, especially if not incorporated into project activities from the beginning
Acceptable costs	<ul style="list-style-type: none"> • The focus on developing human capacities can bring sustainable long-term benefits • Diverse local people have a stronger voice in development; they can play a stronger role in development and resource management vis-à-vis more powerful actors • Innovations can be developed and disseminated more rapidly for specific sites 	<ul style="list-style-type: none"> • Participatory approaches are time consuming for farmers and service providers; Much time is spent in negotiation and on building capacity • Higher time costs are especially significant for women and marginalized peoples. • The traditional 3-5 year research project funding is generally insufficient • There are several challenges in balancing: efforts on diagnostic work and participatory technology development; social and biophysical research ; qualitative and quantitative data use • Methodologies are complex and require new skills that may not be available in

		<p>many research institutions – especially interdisciplinary and social science, communication, leadership skills</p> <ul style="list-style-type: none"> • Inter-disciplinary work is challenging; it requires knowledge, people and technical skills, that may not be available • Low human capacity, institutional hierarchies & bureaucracy, paternalism and poor community cohesiveness can make participatory processes difficult to initiate
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(Source: adapted from McDougall and Braun 2003)

No matter how good the research, if the question it is seeking to address is not the right one, then impact is limited. From Table 2 we can see that participatory approaches offer the advantage of acting as a check on the local relevance of research questions. Yet, great local relevance may pose risks. Very highly specific research questions and outcomes will have low applicability to other areas, and the ‘lifetime’ of their relevance may also be low. Conventional research, on the other hand, typically addresses “slower moving” issues with longer time scales. While in theory the outputs of conventional research may be more readily transferred to greater geographical scales than locally-oriented participatory research, in practice it may be of limited ‘real world’ relevance, especially to more disadvantaged farmers. Some articulation between the two, as well as appropriate application of gender and diversity approaches, lends strength to both.

For more information >>>>>

McDougall and Braun 2003

How do participatory research and participatory learning differ?

To distinguish between these it is helpful to start from the proposition that knowledge generation (or learning) is a social process with research as a mechanism of learning. If we think of research as a way of probing the unknown then education is a process for socialising knowledge, and learning is a process by which an individual or a group taps into the social repository of knowledge. Participatory learning begins as an active process of asking questions about things that may already be understood by others and investigating how they work directly rather than relying on explanations presented by those in authority. Then, when a learner encounters a gap in knowledge, investigation is initiated. Scientific research is understood as one form of investigation.

In participatory research different actors interact in the investigation of unknown things. The term “unknown” is used here in a context specific way. While many farmers may know, for example, how to grow tomatoes, in a place where tomatoes have never been planted, the feasibility of cultivating them is a valid research topic.

How complementary are participatory research and learning approaches?

Research and learning, whether participatory or not, are most powerful when they are can be coupled to one another. Learning from others provides access to knowledge that one does not possess, and can lead to breakthroughs by influencing the questions that are asked and then explored through research. For example, if a Kenyan farmer doesn't know that the worms eating her maize field emerge from eggs laid by moths that fly at night she is unlikely to ask whether she can reduce the number of worms by trapping the moths. She might instead assume that the only way to reduce worm numbers is by killing worms. If someone shows her the insect lifecycle or challenges her to find out for herself by keep some worms in a jar with maize leaves, they are helping her break through to a new level of understanding leading to more options and choices. This case shows how research can stall or take irrelevant directions unless it is coupled to learning.

A participatory learning process can challenge an Indonesian farmer to count the number of beneficial insects in an unsprayed rice plot and the number in a similar sprayed plot, and then to compare the rice yield. Although this learning may lead to fewer insecticide applications per season, it may not help the farmer address his most pressing question, which may be how to manage his limited irrigation water in order to produce enough rice on his small landholding to feed his family. This example shows that a learning process can be greatly enhanced by coupling it to research.

Who participates in whose research and learning?

Research and learning for innovation can be initiated and controlled by farmers, or by professionals from agricultural support services. Depending on assumptions, objectives, who controls the process, and the style of participation four “prototypical” approaches to innovation development can be distinguished (Figure 1). Taken together with the multiple dimensions that comprise research and learning for innovation development, we hope that this section will help readers clarify the “alphabet soup” of methodologies (Box 1) for themselves.

Transfer of technology:

Initiated by development professionals, local people are respondents and/or providers of land/labor for on-farm biophysical research or information for social science research. The process is linear and top-down. In this approach, research and extension and adoption are treated as discrete elements. Scientists determine the research agenda, which is generally driven by interests and available expertise. Scientists conduct formal research, employing hypothesis testing, controls and replication, and drawing upon the full range of tools associated with the scientific method. Scientists may consult with farmers and may involve them as collaborators in experiments. When consultation with rural people is practised, it may be with groups or individuals, and it may employ Participatory Rural Appraisal/Assessment (PRA) tools (e.g. focus-group discussions; semi-structured interviews; seasonal and historical diagramming; mapping and modelling; preference and wealth ranking; transect walks; institutional mapping) to gather information and to improve communication. Once a technology has been developed, it is the role of extension services to disseminate it to farmers. Farmers are seen as adopters or rejecters of innovations developed by others. The transfer of technology model aims at widespread adoption of technologies and is likely to be successful in relatively homogeneous, low risk, natural and social environments where farmers live under similar conditions, perceive the same kinds of challenges and share a common set of beliefs and values.

Farmer First

Farmer First refers to a family of approaches with a common emphasis on the participation of farmers in the generation, testing and evaluation of technology to promote sustainable agricultural production. The expected outcome is the generation and adoption of appropriate technologies by resource-poor farmers that should increase farm productivity and income. Local knowledge is viewed as a “stock” which is available for assimilation and incorporation. The role of researchers and extensionists is to collect information, document local knowledge, plan and manage interventions. Farmers are involved in planning and implementation. Scientists, extensionists and farmers may be the facilitators of local research and learning processes with farmer groups or individuals. The facilitation role may include teaching farmers key elements of the scientific method, such as replication and control, offering ideas, information and access to technology, and helping to establish contacts.

Participatory Learning and Action

- Initiated by communities OR development professionals but with shared control over direction, process and outcomes

- Iterative cycles of action and reflection occur in an evolving collective research and learning process that is demand-led

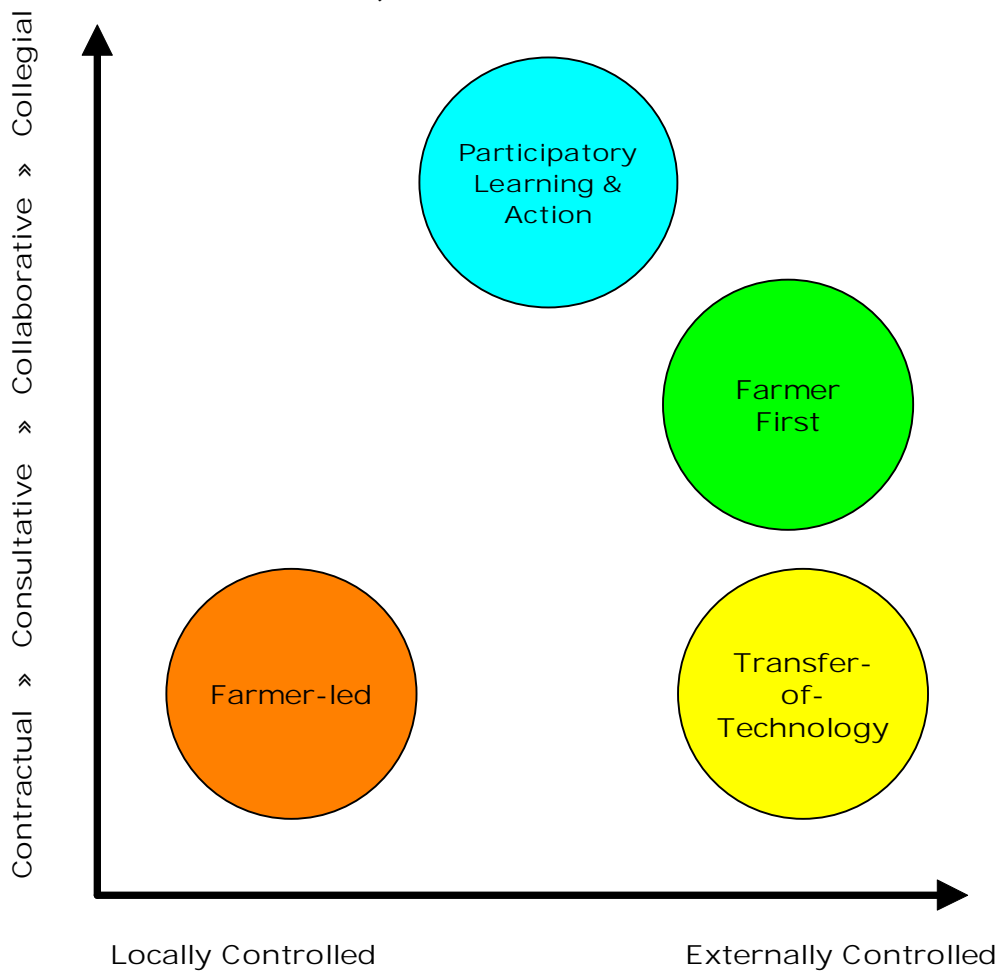
In this approach innovation is considered as the outcome of a mutual learning process involving multiple actors and networks. Instead of developing knowledge for people, the mandate of science becomes one of helping people to develop knowledge. This work of co-creating knowledge requires dialogue, negotiation and the empowerment of all the actors to take on new roles. This approach takes a pragmatic view of differentiated roles and conflicting interests among actors and recognises that local knowledge may be fragmented and diffuse. Practical knowledge is created through learning by doing in a cycle of action and reflection.

Farmer-controlled Research

- Initiated by farmers to solve problems or develop opportunities
- Development professionals are contracted as service providers
- The process is linear, bottom-up and demand-led

Local organisations use their resources (self-generated or donated) to initiate contracts with research services to overcome specific constraints. This model puts local people in a position of power by placing service providers in a position of accountability to them. As such, it represents a bridge between the “Transfer of Technology” and the “Learning and Action Research” models .

Figure 1. Four prototypical approaches to innovation development (Adapted from Probst et al 2000)



For more information >>>>>
 Probst et al 2000.

4 Outcomes and Impacts of Participatory Research And Learning

What difference does participatory research and learning make?

Farmer participation and recognition of farmers' knowledge is present as elements of IPM definition of World Bank, Asian Development Bank, CGIAR, Global IPM Facility and IPM Europe and in related documents of FAO, OECD, USAID, SDC, and CIRAD (Sorby, et.al.2003). This indicates that agricultural research and development institutions are increasingly becoming aware of the relevance and importance of farmer participatory research and learning

processes in the development and utilization of IPM and other agricultural innovations.

Outcomes and impacts of incorporating farmer participation at different stages of innovation processes were observed to go beyond the economic benefits associated with better technologies. Process impacts occurred as a result of participation itself rather than as a result of technologies developed via participatory research methods. Some impacts also manifested even after considerable time lag, sometimes even after the expiration of a project.

FFS evaluations showed that crop losses were reduced, incomes improved, economic benefits increased, application rates of chemicals reduced. It also resulted to non-use or shift from high toxic to less toxic pesticides and yield increases.

Feedback to research has also improved as researchers are involved at all stages in project implementation. These feedbacks guide them to better orient research towards farmers needs. The linkages between research and extension and local governments are also strengthened. Extension services become more effective through increased mobility and training of field staff. Participatory research and learning also facilitates the creation of villagers' ties to research institutions linking farmers to scientists.

Participatory research and learning approaches such as Farmer Field School (FFS) are a feasible investment, not only in the short term but also in the long run, given the cost of training one farmer in the FFS and the potential returns measured by the cost savings of the FFS graduates. Further benefits could also potentially accrue from the diffusion, from the intergeneration effects and from the social costs saved (Rola, 1999).

Recent reports evaluated FPR/L in terms of livelihood capitals as crop production and other agricultural enterprises are major components of rural livelihood systems. Monitoring and evaluation, required showing both qualitative changes relating to individual and institutional capacities, practices, collective action and support systems and significant quantitative changes regarding numbers of people reached and income increase generated.

Human Capital

Since the FAO Inter-Country Program on Rice IPM in South and Southeast Asia started in the early 1980's, millions of Asian rice farmers have been trained in IPM through FFS.

Participatory research and learning processes heighten farmers' awareness on various integrated pest and crop management techniques such as timeliness of planting, choice of right varieties, plant nutrition, etc. Vaccinations, deworming, feeding regime, forage and other livestock management systems and practices

are also introduced. The outcomes include high knowledge, attitude, practice (KAP) and skills ratings of farmer participants. It enhanced farmers' knowledge and skills in pest crop, and enterprise management and in agro-ecosystems analysis and field observation. Farmers' interest in crop ecology makes them quick to seize on and adapt innovations to local conditions.

Participatory research and learning processes develop critical thinking abilities of farmers, so that they can be better decision-makers and experts in their own fields. The wide array of activities in learning fields and other venues increase farmers' enthusiasm, involvement and participation. They develop skills in facilitation experimentation, and technology dissemination. Increase in women's participation in agricultural activity and family level decision-making is also reported.

Participatory research and learning participants gain enough confidence to become and stay well organised, attract NGOs and other organizations to work with them. A number of the farmers expressed confidence in being a resource person or facilitator of FPR/L and some even has to leave the farm as they acquire gainful employment with institutions as facilitators, technicians, etc.

Human capital is also enhanced because of improved health by household members as a result of reduced application rates of chemicals and farmers non-use or shift from high toxic to less toxic pesticides.

Social Capital

Participatory research and learning facilitated the development of a mass of skilled and committed farmers that are mobilizing local resources and support for IPM (Nelson et al.). These farmers proved to be keen to continue the learning process, either through individual or group field studies or through linking up in IPM clubs that meet regularly to discuss agriculture and other related issues.

The establishment of farmer groups open opportunities for collective learning and action. Group work and successful project completion increase confidence of the group and community. There is also increased social knowledge due to group dynamics that has also led to increased group cohesion and a flourishing of collegial relationship between farmers and extension staff. The different stakeholders build up a new relationship based on trust and mutual respect.

Natural Capital

Participatory research and learning processes resulted into a widespread adoption of technologies that regenerates and sustain natural resources. They were used to motivate more than 500,000 farmers in Vietnam to reduce early season insecticide use (Escalada and Heong,). The campaign initiated in Long An province, spread to other provinces contributing to a 50% reduction in insecticide use and increase in the number and variety of natural pests with beneficial effects for the environment.

In Kenya, the technologies include improved Striga resistant varieties, legume trap-crop varieties and improved crop management practices for Striga control and soil improvement. The involvement of CIALs in participatory plant breeding leads to improved germplasm of maize, beans, cassava, soybean, rice and vegetables like chili, onions, cabbage (Quiroz, 2001). FPR/L were also successful in identifying disease resistant rice and potato varieties and breeding lines that meet farmers' needs (Nelson et al.).

Farmer inputs resulted in a shift from sweetpotato IPM to ICM in Indonesia. Sweet potato farmers involved in the FPR process did not consider pests as the main constraint to production and thus challenged researchers to include topics that farmers identified as important in the FFS curriculum (Van de Fliert et. al., 2000)

Financial Capital

A 30% gain in yield was observed with the adoption of new cultivars resistant to Hessian fly in Kenya. Yields also improved by 50% in some communities. A late blight IPM strategy increases farmers' incomes by US \$300 in Bolivia. The push-pull maize IPM strategy in Kenya also increased farmers' income through increased milk production and sales of Desmodium seeds

Four groups of farmers financed the establishment and maintenance of their own clean planting materials production system to address problems created by a virus complex. Each group maintains nethouses for rapid multiplication of tissue cultured and pathogen tested mother plants from the state college. The design of the nethouses varies with the capacity and motivations of each group. (Basilio and Laranang, 2000).

Roling and Pretty (2003) cited different sources to come up with the following table showing economic returns on participatory research and learning facilitated IPM interventions.

Table 3. Farmers economic return from the same land improved through increased yield, increased market price and/or decreased production cost

Country	Crop	Average changes in pesticide use (as % of conventional treatments)	Changes in yields (as % of conventional treatments)
Togo	Cotton	50	90-108
Burkina Faso	rice	50	103
Thailand	rice	50	No data
Philippines	rice	62	110
Indonesia	rice	34-42	105
Nicaragua	maize	25	93
USA	Nine commodities	No of applications up	110-130

		Volume applied down	
Bangladesh	rice	0-25	113-124
India	groundnuts	0	100
China	rice	46-80	110
Vietnam	rice	57	107
India	rice	33	108
Sri Lanka	rice	26	135

Source : From various sources as cited by Roling and Pretty, 2003

With the No Early Spraying (NES) mass media campaign, farmers in Vietnam reduced input costs by about US\$30-50 per season. The amount is equal to a month's income in Vietnam. Reduction in cost of land preparation (minimum and zero tillage, reduction in burning, use of erosion controls (live barriers, trees, cover crops, mulches) is reported in Burkina Faso.

5. Managing Participatory Research and Learning Processes

Which should come first, research or learning?

This question on farmer participatory research and learning processes is not really like the proverbial question of the chicken and the egg. There can be an answer to the question and there are ways of determining the answer to the question. Most innovation processes, and these are not only relevant to FPR/L, should start with assessment and/or diagnosis. The results of process help determine whether to start with research or learning or something else. It depends on the nature of the problem being addressed and also on the features of the options being considered to address the problem.

If the results of an appraisal indicate the existence of gaps in community capacity, then learning processes are the best options. If tried and tested solutions are already available and their success rate in the locality is very high then mass media campaigns and other forms of extension can be more useful. If on the other hand, there is a widespread feeling of uncertainty regarding the options being considered, then research or experimentation can be a good starting point.

How can we prepare farmers to participate in participatory research and learning?

Among FFS practitioners, groundwork refers to the process of preparing the community to participate in the innovation process. It involves stakeholders' discussion of the concepts, principles, advantages, disadvantages, costs, benefits, requirements and expectations of participatory research and learning. At this point, commitments to the process and negotiation of roles and

responsibilities take place. In the CIAL methodology, the process is called motivation. Other approaches simply refer to it as orientation.

Preliminary meetings are conducted to introduce the concept and raise interest for participation. These are done to inform the community of the objectives of the activities. Participation is not an easy task. It requires investment in time, labor and other resources. The different stakeholders need to know about it and as the CIAL methodology indicate, each community is finally responsible for deciding whether to accept this program or not.

It is difficult to achieve the required level of participation if there is an inadequate empowerment and recognition of the farmers' committees. It requires a clear understanding and balancing of the cultural, social, political and economic factors and their interactions that influence participation.

Assessment and Diagnosis

Assessment and diagnosis are conducted to provide better understanding of the community's needs, to broadened ownership of the intervention by different stakeholders and increased possibility of long-term sustainability. The process is invariably called participatory diagnosis, appraisal, needs assessment, etc. Some do it in a day, others in few days or weeks, or in special cases a year is reserved for it.

There are various ways to analyze community situations and systems. The intensity, duration, and extent depend on objectives. Key informant interviews, focus group discussions, timeline and other participatory rural appraisal methods are used in assessment and diagnostic studies. The information generated provides ideas or entry points for learning and action.

The boundary of the systems to be analyzed varies. It could as broad as the entire food production and marketing chain in the case of PROINPA or as focused as the weed management system for corn in the SP-IPM project in Nigeria. Other groups look at pest and crop management systems, while UPWARD assess the community from the livelihood systems perspective.

PROINPA deals with the issues of Andean agriculture from the productive chain perspective. They believe that the consolidation of the relations between the links in the productive chains will result in higher income generation for the actors and better products for the consumers. They think that the only way to successfully address this challenge by ensuring that actors involved with the productive chains and the relevant development institutions work together.

Box 4. Livelihood Systems Analysis

A livelihood system is a dynamic aggregation of activities to generate income and other resources consistent to the goals and aspirations of the stakeholders. It consists of functional sub-systems, that exist interdependently, and operates in a reciprocal or mutual mode. The livelihood system implies a household

focused generalization of material and non-material resources produced and utilized by the household to satisfy its immediate and long term needs. It involves several stakeholders and the dynamics of their interaction has brought about constraints as well as opportunities to the system. This happens because stakeholders involved represent households that belong to different social, economic, and political groups .

Livelihood systems analysis (LSA) focuses on the livelihoods of various stakeholders in a system, their interactions and the ensuing opportunities and constraints. It entangles the different issues in production, marketing, and processing and determines their relevance to the existing livelihood systems. LSA comes up with recommendations on how opportunities/constraints can be made apparent and capitalized for the benefit of various actors.

The analysis attempts to shed light on the resolution of issues and constraints to provide a neutral ground for stakeholders to work together in mutual partnership toward the conversion of opportunities into thriving economic realities. Consequently, it underscores the significance of understanding the livelihood portfolio of stakeholders in the formulation of research and development agenda.

Source: CIP-UPWARD

Box 5. Season Long Record Keeping

In combination with methods such as village profiling, key informant interviews and questionnaire-aided surveys, the CIP sweet potato ICM project in Indonesia used season long record keeping to assess crop production systems in the village. Ten farm families per study village were requested to keep seasonal cultivation record of their crop production system. If the family cultivated more than one field, only one field was selected for record keeping and field observation.

Two farmers from each village who were trained as field researchers managed the data gathering process. Each was responsible for assisting 5-8 farmers to fill out the forms and keep crop production records. The recording started up to one month after planting, including all activities from soil and seed preparation onwards and is continued until harvesting and marketing. The cultivation record calendar consists of:

- 1 front sheet for general information about the field and the crop
- 10 sheets for weekly data recording
- 1 sheet for harvest data

Source: SP-ICM, Indonesia

As a result of the assessment, farmers developed an agenda of issues to learn and investigate. Assessment and diagnosis are conducted to better understand farmers' problems rather than solving their problems. They can also use these skills to address other concerns or interventions.

Who's coming to learn and/or innovate?

FFS participants range from 20-30/school regardless of gender, literacy, ethnicity and socio-economic status. Oftentimes, they volunteer to attend the school and implementing organizations consider them as long as they have passed basic criteria such as farmer of a specific crop, representing an agro-ecosystem or village and experiencing problems that are being addressed by the school. They should be willing to learn new things, able to attend the FFS regularly over the entire growing season and willing to disseminate what participants learn to other farmers.

UPWARD pointed to the difficulty of having participants from different villages. The distance of participants from the school site limited the intensity of their involvement in managing field studies. It also causes delay in the conduct of session activities.

FPR on the other hand is more limiting and selective in terms of the participants. Due to risks that might result, costs involved and to avoid repetition of same thing, one could consider teams of only two farmers per site to participate intensively as farmer researcher in technology development. Larger groups of farmers from the same community, however, are involved in the needs assessment and end-of-season analysis meetings.

One could also limit participants in FPR to FFS graduates. These farmers are volunteers, who are interested in learning and in conducting research projects. The more outstanding graduates are chosen to lead the groups who will conduct the field studies for the benefit of their communities. The group of farmers participating in FPR in a village is separated into two or four mixed sub-groups of 6 to 8 people. Each sub-group carries out an individual experiment.

For the SP-IPM project in Morocco, farmers are selected because their farm is in the middle of the village so that most other farmers of the village can get to and see the sites. The Learning from Diverse Systems project participants are selected through a combination of self and external selection processes, as only interested farmers, communities stay involved. The CIAL methodology requires that the community elect farmers that will be members of the committee and thus be responsible for conducting research that will address concerns of the community.

How can gender and other diversity concerns be integrated in the process?

IPM and other agricultural innovations affect all household and community members and thus require understanding of socio-cultural and economic context of the innovation process. Gender differences in access to resources, division of labor, institutional and demographic context need to be factored-in the design and facilitation process. Ensuring diversity in the participants of the innovation process help ensure that differentiated demand for technology is addressed and an environment of equal access to knowledge, technology and other resources is fostered.

There are already discussions and a number of experiences where households and not farmers are considered as participants in the innovation process. Different members of the household attend the sessions individually but preferably together, although they may be involved in different activities depending on their preferences. Dissemination of technology is more likely when both sexes are involved. Women share knowledge more readily and in different ways than men. When both sexes have access to information, the multiplier effect is used more effectively.

Box 6. Electing the Members of CIAL

A Local Agricultural Research Committee (CIAL) is a local research service belonging to and managed by a rural community. Each CIAT has four members elected at an open meeting of the community to serve as the leader, treasurer, secretary and communicator. The number of members on a CIAL often expand to include other interested farmers who with the planning, implementation and evaluation of the committee's experiments. Before electing a CIAL, a community discusses the characteristics that the members should possess:

Good CIAL members should:

- Be willing to work for the community
- Like doing research
- Be responsible and concerned
- Be good communicators
- Be able to solve problems
- Be willing to take time for the CIAL
- Be good farmers
- Not be selfish
- Like learning from and teaching others."

Adapted from a poster, CIAL Flor Naciente, Ecuador

Box 7. Farmers' Selection Criteria of FPR participants

- Farmer should be a practicing maize farmer; with maize as main occupation and he/she should have a hands-on experience in maize farming
- The land for the trial should be accessible at all seasons
- Striga should be a problem in the farm
- Farmer should be willing to participate and provide labor
- Farmer should be socially acceptable, welcoming, not selfish, trusted and faithful
- Farmer should be hardworking, active and available.
- Farmer should be capable of record keeping

Source: SP-IPM Kenya

Experimentation and Innovation

Participatory research and learning approaches have their own strengths and weaknesses and are used depending on the objectives and the nature of the problem being addressed. They are complementary and can be used in combination with each other. While learning processes focus on knowledge acquisition, the research processes focus on knowledge generation through farmer experimentation.

FFS is usually conducted in areas where knowledge to solve an identified problem is available either at farmers' level or at the researchers' level. In areas where there are no known solutions for farmers' problems, FPR/L process is started with experimentation or other knowledge generating activities. The focus is on meeting farmers' needs and demands for appropriate knowledge generation through local technology development and/or validation processes. (Vos, 2003).

In Bolivia, PROINPA used participatory evaluation to validate the soundness of technologies generated through the formal research process. They also used IPRA through CIALs to develop technologies that will address the priorities of the communities. They also conduct FFS to give emphasis to learning the principles behind the technologies and the different management practices that needs to be integrated to address specific problems. Although experimentation and technology demonstration are components of the FFS core activities, the emphasis is still on facilitating the learning process. The research process in IPRA on the other hand is more in-depth. Experimentation and the conduct of trials are aimed to identify technologies suitable to specific farm conditions.

How can experiments be used in research and learning processes?

Experiments are central elements of research and also have an important place in learning processes. They can serve many different purposes

Table 4. Purposes of experimentation in FPR/L Process

Outcome	Who' s interested?	Characteristics of experimentation process
Generate new knowledge (basic research)	Farmers, researchers	Usually conducted by researchers
Generate innovative practices or guidelines (applied research)	Farmers, researchers	
Develop methodologies for education, learning and research (applied research)	Farmers, researchers, extensionists	
Adapt or fine tune guidelines (adaptive experiments)	Farmers, extensionists	
Adapt and implement innovations	Farmers	Adaptive experiments
Socialise existing knowledge (experiential learning)	Farmers, students	Experiments

Farmer's Experiments

Many studies claim that farmers experiment; however, their experimentation differs from formal agricultural research in several respects.

Farmers sometimes evaluate the performance of different technological options in a similar environment. They frequently conduct controlled experiments that compare treatments; for example they may plant small areas to different varieties. This type of experiment is similar to formal agricultural research practice. Farmers also experiment, often on the whole plot, on the interaction between one or more crops, pests and the environment. These "problem-solving experiments" help farmers understand how the agroecosystem functions. In Nigeria, some farmers anticipated extension recommendations for the control of variegated grasshoppers, an important pest of cassava, through experiments in which they marked and dug up egg-laying sites. Another example of this type of experimentation is observation over time of the effect of changing crop rotations in the same field.

Normally, farmer's data collection methods are qualitative rather than quantitative, in the sense that they do not normally measure inputs and production systematically. For example, farmers rarely weigh the harvest to confirm that a disease lowers yield, although they perceive these effects. Farmers usually do not control non-experimental variables nor do they use repetitions to control for the effect of spatial and temporal variation. Farmers evaluate differences contextually -- rather than using blocking to control for differences in soil type, they evaluate how the variation of soil in a field affects plant development and yield. They also evaluate the performance of a new technology in different locations or in time. Just as serendipity often plays a role in formal research, farmer's "experiments" are sometimes "accidental" or fortuitous discoveries. In general, farmers do not record their data, nor do they analyse it formally, but they remember results and subject them to continuous comparison with new observations.

Farmer experimentation (like that of formal researchers) is limited by gaps in their knowledge. They may not know, for example, how the different "animals" that comprise the stages in an insect life cycle are related to one another. They may draw the wrong conclusion about how a system functions often based on erroneous perceptions or assumptions, especially when the phenomena involved are difficult to observe, and not of direct interest to them.

Finally, in terms of scale, farmer experimentation is local. Farmers are concerned with developing solutions that work under their particular conditions, and not with identifying options that can be adapted to other situations.

For more information >>>>>

Ashby et al. 1995

Rhoades and Bebbington 1991

Richards, 1985, 1994

Bentley et al 1994, Bentley, 1994a,b

Stolzenbach, 1994

Prain et al., 1992

How do participatory research and learning use experimentation differently?

In participatory learning, experiments are used to help learners reveal principles (how something works) for themselves. The design of these experiment are determined carefully in advance by a facilitator or educator in order to maximise the chances that the learner will achieve the desired outcome.

In participatory research hypotheses are formulated through the explicit stating of research questions. The way the question is framed influences the way the experiment is carried out. The handbooks developed by Ashby et al (1993) for use by local agricultural Research committees illustrate the close relationship between the questions asked and the design of experiments.

Box 8. How Questions Guide Experimental Design in FPR/L

Our Local Agricultural Research Committee experiments with new ways to improve agriculture and conserve nature. Before we begin experimenting we identify the agricultural needs in our community and based on this we select our research topics.

What is an experiment? It's a way of comparing something we already know with something new. We can experiment to compare new seeds with the kind we already plant; a new way to apply fertiliser with the way we always apply, it or different ways of preparing the soil from the way we've always prepared it....and many other things!

We farmers are always trying out new things. Once some people from our valley found some maize seed that had fallen on the road by accident. They liked the color and size of the kernels and decided to test it on Julia's farm. The seed was so good that today many farmers around here grow it. They call it "Julia." Although not all experiments turn out so well, we always learn something from them.

From experiments we can answer questions about the way we plant our crops or raise our animals. Experiments help us to choose between new and old ways of doing things on our farms. By experimenting we can decide what works well in our region and whether the agricultural services are giving us useful recommendations.

In our area the farmers want to know whether it's better to plant cucumbers after harvesting tomatoes or whether to plant maize instead. They want to know whether snapbeans produce more with a string support or on a bamboo stake, or whether cut grass is better than sugarcane for feeding cows. So we conduct experiments to investigate these things by comparing something new with something we already know. We manage both the new and the known things in the same way.

Once our neighbor Luis planted potatoes with good results, even though we don't normally grow potatoes in this area. Our Committee wanted to make sure it's a good idea to grow them here, so we compared 5 varieties with the one that Luis planted.

If an experiment compares the seed that we normally sow, with seed from another area, then for both seeds we use the same planting date, the same way of planting, the same fertilizer, the same weeding, and so on. The only difference is the seed, because that's what we're testing in our experiment.

A clear objective is the key to obtaining good results from each experiment. When we plan an experiment, we are making many important decisions. We decide, where, how and with whom to do the experiment.

To plan our experiments, we consult with experienced farmers from our village and with people from agricultural service organizations who are familiar with our local farming conditions. Some of the farmers in our valley are well known for trying out new agricultural methods. they have already experimented with many different practices. We can draw on their experience to help plan our experiments. The agronomist from the agricultural experiment station has valuable information for our experiments. We farmers and people from the agricultural research and extension services can learn together from our experiments.

When the Committee is beginning its research an agronomist or an extension officer visits us regularly to see how the experiments turn out. When we gain more experience, the agronomist visits us only when we ask him to. Little by little we learn to do this kind of research for ourselves.

While we are planning an experiment the Committee members meet with experienced farmers and with the agronomist who is working with us. We review the diagnosis to make sure that we all understand the topic and the reasons it was chosen. Before designing an experiment, we define our objective. Sometimes our objective is very clear; sometimes it is not. Having a clear objective is like planting a good seed.

To set a clear objective, we ask ourselves: What do we expect to learn or find out from this experiment? What do we want to know? For example, our Committee wanted to investigate carrots fertilized with chicken manure. We had several questions about this topic: Which carrot variety is best adapted to our area? How much chicken manure do we need to fertilize each variety? These questions helped us define the specific objective for each experiment.

When our topic was growing new maize varieties, our most important question was: Which maize variety will withstand windy weather without falling over? And so objective became to compare a tall maize variety that we already grow with a new shorter variety.

Last year our community asked us to test potatoes, a crop we've never grown before. Our question was which potato varieties do best in our climate? Our objective was to compare potato varieties to find the ones that grow well in this climate.

A neighboring community experimented with growing bush bean varieties as an alternative to climbing beans. Their question was "Which varieties resists bean pests?" Their objective was to compare 3 new bean varieties with the one they already grow to see which resist the insect pests.

Another Community in our valley chose to experiment with ways to plant trees. Their question was "What kind of trees are good for live fences?" Their objective was to compare 3 different kinds of trees, planting them as live fences and to select the best ones. When their topic was passion fruit, they asked where and how they could plant the vines without taking up all the space in small garden plots? Their objective was to compare planting the passion fruit on bamboo supports with growing it on live barriers in bean fields.

Source: Ashby et al. 1993. Handbooks for Local Agricultural Research Committees. This handbook was designed by farmers and is the result of participatory research carried out by several institutions and rural communities. The examples are based on the experiences of Local Agricultural Research Committees (CIALS), from: Cinco Dias, El Diviso, Pescador, San Bosco, Sotara and Portachuelo in Cauca, Colombia.

Dissemination and Scaling-Up

What capacities do scientists need for participatory research and learning?

Scientists working in participatory research and learning need to develop skills for negotiation, facilitation, monitoring and evaluation, conflict management and teamwork. Scientists participating in participatory research and learning need to respect the farmers involved as equal innovation partners.

Learning by doing is how most practitioners get initiated in the practice of participatory research and learning. Exposure is the key to understand further the implications and reasons for FPR/L. Methodologies in themselves are not the focus of the change process. A methodology can be learned in short training sessions and strengthened in practice. What is important is the understanding of the reasons for participation in research and the possible outcomes.

How should we monitor and evaluate FPR/L Processes?

There are no universal procedures or standard sets of indicators to monitor and evaluate PR/L processes. Project objectives and activities are different, the people involved have different perceptions, interests and strategies and their biophysical and socio-economic environments are highly diverse. Since project realities vary considerably, methodologies to monitor and evaluate the innovation processes are adapted to local conditions, flexible in their design and implemented in many stages of project implementation.

Developing an M&E system for FPR/L necessitates participation of farmers, researchers and other key stakeholders. Participation makes it more likely that the M&E process will meet the needs of different stakeholders as well as increase a general understanding and appreciation of the innovation process. It entails the establishment of efficient feedback mechanisms that keep other stakeholders informed and interested about the progress and performance of the projects.

The system is built on existing M&E procedures and helps assess not only technological outcomes but also process impacts. It provides adequate information necessary for appropriate decision-making from the household and community level up to the program and policy-making level.

Box 9. M&E Mechanisms at Various Stages of FPR/L Processes

- Situation Analysis
- Village Planning Meetings
- Pre-test/Post-Test Ballot Boxes
- Session Evaluations
- Weekly Observations
- End of Season Review and Planning Workshops
- Farmers Technical Conferences
- Self-assessment
- External evaluations

How are FPR/L Processes and Outcomes Scaled Up

Aside from the demonstration effect, one of the main mechanisms for dissemination and scaling-up of FPR/L activities is the Field Day. It is usually conducted at the end of each cropping season. Each field study group conducts a field day to show its results to other villagers, local officials, and other organizations.

District technical meetings for groups of farmers who carry out field studies are also held at the season's end. Farmers from different communities who have carried out participatory research in IPM share their experiences, exchange ideas, discuss constraints to agricultural production, and identify possible solutions.

Heong and Escalada combined solid scientific research innovative communication techniques to further disseminate and scale-up the NES campaign. Communication strategies were used to encourage farmers to resolve a contradiction between what they believe with regards to rice leaf folders and what scientists are recommending through experimentation. Aside from radio plugs, posters in key areas in villages, they got a group of actors to play out a series of brief comedies, relating scientific facts through rustic situations to make the audience laugh.

Advocates and implementers usually face serious difficulties mainstreaming FPR/L processes and building it into national budget streams, district administrations and national line departments because of incompatible policy frameworks and administrative practices. To complement the agriculture sector's effort, ownership is being moved into the Ministries of Health, Education and Environment. They also have begun experimenting with buy-in, inviting LGUs, NGOs and POs to part finance the costs of running FPR/L processes (Roling, 2002).

Box 10. Keys to Successful Scaling Up of FPR/L Process

- Trusting in people as being able to and willing to take control of their lives, communities and environment and capable of dealing with ecological and social complexities of the program
- Having a concrete entry point addressing a multi-faceted problem
- Pressing on realizing that nothing worthwhile succeeds overnight
- Developing a shared vision through continuous dialogue and reflections on accumulated experience
- Being aware that methods and approaches are not neutral and allowing for human views to be incorporated
- Making efforts to push down roles which reside "at the top" as in the case of strategic planning which is now done at community level by farmers
- Giving room for leadership to emerge, be built-up, shared and rotated to maximize human capital
- Building social capital by helping people to learn and organize towards achieving goals that are worthy
- Tolerating, encouraging and enjoying diversity as the stimulus for learning

5 Enabling Participatory Research and Learning

Box 11. Enabling Participatory Research in the Kenyan Context: An institutional view

In the past, research by Kenya Agricultural Research Institute (KARI) was undertaken without the involvement of end-users (beneficiaries). Several technologies were developed, however, there was little impact on the end-users. This raised a lot of concern in KARI because resources (time, funds, personnel etc.) had been spent and in most cases the magnitude was enormous.

As a result, the farming systems approach (FSA) to research was initiated and institutionalized in 1993. However, KARI's evaluation system remained the same and this resulted in new constraints with the scientists undertaking this research feeling undervalued and inferior. A new evaluation system was therefore developed with an effort of taking all this into consideration. This included evaluation on for example number of PRA reports, final project reports, extension bulletins, leaflets and/or pamphlets, impact assessment reports etc. that are written by scientists.

An evaluation form was made including all these aspects where a scientist would fill all the details himself/herself and do a self-evaluation. This is verified by a committee at the centre level and forwarded to KARI HQs for further evaluation by another committee. The final recommendations are then presented to KARI Board of Management for final approval.

To further encourage the scientists, KARI has now initiated an adaptive conference to encourage participation, experience sharing and publication of these outputs. The 1st conference was held in 2003.

In addition, KARI initially had 2 types of centers those with national mandates and those with regional mandates. The centers with national mandates were expected to undertake upstream research mainly basic and strategic research whereas those with regional mandates were downstream mainly applied and adaptive research that involves end-users. Now KARI is in the process of changing these names making every centre equal.

All this has impacted positively on the scientists whether undertaking upstream or downstream research. There is a feeling of equality amongst them thus encouraging participatory research.

KARI is learning from these experiences and has been flexible to change with the times. Through this an evaluation system for the support staff is being developed so that everyone is rewarded on impact.

Source: Felister Makini, KARI

6 Financing Participatory Research and Learning

Agricultural research - participatory or not - is still commonly funded from public sources (government, international and national donors). Learning activities (extension) have traditionally also been publicly funded, though a trend towards more private funding has been observed since several years. Development actors are, however, increasingly worried about the financial sustainability of publicly funded programmes/projects because government and donor funds are becoming more and more scarce. Further the effectiveness with which public funds for research and learning are used, is being questioned. In consequence we have identified the following FAQs related to the financing of FPR/L

1. Why should governments and donors invest funds in FPR/L?
2. How can financing of FPR/L be put on a sustainable basis?
3. Can farmers finance FPR/L themselves?

4. How to foster effective use of funds for FPR/L?
5. Should farmers be paid for taking part in FPR/L?

Why should governments and donors invest funds in FPR/L?

Most concerned people would agree that the funding of research to develop useful agricultural innovations is a major responsibility of the public. In case of funding of learning and extension activities with a wider range of users the case is less clear; there are people who say that learning to improve farming is a private interest which should be largely privately funded. The argument for public funding of research is that useful research outputs benefit usually many more people than those who are involved in its development, and that those who develop innovations cannot claim all the benefits of it. Thus, without public funding the motivation to develop new things that work would be very limited (e.g. to saleable products with a large enough market like agro-chemicals or hybrid seed). On the other hand development cannot take place without innovation, and most people would agree that, generally speaking, development in poorer countries is in the interest of local and national as well as the global society. Therefore, public funds to encourage the development of useful innovation are not only justified, but absolutely necessary.

This argument, however, is also applicable to the case of learning: without large-scale public funding of learning activities, the adoption of useful innovative practices will be much lower, and development slower than society at any level would desire. Thus, also for PL public funds to encourage the utilisation of useful innovation are necessary¹.

How can financing of FPR/L be put on a sustainable basis?

One could argue for public funding of FPR/L. However, reliance of farmers on public funding of their FPR/L activities, makes them dependent on the shifting priorities of actors on which they have little influence. The chances for continued FPR/L at local level are the better, the more funds are raised locally. Farmers, as well as producer groups and associations, use a variety of mechanisms to raise local funds:

- FFS groups in Indonesia and Farmer Research Committees in Colombia maintain common commercial plots besides the experimentation and learning plots to earn income for further joint activities

¹ Note that public funding of FPR/L does not imply that the activities also have to be implemented by public institutions.

- The income from experimentation and learning plots is utilised for FPR/L activities.
- Producer, village and commodity organisations ask for membership fees and use (part of) them for experimentation on issues concerning the majority of members.
- In Indonesia and Kenya for example, researchers and facilitators are sometimes remunerated in kind (animals, crops) for their visits to groups.
- Groups and organisations involved in marketing a particular product can deduct a levy on marketed produce to fund PIP.

In several countries local government have become important funders of FPR/L and particularly FFS activities, after recognising that these activities really result in desirable change in their area.

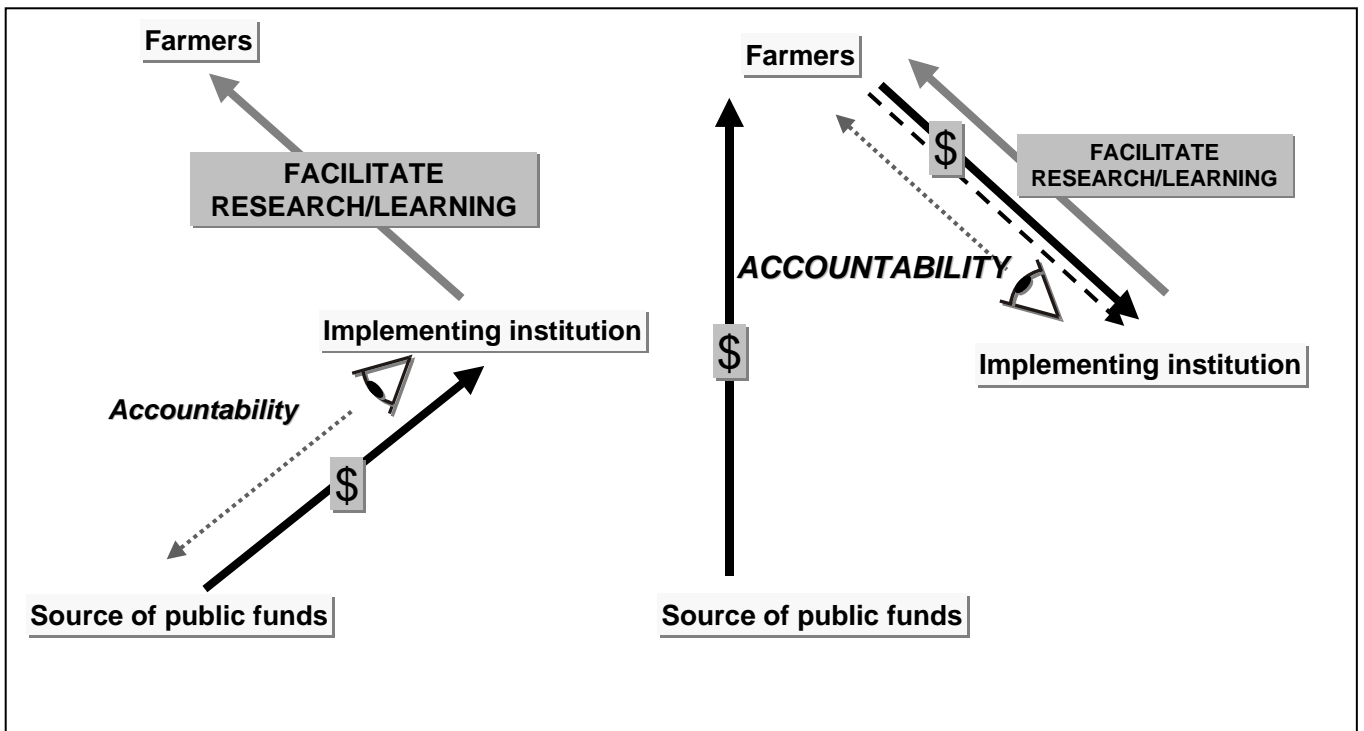
How to foster effective use of funds for FPR/L?

Ineffectiveness is among the main criticisms of conventional research as well as extension. A key cause for this ineffectiveness is seen in the lack of accountability of researchers and extensionists towards the final users of the innovations developed - the farmers. Funding arrangements which foster accountability towards farmers are a reaching step. Competitive funding mechanisms foster effectiveness through competition between different innovation ideas.

Accountability through reversing the flow of funds:

Ideally, farmers or their organisations would contract scientists/research institutions to do the investigations, and facilitators for the FPR/L processes necessary to overcome constraints or exploit opportunities. Since in most countries farmers are neither organised well enough nor have sufficient resources to finance all research and learning, and because there are public interests involved which farmer organisations would not take into account, the public sector remains a major source of funding for FPR/L.

Figure 2. Conceptual framework on financing FPR/L activities



Competitive funding mechanisms:

For research competitive grant funds have become fairly common, for learning activities the concept of competitive funding is still rather new. However, also in the case of FPR/L activities it makes sense to allocate the scarce funds to those initiatives with the best chances to achieve certain desirable objectives (whatever these objectives may be - increased production, profitability, more ecological soundness or less poverty). Decision makers need to have a good mix of different interests and professional know-how to decide which projects are funded so that impact and effectiveness are maximised.

Should farmers be paid for taking part in FPR/L?

The question of paying farmers for taking part comes up frequently in the case of participatory research. In general, the answer is "no"; in fact, farmers should contribute to financing PR experiments - in cash or in kind (e.g. labour, locally available inputs, food for visiting outsiders). This ensures that only experiments in which there is true interest are carried out (e.g. where farmers can see the potential benefits), enhances ownership, and increases likelihood that the resulting innovations are practical for a larger range of farmers. Experiments should be designed in a way and scale that farmers can carry them out without unaffordable inputs and risks.

Exceptions from this strict rule are acceptable in special cases, e.g.

- when farmers participate in scientist's research of the type which have no clear and immediate benefits for the farmers. In this case the farmers perform a support service for the scientist, and should be remunerated for it.
- in case of experiments with broad ecological or social benefits, but little direct benefits for the participating farmers, they should be paid for their participation, best by the part of the society which benefits, e.g. by a community, a local government, or a producer organisation.

A compromise reported from several examples is that farmers contribute labour, land and locally available inputs, whereas the involved outside agency finances the inputs which need to be purchased with cash from outside the area.

7 Quality of Participation

How can “quality” science be ensured in participatory research?

The value and quality of the knowledge generated through participatory research is perhaps one of the hottest debates among development professionals. Research that intends to produce agricultural technologies or processes for ‘adoption’ and ‘adaptation’ by farmers, needs to integrate the best of local and scientific knowledge worlds, or else risk failure. Traditional researcher-led experiments draw on scientific methods to provide information on theoretical maximum effects under controlled conditions, where constraints are minimal. They also provide understanding of key processes. Local research by farmers and other resource users provides responses under realistic management conditions where a wide range of constraints may affect the outcome. In traditional researcher-led experiments, a limited number of factors are tested and hence the extrapolation of the results to more complex settings is problematic. In farmer-led research, on the other hand, it is more difficult to assess the direct causes of changes in performance.

Robert Chambers has pointed out that there is significant evidence of ‘local knowledge’ being more ‘accurate’ than scientific knowledge in some issues; thus the need for ‘science’ to be humble in its claim for validity. At the same time, the reverse may also be true. Local resource managers may notice the symptoms, but incorrectly assign the cause.

The issue of quality has also been at the heart of much debate on knowledge between traditional and participatory science. The vast amount of ‘rigorous’ research that did not take into account local needs, interests, knowledge and preferences, and ended by producing ‘scientifically’ valid, but unused outputs helps to contextualize this issue. Clearly, ‘rigor’ is not itself sufficient if the science is irrelevant to people in the real world. In these cases, the traditional

research can benefit from blending with holistic complex local knowledge through incorporation of participatory approaches.

Christina Gladwin and her colleagues have pointed out three potential shortcomings of participatory approaches to gathering and analyzing data in relation to Rapid Rural Appraisal.

1. each member of the research team tends to work with a small number of farmers, and then draw generalizations from too small a sample size (when these generalizations are pooled with other generalizations, the error is compounded);
2. time pressures contribute to ignoring variation in farmers' decisions and practices, and instead focus on similarities;
3. the hypotheses and generalizations generated may remain untested, mainly because much of the data may remain uncoded and unanalyzed. In these cases, the quality of the research, or its generality is at risk.

Research teams can avoid these pitfalls by attention to careful design, detailed observation and record keeping, and explicit analysis with clear documentation. The design can enhance the quality of local findings by drawing on the essence of the scientific method (see Box 3).

Box 12. participatory approaches require Social Skills

Farmer participatory research and learning approaches to development should be treated with all the ethical concern and care that we already urge for Geographical Information Systems, mechanization, agrochemicals and other technologies that can benefit or threaten the livelihoods and landscapes of rural people. Perhaps the most significant development in the last decade is the recognition that participatory research can be done well, and that it matters. Beyond the mere presence or absence of participatory methods the character and quality of participatory research and learning can affect the health and well-being of people and ecosystems. There can be serious negative social, economic and ecological consequences of poorly conceived participatory approaches to development. Even a good process does not guarantee successful production, conservation and empowerment outcomes. Just as with the choice of research designs within a more traditional set of options, the wrong approach, otherwise well implemented – can lead to problems. The question of professional standards and accountability, while seemingly mundane even petty, is crucial to improving the process and results of participatory approaches.

Source: Rocheleau 2003

Box 13. Ensuring quality in participatory research

A scientific claim is an assertion, not a fact. What makes it scientific is that it is "warrantable". In the course of a typical participatory research initiative, many assertions are made. The challenge is to make them adequately warrantable. An assertion is an interpretation of evidence. The evidence is drawn from the data in the study, and from the literature. To be warrantable, the interpretation must have been reached only after attempts to exclude other interpretations. Further, it must account for the evidence as well as, or better than the alternative interpretations. The interpretation can only be as good as the evidence on which it is based. "Good" evidence must be an adequate sample of all the evidence that might have been collected. Participatory research must address this, while observing the "givens" of the situation. For example:

- In each cycle the researcher may try to disconfirm the emerging interpretation. Many short cycles permit multiple chances to disconfirm.
- At each cycle the methods used can be critiqued and refined.
- Data collection and interpretation can be included in each cycle. Thus both data and interpretation can be tested in later cycles.
- Divergent data can be specifically sought out to increase the chance that any piece of data or interpretation will be challenged by other data.
- The literature can be used as a further source of possible disconfirmation. The researcher who has deliberately sought disconfirming literature, and failed to find it, has a more warrantable assertion than could otherwise be claimed.
- The planned changes emerging from participatory research are derived from the data and the interpretation. Analysis of these offers further opportunities for disconfirmation.

Source: Adapted from Dick, 1997