New Partnerships for Research and Innovation

This chapter describes the main concepts used in the new innovation and sustainable development initiatives implemented in partnership with the different partners (or stakeholders) involved. It also briefly indicates why these initiatives have been made necessary and how the role of research and innovation needs to be re-thought in order to have a social impact and ensure sustainable human progress.[1]

Research and Sustainable Development Concepts

Most of the rural development successes recorded to date have had an impact on territories, revealing a high level of local stakeholder adaptation, but that impact has been limited by the weakness or ignorance of the links existing with other decision-making levels. According to the IAASTD study, gradual depletion of natural resources could be countered by the active inclusion, on different levels, of rural stakeholders in their own development (IAASTD 2008). The major challenge would consist, therefore, in establishing an ongoing dialogue to ensure equitable development of the community as a whole, through 'mechanisms' for cooperation, mutual understanding and coordination between the different categories of parties involved (e.g. farmers, scientists, the private sector, decision-makers) and the different scientific disciplines.

We are moving towards a new concept that makes development in partnership a complex science, combining scientific knowledge with philosophical thinking (Morin 2005), where viewpoints are exchanged between the biophysical sciences

---

(e.g. agronomy, biology, agrotechnology, etc.), the social sciences (e.g. sociology, human geography, economics, etc.), and the human sciences (e.g. philosophy, cognitive sciences, etc.). At a time when this field is undergoing a radical reform, it is worth specifying the most usual terminology employed in relation to research in partnership for sustainable development, involving multiple stakeholders.

Agricultural Research for Development

In a perspective of agricultural production that is sympathetic to the environment and the human population, which today is largely agreed by the international bodies, AR4D is research that incorporates the actions of all those involved in the value chain of a product. The value chain integrates all the activities linked to the product, from its initial production, notably seed production, up to its consumption. The value chain includes collection, transport, processing, marketing, etc., together with advice and regulation services.

AR4D considers that innovation and change result from an interactive exchange of knowledge, experiences and technologies between the different players in the supply chain. When it is driven by demand, research tackles the needs expressed by its users, which may arise from the public sector, civil society or the labour sector.

As AR4D targets human development, it has to be understood in the broadest sense, that is, incorporating social and cultural components. In terms of research, this means aiming for transdisciplinarity, which is not multidisciplinarity where disciplines operate separately, but a cross-disciplinary approach involving concerted and interactive operations.

Research and Innovation in Partnership

The practices found, and the successes achieved in rural development have generally involved methods and approaches from the field of research and innovation in partnership. This field of study characterizes research methods associating researchers, stakeholders, producers and technicians. The purpose of these methods is to promote technical innovations, but also organizational and institutional innovations on a production unit, village and territorial scale. Innovation in partnership is defined as an alternative to conventional research.

Research in partnership has three major ambitions: training for stakeholders, the construction of forums for dialogue, and the production and management of references and information. Why develop this type of research for development? How can partnerships be created and implemented? How can we mobilize people and the so-called 'traditional' knowledge of local populations? How can we assess the impact?

New Partnerships for Development

The partnership for development concept is the cornerstone, the major conceptual tool, of research and innovation in partnership. This notion stems from the view that relations and interactions between stakeholders form 'compositions of interests' (Latour 2010), which are revealed, flourish, come to an end, or are transformed through internal processes whereby their relevance and interest for the different players are assessed.

The multistakeholder concept refers to the groups, organizations and networks representing civil society and the productive sector, and working on issues of mutual interest. This question refers to technical, social and institutional innovations intended to improve the living conditions of rural populations and farmers. The partnership is an alliance or collaboration between organizations representing at least two sectors that are committed to working together to undertake sustainable research for development. Such collaboration involves sharing risks and benefits, and revision of the terms of the partnership if necessary. The partnership is a process comprising different phases and stages.

Brokerage of the partnership is the implementation of mediation, which involves identifying brokers or champions. The latter provide the link between 'good' partners relative to an issue of mutual interest, and harmoniously manage the alliance in order to achieve the collectively defined objectives. These brokers are key people in the construction and life of a partnership arrangement.

Research in Partnership and Society Project

Recent research has produced new knowledge for restoring and improving the integrity of ecosystems with limited resources and their ability to produce goods and services. However, converting those research results into practice has often failed because human and social factors were neglected due to a lack of continuity and an inadequate consideration of social and human factors. These failures have globally been characterized by:

- a limited understanding of local abilities to integrate or create sustainable innovations;
- a difference in the way researchers and local stakeholders see the issues to be dealt with;
- a lack of support policies for sustainable innovations.

In our modern societies, technical innovation is ongoing (Stiegler 1996), but it has to be admitted that (sustainable?) development has not been achieved, particularly in Africa. Nowadays, the products of science are primarily technological products profoundly marked by societal needs, hence they are related to cultures, conceptions and levels of development. The direct transfer of technical innovations from the North (designed in Northern situations) to the South merely serves to increase the dependence of developing countries. This perverse effect, which was long denied, is

condemned today, and the need to construct specific research in the South for the South has been brought to the fore.

Our societies, be they in the North or South, no longer completely control what becomes of them and how they evolve. They innovate by principle and not according to a project. The link between scientific progress and human progress has been undermined. Ignacy Sachs highlighted the fact that all societies are in a state of maldevelopment and that the race for innovation is merely a reflection of that maldevelopment, in the North and in the South.

In that context, the future of our societies will not depend on their ability to adopt novel external technology, whether imposed or not, but on their ability to master it, that is, to influence it. The challenge for research, therefore, is not to ensure that societies are supplied with technical products, but to improve the ability of those societies to think about their future in accordance with their specificities and their aptitude to control factors of change. One of the major functions of research should be to promote the construction of society projects, but nowadays the disciplinary compartmentalization of 'official' research, notably the limited integration between the disciplines of technical and human sciences, rarely allows such promotion.

Innovation System and Capacity for Collective Innovation

Innovation is the implementation of a novelty (i.e. an idea, technology or process) in a novel manner, in order to produce social and economic benefits for the stakeholders involved and, more widely, for society. The term 'system' refers to a dynamic set of multiple interactions, for example, between technology and society, science and societies, nature and society, etc. The system is dynamic because it evolves over time and modifies the sets of interactions.

Innovation is the result of a process of networking and interactive learning between heterogeneous stakeholders. The innovation partnership brings together diverse talents and complementary expertise that accelerate co-learning and the development of creativity. Collective innovation is reflected in the partnership's capacity for adaptation, particularly with regard to strategic orientations on issues of present and future mutual interests (see Box 1).

Paradigm

A paradigm is a model that translates a basic orientation in order to develop a theory. It generally involves a set of ideas or hypotheses that bear witness to a vision of the world. A paradigm gives sense to interactions between mankind and its environment. It adopts innovation systems awarding great importance to the testing of social reality.

Box 1: The Functioning of an Innovation System

The failure of more than 50 years of development aid, particularly in Africa, is now widely acknowledged. Despite some encouraging efforts to promote innovation systems for sustainable development through the inclusion of stakeholders, the results obtained to date seem to fall well short of the answers needed to address the challenges of environmental and food security.

The concept of innovation systems in agriculture and rural development has made a forceful comeback within the major international organizations, NGOs, and national research and development organizations. It is, in fact, the outcome of decades of exchanges and discussions between scientists and researchers in the social sciences on the methodology to be followed for the science of development.

Why Use the Innovation System Approach?

Formal research on innovation systems only started in the 1980s, when emphasis was placed on intensification. Innovation based on a linear model has evolved towards a notion of 'process'. As a process, it encompasses factors affecting the demand for, and the use of, knowledge in an innovative and useful way. Innovation is not a new invention or technology, but depends on the environmental and human context. Consequently, what can be shared are the principles for its adaptation, and not the innovation itself.

What Are the Possible Options?

The most widely used option is action-research. This started in the 1950s. It consists of undertaking collaborative action with local stakeholders, at the same time as studying that action as it is being implemented. It is a reflective process entered into by people working in a team or within a framework of a 'community of practices', in which theory informs practice, which in turn informs theory. Adhesion to the technology transfer system remains, even if the intention is the innovation system. Certain principles guide action-research approaches:

– use learning frameworks, such as experimental learning and social experimentation;
– be aware of the learning levels;
– use integrated concepts, theories, approaches and methods seeking to promote the innovation system;
– use a flexible methodological system, such as action-research.

> **Box 1:** (continued)
>
> **Methodological Shortcomings**
>
> The question of innovation systems does not fall within a precise methodological framework. Learning, or rather types of learning hold a major place in the concerns of research and development. However, these frameworks and types of learning are poorly conceptualized.
>
> One of the main difficulties in the innovation system approach is linked to the lack of a mutual understanding between scientists and development operators regarding questions of method. The development and use of a joint language are prerequisites that should be more fully documented.
>
> (Adapted from Beshah 2008)

Developing Stakeholder Adaptability and Empowerment

The challenge for research in partnership for development thus becomes to develop societies' capacity to adapt in order to cope with changes. The concept has been used in the deliberations on climate change, but it can also be used for other challenges (Folke et al. 2003).

This capacity to adapt first involves strengthening competencies enabling the empowerment of citizens – all citizens. Empowerment is the means whereby citizens acquire greater control over decisions that affect their lives (Laverack and Labonte 2000). Such empowerment should enable them to prepare for the future by applying scientific knowledge to produce techniques, technologies and mechanisms that will help make such a future a reality.

Constructing Competencies

All citizens, whatever their place in society, must contribute to the capacity to adapt by developing competencies. Competencies involve the ability to choose, decide and act. A competency is a 'power' to act, not in absolute terms, but in line with a given situation. They are resources for action, alongside other material or organizational resources. Competencies are not limited to the specific practical skills and know-how of a profession. They are also high-level know-how (e.g. designing, organizing, structuring, assessing, debriefing, etc.). Competencies make it possible to cope with a singular and complex situation, to 'invent', construct an appropriate response (and not to reproduce stereotyped responses), derived from either a common frame of reference, or from formal educational procedures (Perrenoud 2004).

Collective Learning

Under these conditions, collecting learning is one of the keys to the success and sustainability of the innovation process, introducing the adaptation of stakeholders to change or modification of the physical, social or human environment.

Capacity building targets the empowerment of players outside research, by strengthening their commitment and improving the equal accountability of the partnership. Stakeholder commitment is the major mechanism for capacity building. It is based on co-learning within a framework that consists of improving the impact of AR4D.

Creating competencies involves learning processes that articulate the production of different types of know-how. The economics of knowledge propose a classification of the different types of know-how according to that demand for articulation (see Box 2). These are the 'know why', the 'know what' and the 'know who' (CNRS 2002).

The 'know why' analyses the causal relations that explain a given situation. It is in the domain of theory. The outcome of this stage is an analysis framework that often takes the form of a scheme or model.

The 'know what' concerns knowledge of the facts and the characterization of situations. What is the degree of 'sustainability' of farming systems? How do the territory and farming systems contribute positively, or not, to sustainable development?

The 'know what' is a matter of informing the analysis framework applied to a concrete situation. It is a diagnosis.

The 'know why' and the 'know what' are essentially introduced into the programming and planning phases. The 'know how' concerns action, techniques and methods for acting. It refers to the proposal of possible solutions.

Lastly, the 'know who' encompasses the 'who knows what' and the 'who does what'. These are means of organizing competencies in a coherent process, which will govern the establishment of support mechanisms and services.

Articulation of Different Types of Knowledge

The articulation of different types of knowledge can be summed up by the verbs observe, understand, propose and organize (see Box 2). The architecture is that of teaching processes and learning theories (Bordenave and Pereira 1977). It is sought in research systems in partnerships that combine project elaboration, innovation production and training, in the same non-linear process that introduces knowledge, methods (analysis of situations and potential solutions), qualities (creativity and organizing ability) and behaviours (sense of collection action). Innovation resumes its place, serving a society project. It exceeds "the implementation of an invention and its integration in a social setting" (Alter 2000). Co-learning is an integrated process of invention and innovation.

**Box 2: Constructing Competencies: Collective Learning
and Articulation of Different Types of Knowledge**

The ongoing construction of competencies is an essential lever in developing
the adaptation and autonomy of stakeholders faced with a given situation. It is
based on a process that engages and integrates different types of knowledge.
It brings about a partnership in which all the 'constituents' learn from each
other in order to develop a collective ability to innovate. The following table
presents a classification of different types of knowledge based on that demand
for articulation:

Knowledge	Action	Product
Why?	Observe and understand (a situation)	Dynamic and interdisciplinary analysis framework model
What?	Describe and characterize (a situation)	Participatory diagnosis
With whom?	Involve those with the knowledge: who knows what and who does what?	Identification of facilitators
		Operational partnership construction
How?	Design and propose a collective strategy	Methods and mechanisms for action
	Organize competencies	Tools: foresight (scenarios), role playing, etc.
		Support system: information and communication
		Governance system
		Participatory evaluation process

Collective Experimentation

At the interfaces of different types of knowledge, experimentation is no longer a
simple verification, adaptation or demonstration; it is an ability to invent.
Experimentation becomes a tool, a medium for dialogue and a comparison of differ-
ent types of knowledge: "One must be convinced of the status of the experiment. It
is a strategy for overcoming existing constraints to give a sense, a framework, and
objectives to a development process" (Tonneau 1986).

Experimentation thus helps to bring out more complex thought processes regard-
ing the management of production factors, the performance and relevance of activ-
ity systems, and social challenges.

Collective experimentation opens up a forum for creativity involving all
stakeholders, from scientific, technical and human research, development operators
and citizens, to invent new references, that is, technical references, management
references, institutional references for assistance and governance systems, and
political references.

Characteristics of Research Systems in Partnership

The farm field schools of the Food and Agriculture Organization of the United Nations (FAO) have been the most studied system. This system illustrates how a technical problem, in this case managing rice diseases in Indonesia, makes it possible, with groups of farmers, to raise and deal with more complex supply-related issues that go beyond local development (Röling and van de Fliert 1994). Many other such experiences exist, which are often described in the grey literature. By analysing them, we can outline a few characteristics of research in partnership and how it works.

Generally, technical experimentation easily mobilizes since it responds to (simple) targeted needs that are often decisive for activity systems. That simplicity explains why the development of technical products is often a success (easy dissemination). Experimentation tools are available for networks of farmers-experimenters (Hocdé 1998), where the production of references and technical information is collective. The choice of experiments, their monitoring and discussion of their results are subject to exchanges of information and a comparison of knowledge.

Within these systems, experiments are conducted inside farmer organizations, and introduce financial and human resources. These organizations and associations gradually integrate the research function, which they then consider as a means of converting their major autonomy options or their project into practice. In addition, they organize the production and dissemination of technical innovation, avoiding repetition, and facilitating synergies and the circulation of information. It is, in fact, a matter of professionalizing the function of farmer organizations.

Organizations are increasingly widening their field of research through strategic deliberations on the future of agriculture. The strategic vision contributes to debates on agricultural policies and the accompanying measures needed to apply selected technologies. Professional organizations then turn to development policy issues.

Training through 'learning by doing' methods is central. The process is intended to strengthen the technical skills of farmers and other players by developing their capacity to adapt and invent. The co-learning process accompanies experimental work, repositioning it each time in a broader perspective (Tonneau et al. 2003), by adding social and institutional experimentation to technical experimentation (Mercoiret 1992).

Constructing Forums for Dialogue

Another challenge is the collective construction of a forum (or, on a larger scale, platform) for dialogue, where problems and potential solutions are identified and analysed. The forum is first and foremost a place for discussion, dialogue and exchanges between the different development stakeholders. It is the place where

the subject of the experiment and the project will be defined in its complexity, spatial aspects, social relations, economic, physical and environmental components, and its chronology.

Eventually the forum can become a place to debate diverse positions, devise public policies and draw up development programmes that focus on the real problems faced by the population. The forum can then be converted into a legal and managerial body capable of setting in place and managing resources and projects.

Producing References

As with any research approach, research in partnership is obliged to produce references. Producing references means creating an awareness of successful or unsuccessful experiments (failures teach lessons) by describing them. They are then analysed and presented in such a way as to serve as learning media.

The innovation process turns knowledge and information into mediating objects, making it possible to define options and orientations for the future. The information exchanged and shared in forums provides a logical framework for situation analyses (diagnosis and evolution scenarios). Information – and its formalization in the form of information systems – is a tool that enables a group to mobilize knowledge and data that make sense for enlightening and guiding a collective deliberation process. The data are used to construct new knowledge and concepts. Information then becomes the property of social stakeholders working for the innovation process. Management of information and references is a powerful tool for building stakeholder capacities and competencies.

This brief overview of novel concepts and tools working for 'science for development' suggests that research potentially possesses the knowledge, tools and methods to produce useful references that can be used by communities faced with major sustainable development challenges.

Research, however, must also bring out problems and take into account, at all times, the issues raised by rural innovation stakeholders. Indeed, each player brings their vision and introduces the products and results of experiments with which local stakeholders should be closely associated. It is within this interactive, flexible and proactive framework that research in partnership needs to be repositioned.

The case studies presented in the next chapter illustrate how approaches that include the participation and true commitment of stakeholders have produced some tangible results, by endeavouring to link the production of innovative techniques to their specific social and cultural situations.

Springer