21 INCREASING IMPACT – Making it Work

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Introduction

After all the discussions about what scaling up is, why it happens in some situations and not others, and what determines the impact that natural resources (NR) research has on farmers decisions and livelihoods, we come to the big question: is there anything that researchers, research projects, and organisations can do to make scaling up more likely to happen and thereby increase the impact of investment in NR research? The conclusions drawn by the participants of the workshop on this question are presented in three sections. First, we look at the kinds of tools that are available to support scaling up; then we consider the need for more research into the scaling-up process; and finally we turn to the need to improve communication amongst researchers and other stakeholders. The key factors vital to the increasing of impact of NR research, such as power relations, which should be considered in the planning of all projects, are underlined in the following analysis. They include suggestions as to possible ways forward to making impact really work, such as the actor linkage matrix.

Tools to Support Scaling Up

Scaling up the benefits of NR research requires action by many different people. Without widespread involvement, the impact of research is bound to remain localised and be slow to spread. Scaling up will only happen if people outside the immediate research activity and location have information about the research and its potential and develop sufficient interest in it to use its results in their own domain of activity and promote it to others. A useful first step is to articulate linkages between the various sets of actors who might play a part in spreading the lessons from the research to a wider area or to use the lessons to introduce policies and institutional change that will create incentives for NR managers to change the way they do things. Once the key actors have been identified, research teams can plan to share the research process and emerging findings with them from a very early stage in the research.

There are tools for articulating and assessing linkages between actors which have been tested and shown to be effective. Information maps (Garforth 2001) and spider diagrams, for example, based on visualisation techniques, offer a way of describing the links of communication and influence between organisations. Within the toolkit of participatory rural appraisal (PRA) methods, Venn diagramming has been used to explore the perceived strength of influence of different organisations and institutions within a specific context.

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More specific to the context of NR research and development is the actor linkage matrix, as described in Box 21.1 (Biggs and Matsaert 1999). With the matrix complete, an NR research team can decide how to interact with the various actors during the life of the research. As NR research is usually focused as much on process as on the specific local results, this interaction should be longer term than a simple reporting of final research results. Scaling up the impact of research on agroforestry design, for example, is more likely to happen when the process of developing a design in partnership with farmers groups is understood – and has been experienced at first hand – by those who are in a position to replicate or institutionalise it. Perhaps a weak linkage between researchers and a key extension organisation or non-government organisation (NGO) can be made more effective by inviting their personnel to be actively involved in the research process from an early stage.

Assessment of linkages should include power relations, both within and between actors. These can include relationships based on gender and on organisational status (such as the relative status of research vis-à-vis extension organisations or NGOs). Linkages that operate through hierarchical structures (for example, where all communication has to be through the person at the apex of the organisation) are likely to be more difficult to activate locally than those that work horizontally across organisational boundaries. On the other hand, linkage with a centre-dominated hierarchical organisation has the potential for achieving rapid influence over the whole organisation, once the senior management is convinced that it is a good idea.

Linkages are not static and should be reviewed during the life of a research project. This begs the question of who should carry out a linkage analysis and how often. Does each project team need to analyse the linkages between actors every time they start a new project? This would rapidly lead to similar analyses being done by different teams and repeatedly by the same team for successive projects, which represents duplication of researcher effort. It also imposes a burden on those who are expected to provide the information needed for the analysis, including farmers who may be asked to comment on the nature and quality of linkage between their organisations and research or extension organisations. There would seem to be merit in research teams in cognate subject areas and in the same geographical area agreeing to share their analyses to avoid unnecessary duplication. Or a research programme that funds several discrete projects in the same area could commission an actor linkage analysis as a separate research activity, with provision for updating at regular intervals, the results of which would be made available to all research teams. A more complex arrangement would see analyses being carried out at different scales, from the local actors relevant to a specific research project to a national analysis covering the actors relevant to a national research programme to which the separate projects belong. The results could then be combined into a set of nested analyses which all research teams could use, and to which all could contribute updated information.

There are potential difficulties with such a shared resource, as with all common property resources. The institution that is given or assumes responsibility for managing and

Box 21.1: **The Actor Linkage Matrix**

The starting point for this tool is to identify the actors in the specific situation, including those with perceived negative influence on scaling up as well as those with potential for positive influence. These may include central government, local governments, international agencies (CGIAR centres, donors), organisations within the national agricultural research system, NGOs, various categories of farmers, and private sector entities such as banks, agro-chemical companies and local input dealers. The list of actors is then arranged as a set of headings for both the rows and the columns of a matrix, in which each cell represents the arena of interaction or linkage between two actors. The analysis proceeds by asking a set of questions about each cell in the matrix, questions, which can range from general ones to those that are specific to the nature of the NR research under consideration. It is this focus on the linkage rather than on the actors themselves that makes the tool useful for identifying opportunities and constraints to scaling up. The analysis will suggest avenues through which research findings can be promoted or developed further into farm-level recommendations. It will also indicate where barriers to scaling up may be encountered, in time for action to be taken to remove them. The cells on the diagonal represent linkages within each actor organisation – between headquarters and field offices of an extension organisation, for example, or between departments and research groups within a research institute.

Illustration of the matrix:

	Actor	1 Poorer farmers	2 Richer Farmers	3 Researchers in Public Sector	4 Researchers in Private Sector
A	Poorer farmers	A1			
B	Richer Farmers			B3	
C	Researchers in Public Sector		C2		C4
D	Researchers in Private Sector				

Cell B3 represents the flow of information from a group called richer farmers to public sector researchers. Cell C2 represents information going from researchers in the public sector to richer farmers. The cells in the diagonal of the matrix represent information that flows between people in the same group for example Cell A1 represents information that is passed between poorer farmers; the exchange of information about seeds and the actual exchange of seeds between poor farmers would appear in this cell. The text that accompanies the matrix would give details of the specific institutions involved in the transactions in each cell. For example, seeds might be exchanged on a reciprocity basis or it might be a market transaction. The full matrix represents all possible transactions between all the groups of actors.

Source: Biggs and Matsaert (1999)

maintaining it will need an incentive to do so on behalf of all potential research teams. It will need to spend resources on compiling it and making it available. In principle, research programmes should be prepared to contribute to the cost, as it will save them time and money that they would otherwise have had to expend on carrying out their own actor linkage analysis. A team carrying out an analysis on behalf of all researchers would be more likely to unearth information and knowledge that is already available, in grey literature and reports of PRA activities, than a team doing it within the narrower confines of a specific research project. On the other hand, such a degree of centralisation may be too cumbersome: a lighter touch alternative would be for all researchers to pool their actor analyses into a centrally supported resource, so that research teams can easily identify what has already been done and make an informed decision on how much original analysis of actor linkages they need to carry out. Within this pool of actor analyses, agreement would be needed on conventions, for example, on the meaning conveyed by symbols such as arrows of different kinds.

One way of making effective use of linkages for scaling up is to establish a stakeholder forum for a research project, which meets regularly or at key stages in the development of the research. There is a danger that such an arrangement may become ritualistic rather than create opportunity to share emerging research findings with those who might incorporate them into their own thinking and practice, particularly if the driving force behind the forum is the research team itself and there are few obvious incentives for stakeholder representatives to give up their time to participate. A forum organised at a higher level than the individual project and set up at the behest of the users of the research rather than the researchers themselves – a programme stakeholder committee, for example, or a national research monitoring committee set up by government to which all researchers must report regularly as a condition of being allowed to continue their research – might be more productive and could offer constructively critical feedback to research in progress.

Action to enhance uptake among the end users of research, principally farmers, will be more effective if it is based on an understanding of those users' existing knowledge of the local environment (socioeconomic and institutional as well as physical) and farming systems. This can lead both to better definition and design of research projects and to more effective extension programmes. Here again there are tools that have been developed for this purpose and that research teams can use in partnership with farmers to explore local knowledge and perspectives. These include

- the agroecological knowledge kit (AKT), which includes inductive computer software to help identify key concepts that underpin local knowledge (Sinclair and Walker 1999);
- the rapid appraisal of agricultural knowledge systems (RAAKS) methodology for investigating systems of knowledge generation and adaptation (Engel and Salomon 2003); and
- agricultural timelines, a PRA tool that puts the current technology mix within an agricultural system into an historical perspective and generates a discussion of how previous innovations have spread within local social and farming systems (Garforth 2001).

Knowledge of how to use these tools is still limited among NR researchers: more can be done to share information on their merits and on how to apply them. As with actor linkage analysis, however, it may be more realistic and cost effective for studies of local knowledge to be commissioned on behalf of a programme rather than encouraging each team of scientists to conduct such studies in the context of their own research project. In either case, the value of the information generated by such tools would need to be acknowledged in the allocating of resources (personnel, money, training) to build their use into NR research.

Scientists may be reluctant to use tools that seem complicated both in their conceptual basis and in their application and interpretation of outputs. But tools do not have to be dauntingly complex. A simple tool developed by research teams in Nepal is the 'Programme learning and response table'. This is a simple two-column matrix.

In one column, a research team lists what they have learned in the previous, say, six months, including lessons from the wider context as well as those from the project activities and outputs themselves. The former could include changes in the context since the project began, which might suggest the need for a shift in direction or emphasis for the research.	In the second column, the team notes the changes they are going to make in response to the things they have learned.

Researching Impact and Scaling Up

Much of the research that has been done on processes and successes of scaling up has been conceptualised within a linear perspective. Moreover the starting point has usually been a particular NR research project and a specific set of technologies developed within it, with the research tracing what has happened with those technologies over time. The research proceeds by exploring how many farmers have taken up the technologies and the extent to which extension and research organisations have made use of the new knowledge in their own programmes. This leads naturally to an investigation of the factors that have hindered or facilitated this horizontal and vertical scaling up and of the impact it has had on people's farming practices and livelihoods. While research within this perspective may seem logical from the point of view of those who fund NR research and who need to evaluate the impact of and the returns to their investment, it by no means gives a complete picture of the processes at work. The linearity is conceptually restrictive in two ways – temporal and institutional. It assumes, first, that technology development proceeds in discrete stages, from applied research and testing through promotion to adoption or integration into land use systems. Second, it reinforces the separation of roles between those who do research and those who use (or choose not to use) the knowledge, and technologies based on that knowledge, that researchers produce.

An alternative approach is to adopt an innovation systems perspective, which puts farmers and other NR managers centre stage. From this perspective, an NR research project and its outputs are just one of many innovation-related activities that figure in the farmer's decision-making environment. Indeed, formal research as an activity and an institution is only one of the sources of new ideas and technology. This perspective

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Farmer interview at Bandipur

also recognises the reality that farming systems are continually changing as people respond to the complex set of constraints and incentives that the environment (political, social, physical, economic) creates. Adaptation of existing technology, the acquisition and application of new knowledge, and the trying out of new technology play an important part in farmers' response to this changing environment.

Adopting an innovation systems perspective has two implications for the way in which scaling up and impact of NR research are studied. First, by stepping outside the conceptual confines of the linear model, we can look for lessons from instances of innovation that are going on within the wider system. By identifying changes that are taking place and then studying those changes from the farmers' point of view, we can ask questions about the pressures, opportunities, and incentives that are driving changes in technology and land use. Rather than asking through which channels and how far the knowledge created by a research project has been disseminated, we can explore what new knowledge farmers are being exposed to and from what sources. We might also enquire into the social and institutional processes involved in any local experimentation and adaptation of technology and how the policy environment supports or constrains the innovation process. The lessons learnt can then be used to improve the ways in which NR research projects interface with other elements within the innovation system. One particular area where research is lacking is in the link between policy and practice. More studies are needed of how policies and actions by the state and other actors constrict the livelihood opportunities of NR users (see earlier chapters for studies on such projects in Nepal and Uganda).

An example of such innovation is provided by the rapid development of horticulture that is currently visible in the mid-hills of Nepal. This is clearly being driven by market opportunities created by an improved transport infrastructure and changes in settlement patterns and household incomes. What is less clear, however, is how farmers are accessing the knowledge and information needed to introduce and adapt technology in new areas and which particular factors in the institutional environment are enabling the innovation processes. Extension initiatives have played a role in some areas, but only a small part of the overall increase in horticultural production can be attributed to these.

The second implication is a corollary of the first. When assessing the impact of a particular research project or output, we can look at its interaction with the innovation system as a whole, rather than simply asking whether and by whom the output has been taken up. Questions would then include whether the process by which the research was carried out has had any effect on the knowledge and technologies deployed within the farming system or stimulated any farmer experimentation or change in policy or priorities among government and other institutions. This might point to particular actors within the innovation system with whom the researchers failed to interact effectively. And as interaction implies an exchange of experience and views, questioning should include whether the research team has incorporated in its programmes any lessons from the innovation that is going on around it. Impact studies from this broader perspective would also explore how significant the research has been in the eyes of farmers: what has been its importance relative to other sources of technology in solving their problems or enabling them to identify and grasp opportunities?

One specific recommendation from the workshop, in the current climate of questioning by the Department of International Development (UK) (DFID) and other funders of NR research about the extent and nature of impact, is that impact assessment should be done within an explicit innovation system framework rather than a linear research-output-impact model.

These ideas are not new. Indeed, one of the research challenges we face is to understand how ideas about the uptake of knowledge and technology spread (or not) among those who invest in, implement, and evaluate NR research. There is literature in academic and professional journals espousing an innovation systems perspective and approach and which documents farmers' innovation systems, including the papers brought together in the Agricultural Systems issue for July-August 2001 (69:1-2). Are these ideas being effectively communicated to and critically reviewed by those who make decisions about the funding of research and draw up terms of reference for impact studies?

Information and Knowledge Flow

Knowledge generated by research cannot have any widespread impact unless it is widely shared. Whatever else is done to enhance the impact of NR research, resources need to be put into communication. Once again, however, we need to step outside the linear

model, which implies that what is needed is to improve the communication of research outputs to potential users: instead, we should recognise that communication is essentially dialogue and should continue throughout the research process.

Different kinds of knowledge require different tools and methods for effective sharing. Scientists are good at communicating the results of experiments and trials to other scientists through established channels – journals, conferences, and electronic networks. But knowledge of how policies affect NR livelihood opportunities needs to enter discussions within policy-making fora and the consciousness of those who elect politicians before it can lead to any change. Information about the availability of, or how to propagate, seedlings of agroforestry species can be spread by informal networks with the help of low-cost print materials (leaflets, posters). Farmers' knowledge of the economics of various methods of nutrient management can be articulated through participatory farm management methods such as participatory budgeting (Galpin et al. 1998). Research generates knowledge: we need to put as much thought into identifying appropriate channels and tools for sharing that knowledge as we do into designing and carrying out the science that underpins it.

Knowledge needs to be documented so that people can access it when they need it. This requires appropriate sites, whether physical or virtual, where the various potential users can find it. Formats and language must be appropriate to users. Information and communication technologies, from print to searchable internet (world-wide web) based databases, offer a wide range of possibilities. More problematic than coming up with formats for the documentation and sharing of knowledge, however, is the design of effective institutional arrangements for access to knowledge and information, particularly in an era of growing concern over intellectual property rights.

A key message here, then, is that organisations need to invest in communication. Effective sharing of knowledge and information demands human resources, equipment, and time. It also demands commitment at the highest level in the organisation to give adequate priority to this activity. This may require organisational reform to improve internal communication as well as the ability of an organisation to communicate effectively with those outside. Internal capacity for external communication can be built through training and recruitment, once the organisational commitment to effective communication is in place.

There are, again, tools and resources available, that researchers can use to enhance the documentation of and access to knowledge beyond the standard scientific routes. At an international level, electronic resources such as the World Overview of Conservation Approaches and Technologies (WOCAT) enable researchers to document, disseminate, and evaluate research-based information on land management through user-friendly databases. Nationally, there are often resources that could be used more effectively. The Regional Training Centres in Nepal, for example, run courses for farmers and extension staff. Bringing researchers in as resource people for such courses, can foster dialogue through which researchers become more aware of the perspectives and constraints of

the end users of the knowledge they are generating, as well as help to ensure up-to-date content.

A useful way of making knowledge and information flow explicit is to draw up a communication strategy for each research project or programme. A communication strategy

- specifies the communication partners with which the research team will interact;
- states the objectives of the interaction with each communication partner, which might include generating demand for the outputs of the research by creating awareness and interest, facilitating the research process itself, and influencing the formation of favourable policies;
- suggests the means by which the interaction will take place;
- indicates the nature of the information and knowledge content that will form the initial basis of the interaction.

Apart from helping the research team plan its communication activities from the very beginning of the research process, such a strategy will also highlight the need to allocate human and other resources to putting the strategy into effect.

Conclusions

NR research will have a greater impact on rural land use and livelihoods if researchers are committed to learning and self-monitoring. Research can be designed in ways that make learning an explicit part of the process, and which allow – and even encourage – changes to be made in response to the lessons learned. These can be lessons from the outcome of experiments that suggest a change of direction might be more productive, as well as lessons gained from being open to what is going on in the wider innovation system that might change views on the relevance of the current thrust of the research. Having in place a communication strategy, that fosters interaction among the various actors in the system, will make it more likely that this learning will take place.

It is not enough for individual scientists to learn from their work and from their interaction with farmers and other stakeholders. Researchers have a responsibility to be self-critical about their work and open to alternative interpretations of their findings. But for learning to have an effect on the way a research team or institute works and on the direction of their research, there must be procedures in place within the organisation for reflecting and learning. Such procedures, which are likely to include informal seminars, periodic reviews of work in progress, workshops, and internal newsletters, need to be backed up by a commitment to make changes in response to lessons learned.

One of the lessons we have learned through research within a livelihoods framework is that the rural poor rely to a disproportionate extent on common property resources: the irony is that they also face disproportionate structural impediments to access such resources. Despite the international commitment to the millennium development goal of eradicating, or at least reducing, poverty, NR research does not yet have a sufficient

focus on the needs of poor households. Even research projects that have an explicit poverty focus find it difficult in practice to involve poor households in their work. More deliberate efforts are needed to increase the representation of poor farmers on stakeholder committees and in on-farm trials.

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