Node: Suite Summary[1,2]

Bolivia: Promotion of Hillsides products

Context

There is good potential for increasing agricultural production and enhancing the sustainability of land use in smallholder hillside agricultural production systems. However, these areas are extremely vulnerable to soil erosion because of steep slopes, thin soils, high rainfall and poor vegetation cover. Efforts by donors and governments to address these environmental concerns have achieved only limited success.

The key challenge is how the potential of these production systems can be realised in order to support some of the poorest sections of society in often remote areas of mountains and steep slopes. An initial step for research was to develop and test tools for the assessment of environmental processes, such as soil erosion, that directly impact hillside farmers. These tools had to be able to provide assessment outputs that are relevant to and understandable by farmers. The tools needed to be able to integrate economic and financial issues with environmental and biophysical processes. They also needed to be low-cost, participatory and accessible to local professionals working with farmers.

In the context of NRSP, these issues and demands were generic. Although the tools would need to be developed in situ in developing country steep slope situations, they were to be designed to be widely applicable to similar biophysical situations and poor communities. NRSP target countries in the 1995-99 period (Bolivia as the lead country, with Nepal, Uganda, Honduras and Sri Lanka providing ancillary sites for research) were ideal for the development of the tools. These countries all have mountainous regions where poor smallholder farmers reside.

For logistical reasons and because of the existence of a DFID (Department for International Development)-funded project, FORLUMP (Forest/Land Use Mapping Project), which needed suitable assessment tools, the hill lands of Sri Lanka were chosen for initial research into suitable methods. The area was particularly well suited to the research because of a locally recognised need for interventions to reduce environmental degradation and the consequent danger of sedimentation of downstream dams.

Research Topics

- What tools are available to assess the impact of soil erosion and benefits of conservation for resource-poor farmers in hilly areas?
- How can these tools be designed to be usable by and relevant to farmers and local professionals?
- How can the tools be disseminated widely and assist the building of capacity to undertake integrated economic and environmental assessments for hilly areas and poor communities?

[1] This document summarises NRSP's work in one of its Uptake Promotion Node: suites. For further details and links to project and project documents see http://www.nrsp.org.uk/6.aspx

[2] This document presents research funded by the UK Department for International Development (DFID) for the benefit of developing countries. The views expressed are not necessarily those of DFID.

Projects

The identification of a need for examining the vulnerability of hillside production systems to processes such as soil erosion came in the original design of NRSP in 1995. Through projects supported by the UK in the Sri Lankan hill lands - most notably the Mahaweli Development and its Victoria Dam - it had become clear by 1996 that:

1. Local people can be negatively impacted by opening up steep lands for agriculture because soil erosion can lead to loss of soil and soil fertility and thus a reduction in local natural resource (NR) productivity over the long term. Eroded sediment can also damage down-slope cropland and impair the quality of drinking water.
2. Eroded sediment from steeply sloping cultivated land can be deposited in reservoirs, reducing capacity to generate hydro-electricity and capacity to store water for irrigation. Downstream users are affected because of water pollution, sedimentation and reduced services from the stored water.

Therefore, Purpose 1 and Output 1 of NRSP's Hillsides Research Strategy was specified as "Economically viable land, soil and water management techniques packaged and promoted". The Socio-Economic Methodologies (SEM) sub-programme of NRSP (1995-99) also included the development of participatory methodologies and low-cost socially-acceptable technologies. It was recognised that new methods of working with poor farmers were required that integrated economic and financial aspects at the farm-level with tools of environmental assessment.

R6525 (1996-99, see project linkages below) was designed with the aim of supporting the development of cost-effective methods of needs assessment that could be used to identify development opportunities and problems and to enable the packaging and promotion of economically viable land, soil and water management tools. Methods of economic and environmental assessment of soil conservation technologies that could be used in the field by developing country professionals were evaluated and validated by the research team for their appropriateness to smallholder farming situations. This was in support of the Renewable Natural Resources Research Strategy (RNRRS) goals of employing socio-economic methodologies, applicable across all RNR systems, to improve the effectiveness of RNR research and to facilitate the control of soil erosion.

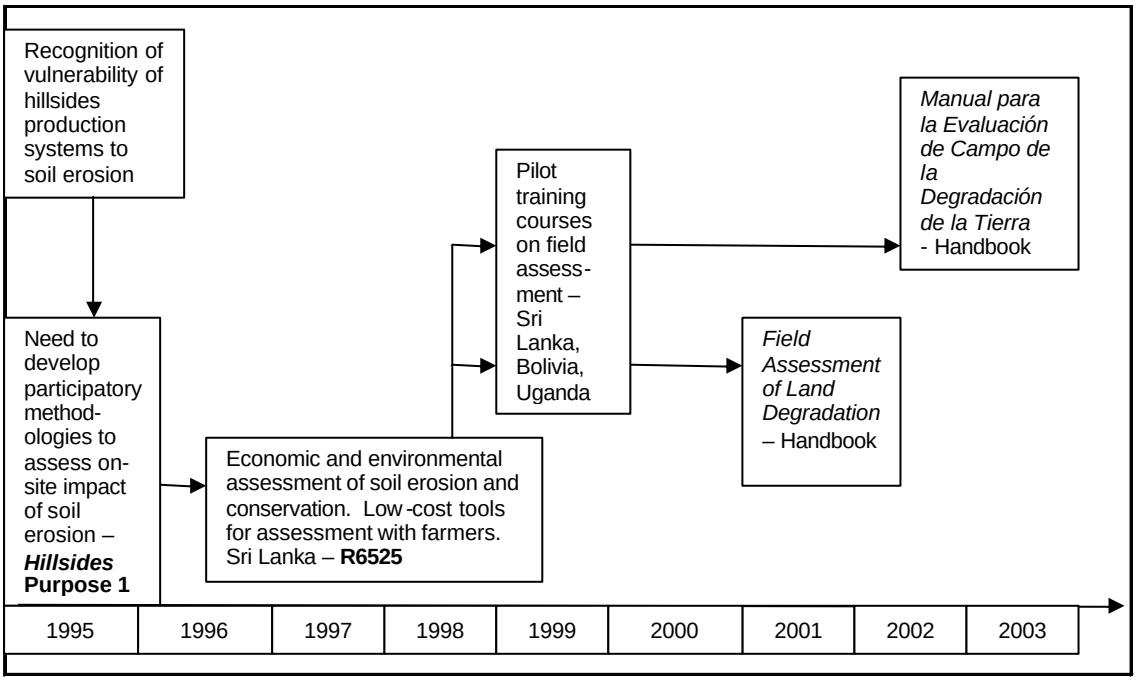
A systems analysis framework for examining soil erosion and conservation in the context of the household was developed by R6525. This framework enabled the integration of various valuation approaches and the communication of results in forms understandable and relevant to smallholder farmers. The systems analysis focused on the investment decisions of farmers, distinguishing between changes in soil nutrients or other resources that farmers use to manage their soil and changes in production as measured by yield loss or gain. The tools developed consisted of relatively simple field methods for assessing soil erosion using indicators recognised and known by farmers. They included indicators to assess a range of important erosion and productivity change processes, including rain splash, depletion of top soils, reduction in soil depth, exposure of roots, enrichment of sediments and in-field sedimentation.

Throughout the project and in follow-up activities, dissemination to relevant stakeholders was stressed. In Sri Lanka, activities were concentrated at Perawella in the Hill Country with about 60 farmers, while 15 local professionals from throughout the country were involved. A

local language (Sinhala) booklet was produced with photographs for the local people who had co-operated with the research. This served the dual purpose of validating findings about the farming practices and disseminating the research findings to the community. A training course was run for local professionals to offer experience of the field tools and also enabled researchers to refine the methods for wider application. In its final few months, the project was extended to Bolivia. A Spanish version of the training manual and workshop report was created for all participants and local institutions. Project findings were disseminated widely in talks, meetings, conferences, poster papers, reports and journal papers.

In the period 1999 to 2001, considerable international interest arose in both the tools and the training of local professionals in field assessment. This resulted in UNEP (United Nations Environment Programme) and the Government of Norway sponsoring a further field training course in Uganda, from which a handbook was co-financed by NRSP, published in 2001 by Earthscan in English. In 2002-3 this work was followed up with a Spanish edition of the handbook that was widely distributed in NRSP's target country, Bolivia, and elsewhere in Latin America through networks such as that of CIAT (International Centre for Tropical Agriculture).

Project links within Bolivia Suite 3: 1995 - 2003



Outputs

Findings

The tool developed by R6525 was a systems analysis framework. Variables and indicators for integrated biophysical and economic assessments direct from the field and farmer - such as colour changes of the soil, and indicators on plant leaves - proved useful in helping local professionals understand and appreciate the circumstances of local farmers. The increased understanding of the financial constraints of poor farmers meant that the local professionals more readily promoted low-cost technologies – such as trash-lines, vegetative strips and

simple lock-and-spill drains. These were instead of technologies requiring input purchase and the hire of labour.

Following a comparative evaluation by the research team of at least three other valuation approaches, the best assessment tool was identified as the 'investment appraisal' approach (R6525). Through testing and validating by more than 40 developing country professionals attending the two workshops and pilot training sessions in Sri Lanka and Bolivia, the biophysical and economic valuation tools were found to be effective. A follow-up with participants showed that the methods were being used in their work. This finding was corroborated in the Uganda training in 2000.

Research messages

- Rapid biophysical assessment tools are widely applicable in hillside environments for assessing soil erosion rates, change in soil quality and effects on yields.
- Field-based biophysical assessment tools can be used to assess a range of important erosion and productivity change processes.
- 'Investment appraisal' is a useful and accessible tool for assessing the economic viability of a conservation technology from the perspective of a farmer. Through a participatory approach it identifies and integrates the variables which are most important to the farmer, such as labour costs and yield.
- Training provides familiarity with the investment appraisal approach and field tools, while overcoming potential scepticism that the tools are too "quick-and-dirty".
- The biophysical and economic evaluation approach is flexible and applicable to other soil and land resource management issues.
- Wide dissemination of the approach through handbooks, training courses, talks, meetings, conferences, poster papers, reports and journal papers builds human and institutional capacity to undertake assessments and identify appropriate interventions for soil erosion problems on steep slopes.

The research produced messages relevant to specific institutions involved in research and development interventions in steep hill lands.

- For NRSP: investment in the development of tools and approaches for NR assessment is valuable. These can have widespread uptake if empirical testing and validation are combined with effective promotion and dissemination strategies and capacity building of key professionals.
- For DFID: issues identified from bilateral aid projects – in this case tackling soil erosion in Sri Lanka – can be investigated efficiently through a centrally-funded research programme, tested and validated locally for the benefit of local target audiences, and then promoted more widely for expanded uptake and impact. As evidence of the potential utility, DFID used illustrative material from this project for two annual reports and an information pack for NRSP printed in 1998.
- For development institutions: the integration of environmental and economic issues that are important to local farmers and the use of the assessments is a good means to inform appropriate development interventions. This may result in the recommendation of technologies that are not usually viewed as biophysically efficient but are economically supportive of local people's livelihoods.

Key research products

The major products are two handbooks published in English and Spanish:

Stocking, M.A. & Murnaghan, N. 2001. Handbook for the field assessment of land degradation. Earthscan Publications, London. xvi + 169 pp.

Stocking, M.A. & Murnaghan, N. 2003. Manual para la Evaluación de Campo de la Degradación de la Tierra. Mundi-Prensa Libros, Madrid, 173pp.

Impacts

- Training was provided to 72 professionals in field assessment tools (the original pilot sessions in Sri Lanka, Bolivia and Uganda followed by three international training courses in the UK and Spain between 2003 and 2005).
- Dissemination of the generic tools and training methods through the networks of NRSP, the United Nations University and UNEP has proved to be influential. Uptake of the tools promoted by the research has been achieved in other projects. Two examples are:
    - Land Degradation Assessment in Drylands (LADA) project. This was a major GEF-funded project, executed by the UN Food and Agriculture Organization, with a total budget of US$12 million. It adopted the field training tools developed by R6525 and used them for local level assessments of land degradation in LADA's six countries: Algeria, Argentina, China, Cuba, Senegal, South Africa (see http://www.fao.org/ag/agl/agll/lada).
    - Sustainable Land Management in the High Pamir and Pamir-Alai Mountains (Kyrgyzstan and Tajikistan) – an Integrated and Transboundary Initiative in Central Asia. This GEF-funded project, implemented by UNEP and the two national governments, has adopted the field training approaches from the R6525 handbooks. Materials are being translated into Russian for use in 2006-2008.
- The biophysical and economic valuation approach has been used in other NR and conservation areas, including in biodiversity conservation on-farm (see Brookfield, H., Stocking, M. & Brookfield, M. 2002. Guidelines on agrodiversity assessment. In: Brookfield et al (eds.) Cultivating Biodiversity: Understanding, Analysing and Using Agricultural Diversity. ITDG, London. Pp.41-56).

Further work

- The 'investment appraisal' approach has a number of limitations. For example, it is limited to in-situ impacts, whereas in some situations off-site impacts may be as great or greater. Further work is needed by researchers and local professionals, working with local communities, to integrate on-site and off-site impacts, to include the full effects of soil erosion or other degradation processes on resource users other than farmers. Tools for off-site appraisal exist, but they are not participatory. Further, it is not known whether off-site impacts are greater than on-site. It is also not known how society can balance the values lost in on-site impacts against those lost off-site.
- The approach relies on some knowledge of accounting and economics. These subjects can sometimes be difficult for conventionally-trained NR professionals to apply, as

the projects in this Suite found. Capacity-building and training overcame the problems. However, further work on building inter-disciplinary capacity in scientists and widening disciplinary horizons would be advantageous for more effective uptake of the tools.

- Scope exists to apply the field-level tools for biophysical and socio-economic valuation of NRs to forest, freshwater, marine and other conservation areas. To date, only in biodiversity conservation has there been a direct uptake.
- While there was considerable dissemination and uptake of the 'investment appraisal' approach, there was a tendency to revert to stereotypical and reductionist approaches to NR assessment. How to keep in place the integrated and farmer-centred perspective is another challenge that needs to be addressed.