Left: A farmer-technician interaction programme; holding such programmes before implementing new technologies builds farmer's confidence in the technology. (PARDYP)
Right: A farmer exchange programme underway – an important scaling-up approach. (PARDYP)

Improving terraces with farmers

Nepal: किसानसंगै गह्रा सुधार

Participatory action research with multiple stakeholders for the demonstration and extension of improved rainfed hill terraces in Nepal

The traditional farming practices employed on steep sloping land in Kubinde village in Nepal's midhills led to soil and water erosion and low crop and fodder yields. The People and Resource Dynamics in Mountain Watersheds of the Hindu Kush-Himalayas Project (PARDYP) started work in 2001, with a small group of farmers from this village (who were also members of the local forest user group) and the Department of Soil Conservation and Watershed Management to identify and test an integrated approach for addressing these constraints. The approach taken was an improved hill terrace for rainfed conditions consisting of structural and vegetative measures.

The aim was to demonstrate and test the technologies' potential for overcoming constraints related to farming sloping agricultural land. The specific objectives were, in association with the local farmers, to design a technology that solved soil erosion problems on sloping agricultural lands whilst at the same time increasing the land's nutrient conservation and production capacity. The local line agency office of the Department of Soil Conservation and Watershed Management was involved in developing the technology to make use of their experiences and to come up with a validated technology that the department could use in its own programmes.

Before implementing the terrace improvement work in Kubinde village, a terrace improvement committee was formed made up of local farmers. The awareness activities began in January 2001. Committee members were trained on sub-watershed management and were taken to the International Centre for Integrated Mountain Development's (ICIMOD) Demonstration and Training Centre at Godavari and another ICIMOD site to show them potential soil and water conservation technologies including improved terraces.

After the technologies were implemented, a number of farmer exchange, interaction and monitoring programmes were held to assess the technology and to promote it. Indicators were developed for monitoring the activity.

About half of the costs were covered by the participating farmers and the rest by PARDYP. The other incentives were training and extension, allowances for participants, national expert honoraria, and training material such as audio-visual facilities. These were all provided by PARDYP with the help of the line agency.

WOCAT database reference: QA NEP2
Location: Kubinde village, Jhikhu Khola watershed, Kabhrepalanchok district, Nepal
Approach area: 0.02 km²
Land use: Annual cropping
Climate: Humid subtropical
Related technology: Improved terraces, QT NEP2
Compiled by: Madhav Dhakal, ICIMOD
Date: February 2003, updated May 2007

The technology was documented using the WOCAT (www.wocat.org) tool.

Problem, objectives and constraints

Problem

- Weak institutional collaboration for addressing 1) poor soil fertility and land productivity; 2) soil and nutrient loss and excessive water runoff from sloping agricultural land; and 3) fodder scarcity.
- Lack of on-farm research for developing technologies that attend to farmers' needs.

Objectives

- Local farmers collectively solving problems by identifying and using the most appropriate local solutions
- Local farmers designing, testing, and disseminating alternative technologies adapted to local conditions
- Strengthening joint learning by farmers and development actors

Constraints addressed

Major	Specification	Treatment
Technical	Not a priority area of line agencies	The approach relies on farmer adoption
Institutional	Lack of coordination among land users	Terrace improvement user group formed
Minor	**Specification**	**Treatment**
Financial	Government incentives are lacking	The technology is cost-effective
Other	Lack of awareness	Trainings, discussions, and field visits

Participation and decision making

Target groups


Land users


Extension workers


School teachers and children


Local leaders

Approach costs met by:

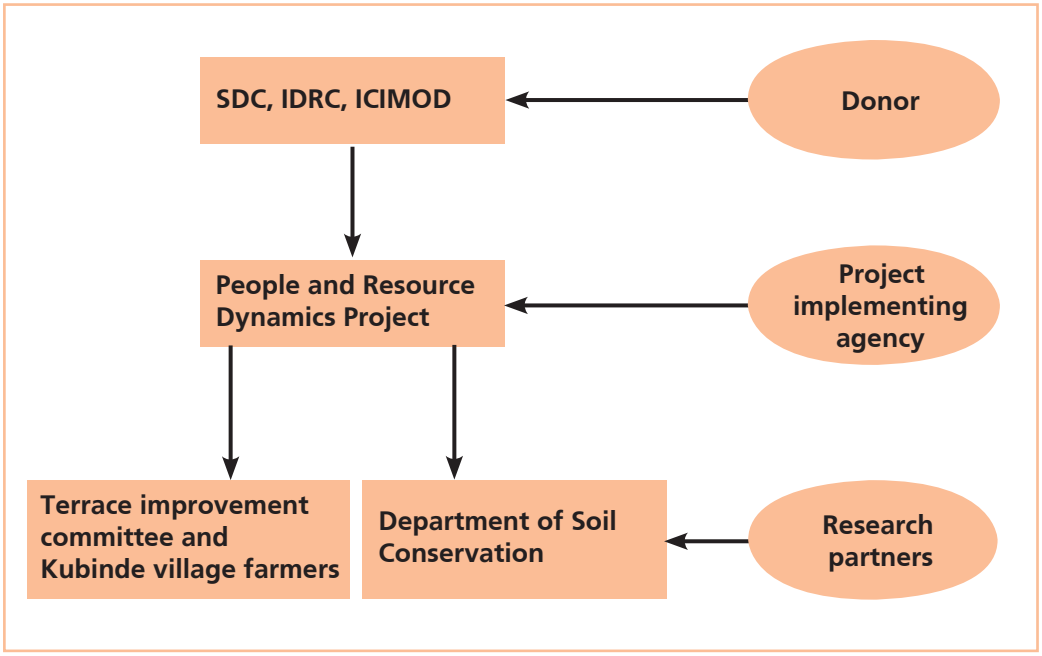
International donor funded project (PARDP)	65%
Community/local	35%
TOTAL	**100%**

Decisions on choice of the technology: Mainly national soil and water conservation (SWC) specialists in consultation with land users. The package was initially offered by researchers and later modified and implemented by land users.
Decisions on method of implementing the technology: Mainly land users supported by national SWC specialist as land users are more familiar with their land's capacity and characteristics.
Approach designed by: Designed by national specialist together with district soil conservation office. The implementation approach was jointly designed by the specialist and land users.

Community involvement

Phase	Involvement	Activities
Initiation	Passive	Group discussions organised with local forest user group; selection of members for training tours (12 men and 11 women); formation of terrace improvement committee
Planning	Interactive	Survey, site selection, fodder/grass species selection
Implementation	Self-mobilisation	Terracing activities: measurement, soil excavation, and retaining wall construction
Monitoring/ evaluation	Interactive	Done in a participatory way involving individual farmers, project staff, and Department of Soil Conservation staff
Research	Passive	Assessing performance of planted grasses and advantages and disadvantages of technology

Differences in participation of men and women: None as both participated equally



Project donors and implementing partners
SDC: Swiss Agency for Development and Cooperation
IDRC: International Development Research Centre
ICIMOD: International Centre for Integrated Mountain Development

Extension and promotion

Training: Before implementing the technology, a training on sub-watershed management was provided to local land users including women, school teachers and students, and local leaders. The training was based around visits to farms and demonstration sites and used information, education, and communication materials including a film on watershed management. The training was very effective as all participants learned much about the benefits of soil and water conservation.
Extension: After the implementation of the technology, a number of exchange, interaction, and monitoring programmes were held as a scaling up strategy. The involvement of multiple stakeholders in these programmes helped to evaluate the technology.
Research: Some ad hoc research has been carried out on the impacts of the technology and the performance of the structures and vegetation.
Importance of land use rights: Individual land use rights helped to implement the technology as there were no conflicts among land users.

Incentives

Labour: About 50% of total labour costs were met by land users.
Inputs: PARDYP provided grass seeds and seedlings free of charge, and fruit trees (papaya) were provided once.
Credit: No credit was provided.
Support of local institutions: None
Long-term impact of incentives: The incentives for implementing the technology helped improve the sloping land by creating awareness about SWC. As a result, land users converted many sloping fields into level terraces without any external help. Incentives had a great positive long-term impact.

Monitoring and evaluation

Monitored aspects	Methods and indicators
Biophysical	ad hoc observations on plant height, biomass production, and usefulness of fodder/grass species
Technical	ad hoc observations by SWC experts for providing their views about the technology
Socio-cultural	ad hoc observation on farmers' preferences in terms of species selection and on how farmers change their agricultural practices
Economic / production	ad hoc observations on changes in crop yields and patterns and the value of the land
Area treated	ad hoc observations through farmer survey and on-site verification of results
No. of land users involved	ad hoc observations through farmer survey on number of land users applying the SWC technology
Management of appraoch	ad hoc observations on how farmers maintain their terraces and the hedgerows

Impacts of the approach

Changes as result of monitoring and evaluation: New ideas have been generated but strategies to implement them have yet to be put in place.
Improved soil and water management: Area expanded about 100% from 2001 to 2003. New varieties of grass and fodder species have been introduced.
Adoption of the approach by other projects/land users: The project's aim was not to promote the approach but the technology. Similar approaches have been followed by other departments and programmes such as the District Soil Conservation Office.
Sustainability: More than 60% of the total improved terraces in Kubinde village were built by the land users themselves. Widespread rapid adoption did not happen in other villages due to financial and labour limitations. Land users of Kubinde village continue to maintain the improved terraces.

Concluding statements

Strengths and ➔how to sustain/improve*	**Weaknesses** and ➔how to overcome
The approach is based on building the capacity of farmers (both men and women) by involving multiple stakeholders in the development and adoption of the technology ➔ Approach should be to strengthen land users' involvement in SWC activities	Due to the conflict, which was on-going at the time, follow-up after a year of implementing technology was not possible and the monitoring was not done. This resulted in the adoption of the technology by other farmers not being carried out properly with, for example, farmers not maintaining the hedgerows as recommended. Also, the new terraces were not as good as they should have been. ➔ The technical experts need to visit the sites and identify gaps and encourage farmers to 'fill them'. For example, the benefit of hedgerow management needs to be demonstrated
Technical knowledge and confidence increased from the training and field visits, interactions, and experience sharing ➔ Such activities should be continued by incorporating other new ideas	
The approach led to the development of a team spirit among farmers ➔As above	

Key reference(s): Mathema, P. (2003) *Watershed Management in South Asia.* Kathmandu: Government of Nepal, Department of Soil Conservation and Watershed Management
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