Left: Members of the Chepang community discuss technical aspects of contour bunding. (BB Tamang)
Right: Many attended the community awareness programme which was held before the technology was implemented. (BB Tamang)

Sharing labour to implement contour bunding

Nepal: जनशक्तिको आदान–प्रदान गरी भाँजो हाल्ने पद्धतिको कार्यान्वयन

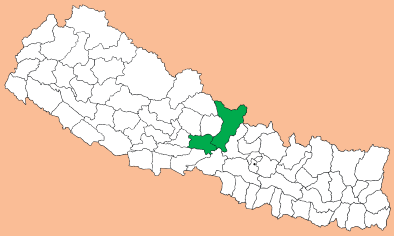
Members of a community can work together to help prevent soil erosion and increase productivity by working collectively to establish contour bunds.

Over generations, the ethnic minorities of Nepal, who practice fireless shifting cultivation, known as 'gujultyaune', have successfully used contour bunding to control soil erosion, promote water retention, and increase crop production. Contour bunding is a proven sustainable land management practice in areas where the soil productivity of marginal, sloping, and hilly lands is very low. While it is both low cost and simple to implement, it does have the drawback that establishing contour bunds is very labour intensive. When members of a community work together to establish contour bunds the whole village can benefit.

By working collectively, a community can establish contour bunds that will benefit everyone and not individual farmers alone. The first step is to plan a course of action and to select the sites. Members of the community, who are thoroughly familiar with the landscape that the community inhabits, get together to discuss where the contour bunding will be most successful and benefit the greatest number of farmers. This planning phase is best carried out during the dry season before the rains begin. Once the sites are selected, everyone participates in the slashing of materials on the shifting cultivation lands. After the slashed materials have been allowed to dry for some weeks, the community assembles to gather these into rows that will form the bunds. Every member of the community participates according to their ability.

The steps for sharing labour to establish contour bunds in a community which practises shifting cultivation can be summarized as follows:

- The community meets to finalize a plan of action.
- Everyone participates in the slashing of shifting cultivation plots.
- The slashed materials are collected and allowed to dry.
- The slashed materials are formed into rows that will constitute the bunds.
- Everyone participates and eventually, the land between the bunds is prepared for the cultivation of crops.



WOCAT database reference: QA NEP 26
Location: Tanahun and Gorkha Districts, Nepal
Approach area: Approximately 1–10 km^2
Land use: Agroforestry
Type of approach: This traditional approach has been implemented for more than 50 years.
Focus: Mainly on conservation with other activities
Related technology: Contour bunding QT NEP 26
Compiled by: BB Tamang, LI-BIRD
Date: March 2010, updated March 2013

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

ICIMOD LI-BIRD WOCAT

Problems, objectives and constraints

Problems

The main stumbling blocks to this approach are a gap in the sharing of traditional knowledge, lack of the money needed for investment, community conflicts over allocation of resources, and overall poor social cohesiveness.

Aims/objectives

To increase crop yields and help to prevent soil erosion in communities that practise shifting cultivation by getting the whole community to participate in establishing contour bunds.

Constraints addressed

Major	Constraint	Treatment
Technical	Traditional knowledge on contour bunding is not shared	Technical information is shared when the technology is implemented
Minor	**Constraint**	**Treatment**
Institutional	Groups are not aware of how to mobilize for community empowerment	Raise level of awareness and enhance capacity on how to mobilize the community and on how to institutionalize the process
Financial	Individual farmers do not have sufficient resources to implement the technology on their own	By sharing labour everyone benefits without any outlay by individual farmers

Participation and decision making

Stakeholders/target groups

Land users, groups

Approach costs met by:

Land users	80%
Project (LI-BIRD)	20%
TOTAL	**100%**

Annual budget for sustainable land management component: USD 8

Remarks

- The cost of implementing this technology is dependent on the gradient of the slope and other geographical features, the local cost of the seeds or seedlings, and the availability of labour.
- All costs and amounts are rough estimates by the technicians and authors. Exchange rate USD 1 = NPR 73 in March 2010

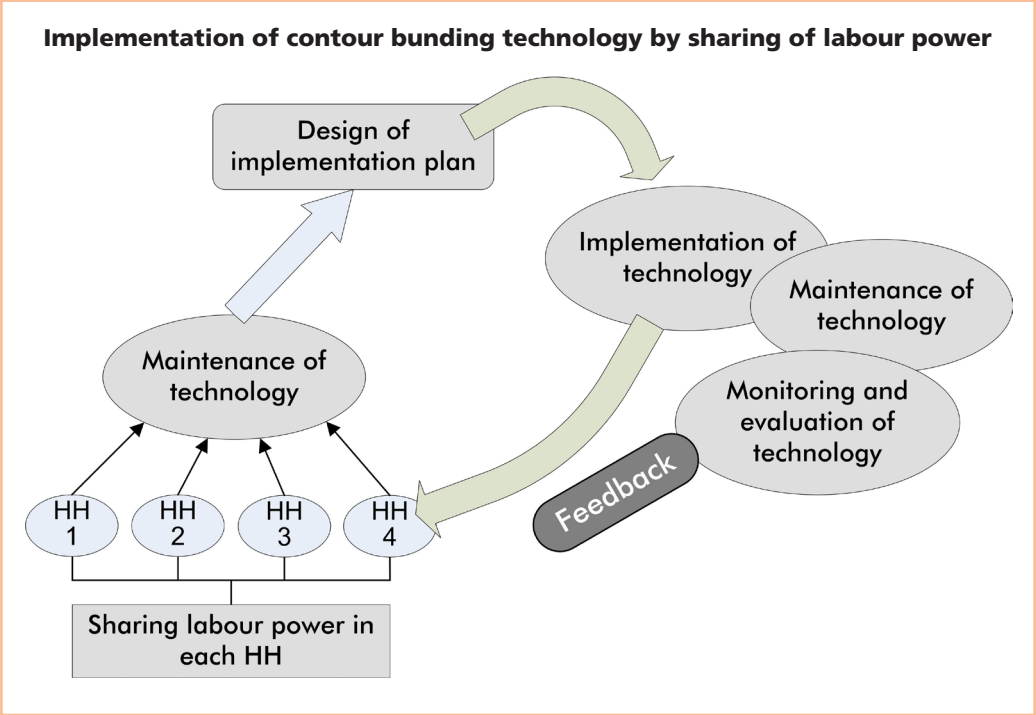
Decisions on choice of the technology: The land users themselves decide on the technology during participatory discussions held in the community. This is a bottom-up approach.
Decisions on method of implementing the technology: The land users themselves possess traditional knowledge on how the technology should be implemented. Since some farmers have a better grasp of the technology than others, the different methods are discussed and the community as a whole decides what method is to be used.
Approach designed by: Land users
Implementing bodies: This technology is straightforward; the community of land users can implement it without external input.

Land user involvement

Phase	Involvement	Activities
Initiation/motivation	Self-mobilization	Demand created by the community
Planning	Interactive	Through discussions the whole community is involved in deciding what sites are to be contoured and how the bunding technology is to be implemented.
Implementation	Self-mobilization	The whole community is involved in planning the sites, slashing the biomass, and forming the contour bunds.

Differences in participation of men and women: Both men and women participate equally

Involvement of disadvantaged groups: This is a sustainable land management practice in areas where shifting cultivation is practised. These areas have typically been inhabited by poor and marginal groups like the Chepang, Magar, Dalit, and Gurung groups.



Organogram
Each household (HH) contributes labour and the community works together to implement contour bunding.
(AK Thaku)

Technical support

Training/awareness raising: Working together through site visits, farmer to farmer dialogue, demonstration areas, and public meetings, helped to raise awareness and to train all members of the community (both male and female). The whole community now understands the importance of working collectively for the common good.
Advisory service: None
Research: None

External material support/subsidies

Contribution per area (state/private sector): None
Labour: None
Inputs: None
Credit: None
Support to local institutions: None

Monitoring and evaluation

Monitored aspects	Methods and indicators
Biophysical	Land users regularly monitor the organic matter and moisture content of the soil and establish plants in bunds
Technical	Land users regularly monitor terrace formation and soil erosion
Socio-cultural	The community observes and comments on the degree to which contour bunding is implemented
Economic/production	Land users note crop production and how it affects their cash income
Area treated	Land users regularly monitor small patches used in shifting cultivation
No. of land users involved	The whole community participates in observing how many people are involved
Management of approach	The whole community participates

Impacts of the approach

Changes as a result of monitoring and evaluation: Gradually, farmers in other communities are also adopting the same approach.
Improved sustainable land management: Moderate improvements were noted. The approach was a good way of improving sloping land management.
Adoption by other land users/projects: A few other groups have followed suit. Those who implemented this approach cited improved soil fertility and the increased productivity of cash crops like legumes as a plus point.
Improved livelihoods/human wellbeing: Moderate improvements were noted; these were mainly due to the increased earnings from the production of cash crops. Earnings were invested on daily needs which improved livelihoods.
Improved situation of disadvantaged groups: Moderate improvements were noted in Chepang, Magar, and Dalit households who benefited from this approach and improved their livelihoods.
Poverty alleviation: Some poverty alleviation was noted among households who could increase the amount that they earned from cash crops. These households used the additional earnings on health care and education.
Training, advisory service, and research: Not applicable
Land/water use rights: Not applicable
Long-term impact of subsidies: Not applicable

Concluding statements

Main motivation of land users to implement: By working together, land users can help to prevent soil erosion and increase crop productivity for the entire community.
Social cohesiveness (affiliation to group): This approach helps to promote cohesiveness and improves the livelihoods of all who participate.
Sustainability of activities: This is a community-based approach; each community formulates its own rules and regulations.

Strengths and →how to sustain/improve	**Weaknesses** and →how to overcome
Effectiveness → Improve the approach by continuing to work together to design, plan, and implement.	Some members contribute more than others → Each member of the group needs to be made aware of how they can contribute.
Increases social cohesiveness → Continue to work collaboratively	
Decreased workload → Over time, the group decisions that work best no longer need to be revisited and less time is spent in discussions.	
Quick implementation of sloping land management measures → As the group learns to work together they can taking advantage of their synergy to quickly implement new measures.	
Empowerment →Encourage the community with technical backstopping	

Key reference(s): Regmi, BR; Aryal, KP; Subedi, A; Shrestha, PK; Tamang, BB (2001) *Indigenous knowledge of farmers in the shifting cultivation areas of Western Nepal.* Pokhara, Nepal: LI-BIRD
Contact person(s): Bir Bahadur Tamang; LI-BIRD, Gairapatan, Pokhara, Nepal, P.O. Box 324, Email: info@libird.org, btamang@libird.org; Tel: +977 61 526834 (0); 9746005992 (M)

Left: Land users with an A-frame that they use to mark out contour lines on sloping land (Gyanbandhu Sharma)
Right: A local woman harvesting grass planted along a contour line (Gyanbandhu Sharma)

Participatory hedgerow management

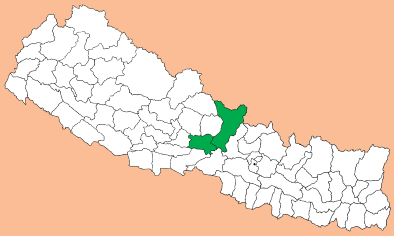
Nepal: सहभागितामूलक घाँसेहार ब्यवस्थापन

Hedgerow technology can be introduced through the joint participation of farmers, scientists, and related stakeholders. The whole community works together at all stages, including designing, planning, implementation, monitoring and evaluation, and scaling up.

Communities can establish better hedgerows by supplementing the traditional knowledge that they have employed for generations with scientific knowledge through a participatory process where both groups are involved in every step of planning, designing, and implementation. This approach recognizes the validity of the local knowledge that farmers have about their land and supplements it with scientific techniques to facilitate the implementation of methods which will yield better results sooner.
Hedgerow technology can be implemented by forming farmers' groups and using a participatory approach. This technology has the potential to be scaled up and applied on a broader scale. The steps for sharing labour and know-how to establish hedgerows can be summarized as follows:

- Capacity is strengthened through discussions with technical persons.
- Farmers, technical persons, and related stakeholders work together to come up with plans that make the best use of both the farmers' indigenous knowledge on how to form hedgerows and their understanding of the landscape, and scientific knowledge, for designing and planning.
- The hedgerows are established by the farmers as per the consensual plan.
- Some farmers are designated to periodically inspect the hedgerows and to perform maintenance as needed.
- The technology is scaled up by farmers who disseminate the learning to other farmers through extension and knowledge sharing at different fora.

Farmers, technical persons, and related stakeholders were all involved at every stage. In addition, LI-BIRD, local community-based organizations, and other related stakeholders such as the district forest office and the district agriculture office were on hand to support the farmers' group by offering technical and financial resources. The farmers' groups had a vested interest in this approach and demonstrated their commitment by: generating funds from a savings and credit scheme and conducting income generating activities. They also worked to establish effective linkages and to coordinate with related stakeholders to obtain resources which would ensure that the group would be self-reliant in the long run. The involvement of a wide range of participants will ensure that the technology is not only effective but that it is also sustainable. Moreover, when neighbouring communities see how successful this approach can be, it is hoped that they also will adopt the technology.



WOCAT database reference: QA NEP 27
Location: Tanahun and Gorkha Districts, Nepal
Approach area: Approximately 1–10 km^2
Land use: Agroforestry
Type of approach: This is a project/ programme-based approach
Focus: Mainly on conservation with other activities
Related technology: Hedgerow technology QT NEP 27
Compiled by: Gyanbandhu Sharma, LI-BIRD
Date: March 2010, updated March 2013

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

ICIMOD LI-BIRD WOCAT

Problems, objectives and constraints

Problems

This approach addressed a few of the major problems in the area. The outstanding problems were:

- poor technical knowledge,
- lack of group efforts,
- lack of cash for investment,
- poor access to service providers,
- inadequate use made of farmers' traditional knowledge,
- inadequate knowledge resources, and
- poverty and poor social cohesiveness.

Aims/objectives

- The objective of this approach was to introduce the technology through participatory planning, designing, and implementation by integrating farmers' knowledge and experiences in the process.

Constraints addressed

Major	Constraint	Treatment
Technical	Farmers had low technical knowledge	Farmers shared their know-how and also learned from scientists, other farmers and related stakeholders
Institutional	Farmers had no formal institutional mechanisms and also had no capacity to run their institutions	Farmers learned how to form a formal group and also improved their capacity to run their institutions
Minor	**Constraint**	**Treatment**
Financial	Farmers had insufficient financial resources to implement the technology	Farmers learned how to apply for resources from different related stakeholders and they also learned how to generate cash from their own group using savings and credit schemes.

Participation and decision making

Stakeholders/target groups


Land users, groups


Land users, individual


SLM specialists, agricultural advisors

Approach costs met by:

National non-governmental organization	20%
Local community/land user(s)	70%
Local government (district, municipality, and village)	10%
TOTAL	**100%**

Annual budget for sustainable land management component: approximately USD 8

Remarks

- The cost of implementing this technology is dependent on the gradient of the slope (and other geographical features), the local cost of the seeds or seedlings, and the availability of labour.
- Costs are rough estimates by the technicians and authors. Exchange rate USD 1 = NPR 73 in March 2010.

Decisions on choice of the technology: Mainly by land users supported by sloping land management specialists. Both farmers and specialist were involved in on-farm visits to assess the condition of the land; farmers attended seminars to acquire new knowledge and they also used this opportunity to share their own knowledge. Farmers and specialists together selected the technology.

Decisions on method of implementing the technology: Mainly by land users supported by sloping land management specialists

Approach designed by: Specialists and land users. During the design process, specialists organized on-farm visits and exposure visits. The plan was prepared jointly by the land users and the specialists who used each others' expertise.

Implementing bodies:

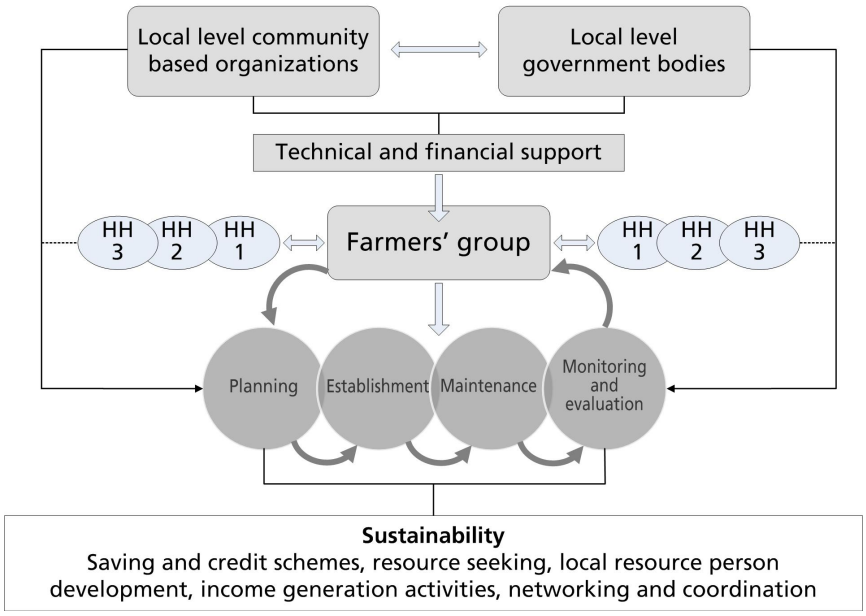
- LI-BIRD was the implementing national non-governmental organization.
- Local farmers' groups were involved in the field implementation.
- Local government bodies such as the district forest office, the range post office, the district agriculture office, and the agriculture service centre, all supported the local farmers' groups with resources and coordination.

Land user involvement

Phase	Involvement	Activities
Initiation/motivation	Passive	At the beginning, the land users were mostly passive because they lacked information on sloping land management.
Planning	Interactive	Land users were actively involved in the planning stage and they incorporated feedback from other stakeholders to finalize the action plan. During this phase they also prepared the land and the materials, and recruited the resource person needed to implement the technology.
Implementation	Self-mobilization	Land users were involved in the implementation phase mobilizing their group members and shared the new technical knowledge that they had acquired.
Monitoring/evaluation	Interactive	Land users and other stakeholders remained actively involved throughout the different stages of monitoring and evaluation.
Research	Payments/external support	Land users were actively involved in research work to test and validate the approach.

Differences in participation of men and women: Men and women participated equally.

Involvement of disadvantaged groups: Yes, moderately. This approach encouraged the involvement of disadvantaged groups and ethnic minorities such as Dalits, Gurungs, and Chepangs at different stages of implementation.



Organogram
Households (HH) participate in hedgerow management
(Gyanbandhu Sharma, AK Thaku)

Technical support

Training/awareness raising: This approach provided training on hedgerow technology and group mobilization to enhance the capacity of land users, field staff, and local resource persons. Site visits to the demonstration areas were also organized for the land users.
Advisory service: They used an advisory service called the 'group mobilization method'; networking and coordination of farmers' groups with district level line agencies such as the district forest office, the district agriculture office, the district livestock office, and other relevant stakeholders for learning and sharing of information.
Research: On-farm technical research was a part of the approach applied by land users, specialists, and relevant stakeholders who were involved in hedgerow technology trials.

External material support/subsidies

Contribution per area (state/private sector): LI-BIRD provided some support.
Labour: The land users themselves contributed to implementing the whole approach.
Inputs: Not financed
Credit: Not provided
Support to local institutions: Yes, a little. Trainings and sessions on capacity building were provided to the land users.

Monitoring and evaluation

Monitored aspects	Methods and indicators
Biophysical	The land users and project staff made regular observations of sediment deposition rates after the intervention.
Technical	The land users and project staff made regular observations on the formation of terraces and control of erosion.
Socio-cultural	The land users and project staff regularly observed sociocultural impacts.
Economic/production	The land users and project staff regularly observed the extent to which the income of the land users changed.
Area treated	The land users and government staff monitored the coverage of the technology.
No. of land users involved	Regular observations were made by the land users and project staff on how many land users were adopting the technology.
Management of approach	The land users and project staff regularly observed how well the group functioned together and how well they linked with stakeholders

Changes as a result of monitoring and evaluation: Monitoring brought few changes; farmers used the information gathered during monitoring of on-farm demonstration to help them select the species they preferred but the technology remained the same.

Impacts of the approach

Improved sustainable land management: Yes, moderately. This approach helped to stabilize the fragile hill slopes.
Adoption by other land users/projects: Yes, some. This approach was adopted by adjoining villagers and scaled up gradually in Dhading, Chitwan, Nawalparasi, and Makwanpur Districts. According to preliminary information, at least 450 households have now adopted this approach for sustainable land management.
Improved livelihoods/human wellbeing: Yes, moderately. This approach helped to improve the livelihood status of the land users by helping to diversify their options for income generation and skills development.
Improved situation of disadvantaged groups: Yes, a little. The capacity of marginal ethnic groups increased; they learned how local institutions function and felt empowered to seek resources from their service providers.
Poverty alleviation: Yes, moderately. After the implementation of this approach, land users could earn cash income and learned how to increase their capacity to implement income generating activities which would enhance their livelihoods.
Training, advisory service, and research: Farmers and stakeholders participated in capacity building and training sessions to learn about the technology. Land users gradually became more receptive to advice from specialists and stakeholders. Research was an effective way to help introduce the approach; the land users were more open to the whole approach once they had seen the results of the research.
Land/water use rights: Land: individual, not titled; Water: community owned
Long-term impact of subsidies: Not applicable as subsidies were not provided.

Concluding statements

Main motivation of land users to implement sustainable land management: Improved wellbeing and better livelihoods as a result of enhanced capacity and the ability to earn cash income. Affiliation to other groups improved their networks.
Sustainability of activities: Individual land users were enthusiastic to implement the approach and to take it further. Land users who are shifting cultivators, and who typically have no land ownership, are slower to embrace the approach.

Strengths and ➔how to sustain/improve	**Weaknesses** and ➔how to overcome
Sustained capacity building ➔ Continue to build strong links and coordinate with government line agencies	Difficult to develop common understanding ➔ Organized regular learning and sharing to develop common understanding
Improved access to services providers helped to enhance their capacity to cope with adverse conditions ➔ Continue to build and maintain contact with government line agencies	Farmers have only a limited understanding of the skills needed ➔ Continue to strengthen farmers' groups and continue to mobilize through sharing and learning
Local institutions were strengthened ➔Established formal institutions and help to sustain them	The approach is resource intensive. ➔ Promote savings and credit schemes with farmers' groups. Mobilize farmers' groups so that they can petition other groups and line agencies for resources.
Land users actively participated and took ownership ➔ Continue capacity building and training. At present the government is initiating programmes with leasehold forest groups in Gorkha and Tanahu Districts that encourages the establishment hedgerows ➔ Work to mainstream the approach within government programmes	Time consuming ➔ Work with land users to improve their time management and their ability to plan future activities and delegate responsibilities.
Collaboration helped land users to sustain their efforts ➔ Continue to build a sense of community between land users	Few farmers participated during the initial stages ➔ Conduct awareness raising activities and promote activities that give some tangible benefits in the short term.
Developed skilled manpower ➔ Continue to build a critical mass of skilled land users so that they themselves can help to propagate the approach	

Key reference(s): Regmi, BR; Aryal, KP; Shrestha, PK; Tamang, BB (2003) Building on partnership approaches in participatory identification of integrated agricultural technological packages suitable for sloping land areas (unpublished). Pokhara, Nepal: LI-BIRD
Contact person(s): Gyanbandhu Sharma, Local initiatives for Biodiversity Research and Development (LI-BIRD), P.O.Box No. 324, Gairapatan, Pokhara, Nepal; Email: gsharma@libird.org, www.libird.org, Tel: +977 61 5526834/5535357 (O); +977 9846044871 (M)

Left: Villagers gather for a focus group discussion on no-till garlic cultivation; it is not unusual that a majority of the participants are women (Krishna Lamsal)
Right: Villagers often continue their discussions in smaller groups throughout the day. (Krishna Lamsal)

Learning about no-till methods through farmer-to-farmer dissemination

Nepal: किसान–किसानबीचको प्रसारद्वारा खनजोत नगरिकन खेति गर्ने तरिकाको अध्ययन

Farmer to farmer dissemination of information on no-till methods for garlic cultivation technology

Farmers can learn about alternative or newer methods by sharing their experiences with one another. In this approach, farmers shared information and knowledge on no-till garlic cultivation technology. Since no-till methods are not widely known in the area, the approach aimed to increase awareness of the many features of the technique and its benefits. Through farmer-to-farmer dissemination, communities can learn about the various aspects of no-till for crop residue management, resource use, and how it can reduce labour costs. These discussions highlight the environmental and social benefits of no-till methods especially with respect to moisture retention, soil and water conservation, and climate change adaptation.
In 2009, Local Initiatives for Biodiversity, Research, and Development (LI-BIRD), piloted and validated no-till farming in Nepal as a measure for soil and water conservation through the Western Terai Landscape Complex Project (WTLCP) and the Promoting Local Innovation (PROLINNOVA) programme. The dissemination was multi-faceted and the farmers remained engaged throughout the discussions, which included both talks and group participation. Farmers' groups, community-based organizations, biodiversity conservation groups, and development committees at the village level were given training and technical inputs. This community-level interaction encouraged farmers to discuss with one another as well as to head out to the field for demonstrations and observations. After no-till garlic cultivation was successfully piloted, it was widely adopted by farming communities and especially the indigenous Tharu communities of western Nepal.

WOCAT database reference: QA NEP 39
Location: Gadariya VDC, Kailali District, Seti zone, Nepal
Approach area: 1–10 km^2
Land use: Annual cropping
Type of approach: Innovative; this is a local initiative started about 10 years ago
Focus: Mainly on conservation with other activities such as agriculture and livelihoods
Related technology: No-till garlic cultivation (QT NEP 39)
Compiled by: Krishna Lamsal, LI-BIRD
Date: June 2011, updated March 2013

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

ICIMOD LI-BIRD WOCAT

Problems, objectives and constraints

Problems

- Lack of awareness about low cost soil and water conservation technologies that address farmers' needs
- Initially there was weak institutional support for organizing discussion sessions

Aims/objectives

- To disseminate information and know-how on no-till methods
- To increase awareness among the farmers on the benefits of no-till methods and crop residue management
- To increase awareness of the environmental and social benefits of no-till methods and the role that it can play in adaptation to climate change

Constraints addressed

Major	Constraint	Treatment
Social/cultural	No-till methods are not widely known in the area	The group was readily convinced of the economic benefits of no-till methods (especially for garlic production) and this was essential in persuading them to accept the technology.
Minor	**Constraint**	**Treatment**
Financial	Financial resources lacking; this group does not have links to financial institutions.	Farmers used their own resources.
Other	Water availability is poor.	No-till methods help to conserve moisture in the soil.

Participation and decision making

Stakeholders/target groups

Land users individual/ group

Approach costs met by:

Mostly by the land users; capacity building activities and field demonstration costs were borne by LI-BIRD.	100%
TOTAL	**100%**

Decisions on choice of the technology: Made collectively by farmers in the group and facilitated by discussion with specialists.

Decisions on method of implementing the technology: Made by farmers in the group and facilitated by discussion with specialists.

Approach designed by: LI-BIRD on the basis of information from the literature and on experience with other groups. LI-BIRD piloted the technology and found it to be a good measure for soil and water conservation, as well as being approximately 25% less expensive to implement than the traditional technology for garlic production. It promoted use of the technology and encouraged scaling up to more communities through dissemination by different means including local FM radio stations.

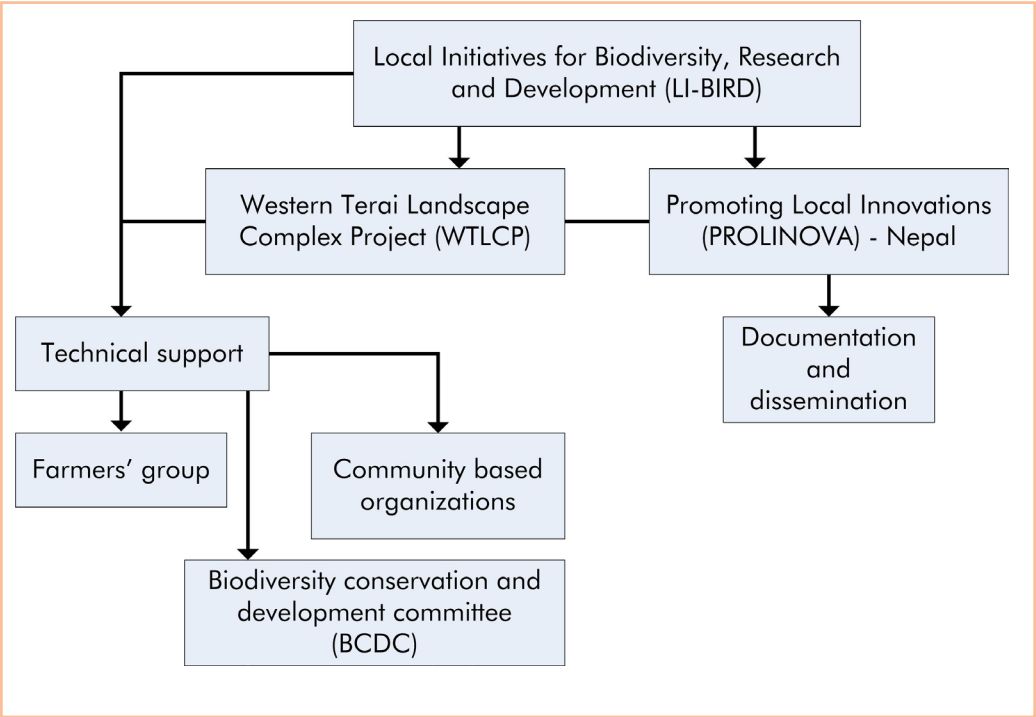
Implementing bodies: The initial dissemination of the technology was driven by the land users themselves. At the local level, community-based organizations, farmers groups, and local NGOs were all involved.

Land user involvement

Phase	Involvement	Activities
Initiation/motivation	Self-mobilization and interactive	Community meetings organized to discuss the new technology and how it could be implemented locally
Planning	Interactive	Interactive discussion groups and focal groups organized in the community
Implementation	Self-mobilization and interactive	Individual farmers implemented the technology on their land without external support. LI-BIRD provided in-kind and technical information and support.
Monitoring/evaluation	Self-mobilization and interactive	LI-BIRD monitored the implementation of the technology and helped to evaluate the outcome. They collected and analysed data in order to highlight the soil and water conservation aspects of the no-till method and disseminated this information.

Differences between participation of men and women: Yes, moderately; about 60% of those who attend meetings are women. Most of the field activities such as planting and harvesting are performed by women.

Involvement of disadvantaged groups: Yes, the indigenous Tharu communities are adopting this technology.



Organogram
LI-BIRD piloted and validated no-till farming in Nepal as a measure for soil and water conservation through the Western Terai Landscape Complex Project (WTLCP) and the Promoting Local Innovation (PROLINNOVA) programme. Technical support was extended to farmers' groups, community-based organizations, biodiversity conservation groups, and development committees at the village level.
(A. K. Thaku)

Technical support

Training/awareness raising: Land users and community mobilizers from the indigenous Tharu communities were given training on no-till method and crop residue management. Disseminating information on resource use and on the multi-faceted environmental, social, and climate change adaptation benefits of this technology is an important component of this approach. Participatory methods and approaches were used in order to enable participants to learn about the technology.**Advisory service:** Capacity building took place through site visits and extension materials as well as through discussions and exchanges
Research: None

External material support/subsidies

Contribution per area (state/private sector): None
Labour: None
Inputs: None
Credit: None
Support to local institutions: LI-BIRD supported farmers groups, biodiversity conservation and development committees, and community-based organizations by providing hands-on training and technical support.

Monitoring and evaluation

Monitored aspects	Methods and indicators
Technical	Regular observations by technical staff from LI-BIRD jointly with representatives from biodiversity conservation and development committees, farmers groups, and community-based organizations
Socio-cultural	Regular observations by the land users and LI-BIRD technical staff
Economic/production	Regular observations by technical staff from LI-BIRD jointly with representatives from biodiversity conservation and development committees, farmers groups, and community-based organizations

Impacts of the approach

Changes as result of monitoring and evaluation: Several changes were observed. People learned both through discussions and by taking a hands-on approach. An initial attempt to replicate the method ended in failure. However, through discussions and technical inputs, the farmers were eventually able to replicate the method and it is now well understood.

Improved sustainable land management: Yes, moderately. No-till and better use of crop residues has contributed to improved land management; more moisture is now retained in the soil. Water is in poor supply and vegetable production in this area is limited by the amount of moisture in the soil.

Adoption by other land users/projects: Yes, many. Community-based organizations, as well as members of other communities and neighbouring districts, have either adopted the method or expressed an interest in learning how to implement it.

Improved livelihoods/human wellbeing: Yes, moderately; mainly due to increased income from garlic production and reduced labour costs associated with no-till.

Improved situation of disadvantaged groups: Yes, moderately. The indigenous Tharu communities now have some increased cash income from selling their garlic crop.

Poverty alleviation: Yes, a little, mainly due to increased income from garlic production and reduced labour costs. Studies showed a 25% increase in crop yield and reduced labour requirements.

Training, advisory service, and research: The training was instructive not only to transfer the no-till technology but also to make land users and community members at large aware of the importance of moisture conservation.

Concluding statements

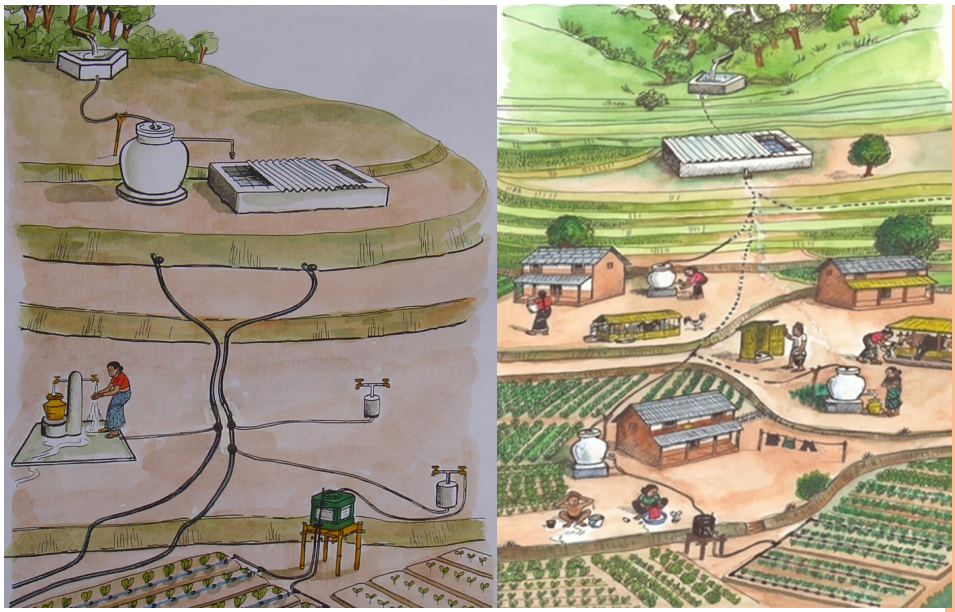
Main motivation of land users to implement sustainable land management: Increased profitability, reduced workload, and improved wellbeing and livelihoods

Sustainability of activities: This technology has a high probability of being sustainable because it is cost effective and requires minimal technical input (farmers can do it on their own); moreover, it helps with soil conservation.

Strengths and →how to sustain/improve	**Weaknesses** and →how to overcome
Farmers can easily learn no-till techniques through community participation. The approach is sustainable because it is easy to implement and it appeals to farmers because they appreciate it as a way of reducing labour and increasing crop yields. → Continue to give some minor technical support and encouragement.	Market linkages are poor and the scope to scale up is also small. → The establishment of stronger market linkages would motivate farmers to attempt commercial cultivation.
The approach focused on building capacity by using a hands-on approach similar to how farmers traditionally transfer know-how between themselves. Farmers can adapt and modify the technology as needed to deal with changing conditions in the environment. Financial inputs by external organizations are not needed. → Continue to give some minor technical support and encouragement.	

Key reference(s): None

Contact person(s): : Krishna Lamsal, Local Initiatives for Biodiversity, Research and Development (LI-BIRD), P.O.Box 324, Gairapatan, Pokhara
Tel: +977 61 5535357/5526834, 9841483937 (M); Fax: +977 61 5539956, Email: info@libird.org, klamsal@libird.org, naturekrish@gmail.com ; www.libird.org



Left: Diagrammatic illustration of a two tank system where the source water is first collected into a tank which is dedicated for domestic use and spillover water is collected into a second tank which is dedicated for agricultural use. (IDE/Nepal)
Right: Diagrammatic illustration of a one tank system where a single tank provides water both to the domestic tap stand and to fill up drip irrigation header tanks. (IDE/Nepal)

A multiple-use water system

Nepal: बहुउद्देश्यीय पानी प्रयोग प्रणाली

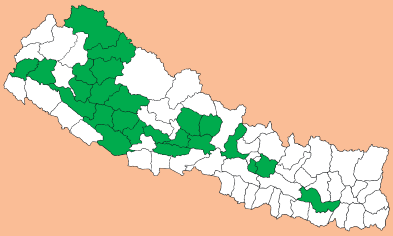
A multiple-use water system gives a community access to water for domestic use and water for crop irrigation.

A multiple-use water system (MUS) is a combined water facility that has proven useful as a means of providing drinking water and water for irrigation for smallholder farmers in the hilly areas of Nepal. Water is collected by gravity from a highland source into a holding tank and is shared by means of distribution lines, domestic tap stands, and irrigation off-take lines. It can also support application of micro-irrigation technologies (MIT) such as drip and micro sprinkler irrigation systems.

MUS is a community-managed system that caters mainly to smallholder landowners and marginal households in rural hilly areas. When properly implemented, it can help to alleviate poverty and increase food security for poor and marginalized groups. The first priority is to provide drinking water and water for domestic use to the community; any excess water is used for agriculture and irrigation.

The following points should be taken into consideration before a community establishes a MUS:

- The source of water should be clear of water-rights issues
- The water should be plentiful and of good quality
- There needs to be a sufficient drop in gradient between the source and the tank if the water is to be collected by gravity. If the drop is not sufficient, users should be prepared to consider lifting the water.
- The distance between the source and the village should be less than 3 km.
- The community should be ready to contribute unskilled labour as part of their contribution to the project.
- The community should be ready to put aside some funds for operational and maintenance costs; these funds can, in part, also be collected in the form of monthly users' fees.
- At least 70% of the water users should be ready to adopt micro-irrigation technologies (MIT) such as drip and sprinkler irrigation.



WOCAT database reference: QA NEP 29
Location: Kaski, Lamjunj, Tanahun, Dhading, Sangjya, Gulmi, Arghakhanchi, Palpa, Udayapur, Pyuthan, Rolpa, Rukum, Salyan, Dang, Surkhet, Dailekh, Jajarkot, Kalikot, Mugu, Humla, Jumla, Doti, Dadeldhura, Lalitpur, and Kabhrepalinchok Districts, Nepal
Approach area: 45,000–50,000 km^2
Land use: Annual cropping
Type of approach: Project/programme based
Focus: Collect water from a small-scale source and distribute it both for domestic use and for the production of vegetables and high value crops
Related technology: Not described
Compiled by: Parmanand Jha, IDE Nepal
Date: August 2011, updated March 2013

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

ICIMOD iDE नेपाल Nepal WOCAT

Problems, objectives and constraints

Problems

- The community needs to prioritize how it will partition the water for domestic use and for irrigation.

Aims/objectives

- To provide a regular supply of water for domestic and agricultural use
- To supply water for micro-irrigation technologies such as drip and sprinkler irrigation systems
- To improve health and sanitation
- To help smallholder landowners improve their incomes and livelihoods as well as to adapt to climate change by having access to a regular supply of water so that they can grow crops regardless of changes
- To conserve water by using it more wisely

Constraints addressed

Major	Constraint	Treatment
Social-up	The community often cannot agree whether to scale up the domestic or the irrigation water supply.	Concerned stakeholders need to confer and agree
Social	Management and operation of system	Strong social mobilization is needed
Minor	**Constraint**	**Treatment**
Technical	Water supply insufficient to meet the demand	Increase the capacity of the storage tank

Participation and decision making

Stakeholders/target groups

Land users individual/ group | SLM specialists, agricultural advisors | Local leaders and local government | Teachers, students and parents | Women/Men/ Dalit/Janajati/ Brahmin/ Chhetri

Approach costs met by:

International non-governmental organization	30%
Local government (district, village, national)	26%
Local community and land users	44%
TOTAL	**100%**

Annual budget: USD 10,000–100,000

Remark:
All costs and amounts are rough estimates by the technicians and authors. Exchange rate USD 1 = NPR 74 in August 2011

Decisions on choice of the technology: The community discusses and makes a decision on the type of water supply system they would like and specifies how they would like to apportion water for domestic and agricultural use. They submit a proposal to the concerned authorities.
Decisions on method of implementing the technology: Technical support is provided by IDE Nepal in collaboration with different national and international non-governmental organizations, government organizations, and local bodies.
Approach designed by: IDE Nepal. This is a leading organization that has designed its own model for multi-use water systems and has helped to install these throughout the country for the past eight years.
Implementing bodies: IDE provides technical support: it helps communities to conduct feasibility studies, it works with them to come up with a suitable design, it provides cost estimates, and it offers supervision during the construction phase. The actual construction is managed by the communities themselves through their appointed construction committee and subcommittees as decided in the MUS users group. Training and capacity building is provided by IDE.

Land user involvement

Phase	Involvement	Activities
Initiation/motivation	Interactive	The community comes to a consensus on their water needs. They identify a source that it is within the 3 km limit and investigate the water use rights.
Planning	Motivation and mobilization	Technical aspects are dealt with; these include assessing the source to verify whether it has an adequate supply of water, assessing different schemes (for intake, take off, tap stands, and the like), preparing a design and estimating the cost, and discussing funding.
Implementation	Mobilization	A users' committee is formed and the community provides unskilled labour. Technical assistance is provided by INGOs/NGOs.
Monitoring/evaluation	Self-mobilization and INGO/NGO	The work is monitored by the users' committee but monitoring and evaluation of technical aspects are provided by INGOs/NGOs at different times during the project.

Differences between participation of men and women: More than 60% of the participants are women who are directly involved with the domestic uses of water for drinking and sanitation as well as in the farming of vegetables and high value crops.

Involvement of disadvantaged groups: More than 40% of the users were members of disadvantaged groups.

Procedural Steps of MUS Design and Implementation

Pre construction phase:	Project Initiation
	Consultative meeting/application call
	Scheme screening
	Feasibility study and tentative costing
	Scheme ranking and selection
	Scheme appraisal
	Formation of water users committee
	Detailed engineering survey
	Design and cost estimation
	Approval/agreement
	Preparation of work plan
	Collection of fund for O & M and MIT kits
	Agreement between WUC and contractor
Construction phase:	Procurement of materials and tools
	Transmission section
	Tanks, taps and distribution section
	Testing
Post-construction phase:	Nomination of scheme operator and caretakers
	Training: Scheme operation
	Micro-irrigation
	Project completion meeting/social audit
Evaluation phase:	Evaluation/feedback

Organogram
(Adapted from
(Mikhail and Yoder 2008)

Technical support

Two main types of MUS are constructed in Nepal.

- One tank system. The source water is collected into a single tank; this tank provides water to the domestic tap stand where householders can collect water for domestic use. The same tank is used to supply water to fill up drip irrigation header tanks.
- Two tank system. The source water is collected into a first tank for domestic use; when this tank is full, overflow is collected into a second tank for agricultural use. The system uses dedicated water distribution lines for domestic and agricultural use.

International Development Enterprises (IDE) has used this approach since 2003 to help supply water to marginalized and poor communities in the hill areas of Nepal. Once these communities have access to a regular water supply, their drudgery decreases, and their health and livelihoods improve. They can take advantage of the irrigation facilities to increase their income opportunities by growing high value crops. MUS has potential beyond what is discussed here since it can be upgraded to accommodate other end-use applications in addition to irrigation.

Training/awareness raising: The approach provided training to the community through the users' committee, field staff, and an agricultural advisor. The local skilled body is trained during site visits. For the most part, information is transferred from farmer to farmer. Much of the training is hands-on.
Advisory service: An advisory service is provided for the land/water users, but what is given is usually insufficient to help farmers learn new techniques such as micro-irrigation.
Research: IDE has researched and implemented this type of MUS concept, system design, and methodology in Nepal since 2003; now other agencies also provide similar systems.

External material support/subsidies

Contribution per area (state/private sector): All MUS systems in Nepal are built by communities or community groups in collaboration with the government and NGOs. The fact that MUS systems provide multiple benefits is seen as a plus point for institutions looking to invest in community projects.
Labour: Unskilled labour is provided by the community; skilled labour is provided by the implementing organization. The implementing organization pays for both the skilled and unskilled labour.
Inputs: Materials that are available locally are contributed by the community. Materials that are not available locally are paid for out of project funds. Equipment, tools, and specialist materials are purchased through collaborative partners. Training programmes aimed at capacity building and upgrading skills are subsidized.
Credit: No credit was provided.
Support of local institutions: The following groups can provide support: village development committees, local governance and community development programmes (LCGDP), community forest user groups, youth clubs, and women's groups. Village development committees can invest in MUS and micro-irrigation technologies as specified in their guidelines.

Monitoring and evaluation

Monitored aspects	Methods and indicators
Biophysical	Project staff and land users routinely monitor the water source and other biophysical aspects to ensure that the approach remains sustainable.
Technical	Commercial vegetable or high value crop production, micro irrigation, drinking water and sanitation
Socio-cultural	MUS schemes help to improve sanitation and thereby reduce the incidence of waterborne diseases. They also help to improve livelihoods by making more fresh vegetables available both for immediate consumption and for sale.
Economic/production	MUS schemes help to reduce drudgery; the labour saved can be used in the production of vegetables and other high value crops.
No. of land users involved	From 10 to 80; on average 28 land users are involved in one MUS scheme
Management of approach	Participatory approach with collaboration by government organizations, INGOs/NGOs and others to provide routine inspections and technical support

Impacts of the approach

Changes as result of monitoring and evaluation: The approach, as it is now put into practice, is a result of incorporating technological improvements that were originally identified through years of monitoring and evaluation.
Improved sustainable land management: The approach supports sustainable land management because micro-irrigation technologies promote optimal use of water and help to retain nutrients in the soil. Similarly, the production of high value crops and vegetables further increases the fertility of the soil.
Adoption by other land users/projects: Since the reduction in drudgery and the improvements in livelihoods are so great, many communities would like to implement this approach. INGOs/NGOs can help with the financial and technical aspects of implementation.
Improved livelihoods/human wellbeing: This approach helps to reduce drudgery and to improve sanitation; overall, it improves livelihoods and contributes to human wellbeing. It also increases the production of crops, and helps to conserve the soil and improve its fertility.
Improved situation of disadvantaged groups: The wellbeing of marginalized and socio-economically disadvantaged groups improves significantly.
Poverty alleviation: Through increased income from the production of vegetables and high value crops
Training, advisory service, and research: Land users benefit since their livelihoods are improved. A MUS can help a community to develop.
Land/water use rights: Since this approach uses small spring sources of water, there is usually only a minimum risk of conflict for water use. When the water source is registered with the local authorities, it helps to reduce potential conflicts over water rights between communities.
Long-term impact of subsidies: The land users themselves are self motivated to keep the MUS system operational because they depend on it to produce vegetables and high value crops. They can usually recover their initial investment within a year. The monthly maintenance fees insure that the system is operational in the long run.

Concluding statements

Main motivation of land users to implement sustainable land management: The farmers are interested in increasing their vegetable production and in selling their produce. Since the profits earned by selling vegetables and high value crops is quite high they can pay off the debts they have incurred for their initial investment quickly and soon start realizing a profit. As a bonus, this approach also helps to improve sanitation, to reduced waterborne diseases, and generally boost the health of the community.
Sustainability of activities: Since the approach was requested by the community as a whole, they all have a vested interest in seeing that it remains sustainable. When technical support is needed, it can be obtained from the concerned agencies.

Strengths and →how to sustain/improve	Weaknesses and →how to overcome
A reliable water supply for both the domestic and irrigation needs of hill farmers → The continued involvement of the community, the government, and assisting INGOs/NGOs.	Installation costs can be a challenge for very poor communities. It can only irrigate small areas (0.1-0.15ha). → Installation costs can usually be recovered within 1 year when the irrigation water is used to produce high value crops.
The MUS is a simple gravity system that does not require either sophisticated equipment or training. → Continue to investigate how it can be simplified even further.	The intake and reservoirs need to be inspected regularly. → Either devise a means to ensure that inspections are conducted regularly or find a system that requires fewer inspections
A MUS system has a minimum lifespan of ten years and is easy to install even in remote areas. → Continue to investigate how it can be improved even further.	Reservoir tanks and intake pipes can deteriorate over time and pipes and joints can start to leak. → Local skilled labour can be employed to carry out needed repairs. Pipes and fittings should be checked regularly. Routine inspection and maintenance are essential.
MUS is well suited to the dual purpose use of water for both domestic and agricultural use. → Continue research and development to see how it can be improved even further.	Costs can be high when imported materials are needed for repair and maintenance. → At the outset, some money needs to be set aside for operation and maintenance costs; additional funds should be collected by charging monthly users' fees.

Key reference(s): Mikhail, M; Yoder, R (2008) Multiple use water service implementation in Nepal and India: Experience and lessons for scale-up. http://www.ideorg.org/OurStory/IDE_multi_use_water_svcs_in_nepal_india_8mb.pdf (accessed 2 December 2012)
Contact person(s): Parmanand Jha , IDE/Nepal, Food Security Project, Regional Office, Banke Bagiya, Shantinagar, Nepalgunj; Email: pjha@idenepal@org; jhap-2003@yahoo.com; Tel: 98487 28274 (M); 97495 12791 (M)

Using the participatory market chain approach to help smallholder farmers market their produce

Nepal: तरकारी सहक्षेत्रमा सहभागितात्मक बजार सञ्जाल विधिको प्रयोग

Discussions and structured interactions between farmers and the different actors involved throughout the market chain can help to stimulate joint innovations based on shared ideas and mutual trust.

Most Nepalese rural smallholder landowners are subsistence farmers; when they attempt to produce high value crops such as vegetables for income generation they are often disappointed because they end up selling their produce at local markets for marginal profits. They mostly work alone and, for the most part, their efforts are poorly rewarded, since every step of the value chain is either unmanaged, badly structured, or otherwise uncoordinated. A first step towards addressing the myriad challenges and special needs faced by these smallholder farmers can be to use an adapted version of the participatory market chain approach (PMCA). This approach can help them to improve their livelihoods by building their capacity and assisting them to coordinate and form linkages with other smallholder producers and actors all along the market chain.

The participatory market chain approach uses the tools of rapid market assessment, focus group discussions, stakeholder interviews, and interaction workshops to help identify the constraints and opportunities faced by each of the different actors in the market chain. This approach uses a set of guidelines to help achieve well-defined objectives at specific points as the programme is implemented.

Overall, the long-term objective of the PMCA is to help alleviate the poverty of smallholder producers by introducing market chain innovations, and in particular participation and collaboration among the different market chain actors. Once a given set of conditions is found to work, they can benefit a larger number of farmers if the findings are documented and disseminated among organizations and agencies who share the same goals.

The PMCA approach is executed in three phases:

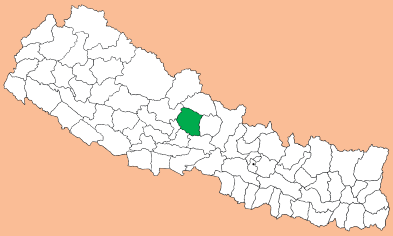
Phase 1: The different actors along the market chain get to know each other. They analyse their situation with the help of market chain sketch tools. By the end of Phase 1, they form a thematic group.

Phase 2: The group analyses potential business opportunities by using a variety of tools such as: rapid market appraisal, quantitative market survey/study, and focus group discussions.

Phase 3: They put into practice the work plan that they have devised to implement the proposed innovations and continue to work on ideas for commercially viable products using the market concept and business plan development tools.

Left: The members of a thematic group and market chain actors present their work plan at a district-level public meeting in Pokhara, Kaski District. Government officials and representatives of NGOs are also present.

Right: The members of a thematic group conduct their meeting in Dhikurpokhari VDC, Ward No. 2 at Simpali. Members of their supporting R&D organization are also present. This type of meeting provides a venue where they can present their achievements as well as discuss their current and future working plans.



WOCAT database reference: QA NEP 33
Location: Bhalam and Dhikurpokhari VDC, Kaski District, Western Development Region, Nepal.
Approach area: 10–100 km^2
Land use: Annual cropping
Type of approach: Project/programme based
Focus: Marketing of agricultural commodities
Related technology: Tomato grafting QT NEP 33
Compiled by: Bharat Nepal, programme officer, International Development Enterprises (IDE) Nepal, Regional Office, Pokhara, Kaski District, Nepal
Date: December 2010, updated March 2013

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

ICIMOD iDE नेपाल Nepal WOCAT

Problems, objectives and constraints

Problems

- At the local level, the markets are poorly structured and poorly managed; there is a lack of systematic marketing for agricultural commodities.
- There is little knowledge of post-harvest processing which would add value to agricultural produce.
- The links and coordination between service providers, market actors, and stakeholders are poor.
- There is insufficient knowledge of institutional development and of the import role it plays in getting products to market.
- Smallholder farmers do not have access to pricing information.
- Distrust and misunderstanding prevail at every step along the market chain.

Aims/objectives

- Develop collection centres at the local level
- Strengthen linkages with the concerned development agencies, service providers, and related market chain actors
- Help smallholder farmers to work with a market-led production plan
- Summarize and share the information gathered with the concerned development organizations in order to scale up the approach
- Develop an action plan based on discussions held with thematic group members and market chain actors

Constraints addressed

Major	Constraint	Treatment
Technical	Inadequate information on market-led production and post-harvest processing; poor links with markets.	Disseminate pricing information; provide training on postharvest processing; give smallholder farmers an opportunity to visit commercial vegetable production sites and different market outlets and allow them to interact with market chain actors and other land users.
Institutional	Weak institutional collaboration among line agencies; market and planning committees only function irregularly.	Facilitate better management of market and planning committees so that the local collection centre can function well.
Other	Distrust, misunderstanding and poor communication are prevalent in interactions between smallholder farmers, traders, service providers, and those in development agencies.	Facilitate frequent interactions between vegetable producers, market and planning committee members, and traders to help break down barriers and build trust; facilitate the development of plans for joint implementation.
Minor	**Constraint**	**Treatment**
Social/cultural/ religious	Smallholder producers have little experience selling their produce at larger markets.	Strengthen community-based collection centres for collective marketing.
Financial	There is no support that smallholder farmers can count on to market their produce.	Inform farmers of the possibility of participating in programmes like PMCA to extend their networking.

Participation and decision making: This approach targets everyone all along the market chain, including traders, market planning committees, members of thematic groups, community-based farmers' groups, and consumers.

Stakeholders/target groups

Land users, individuals and group

Approach costs met by:

International non-governmental organization	60%
Private sector	10%
Local government (district, village)	10%
Local community and land user	20%
TOTAL	**100%**

Annual budget: USD 1,400-14,000

Remarks:

All costs and amounts are rough estimates by the technicians and authors. Exchange rate USD 1 = NPR 72 in December 2010

Decisions on choice of the technology: Initially, the choice of the PMCA approach was made by national and international specialists in consultation with local people. It was first offered by a research and development organization, but as everyone came to see how valuable it was, it was eventually taken on by local people and is now offered by various groups to everyone throughout the market chain.

Decisions on method of implementing the technology: The approach is implemented through the Marketing Planning Committee (MPC), which works through vegetable collection centres and creates various thematic groups with the assistance of research and development (R&D) staff.

Approach designed by: International specialist and adapted by development agencies and non-governmental organizations through the thematic groups

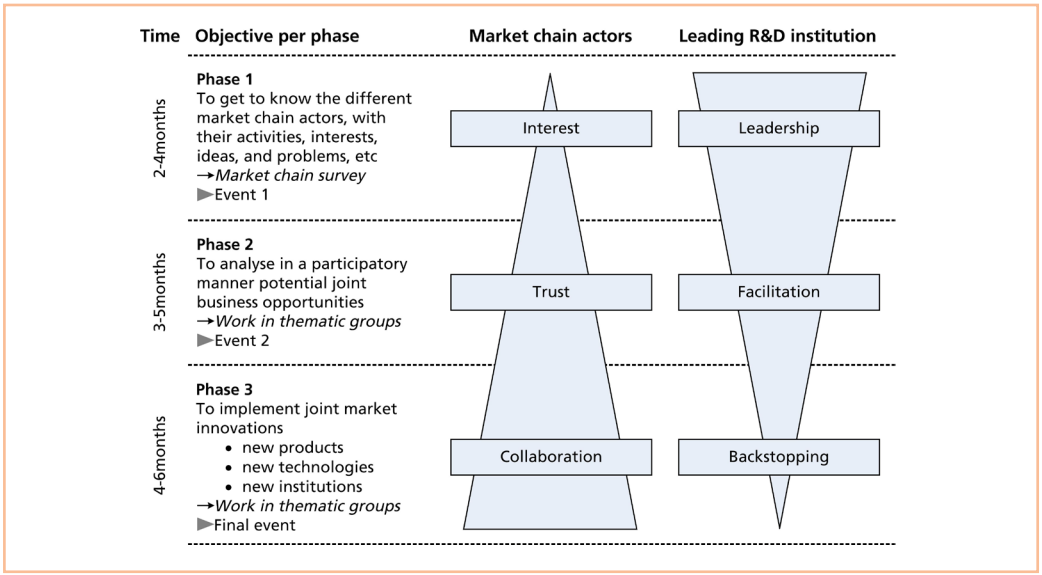
Implementing bodies: Mainly international and national non-governmental organizations in coordination with different groups throughout the market chain

Land user involvement

Phase	Involvement	Activities
Initiation/motivation	Interactive	Public meetings, focus group discussions, interviews, market surveys and rapid market assessments, impact filters
Planning	Self-motivation and self-mobilization	Market constraints and opportunities are identified; actors throughout the market chain and members of thematic groups develop future plans based on their assessment of the business potential for local products and services.
Implementation	Self-mobilization	The PMCA is implemented through the Marketing Planning Committee and collection centres by various actors from throughout the market chain and members of the various thematic groups; skilled staff from the R&D organization helps with facilitation.
Monitoring/evaluation	Self-mobilization	Members of the various thematic groups and the MPC jointly monitor and evaluate plans and achievements on a regular basis.
Research	Interactive	The approach is applied by the thematic groups. R&D organizations help these groups to analyse both quantitative and qualitative information.

Differences between participation of men and women: A majority of the participants (>60%) were women who are involved at different points along the market chain.

Involvement of disadvantaged groups: More than 20% of those who participated are from disadvantaged groups.



Organogram
The PMCA approach facilitates and promotes trust among market chain actors and allows them to work together to introduce innovative new ideas. During the initial phase, it is usually R&D organizations that take the lead, but as the approach matures, there is an ever greater involvement of the community. The PMCA process supports the development and implementation of institutional, technological, and commercial innovations and has acted to promote constructive interactions through mutual learning and trust. (AK Thaku)

Technical support

Training/awareness raising: Before implementing this approach, it is essential to increase the capacity of everyone along the market chain so that they are familiar with basic concepts such as rapid market assessment, joint programme planning, business plan development, and market-led production plans. Similarly, governance training is necessary for institutional development.

Extension: The key elements of the extension approach were afforded to everyone all along the market chain and included exposure visits, demonstrations, audio visual presentations, public/stakeholders meetings, sketch and interaction meetings, and the distribution of publications. Both the government and NGOs are adopting these extension methods and are also applying them to other fields.

Advisory service: Included the following: a market-led production plan; technical training for the thematic groups and regular monitoring of land users' fields; and facilitation of joint programme planning and implementation.

Research: This approach is the result of research which took place in Peru and Uganda. It has been adapted to the vegetable subsector in Nepal by IDE Nepal in collaboration with local NGOs. Both the government of Nepal and other local NGOs are in the process of adopting and piloting what was learned.

External material support/subsidies

Contribution per area (state/private sector): District level government, non-governmental organizations, and private sector service providers have supported the development of market centres as well as technical aspects of agricultural production and marketing.

Labour: Various actors throughout the market chain participated voluntarily; they worked together to improve their production and marketing for the common interest. Eventually, everyone benefited: the consumers had a greater choice of vegetables to choose from; the farmers obtained better prices for their produce in a secure market, and they were able to increase their landholdings; and the Marketing Planning Committee was able to obtain more revenue because the volume of trade increased.

Inputs: The project demonstrated new agricultural technologies only once; after that, the various groups adopted new technologies at their own cost.

Credit: Not applicable

Support to local institutions: The groups that were given market-centred training, and technical training on high value vegetable production and post harvest processing. Participants included members of village development committees, local governance and community development programmes (LCGDP), community forest users' groups, youth clubs, and women's groups.

Monitoring and evaluation

Monitored aspects	Methods and indicators
Technical	Commercial production and collective marketing
Socio-cultural	This approach increased their bargaining power and made them aware of current market prices for their high-value products.
Economic/production	Market-led production and the application of post harvest processing techniques
Area treated	The Marketing Planning Committee surveyed the area.
No. of land users involved	Some 200–750 farmers were involved in the Market Planning Committee and the collection centre.
Management of approach	Various actors from all along the market chain participated; regular observations were made and training was given to facilitate the implementation of innovative activities.

Impacts of the approach

Changes as result of monitoring and evaluation: The focus was on the collective marketing of smallholder farmers' vegetable produce. These farmers now work towards market-led production through regular meetings and trainings; they market collectively, and have better post-harvest processing. It is helping to empower women and members of disadvantaged groups and to improve their livelihoods.

Improved sustainable land management: In districts where the farmers have adopted organic vegetable production, there has been a noted retention of good soil fertility. Valam VDC of Kaski District is one such example.

Adoption by other land users/projects: The agricultural component of the Market Access for Smallholder Farmers (MASF) Project which is implemented by IDE (and funded by DFID) has adopted this approach. District level line agencies such as LI-BIRD have also adopted it. Districts in the Eastern Region that adopted agricultural crop and goat programmes include Bara, Rautahat, Siraha, and Saptari Districts.

Improved livelihoods/human wellbeing: When everyone along the market chain collaborates through shared interests and mutual trust to bring better produce to a common market - everyone benefits from the increased opportunities.

Improved situation of disadvantaged groups: Smallholder farmers are commonly the poorest and most disadvantaged members of any community, and they have benefited from this approach.

Poverty alleviation: When smallholder farmers sell their produce at collection centres for a fair price they earn more income and, as a result, their livelihoods are improved and poverty is reduced.

Training, advisory service, and research: This approach facilitates smallholder farmers in the production, marketing, and market linkages for their produce. The training which is needed at each step is provided by a whole host of organizations, including R&D organizations that mobilize thematic groups, Market Planning Committee executive members, sloping land management specialists, agricultural specialists, and other actors all along the market chain as needed.

Land/water use rights: The approach does not deal specifically with water or land use rights. When these are problematic they are referred to the concerned authorities on a case-by-case basis.

Long-term impact of subsidies: Some long-term investments, such as the collection centres, and the training and awareness-raising sessions, have yielded and continue to yield, long lasting benefits for smallholder farmers.

Sustainability of activities: The approach can be replicated without external support. Once a core group of smallholder farmers understands the approach, they can pass on the know-how to others through regular meetings and other vehicles. The establishment of the collection centre is an activity that should yield benefits for a long time to come.

Concluding statements

Strengths and →how to sustain/improve	Weaknesses and →how to overcome
Everyone along the market chain is involved in making decisions about the choice of high value crops and their marketing. →It is important to continue the regular meetings in order to assure the continued success of the present activities and to introduce innovations.	Smallholder farmers cannot always produce enough high value crops to sell profitably; it can be a challenge to transport crops to the collection centre. → Farmers need time and support in order to learn how to adopt commercial farming methods and how to market their produce collectively.
The PMCA has proven that it can be a valuable tool for all stakeholders along the market chain to help them design and implement programmes. → Lobby the government and other agencies to replicate the PMCA in other areas and agencies.	When only smallholder farmers are involved, the meetings of the thematic groups can be sporadic. → Need to involve commercial farmers in the thematic groups.
The approach helped to build relationships and trust among the market chain actors and it led to increased vegetable production and increased earnings for farmers. → Upgrading the market planning committee to a cooperative would help to generate more resources from the members.	The PMCA process has not been well documented for replication. → Clear documentation is necessary so that the results can be replicated in other areas.
Farmers sell their produce through the collection centre in a collective marketing approach. → If this approach is documented and disseminated, other areas of the country can learn from it and replicate it.	Smallholder farmers often do not have the means to implement innovations. → Provide some seed money for thematic groups; development organizations who plan to implement the PMCA approach can provide this.

Key reference(s): Thomas, T; Graham, T; Thomas, Z (no date) *Participatory market chain approach (PMCA): user guide* (unpublished). Kathmandu, Nepal: IDE Nepal, RIU Project

Contact person(s): Bharat Nepal, Program Officer, International Development Enterprises (IDE) Nepal, Research Into Use (RIU) Project, Regional Office, Pokhara, Kaski; Tel: +977 61526537, +977 15520943 (KTM); PO Box No. 2674, Kathmandu, Nepal, Email: bnepal@idenepal.org; bnepal2@yahoo.com; Tel: 9846022065 (M)

Left: Meeting of a riverbed farming group near Dhangadi. (Juerg Merz)
Right: Watermelons grow well and are a favourite crop in riverbed farming areas. (Juerg Merz)

Land distribution and allocation for riverbed farming

Nepal: बगर खेतिको लागि भूमि बितरण र बिभाजन

Riverbed farming provides landless and land-poor households with the possibility to earn an income from on-farm activities close to home

At least 20% of the households in the Terai, the plains of southern Nepal, do not own land. In order to make a living, these households commonly rely on share cropping and work in low paid off-farm jobs. The approach described here allows these farmers to make the most of the large areas of fallow land near riverbeds which are normally unclaimed and not cultivated. Since the lands near riverbeds have alluvial soils and sufficient moisture, they are suitable for seasonal vegetable cultivation during the dry season. In order for these landless and land-poor households to be able to farm these riverbed areas, they need to have access to suitable plots and the necessary agricultural inputs and training.

Potential riverbed areas are identified using topographic maps; subsequently, field verification identifies whether the selected riverbed areas are indeed suitable for cultivating horticultural crops. During the field verification, target groups in the given riverbed area are identified and the land is assessed in consultation with them. The relevant stakeholders are the village development committee and the district agricultural development office. Local resource persons are selected from target groups, which typically consist of 20 to 25 households, and are given training so that they can provide the local technical support. Once the farmer target groups have been identified and the riverbed sites selected, the group is given the legal support needed to get a leasehold agreement with the land owner, often the state. The riverbed area is then parcelled out to landless and land-poor households based on fixed selection criteria. This approach works best when the riverbed land area is at least 3 ha because it means that every target household can cultivate at least 0.13 ha (4 kattha), the least amount of land which can provide a meaningful cash income.

WOCAT database reference: QA NEP 34
Location: Kanchanpur and Kailali Districts, Nepal
Approach area: 400 ha
Land use: Originally fallow riverbed land now used for one season crop production
Type of approach: Project/programme based
Focus: Increasing the income of landless and land-poor households by encouraging them to cultivate previously unexploited riverbed areas
Related technology: Riverbed farming (QT NEP 34)
Compiled by: Hari Gurung, HELVETAS Swiss Intercooperation
Date: July 2011, updated March 2013

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

ICIMOD HELVETAS Swiss Intercooperation NEPAL WOCAT

Problems, objectives and constraints

Problems

- A high number of landless and land-poor households subsist on share cropping and low paid off-farm work
- The number of landless and land-poor households is increasing because many farmers have lost their agricultural land due to floods, many hill farmers are migrating to the Terai, and an increasing population means that holdings are divided up into ever smaller plots
- Inadequate agricultural extension for riverbed farming
- There are no local level policies which allow landless and land-poor farmers access to marginal lands

Aims/objectives

- Give landless and land-poor households access to riverbed land for cash crop cultivation so that they can increase their household income and their food security

Constraints addressed

Major	Constraint	Treatment
Access to agricultural land	Riverbeds are generally owned by the state (village development committee, municipality, or community forest users' groups) and in some cases, by private owners. The owners are reluctant to provide access to the riverbed land because of the Tenant Law.	Farmers and land owners agree on a 3-year lease for riverbed land. The land is allocated according to the size of the group, the size of the land, and its location relative to the river. Each member is allocated 4 katthas (0.13 ha) perpendicular to the river flow. A border is determined and the area is guarded at night.
Access to agricultural extension	The government's extension service does not cover riverbed farming	Local resource persons are trained and mobilized to provide agricultural extension services to riverbed farmers.
Access to agricultural input supply	Seeds for crops which are suitable for riverbed farming generally come from India and the local agrovets often cannot supply them on time.	Agrovets are informed about the type of agricultural inputs needed (seeds, fertilizers, bio-pesticides) and how to supply them. Riverbed farmers are trained on how to use local and improved seeds and how to conserve and store them.
Minor	**Constraint**	**Treatment**
Lack of either a local or a central policy for riverbed farming	Unclear government policies may limit access to riverbed land and subsidies from poverty alleviation programmes	Lobby local bodies to address issues of riverbed farming policies

Participation and decision making

Stakeholders/target groups

Authorities: district development committee, municipality, village development committee

Line Agencies: district agricultural development office, district forest office

Land users: Landless and land-poor household district development committee, municipality, village development committee

Approach costs met by:

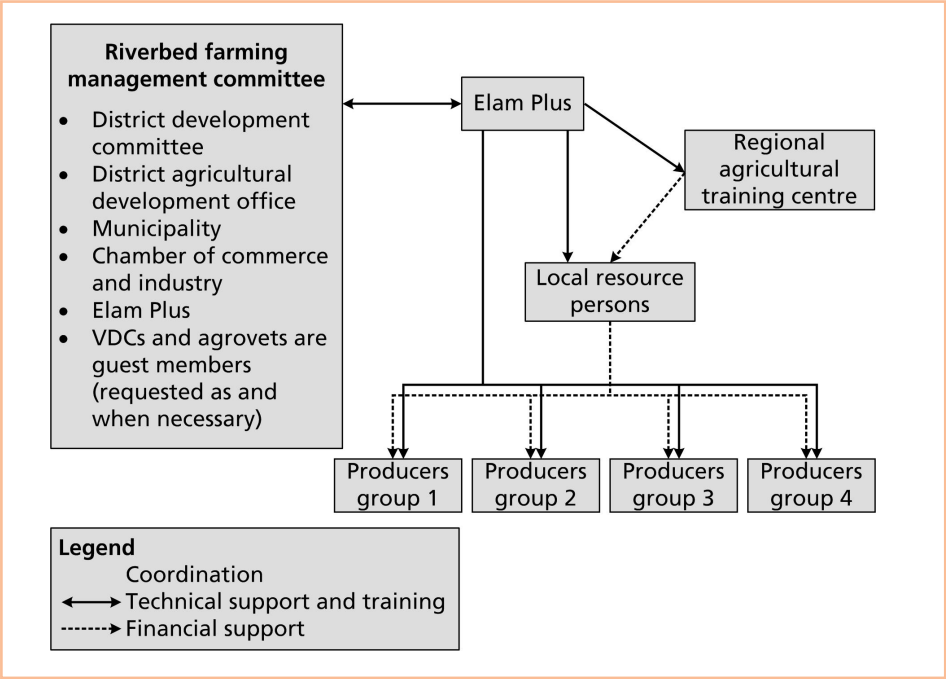
Producers' groups	60%
Supporting organizations	40%
TOTAL	**100%**

Decisions on choice of the technology: Farm coordinators consult with the Elam Plus team, the District Agricultural Development Office, local resource persons, and producers groups to come up with a mutually agreed technology.
Decisions on method of implementing the technology: Producers groups and local resource persons work in close collaboration with farm coordinators and the enterprise development officers of Elam Plus.
Approach designed by: Elam Plus, in close consultation with the regional training section, the district agricultural development office, and the district soil conservation office
Implementing bodies: Farmers who are supported by Elam Plus

Land user involvement

Phase	Involvement	Activities
Initiation/motivation	Interactive	Group meeting conducted with key members of a group, request for follow-up forwarded to supporting organization.
Planning	Interactive	The riverbed area is selected and the land is distributed to the members. The arrangements are agreed in consultation with both men and women of the producer group.
Implementation	Self-mobilization	Land preparation, sowing, irrigation, weeding, harvesting, and marketing. Both men and women are involved.
Monitoring/evaluation	Interactive	The process of requesting access to the riverbed land involves group level discussions between farmers and government officials or land owners. Key members of the group (e.g. chair person or secretary) are involved in monitoring and evaluating the success of the riverbed farming programme.
Research	Interactive	Farmers pilot crop innovations based on the research design suggested by supporting organizations and they provide feedback on how successful the implementation was.

Differences in participation of men and women: Men and women are equally involved in riverbed farming
Involvement of disadvantaged groups: 99% of all beneficiaries are from disadvantaged groups



Organogram
Role of riverbed farming management committee:
- Organize, review, and plan meetings
- Decide on suppliers
- Oversee the land lease process and insure that the land is properly allocated
- Conduct field monitoring

Role of Elam Plus:
- Organize stakeholders' meetings for managing and generating resources
- Funding support
- Introduce innovations
- Train local resource persons

Role of local resource persons:
- Provide technical support to farmers
- Support producers groups to maintain records and bookkeeping
- Support producers groups to find market linkages

Role of Regional Agricultural Training Centre:
- Develop modular training package
- Train local resource persons

(AK Thaku)

Technical support

Training and awareness raising: The Regional Agricultural Training Centre of the Department of Agriculture trains the local resource persons. Once trained, they help to raise awareness among landless and land-poor farmers of the advantages of riverbed farming and they also give them technical training and extension services.
Advisory service: The District Agricultural Development Office provides plant protection expertise and Elam Plus provides technical backstopping and field learning.
Research: Innovations, such as piloting new crops, selecting appropriate varieties, and trying out new cultivation techniques are activities supported by Elam Plus through regular communication with the local resource persons.

External material support/subsidies

Contribution per area (state/private sector): Farmers receive a financial contribution of USD 540 (NPR 38,500) per hectare per season. This lump sum given by Elam Plus is intended to cover the cost of agricultural inputs such as seeds, organic manure, fertilizers, agricultural tools/equipment, biopesticides, micro elements, and labour costs.
Labour: Labour is provided by the farmer groups themselves costing an equivalent of USD 213 (NPR 15,100) per hectare.
Inputs: In the first year, USD 331 (NPR 23,531) worth of inputs are provided by the supporting organizations. In the second year, only 50% is provided, mainly to cover the cost of the seeds. In the third year, only 50% of the cost for the services of the local resource persons and market linkage support are provided.
Credit: No credit was extended for riverbed farming, but the groups have initiated their own savings schemes. These group funds can be used for loans to purchase the required inputs.
Support to local institutions: Local resource persons form their own organizations and their capacity is strengthened.

Remarks: All costs are rough estimates by the technicians and authors. Exchange rate USD 1 = NPR 71 in July 2011

Monitoring and evaluation

Monitored aspects	Methods and indicators
Technical	In total, 35 local resource persons were trained and mobilized in Kailali and Kanchanpur Districts.
Socio-cultural	Riverbed farming indirectly reduces outmigration and the need for farmers to seek off-farm employment like collecting and cutting fuelwood and other seasonal labour.
Economic/production	On average, households can earn USD 352 (NPR 25,000) in 6 months from 0.13 ha (4 katthas) of land.
Area treated	In 2011, a total area of 396 ha was under riverbed cultivation with support from Elam Plus in Kailali and Kanchanpur.
No. of land users involved	In 2011, about 3,000 landless and land-poor households were involved in 122 riverbed farming areas. The number of households increased from 2000 in 2008 to 3165 in 2012.
Management of approach	Management of the riverbed farming programme is handled by Elam Plus. The riverbed farming management committee plays an active role in co-ordinating fund contributions from stakeholders for input purchases, organizing planning and review meetings, conducting joint field monitoring, and other related activities.

Impacts of the approach

Improved sustainable land management: Previously underutilized land resources are productively used for vegetable production and income generation. When farmers use organic methods, the impact on the river ecology is minimal.
Adoption by other land users/projects: Other groups and projects have started to replicate riverbed farming in their own areas by imitating what they have observed of groups working with Elam Plus.
Improved livelihoods/human wellbeing: Households earned on average USD 352, or NPR 25,000, per household from 0.13 ha of land. Locally traded, this is equivalent to four months' worth of additional food grain.
Improved situation of disadvantaged groups: The vegetable consumption of disadvantaged groups has improved. In addition, they also earned cash from riverbed farming that they spent to purchase education, health care, and food grain.
Poverty alleviation: Cash income from the sale of riverbed farming produce helped to alleviate poverty to some extent.
Training, advisory service, and research: Local resource persons are trained at the regional agricultural training centre. Need-based advisory services are provided by the district agricultural development office. Additional support on piloting new crops and implementing new cultivation techniques is provided by Elam Plus.
Land/water use rights: About 65% of the riverbed land is owned by the state and the rest is privately owned. Individual land right issues are discussed in the group and negotiated among group members. Generally, the choice of crops for riverbed farming depends on the type of soil and the sand moisture level; attempts are made to minimize the amount of river water used. So far, downstream farmers have not complained about any overuse of water by upstream riverbed farmers. In this regard, water rights issues are not generally raised.
Long-term impact of subsidies: Inputs are provided during the first and second years only; producers know that there will be a gradual reduction in the amounts they receive from supporting organizations. Should they require support in the future, producers groups are linked to other development agencies or the Micro Enterprise Development Fund, which is collected from various stakeholders and used to fund demand-driven enterprise and agriculture extension services required for the promotion of farm and off-farm products.

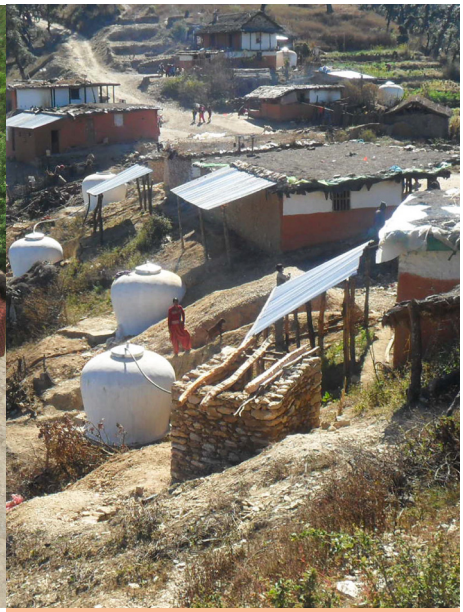
Concluding statements

Main motivation of land users: Landless and land-poor farmers are convinced of the benefits; to date, they have not experienced any difficulty in marketing their produce. Farmers gained considerable experience and basic technical know-how in riverbed farming. More than 85% of the producer groups continued their riverbed farming activities in the third year crop cycle, when they did not receive any inputs except technical support from local resource persons. They purchased agricultural inputs from their savings funds.

Sustainability of activities: The local stakeholders in the riverbed farming approach are committed to providing funds and to being actively involved in reviews, planning, and joint field monitoring. Riverbed farmers have gained basic know-how, and trained local resource persons are available to help at the local level if needed. The Micro Enterprise Development Fund now has a presence in the district and producers can access support from them for riverbed farming. Farmers' groups have already organized savings schemes that can be used to purchase the required agricultural inputs. The majority of farmers continued riverbed farming beyond the third crop and many made a significant income. Riverbed farming has a negligible negative impact on the environment. When all of these factors are considered, riverbed farming is indeed a sustainable activity.

Strengths and →how to sustain/improve	**Weaknesses** and →how to overcome
Local government stakeholders are positive about riverbed farming and the current level of coordination from Elam Plus is appreciated. → This needs a model so that it can be institutionalized and replicated in other areas.	Currently riverbed farming producer groups are scattered and their production is limited. → Production needs be market-led and farmers should have better links to markets.
Trained resource persons who can provide extension services are available locally. → The local resource persons need to be linked with the Micro Enterprise Development Fund and their services need to be diversified to include aspects all along the market chain.	Riverbed farming is supported on a case-to-case basis by line agencies and non-governmental organizations. → The Ministry of Local Development can develop a riverbed farming policy to ensure that landless and land-poor farmers have access to riverbed lands.
Local agrovets are available and they have the capacity to provide the right inputs. → Local agrovets need to be aware of the needs of this new type of farming in order to ensure timely inputs.	
Groups have mobilized their savings funds to purchase inputs. → Encourage the formation of savings and credit groups.	
Riverbed farming increases household income. → Market-led production should be further promoted.	
Marketing facilitators have been developed in each group. → Capacity building of the marketing facilitators needs further attention.	
Village development committees have to become involved in the land leasing process. → Develop policies related to land leasing.	

Key reference(s): None
Contact person(s): Dr. Juerg Merz, International Programme Advisor, Tel: +977 1 5524925; +977 985104442 (M); HELVETAS Swiss Intercooperation Nepal; juerg.merz@helvetas.org.np or Hari Gurung at hari.gurung@helvetas.org.np; Tel: +9741056444 (M)



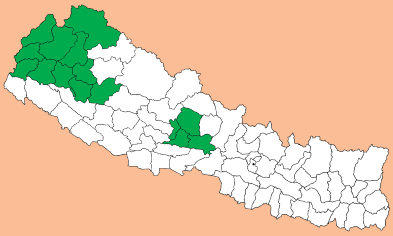
Left: A community gathers for social and resource mapping; a facilitator talks them through the mapping exercise. (WARM-P)
Right: Household rainwater harvesting tanks in Dailekh. (WARM-P)

Water use master plan

Nepal: जलउपयोग गुरुयोजना

A water use master plan supports the development of integrated water resources at the local level; all stakeholders, including disadvantaged groups, take part in the plan.

A water use master plan (WUMP) is a holistic, participatory, and inclusive planning process that takes an integrated approach to the management of water resources and uses at the village level. The WUMP specifies the total water budget for its planning unit, the village development committee (VDC), and explores potential uses for it. It empowers marginalized groups to claim their rights to an equitable share of water within and between communities. The WUMP also helps local bodies with annual and periodic planning and project prioritization.
The WUMP is a 17-step process that includes social mobilization, the formation of inclusive management committees, capacity building for everyone involved in the process, and, as a final step, social assessment using various participatory rural appraisal (PRA) tools. Simultaneously, the technical part of the process evaluates the capacity of all water resources and their potential uses. In a workshop facilitated by NGO staff, the community discusses suggestions formulated by the two participatory assessments, prioritizes possible projects, and formulates plans. The VDC representatives decide which plans can be implemented using their own resources and which need external support. The WUMP then organizes a workshop to present these plans to various organizations in order to get their commitment and support. The prioritized projects are implemented according to the WUMP.
The plan also contains a series of long-term activities and during the course of its implementation, there is sufficient latitude to allow the community to rectify its original plans in order to put into practise lessons learned during earlier phases and to continue to review and modify the plan as needed.



WOCAT database reference: QA NEP 36
Location: 15 districts in the Western, Mid-Western, and Far-Western Development Regions of Nepal
Approach area: >3,000 km^2
Land use: Not specified
Type of approach: Project/programme based
Focus: Water conservation, water sources, catchment area
Related technology: Not described
Compiled by: Madan Raj Bhatta, HELVETAS Swiss Intercooperation
Date: July 2011, updated March 2013
Comment: This is a broad and integrated approach; WUMP advocates water conservation; water harvesting, and technologies that promote the efficient use of water

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

ICIMOD HELVETAS Swiss Intercooperation NEPAL WOCAT

Problems, objectives and constraints

Problems

- Issues on access to water are often contentious, communities often quarrel over water rights
- A lack of coordinated planning at the local level
- A growing demand for water both for domestic and agricultural use
- Water sources are diminishing and the changing climate will further aggravate this

Aims/objectives

- Establish inclusive water planning and water resource management at the community level
- Ensure the optimal use of water resources; see that water is equitably and efficiently distributed
- Promote conservation of water and natural resources linked to water; implement water projects based on the plan agreed by the entire community

Constraints addressed

Major	Constraint	Treatment
Institutional	There is no elected body in the VDC and no one takes permanent ownership of the WUMP.	Create an advisory body consisting of representatives from all political parties.
Social	Communities are reluctant to share water resources and hide the sources of water during planning	Earn everyone's trust through meetings, dialogue, and social mapping that includes all stakeholders including disadvantaged groups.
Social/Awareness	Low awareness of the need for conservation and of the need to use water efficiently	Intensive awareness raising and capacity building programmes
Minor	**Constraint**	**Treatment**
Financial	When the WUMP is implemented by the VDC using its own funds it usually takes a long time.	Collaborate and network with resource organizations such as INGOs and donor funded programmes for funding.
Technical	When the administrative boundaries of a VDC do not coincide with its physical watershed boundaries, it can be difficult to make technical decisions.	Cluster VDCs into groups in the same sub/watershed.

Participation and decision making

Stakeholders/target groups

VDCs, district development committees (DDCs), resource organizations

Local service providers, NGOs, consultants

Local communities

Approach costs met by:

VDC	25%
Project (WARM-P)	75%
TOTAL	**100%**

Annual budget: The Water Resources Management Programme (WARM-P) of HELVETAS Swiss Intercooperation has an annual budget of USD 5,000 per plan which includes funds for the preparation of the WUMP. It also supports the implementation of selected water supply and sanitation schemes for which it has an additional budget; allocation of funds depends on the requirements of the WUMP and may differ from one VDC to another.

Remarks

- All costs and amounts are rough estimates by the technicians and authors. Exchange rate USD 1 = NPR 71 in July 2011.

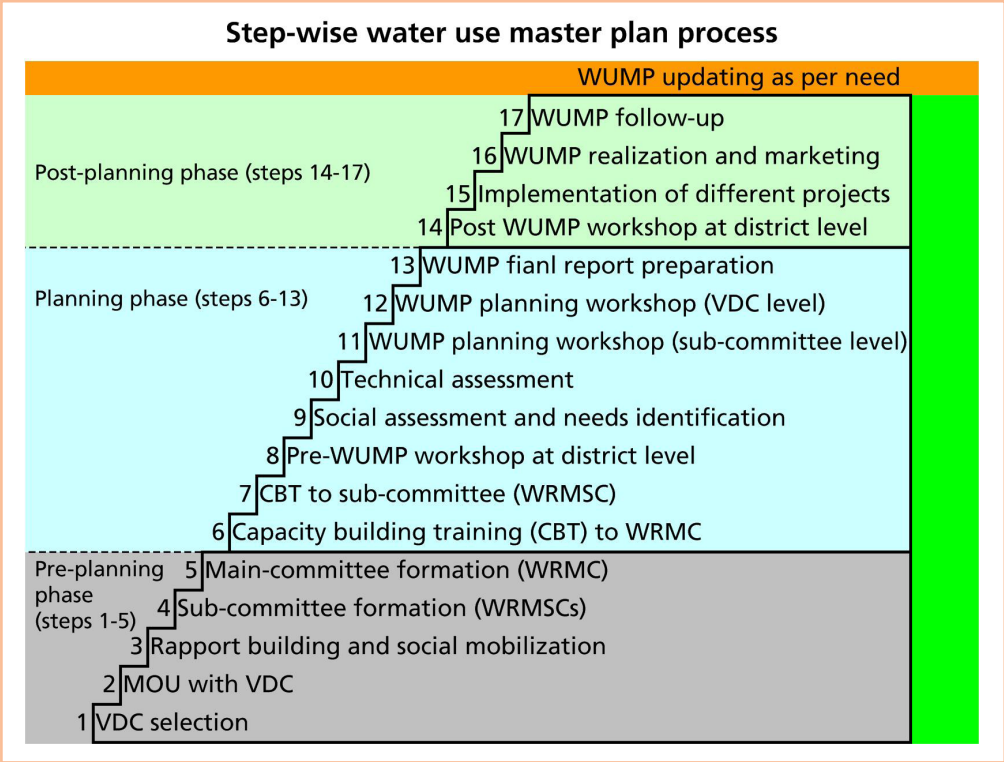
Decisions on choice of the technology: Technologies are selected on the basis of suitability and availability of water sources by local communities with the support of technicians and the VDC.
Decisions on method of implementing the technology: Since the VDC endorses the WUMP, it decides on implementation.
Approach designed by: The Water Resources Management Programme (WARM-P) of HELVETAS Swiss Intercooperation
Implementing bodies: The VDCs in partnership with WARM-P/HELVETAS Swiss Intercooperation and local service providers

Land user involvement

Phase	Involvement	Activities
Initiation/motivation	Interactive participation by the community and the members of the VDC	Community meetings, decision taken by the VDC on how to prepare the WUMP
Planning	Interactive participation by the community, the water resource management committee and sub-committees (WRMC and WRMSCs), and the VDC	Social and resource mapping, social assessments, technical assessments and planning
Implementation	Self-mobilization of the community and the users' committee with the support of the VDC	Implementation of the water projects, source protection/conservation
Monitoring/evaluation	Interactive participation of the users' committee, project staff, and the VDC	Review of the plan, community monitoring during the construction phase, follow-up monitoring during routine operation

Differences in participation of men and women: Equal participation of men and women is encouraged during the social assessment and needs identification phase. During the planning and implementation phases, the participation of women in decision making is ensured through a provision that there be a representation of at least 33% women in the water resource management committees, sub-committees, and users' committees.

Involvement of disadvantaged groups: Disadvantaged groups (Dalit and Janajati among others) are requested to participate in numbers proportional to the percentage they represent in the community in all activities and committees.



Organogram
The step-wise WUMP process
VDC = Village development committee
MOU = Memorandum of understanding
WRMC = Water resource management committee
WRMSC = Water resource management sub-committee
WUMP = Water use master plan
(AK Thaku)

Technical support

Training and awareness raising:
- Social mobilization and awareness raising orientations, training
- Capacity building and training to WRMC and local service providers

Advisory service: provided by local service providers

External material support/subsidies
- The community is not paid to participate in meetings or other social or technical assessments
- No external material is needed

Contribution per area (state/private sector): 25–50% is contributed by the VDC and 50-75% is contributed by the project
Labour: No support for labour
Inputs: No inputs are required for the preparation of the WUMP. When the water schemes are implemented, external materials are generally supplied.
Credit: No provided
Support to local institutions: Support is provided to the VDC for the preparation of the WUMP

Monitoring and evaluation

Monitored aspects	Methods and indicators
Biophysical	Follow-up monitoring to check if the water sources are protected, and if the area is conserved by planting
Technical	Follow-up monitoring to check water sources and number of water projects implemented
Socio-cultural	Public hearings and audits to ensure transparency and community participation (especially of disadvantaged groups)
Area treated	Follow-up monitoring of implementation (as shown in the diagram above)
No. of land users involved	Public review, final commissioning: community contribution and participation (as shown in the diagram above)
Management of approach	WUMP follow-up: implementation of WUMP (as shown in the diagram above)
Other (implementation of WUMP)	WUMP follow-up: implementation of WUMP (as shown in the diagram above)

Impacts of the approach

- All members of the community, even those with water resources on their own land, are willing to share water resources after participating in the WUMP.
- Disadvantaged groups participate on an equal footing in management committees and have equal access to water resources.
- The community realizes the need to protect water resources and begins to conserve water.

Improved sustainable land management: Water, forests, and land are all interlinked. Proper management of water resources, source protection, and conservation are all part of sustainable land management.
Adoption by other land users/projects: This approach has been replicated by the Rural Water Resources Management Project of FINNIDA, the LIVE/EU project, and Nepal Water for Health (NEWAH), a national-level NGO in Nepal. Nepal's Ministry of Local Development, Department of Local Infrastructure and Roads, has expressed an interest in developing WUMPs for all the VDCs in Nepal.
Improved livelihoods/human wellbeing: Having access to sustainable water resources improves livelihoods.
Improved situation of disadvantaged groups: Disadvantaged groups participate and share benefits on equal terms.
Poverty alleviation: Access to water improves hygiene and contributes to better health and to poverty alleviation.
Training, advisory service, and research: Capacity building, training, and orientation are an integral part of the WUMP.
Land/water use rights: Ensuring equitable use of water resources is a key feature of the WUMP approach.
Long-term impact of subsidies: No subsidies are involved.

Concluding statements

WUMP is a practical tool for the integrated management of water resources at the local level. It is a process-oriented approach. WUMP helps to provide access to drinking water and water for irrigation and also provides for a sustainable supply of water by making provisions for the conservation of water resources and the catchment area. Capacity building and awareness raising in the community are a prerequisite for the successful deployment of a WUMP. The concept is well-recognized and replicated by other agencies, but ultimately, successful implementation depends on the capacity of the VDC and the extent to which it takes ownership.

Main motivation of land users: Equitable and sustainable access to water resources to meet domestic and agricultural needs
Sustainability of activities:
In order to ensure sustainability the following issues need to be addressed:

- Social: Coordinated planning in consultation with the local people; capacity building at all levels so that management committees, local service providers, local government, and the community as a whole can participate better, voice their concerns, and be part of the solution.
- Economic: The VDCs take a lead role, the beneficiaries need to be willing to share the costs and need to want to participate in activities such as quality control, and routine operation and maintenance schemes.
- Environment: Conservation of water sources, integrated water resources planning, and the efficient use of water

Strengths and →how to sustain/improve	**Weaknesses** and →how to overcome
Communities appreciate the WUMP approach → The Ministry of Local Development has expressed an interest in preparing national guidelines for this process in order to scale it up to all the VDCs in Nepal	Not all VDCs actively participate in the WUMP → When VDCs contribute funds for the WUMP, they are usually more actively involved.
VDCs own the process both by participating and by contributing to the funding. → Need to simplify the process and make it more cost effective so that it is easier to replicate.	Communities can have high expectations for WUMP but their VDCs may have limited resources. → The VDCs need to communicate clearly with their community so that they can prepare a realistic plan together.
An integrated approach to the use of water resources may help in climate change adaptation. → Strengthen awareness activities and continue to promote water conservation	Conflicts can arise over the allocation of water resources → The VDC and the management committee must work with the community to see that any contentious issues are resolved equitably
The WUMP process is inclusive and is managed by the whole community. → Continue to strengthen the capacity of disadvantaged groups so that they can participate more actively.	At times it can be difficult to get everyone to agree to a given WUMP. → The VDC authorities can improve their negotiating skills in order to make their demands heard with donors and district development committees.

Key reference(s): HELVETAS (2007) *Water use master plan preparation guideline.* Lalitpur, Nepal: WARM-P/HELVETAS; Rural Village Water Resource Management Project (2011) *Proceedings of water use master plan national level experience sharing workshop.* Lalitpur, Nepal:
Contact person(s): Programme Coordination Office, HELVETAS Swiss Intercooperation Nepal, GPO Box 688, Kathmandu/Nepal, po@helvetasnepal.org.np, +977 1 5524925; Dr. Juerg Merz, International Programme Advisor, Tel: +977 1 5524925; 9851044421 (M), HELVETAS Swiss Intercooperation Nepal, juerg.merz@helvetas.org.np

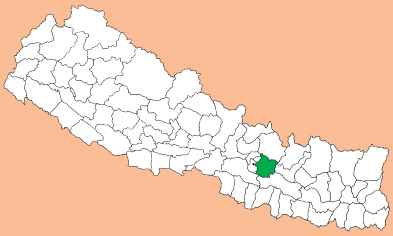
Left: Members of the community gather for a focus group discussion on the approaches for gully conservation. (Sabita Aryal Khanna)
Right: Community worship for Nagadevta along the gulley, devotees take extra care and consciousness for the protection of the gully (Sabita Aryal Khanna)

Protected gullies – a traditional sustainable land management practice

Nepal: खोल्से एक परम्परागत दीगो भू–ब्यवस्थापन विधि

Protected gullying is a sustainable land management practice initiated and maintained by the traditional community approach; it is based on indigenous knowledge and uses only locally available materials.

Sustainable land management aims to prevent soil erosion and to increase productivity; it can take on different forms depending on the exigencies of the terrain. In Kabhrepalanchok District, where the slope of the land is not too steep, farmers use gullies controlled using indigenous techniques to protect fertile agricultural land, to minimize erosion, and to help prevent landslides near villages. For more than two hundred years, land users in jagidol (jagi=rice, dol=gully) villages practiced gully control and they have developed innovative methods for deployment and maintenance of gullies. Periodically, the whole community is involved in discussions for planning and implementation of new measures, but for the most part only routine repairs are needed and the individual farmers whose properties border the gullies shoulder the main responsibility for maintaining them. When severe flooding events cause many gullies to collapse, materials are collected locally and the whole village cooperates in the rebuilding. Both men and women are involved; men usually help with the heavy digging when new gullies are established or during crises when many gullies collapse at once and women are involved in the day-to-day maintenance of the gullies. Communities in villages higher up in the hills have used this approach for a long time; their gullies are more mature and well-entrenched and are reinforced by mature bio-engineering measures. Gullies in villages situated lower down the slope are usually more recently established and typically still require regular maintenance.
The jagidol village community, the Newari guthi (religious group) in the area, and the Hindus who worship the snake god Nagdevata and Shivadevata along the stream banks are particularly conscientious in maintaining the gullies that border the shrine(s). In this example, maintenance of the gullies is a collective effort through social networks.



WOCAT database reference: QA NEP 25
Location: Sharada Batase VDC, Kabhrepalanchok District, Nepal
Approach area: Approximately 1 km^2
Land use: Waterways, drainage lines, ponds, and dams
Type of approach: This is a traditional approach that has been practised for at least 200 years.
Focus: Mainly on conservation with religious, cultural, and ecological significance
Related technology: Sustainable land management using controlled gullying in 'jagidol' areas (QT NEP 25)
Compiled by: Sabita Aryal Khanna, Kathmandu University
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The technology was documented using the WOCAT (www.wocat.org) tool.

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Problems, objectives and constraints

Problems

This approach suffers from a lack of institutional infrastructure. Since the group that maintains the gullies is not registered as a conservation team or an organization, it is not entitled to technical or financial support of any kind from government or non-governmental organizations. The research conducted by the community is not documented anywhere, it is passed on by word of mouth. A shortage of labour (or labour saving devices) is a persistent constraint in the maintenance of the gullies.

Aims/objectives

To ensure the maintenance of the system of gullies that acts to help prevent soil erosion and protect against flooding. During the rainy season the gullies channel water away, and during the dry season they can be modified to collect water for irrigation. Maintenance is especially important during the rainy season because when water is not channelled many terraces can collapse simultaneously and the ensuing landslide can threaten the stability of the entire village.

Constraints addressed

Major	Constraint	Treatment
Legal (land use and water use rights)	The landowner is mostly responsible	The landowner is encouraged by others in the community to maintain the gullies that border of his/her land
Financial	For the labour needed to perform the maintenance. During the busy parts of the farming year there is little or no labour available for land management projects.	Sustainable land management projects are scheduled for the dry season when farmers have fewer farming-related obligations.
Minor	**Constraint**	**Treatment**
Financial	To purchase tools and equipment needed for maintenance activities	Local materials are used; the community makes in-kind and (occasionally) in-cash donations
Technical	Farmers are not fully aware of the best gullying practices	New methods and the use of new materials can be learned from other projects implemented in nearby areas

Participation and decision making

Stakeholders/target groups

land users, individuals and groups

Approach costs met by:

Community/local land user(s)	100%
TOTAL	**100%**

Annual budget for sustainable land management: <USD 2,000

Remarks

All costs and amounts are rough estimates by the technicians and authors. Exchange rate USD 1 = NPR 71 in November 2010.

Decisions on choice of the technology: Over generations, the land users themselves have developed methods and techniques by trial and error.

Decisions on method of implementing the technology: The land users themselves make decisions concerning best practices. These decisions are based both on experimentation on their own land and on learning from nearby places where the technology has had input from conservation specialists.

Approach designed by: The elders in the community are the repositories of traditional knowledge and best practices on gullying. The community discusses with them and together they decide on a plan of action that best suits the existing conditions. The solution is usually implemented by the men during the dry season and the women maintain the gullies during the rainy season.

Implementing bodies: The land users and the village as a whole are responsible. Generally the farmer owning the land that borders on the gullies maintains them.

Land user involvement

Phase	Involvement	Activities
Initiation/motivation	Self-mobilization	The community as a whole decides when it needs to initiate sustainable land management in order to prevent erosion, to increase the amount of available farmland, and to protect the village from landslides.
Planning	Self-mobilization	The community plans to dig gullies during the dry season; during the monsoon they plant grasses whose roots help to anchor the structures.
Implementation	Self-mobilization	The land users implement protective measures during the times when they are not actively farming; they use all local materials.
Monitoring/evaluation	Self-mobilization	Gullies are monitored routinely as part of normal farming activities; the gullies are maintained and repaired as needed.

Differences in participation of men and women: Yes. Usually the gullies are dug by young men. Men are also involved when gullies collapse and heavy digging is needed. Women conduct routine maintenance throughout the year.

Involvement of disadvantaged groups: Not specifically.

Technical support

Training and awareness raising: None
Advisory service: None
Research: Research was not part of the approach.

External material support/subsidies

Contribution per area (state/private sector): None
Labour: Volunteered by land users
Inputs: No outside input. The full costs is borne by the land users
Credit: None
Support to local institutions: None

Monitoring and evaluation

Monitored aspects	Methods and indicators
Biophysical and technical	Gullies are regularly monitored by the land users but there is no formal reporting; the community observes the evolution of the approach
Socio-cultural/religious	When there are temples or shrines near the gullies, these are also places of worship for Nagadevta (the snake god) and Shivadevata. The villagers make a special effort to maintain the gullies.
Continuity of the approach	The community has for generations used gullying as a practice for sustainable land management.

Changes as result of monitoring and evaluation: Few. The practice has not changed significantly for generations; however, the use of new materials and techniques can be observed in communities farther downhill where the practice is a more recent innovation.

Impacts of the approach

Improved sustainable land management: Yes, gullying helps to reduce the incidence of erosion, landslides, and floods as a result of which the dwellings in the village are more stable and everyone enjoys a greater sense of security.
Adoption by other land users/projects: Yes, there are a few incidences where farmers from neighbouring valleys have observed the gullying and have implemented similar sustainable land management measures in their own villages.
Improved livelihoods/human wellbeing: Yes, the water and soil conservation afforded by the gullies means that there is more arable land available for quality crop production. More abundant crops ensure a marked improvement in the health and wellbeing of the whole community.
Improved situation of disadvantaged groups: Not specifically.
Poverty alleviation: Yes, moderate. Farmers can now produce more crops so that families have more food available and can even earn some cash income by selling some of their excess produce. The entire village has benefited from this approach and everyone is better off.
Training, advisory service and research: None.
Land/water use rights: It is generally accepted that since the farmer whose land borders the gullies gets the most benefit by having access to the water, that it is his responsibility to maintain and repair them. In times of crises, when gullies collapse beyond his individual ability to repair them, he can ask the community for help.
Long-term impact of subsidies: Subsidies were not provided.

Concluding statements

Main motivation of land users to implement sustainable land management: 1) Improved production: creating better soil conditions and making water available for irrigation. 2) Increased profitability, improve cost-benefit-ratio: when better quality farm land is available and when farmer have access to water for irrigation more profits can be obtained. 3. Risk minimization: flooding, soil erosion (runoff), and landslides are a constant threat for hillside farmers.
Sustainability of activities: Uncertain. In recent times there is a shortage of local labour and volunteers. Some form of subsidy or external aid will be needed to support this land management practice and keep it sustainable. With funding, the village can purchase better materials and create longer lasting structures which need less maintenance.

Strengths and ➔how to sustain/improve	**Weaknesses** and ➔how to overcome
The community works together for the benefit of all. ➔ Continue to support the community in their traditional land management practices.	There is no formal planning and no contact with either the local authorities or potential funding agencies for conservation work ➔ Formalize planning and implementation and become recognized as a legitimate conservation group.
Everyone's suggestions, including those of nearby communities, are taken into serious consideration when planning sustainable land management. ➔ Continue to promote a regard for others sharing the same landscape.	Farmers are leaving the area in search of paid employment. New actors are moving into the area and the larger community is changing. There are recurrent incidents of land use change such as brick factories moving into the area. ➔ The government can institute zoning to regulate what land is deemed for cultivation only.

Key reference(s): None
Contact person(s): Sabita Aryal Khanna, Kathmandu University. Email: sabita@ku.edu.np, sabitaaryal@hotmail.com Tel: 9841540579 (M)