Enhanced Decision-Making Based on Local Knowledge

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Source: Mountain Research and Development, 22(1) : 14-18

Published By: International Mountain Society

URL: https://doi.org/10.1659/0276-4741(2002)022[0014:EDMBOL]2.0.CO;2

Mountain Research and Development Vol 22 No 1 Feb 2002: 14–18

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The WOCAT Method of Sustainable Soil and Water Management

Many types of problems caused by land degradation can be documented worldwide. The main natural resources affected are soils, water, natural vegetation, and wildlife; but cultivated plants are exposed to even greater damage, which poses a threat to food security as well. Soil degradation is one of the most crucial processes of land degradation and environmental change. Over a quarter of the world's agricultural land has been damaged by long-term soil degradation, corresponding to one-tenth of the earth's land surface. As is well known, mountain areas are especially vulnerable to land degradation (Figure 1). Because mountains are also water towers, providing water not only for highland areas but also for the surrounding lowlands, land degradation in the mountains has serious impacts on the global supply of freshwater and on growing water-related conflicts.

At the same time, there have been many achievements in sustainable land use and in avoiding and combating degradation (Figure 2). Every day land users and soil and water conservation (SWC) specialists evaluate experience and generate know-how related to land management, improvement of soil fertility, and protection of soil resources. Most of this valuable knowledge, however, is not well documented or easily accessible, and comparison of different types of experience is difficult. The World Overview of Conservation Approaches and Technologies (WOCAT) has the mission of providing tools that allow SWC specialists to share their valuable knowledge in soil and water management, assist them in their search for appropriate SWC technologies and approaches, and support them in making decisions in the field and at the planning level.

FIGURE 1 A hailstorm event in May 2001 in the deforested and overgrazed Varzob Valley in Tajikistan caused a catastrophic flood and a landslide that covered a road along the river. Three villages were destroyed and 1 person died. Events such as this illustrate the need for SWC measures to reduce direct runoff and soil erosion. (Photo by Hanspeter Liniger)

The need to collect and document soil and water conservation knowledge

By and large, soil and water conservation (SWC) knowledge remains a local, individual resource, unavailable to others working in the same areas and sharing the same aims. This may be one of the reasons why soil and water degradation persists, despite many years of effort throughout the world and great investment in SWC. The World Overview of Conservation Approaches and Technologies (WOCAT) has developed

FIGURE 2 Intensive and highly diverse land use and SWC practices on very steep slopes in the Uluguru Mountains in Tanzania. Covering the soil either with vegetation (eg, banana, sweet potatoes) or mulch and soil bunds along the contour appears to reduce soil erosion. (Photo by Hanspeter Liniger)

tools to document, monitor, and evaluate SWC know-how and to disseminate it around the globe in order to facilitate exchange of experience (Figure 3).

WOCAT tools

A set of 3 comprehensive questionnaires and a database system have been developed to document all relevant aspects of SWC technologies and approaches, including area coverage. SWC technologies are defined as agronomic, vegetative, structural, and management measures that control soil degradation and enhance productivity in the field. SWC approaches are defined as ways and means of support that help to introduce, implement, adapt, and apply SWC technologies in the field.

The questionnaires on technologies and approaches together describe case studies from the field. They are always linked to a specific area where the technology is applied and to SWC specialists who provide the information. The questionnaire on SWC technologies addresses the specifications of the technology (purpose, classification, design, and costs) and the natural and human environment where it is used. It also includes an analysis of the benefits, advantages and disadvantages, economic impacts, acceptance, and adoption of the technology. The questionnaire on SWC approaches focuses on implementation, with questions on objectives, operation, participation by land users, financing, and direct and indirect subsidies. Analysis of the described approach involves monitoring and evaluation methods as well as an impact analysis.

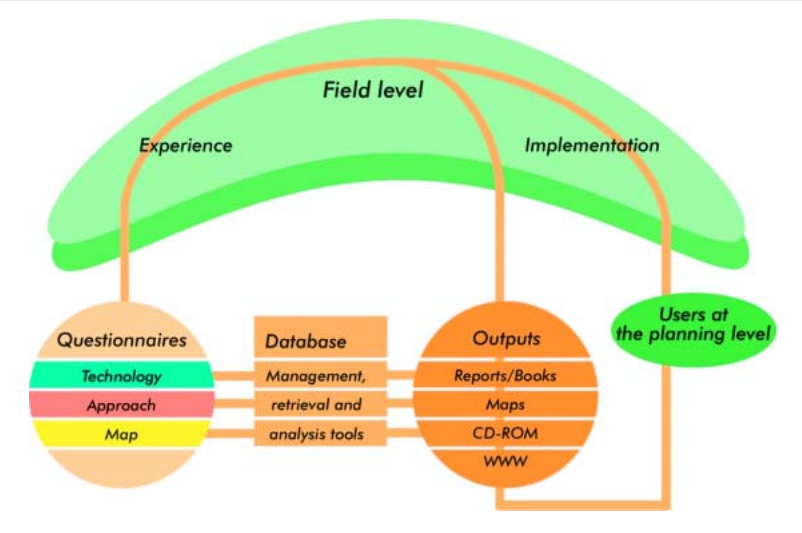
The collection of information involves personal contacts and knowledge sharing between land users and SWC specialists. The immediate benefits of filling in the questionnaires include the compilation of fragmented information—often consisting of the undocumented experiences of land users and specialists—and a sound evaluation of one's own SWC activities.

The questionnaire on the SWC map addresses the issue of where degradation problems and their treatments occur. Information on land use, soil degradation, SWC, and soil productivity is collected for each unit on a map with fixed polygons (eg, physiographic or administrative units). WOCAT has developed a system that allows data to be entered and the resulting maps examined immediately in an interactive way (Figure 4). The maps provide an overview of degradation problems and SWC achievements in a selected area (eg, a country or a district) and help planners, coordinators, and decision makers to devise appropriate plans and set priorities for future investments.

WOCAT outputs

Besides a brochure and video, as well as the aforementioned tools for documentation, evaluation, and exchange of knowledge (questionnaires, user-friendly databases), WOCAT helps to produce national and regional overviews and analytical reports as well as maps on degradation and conservation for use in planning and decision-making. Guidelines on getting started with and using WOCAT, including a glossary of terms, provide assistance to

FIGURE 3 The WOCAT process and tools.



regional and national initiatives. In addition, WOCAT has developed an SWC classification system. WOCAT outputs are accessible via the Internet (www.wocat.net), on CD-ROM, and in the form of books and maps. They are made available in the 3 official WOCAT languages, English, French, and Spanish. Additional translations into Arabic, Chinese, and Russian are under way.

Using WOCAT in the field and at the planning level

WOCAT makes use of global knowledge to effect local improvements. It offers contacts as well as opportunities for sharing experience around the globe, and it provides SWC specialists with technical information about technologies and approaches from their own and other regions. The same pool of knowledge and information can be used in the field and at the planning level. The most important thing is to use existing knowledge and funds more efficiently for improved decision-making and optimized land management.

At the field level, SWC specialists work under very different biophysical, socioeconomic, and institutional conditions. They search for technologies and approaches that are adaptable to their specific situation and meet their specific demands (see Box 1). The WOCAT query system therefore provides access to information at various points. For example, the search criteria include agro-ecology, climatic and slope conditions, the degradation processes to be tackled, farming systems, the desired level of costs and inputs, etc. Thus, a choice can be made among relevant SWC options. Names and addresses are included for personal contact with the respective providers of the information and for discussion of questions that remain open after consulting the WOCAT outputs.

At the national and regional levels, WOCAT tools, overviews, and maps help planners, coordinators, and decision makers to take advantage of existing experience and avoid mistakes and duplication. The database, analysis, and reports help in formulating appropriate decisions and plans. Training provided by WOCAT contributes to regional and national capacity building. WOCAT workshops allow personal contacts with other specialists for immediate exchange of experience in the established network.

WOCAT tools obviously provide inspiration. They have been recommended for use by researchers, technicians, and planners involved in combating degradation and searching for improved natural resource management options. For donors and investors, the tools and outputs of WOCAT are useful in enhancing decision-making with respect to investments, monitoring of efficiency, and capacity building. They also contribute to achieving overall goals such as poverty alleviation and sustainable development.

FIGURE 4 The WOCAT mapping tool.

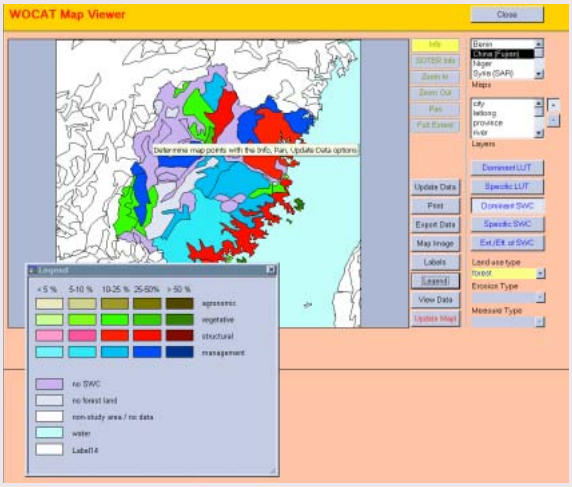


FIGURE 5 Trash lines such as this one in Uganda retard surface flow, trap soil sediments, increase infiltration, and effectively act as "mobile compost strips." (Photo by Will Critchley)

Integration of WOCAT into existing activities and programs

WOCAT was not designed as a separate activity to parallel existing SWC efforts. It aims to incorporate its tools and activities into existing programs at the international, national, and subnational levels.

At the international level, WOCAT correlates well with the UN convention to combat desertification (CCD) and the convention on biodiversity (CBD), in terms of documentation and exchange of experience and the search for options to combat desertification and enhance anthropogenic diversity. WOCAT can help provide documentation and assessment of the impacts of improved land management on carbon sequestration in the context of the framework convention on climatic change (FCCC). The use of WOCAT tools has also been suggested for the proposed international panel on land and soil (IPLS).

At the national and project levels, WOCAT has been successfully integrated into ongoing governmental, nongovernmental, and other development projects as part of their efforts to document and evaluate their experiences and make use of knowledge about improved decision-making procedures, based on other experience in their country, their region, or even in other continents. WOCAT tools and results have also been increasingly used in training and education at universities and in extension programs.

A global network

WOCAT is a network of SWC specialists from all over the world. It is a consortium of national and international institutions that operates in a decentralized fashion through initiatives at the regional and national levels, with backstopping from experienced members of the consortium. The main activities are conducted by committed national and regional institutions. These institutions organize training workshops, compile and administer the database, and produce and disseminate the outputs. At the global level, WOCAT is coordinated by a management group, assisted by the global secretariat and various task forces. Its main responsibility is to further develop methods and tools, provide training, maintain a global database, facilitate exchange among national and regional initiatives, support regional and national outputs, and provide initial assistance for new initiatives. Annual international workshops and steering meetings provide a basis for exchange on progress with different initiatives and the direction of future activities. The WOCAT network is open to all

BOX 1

A case study from Uganda

Jocelyn Turyamureeba lives on a small-scale farm in the southwest highlands of Uganda. Jocelyn was identified for her traditional practice of using contour trash lines of plant residues (Figure 5) as a means to control surface runoff and reduce erosion. Even more important to Jocelyn is the impact on soil fertility—when the trash decomposes, it is dug into the soil. Jocelyn is an innovator, in that she has worked with scientists and extension agents in the area to improve and disseminate her trash line system through the processes of participatory technology development (PTD) and participatory extension (PE). The technology is especially suitable for women farmers because they tend to do the weeding work in the fields, and they can build up trash lines with little extra labor. An impact assessment in 1999 showed that 7 farmers (6 women, 1 man) had copied the technology directly from Jocelyn. On average, 4 more had then copied from each of the original 7. This implies a total of 30, the majority of whom were women.

BOX 2

Global experience with WOCAT

The following comments, based on examples from 2 different regions, reflect similar experience with WOCAT tools. The first example is drawn from a field study carried out in the middle hills of Nepal in the Kumpur Watershed in Dhading District. The second is drawn from a project concerned with farmer innovators in East Africa. The comments were as follows:

- WOCAT tools were very useful in documenting SWC technologies and approaches and in analyzing technologies, and they enhanced the insight of researchers and extension workers through the process of seeking a consensus that included land users.
- The questionnaires provided a consistent and thorough framework for analyzing SWC activities in the field.
- The questionnaires require a great deal of specific information, which is often not readily available. They were time consuming, requiring 2–3 days to gather information about one technology.
- Cooperation between farmers and different specialists in gathering the information is essential and brings an immediate benefit from mutual learning, sharing of views, and identifying gaps and contradictions. This process resulted in an initial joint analysis and evaluation of SWC measures and helped identify possible improvements.
- Enough time for hands-on training is required to make the best use of the tools.

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individuals and organizations with a mandate or an interest in SWC. The WOCAT knowledge base is open to everyone, on a complementary rather than a competitive basis.

Future objectives

In the near future, WOCAT plans to integrate its tools for sustainable resource management into local, national, and international activities. WOCAT is not a new and separate activity; it should be seen as an aid to daily work and should thus be incorporated into ongoing activities and development projects. WOCAT's current emphasis is on enhancing data quality, further data collection and sharing, and production of useful analyses, with conclusions and recommendations for use at the field level and at the national and regional levels.

WOCAT can be applied in all environments. Because soil degradation in mountainous areas is a much greater problem and a greater threat than in the lowlands, many activities take place in mountains and highlands. Because of the role of mountains as water towers, sustainable management of mountain areas with improved SWC has an important role to play. Water and land cannot be separated; they must be seen as a single entity. In light of predictions regarding dwindling water resources in the near future, WOCAT will extend its focus from combating soil degradation to put greater emphasis on water conservation measures.

FURTHER READING

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