
ENGLISH TRANSLATION



PREPARING FOR THE NEXT GENERATION OF
WATERSHED MANAGEMENT
PROGRAMMES AND PROJECTS

LATIN AMERICA

Proceedings of the Latin American Workshop

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PREFACE

On the occasion of the International Year of Mountains, and in response to the clear consensus reached by the international community regarding the need to ensure harmonious and sustainable development of mountainous areas and watersheds, the Food and Agriculture Organization of the United Nations (FAO) and its partners in the subject undertook a large-scale assessment and global review of the current status and future trends regarding knowledge about and techniques for integrated watershed management.

The objectives were to promote the exchange and dissemination of experiences of integrated watershed management techniques, identify constraints to the implementation and development of those techniques during the decade from 1990 to 2000 and capture relevant new paradigms and approaches. The lessons learned from diverse experiences are being used to define a new generation of integrated watershed management projects.

Experts from four continents contributed to the assessment, which yielded four main outputs: 1) a review of experiences in watershed management, based on questionnaires that were sent to active partners in the field; 2) substantive reports from four regional workshops held in Nairobi (Kenya), Kathmandu (Nepal), Arequipa (Peru) and Megève (France); 3) four case studies from the Mediterranean basin, Nepal, Bolivia and Burundi; and 4) an international conference in Porto Cervo, Sassari Province, Sardinia, Italy.

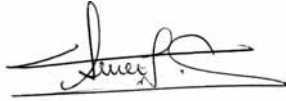
Watershed management concepts and approaches were reviewed, and different experiences assessed. The results of this exercise are presented in several documents, including the proceedings of workshops and reports on the four case studies.

The conservation, use and sustainable management of watershed resources in order to meet the demands of growing populations have been a high priority for many countries over the past several decades. In this respect, integrated watershed management through people's participation has become widely accepted as the approach that ensures sound sustainable natural resources management and a better economy for upland inhabitants, as well as people living in downstream areas.

As an element of FAO's wider review and assessment process of watershed management strategies and approaches for the decade 1990 to 2000, the Latin American Regional Workshop on Preparing the Next Generation of Watershed Management Programmes and Projects was held from 15 to 17 June 2003 in Arequipa, Peru. As elsewhere, considerable progress has been achieved in Latin America in the development of participatory integrated watershed management approaches and methodologies, especially since the 1990s.

Organized in conjunction with the Third Latin American Congress on Watershed Management, the workshop pursued the broad objectives of considering and discussing watershed management programmes and projects in the Latin American region, their achievements, gaps and lessons learned, defining guidelines and new approaches for the next generation of watershed management and proposing new project ideas.

The workshop aimed also to contribute to a better understanding of the current status of watershed management in Latin America, raising awareness of and providing the necessary advocacy and support for effective watershed management at the local, national and regional levels in the future.



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PUBLISHERS NOTE

This bilingual volume is part of a series including the proceedings of the other regional workshops (Africa, Asia and Europe) on the next generation of watershed management programmes and projects and the final international conference. The volume include summaries of presentations and discussions held in the course of the event. Readers interested in further information are referred to the authors listed in Annex B.

ACRONYMS

COFO	Committee on Forestry (FAO)
GIS	Geographic Information Systems
GPS	global positioning systems
IUCN	World Conservation Union
NGO	non-governmental organization
REDLACH	Latin American Technical Cooperation Network on Watershed Management
UNCED	United Nations Conference on Environment and Development

INTRODUCTION

In extensive areas of Latin America and the Caribbean there is a lack of balance between development and the conservation and protection of natural resources. This is leading to the deterioration and degradation of natural resources and the environment, especially in areas where land is used intensively and there is a large human population.

The root cause of this situation is a lack of planning and integrated management, which affects the sustainability of forest management, as well as contributing to water pollution, the erosion of productive soils and the instability of fragile ecosystems. The relationships among different elements of the environment – climate, soil, water, vegetation, wildlife and human activities – determine the ways in which a region can be developed sustainably to meet the needs of its population. The exploitation of natural resources (especially water, soil and vegetation) is a threat to fragile ecosystems and needs to be carried out in harmony with resource conservation.

In the 1950s, countries in Latin America and the Caribbean started to adopt the watershed management approach as a way of promoting the conservation and sustainable use of natural resources. Since then, the watershed management concept has evolved significantly throughout the region, and has now become a participatory process that involves the local population and watershed users. The community establishes specific objectives, for which integrated actions directed at the environment and the social, economic, institutional and legal situation are then designed, managed and implemented to achieve.

So far, only a few projects throughout the region have been planned and implemented according to the integrated management approach. Some of these have been very successful in terms of new technologies, coordination of public and private organizations, and wider stakeholder participation. However, the progress that has already been made and the steps that are necessary to improve future programmes have not yet been fully assessed and identified.

Watershed management has also made considerable progress at the global level, especially during the 1990 to 2000 period, when new approaches and methodologies to promote participatory integrated watershed management were developed. It is now essential that a systematic review and assessment of watershed management strategies, their achievements and gaps be carried out in order to establish what works and what can be done to improve future programmes; the experiences of 1990 to 2000 should receive particular emphasis. Such information is necessary for the development of innovative approaches and appropriate strategies for the future.

In response to this need, a global assessment is currently under way. Its main objective is to respond to the various needs and characteristics of the different stakeholders involved in watershed management at the global, regional and national levels. An important feature of this assessment is a series of workshops held in each of the major regions of the world.

The Latin American Regional Workshop on Preparing the Next Generation of Watershed Management Programmes and Projects was held from 15 to 17 June 2003 in Arequipa, Peru.

Its broad objectives were to promote the sharing and dissemination of information on watershed management achievements and existing gaps, and to support the development of effective watershed management through better designed and adequately implemented projects and programmes.

The workshop set out to:

- provide an opportunity for concerned parties to share information and contribute to a better understanding of the current status of watershed management; and
- raise awareness and provide the necessary advocacy and support for implementing effective watershed management at the local, national and regional levels.

The workshop was organized in conjunction with the Third Latin American Congress on Watershed Management, which preceded it and was held at the same location (see Annex C). The congress aimed to provide an opportunity for analysing, evaluating and exchanging information and ideas regarding watershed management in the region. It was arranged around five basic themes: 1) policies, legislation and institutions; 2) economic and financing aspects; 3) social and cultural aspects; 4) research and education; and 5) management instruments. More than 300 papers were presented at 20 congress workshops, and 1 000 specialists from various disciplines related to watershed management participated. The results provided a useful contribution to discussion of the next generation of watershed management programmes and projects.

These workshop proceedings provide a summary of the information presented, an analysis of the lessons learned and the gaps, and recommendations regarding the next generation of watershed management programmes and projects.

Using an in-depth analysis of watershed management activities from recent decades (especially 1990 to 2000) as a basis, and taking account of important events such as the International Year of Mountains (2002) and the International Year of Freshwater (2003), the workshop's main objectives were to:

1. assess and identify the nature and extent of achievements and existing gaps in state-of-the-art watershed management projects, programmes and approaches in the region;
2. identify lessons learned and principal issues emerging from past experiences in the region, with particular focus on the 1990 to 2000 period;
3. draw up guidelines for the formulation and implementation of the next generation of watershed management projects and programmes, with special focus on the role of effective watershed management in the conservation and sustainable use of water resources.

The workshop was attended by 30 experts from 16 Latin American countries, as well as specialists from FAO and the World Conservation Union (IUCN). The regional participants were the national coordinators (or their representatives) of the Latin American Technical Cooperation Network on Watershed Management (REDLACH), and also played important roles in the Third Latin American Congress on Watershed Management where many had served as moderators for the congress workshops. These people were therefore particularly well informed about the current situation regarding watershed management in the region

CHAPTER 1

SUMMARY OF PAPERS PRESENTED AT THE WORKSHOP

Workshop discussions were centred on five presentations:

- *Preparing the next generation of watershed management programmes* by Moujahed Achouri;
- *Watershed management, review, assessment and strategies for the future* by Larry Tennyson;
- *Review and evaluation of strategies for watershed management* by Pablo Sosa;
- *What really works in watershed management* by Henry Tschinkel; and
- *Relationship between land use and water in watersheds. Implications for the management of watersheds* by Benjamin Kiersch.

PREPARING THE NEXT GENERATION OF WATERSHED MANAGEMENT PROGRAMMES

Moujahed Achouri presented an overview of FAO's programme for assisting countries to develop and refine policies and programmes related to integrated participatory watershed management activities. He recalled that Chapter 13, Agenda 21 of the United Nations Conference on Environment and Development (UNCED), for which FAO is the United Nations Task Manager, stresses that:

Promoting integrated watershed development programmes through effective participation of local people is a key to preventing further ecological imbalance. An integrated approach is needed for conserving, upgrading and using the natural resource base of land, water, plant, animal and human resources.

FAO programmes and priorities pay much attention to watershed management's important role, especially with regard to water resources and food security. During its Thirteenth Session in 1997, the Committee on Forestry (COFO) urged FAO to continue its support for Chapter 13 of Agenda 21, taking into account watershed management's contribution to food security. COFO's Fourteenth Session in 1999 provided further encouragement for FAO's work in this field by requesting the Organization to assist in the formulation and implementation of integrated watershed management policies.

In this context, it was recognized that an in-depth analysis of watershed management achievements and gaps was essential to the further development of watershed management activities. Such an analysis would create a clear picture of what really worked in the past and what could be done to improve future programmes.

Mr Achouri noted that much progress in watershed management had been achieved during the 1990 to 2000 period, when new approaches and methodologies to promote participatory integrated watershed management programmes were developed.

The last systematic effort to review and assess watershed management strategies and approaches at the global scale was conducted 18 years ago, in 1985. FAO launched this initiative through an expert meeting held in Kathmandu, Nepal. The 2002 analysis was therefore to focus on the 1990 to 2000 experiences in particular.

It was proposed to review and assess watershed management activities that could provide reliable information on lessons learned and existing gaps regarding key issues of major concern. Such information is urgently needed for the development of innovative approaches and appropriate strategies for future watershed management programmes.

The assessment was designed to respond to the needs of the different stakeholders involved in watershed management at the global, regional and national levels. In this respect, it took the following considerations into account: stakeholder identification, participation and contributions; appropriate steps that provide key actors with opportunities to contribute; and outputs that respond to the issues raised by stakeholders.

The following steps were identified as the best way of providing an appropriate and useful assessment and review of watershed management: stocktaking exercise; case study analysis; regional workshops; and dissemination of results.

WATERSHED MANAGEMENT: REVIEW, ASSESSMENT AND STRATEGIES FOR THE FUTURE

Mr Larry Tennyson, a FAO consultant on watershed management, reported on the results of Phase 1 of the FAO Review and Assessment of Watershed Management Strategies and Approaches, which was carried out to analyse the achievements and gaps in watershed management and to provide support for effective watershed management projects and programmes in the future. The study includes the results of a survey of 18 key actors (organizations, agencies and institutions) involved in watershed management, and of a stocktaking of FAO experiences in watershed management projects and programmes during the 1990 to 2000 period. It also reviews project terminal and evaluation reports; the proceedings of seminars, conferences and workshops, as well as of personal and group consultations; and other information sources. A selection of completed case studies related to watershed management projects or programmes were also reviewed.

Key actors survey

Survey results are summarized in Table 1.

TABLE 1
Findings of key-actors survey

<p><i>Major issues that require further investigation and in-depth analysis:</i></p> <ul style="list-style-type: none"> ▪ the dynamics of intensified natural resource use; ▪ appropriate options for sustainable resources management; ▪ how to value the ecosystem services of catchments effectively; ▪ solutions for biophysical and socio-economic issues at different scales; ▪ how land management interventions affect water flow, sediment and nutrients; ▪ trade-offs and conflict analysis. <p><i>Major constraints in the present:</i></p> <ul style="list-style-type: none"> ▪ reconciling the needs of resource-based planning with “people-first” objectives; ▪ a lack of process-based concepts and models across different temporal and spatial scales; ▪ weak national research systems in developing countries; ▪ a lack of sustainable financial and institutional mechanisms, which is probably the “Achilles heel” of watershed management projects. <p><i>Major constraints for the future:</i></p> <ul style="list-style-type: none"> ▪ limited access to freshwater as the environmental situation worsens; ▪ water quality and flooding becoming more serious issues in highly settled areas; ▪ upstream–downstream issues becoming particularly important where the water supply limits the productive use of land. <p><i>Challenges:</i></p> <ul style="list-style-type: none"> ▪ Decision support tools should be adapted to different biophysical and socio-economic conditions. ▪ FAO needs to have the ability to document experiences and lessons learned so that it can become the leading organization in this field. <p><i>Needs:</i></p> <ul style="list-style-type: none"> ▪ Water and sustainability should be a specific focus, as they affect human health and the environment. ▪ Capacity building for youth should be carried out through training and rural school curricula that are appropriate to the specific environment. ▪ Demonstrations should be used to show the usefulness of methodologies for science-based project design and monitoring and evaluation. <p><i>Opportunities:</i></p> <ul style="list-style-type: none"> ▪ Watershed management is one of the most important mechanisms for sustainably addressing the issues of global climate change and the negative impact of desertification. ▪ There is increasing public awareness about the importance of managing watersheds. Information collected during the 1990s makes it possible to carry out more effective performance assessments and comparisons of methodologies and approaches based on actual results.
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FAO’s experience

The second step of the study was to conduct a stocktaking of FAO’s experience in watershed management projects and programmes during the 1990 to 2000 period. The following is a summary of the findings of this exercise:

- The top-down approach has given way to a bottom-up approach. However, neither of the extremes is a recipe for success.
- Upland people are being empowered so that they can actively manage their own natural resources.
- The impact that watershed management in upland areas has on the quantity and quality of water downstream is still a controversial issue.
- The lack of policy and legislation that support participatory watershed management continues to be a major issue.

- Watershed management training and education have made significant progress in the past decade. However, there is still a need for the training of field-level technicians, local government personnel and farmers, as well as for training in participatory methods at all levels.
- Projects are often too complex and have ambiguous objectives. There is a need for comprehensive design that includes all key actors.
- New technologies are being employed globally, including Geographic Information Systems (GIS), global positioning systems (GPS), satellite imagery, tools for management decision-making, advanced monitoring and evaluation, and participatory models.

The case study

A case study was prepared on the Land Management II – Santa Catarina, Brazil project, which was funded by the World Bank and carried out between 1995 and 1999. The project's objective was to safeguard farmers' incomes and natural resources through increasing agricultural production and farm incomes for about 81 000, mostly small-scale, farmers. It achieved this by promoting the adoption of modern sustainable methods of land management that conserve resources and mitigate the degradation of upland areas.

Project interventions centred on land management methods that would improve soil and water conservation and the disposal of animal, human and pesticide wastes in 520 of Santa Catarina's 1 700 micro-catchments. The project's major components included: agricultural extension; research; incentives for cost sharing that help farmers to pay for implementing new methods; reforestation of critical landscapes; improvement of rural access roads; land-use planning and mapping; environmental monitoring; training; assistance to state parks and biological reserves; and project administration.

The following are some of the main findings and lessons learned during the project:

- Success depends on having the active participation and organization of land users.
- Participatory methods must be promoted at the micro-watershed level.
- Formal extension and education for farmers are necessary.
- Existing farmers' organizations need to be strengthened.
- Farmers are most interested in activities that improve production at the farm level.
- Environmental education for upstream and downstream inhabitants is essential.
- Research and extension must be decentralized.
- Project interventions must be more evenly distributed.

Conclusions and recommendations

The presentation concluded that watershed management is now considered to be an important part of development. It will become more viable as rural people's empowerment to manage their natural resources increases, and will continue to evolve as development goals change.

The study's recommendations for improving the performance of future projects and programmes include: identifying and treating the underlying causes of watershed degradation; giving equal priority to improving and maintaining upland natural resources; emphasizing stakeholder

participatory learning and technology development; implementing sustainable multi-use management of watersheds, including water resources development; and implementing multi-use management of both renewable and non-renewable natural resources, with an emphasis on water and soil resources in upland watersheds and with development responsibility going to the relevant line agency.

REVIEW AND EVALUATION OF STRATEGIES FOR WATERSHED MANAGEMENT IN LATIN AMERICA

Mr Pablo Sosa, FAO consultant for watershed management in Latin America, presented a paper reviewing the status of watershed management in Latin America. The objective of this paper was to evaluate the achievements and existing gaps in watershed management programmes and projects, to review the lessons learned during the 1990 to 2000 period, and to suggest guidelines for the next generation of programmes and projects in Latin America.

Mr Sosa's paper was based mainly on national reports about the watershed management situation in Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela. It also highlighted the results of a case study of the Integrated Management and Participation of the Alta del Rio Pira'I project (GCP/INT/542/ITA), which was carried out in Santa Cruz, Bolivia. The evaluation included the results of various workshops and other technical cooperation activities organized by the Latin American Technical Cooperation Network on Watershed Management (REDLACH). It took particular account of the First and Second Latin American Congresses on Watershed Management, organized by FAO and REDLACH, and reviewed the work of other international organizations involved in watershed management topics in the region.

Lessons learned

The following is a summary of the lessons learned that could be useful for the next generation of watershed management programmes and projects:

- It is difficult to obtain medium- and long-term results because there is no legal and policy framework to provide continuity to watershed management programmes and policies.
- When there is a national plan for watershed management, coordination among the institutions responsible for various components of integrated watershed management is improved.
- Key elements for successful watershed management programmes and projects are the active participation of local stakeholders and the achievement of outcomes that are economically, socially or environmentally beneficial.
- It is necessary to have a system for monitoring and evaluating the results of watershed management programmes in order to justify future investments, disseminate experiences and validate the practices used.
- If watershed resource management is used to generate funds, it is easier to justify future investments in watershed management projects.
- Information and databases based on the results of watershed management programmes and projects are essential tools for increasing cooperation and promoting future interventions.

Profile of the next generation of watershed management programmes and projects

National reports from Latin American countries include information about more than 200 programmes and projects, which represent diverse focuses, operational modalities, scales and time frames. Although each country has its own specific conditions and needs, there are also many common characteristics among countries. These make it possible to define the following guidelines for the next generation of watershed management programmes and projects:

- All participating stakeholders, including local beneficiaries, local authorities and interest groups, should be involved in the design, execution and evaluation phases of programmes and projects.
- Programmes and projects should form multidisciplinary teams with representatives from all the institutions involved. They should also strive to harmonize the policies and priorities of the different institutions, and avoid conflicts of interest and unnecessary overlapping.
- From the design phase onwards, programmes and projects should integrate sustainable natural resources management with the needs of local production systems and social realities. They should ensure that all activities can be transferred to and continued by local communities.
- Projects and programmes should be designed and executed in ways that can be adapted easily for application in other watersheds with similar characteristics.
- Regional programmes and projects should be planned in ways that harmonize the diverse development policies of different government sectors, and that transcend government changes so that they can progressively become national policy.
- Programmes and projects should support economic, social and environmental stability.
- Programmes and projects should incorporate a follow-up system, the monitoring of activities during implementation and the evaluation of end results. This makes it possible to validate the methodologies and practices applied, assess the cost–benefit ratios and – as a result – justify future investments.
- When programmes and projects are partially or totally self-funding (through tariffs, payments for environmental services and the creation of mixed public and private funds) there is less need for external financing and less competition with other sectors that depend on limited external funds.

WHAT REALLY WORKS IN WATERSHED MANAGEMENT

This paper was prepared by Mr Henry Tschinkle and was based on the author's own experience. It concentrated primarily on technical approaches and practices in watershed management in Latin America, and assessed what has been learned from experience that might help in similar efforts in the future. The following is a summary of some of the important aspects treated in the paper:

- Although the aims and priorities of rural development seldom conflict with those of watershed management, the two approaches are not always complementary. For example, improved land-use practices that are carried out on only a small portion of a watershed might not result in significant improvements to watershed conditions.
- Many of the non-governmental organizations (NGOs) that focus on rural development and the improvement of farmers' welfare present their programmes and projects as watershed management interventions, even when they cover only a tiny portion of the watershed.

- Successful watershed practices continue to change the landscape after a project has ended. At present, however, the results of watershed and land-use projects tend to be assessed in terms of the land area treated, the number of farmers assisted, the number of people trained, etc. More attention must be paid to learning from past experiences.
- Projects that are under pressure to demonstrate positive changes often neglect the protection of land that is still in good condition. Yet, maintaining current conditions on such land is the greatest and lowest-cost impact that a project can have. Efforts need to focus more on protected areas, especially in upper watersheds.
- A promising approach to watershed management is for downstream users (irrigation districts, hydroelectric works, urban users, industries) to pay for the environmental services that farmers and forest owners in upper watersheds provide.
- It is often assumed that technical experts are no longer needed, and that almost anyone can deal with the technical problems of watersheds. Young, inexperienced field technicians with inadequate supervision are often expected to advise farmers. Projects that fail to pay enough attention to technology often end up with little to deliver, in spite of the sophisticated and efficient extension organizations that have been created to reach thousands of individuals in remote villages.
- The primary experience to be gathered from Central America's many watershed projects is that – in the long chain from international donor to farmer – the only person with an incentive to point out what does not work is the farmer. However, farmers have no power and are regarded only as the beneficiaries of project “gifts”.
- There are now far more NGOs because donors have funded them to implement projects. However, most NGOs provide unsatisfactory technical services and, although highly motivated, are low on expertise. The recent emphasis on strengthening local municipal governments is a positive step, but they too require considerable development.
- Implementing organizations must explore and test extension systems that encourage farmers to take the lead in defining the content of technical assistance and evaluating its impact. Such extension systems should be based on formal contracts between farmers and implementing organizations, whereby both parties define one common goal and the technical mechanisms that organizations should provide to attain that goal.
- Land use responds to market forces. Projects and their delivery systems have a greater impact when they help farmers to reach new markets for environmentally friendly products (through value-added processing, identifying niches or other means) than when they try to encourage farmers to change their ways.
- When they are implemented effectively, policies can do more than projects to bring about changes in land use. Rental arrangements or insecurity of tenure owing to a lack of clear title tend to restrict land-use improvements, especially when these entail major investments in permanent crops, pasture improvement, forest management and infrastructure.
- If future efforts are to have a visible impact on the landscape and on the welfare of a significant proportion of upland farmers, it is necessary to look beyond final project evaluations and isolated successes when selecting approaches and practices for financing. Experiences dating back five or ten years must be carefully scrutinized in order to identify what is likely to be effective on a significant scale.

Some project design suggestions

- *First look backward* to determine which practices spread spontaneously and which do not.
- *Then look around*; invest time in learning about the experiences of others.
- *Pick a few winning technologies*, such as a few crops and practices to promote.
- *Build in a mechanism for continuous learning* by including project components whose purpose is to evaluate farmers' criticisms, and suggest corrections.
- *Strengthen accountability*; those who do not deliver funds, services or results as agreed should be held accountable and pay the consequences.
- *Look for solutions that are not based on land use* by creating alternative sources of income that are not based on agriculture.
- *Diversify cash crops* through improving the production of existing commercial crops and introducing new ones.
- *Emphasize markets and processing* by identifying markets and helping to set up processing and transport facilities.
- *Establish incentives for improvement*, which turn farmer beneficiaries into clients; when proper mechanisms are in place, farmers are willing to pay for technical services that they really value.
- *Put protection before rehabilitation*; the protection of land that is still in good condition, especially natural and secondary forests, should be the number one option of any project.
- *Projects should first be implemented in watersheds that supply water for households*; people are far more willing to improve land-use practices in watersheds that supply the water they drink.
- *Take into account the production capacity of land* by using simple methods of classifying land according to the maximum intensity of use that should be allowed.
- *Stem the flood of useless documents*; projects should include rules and controls that limit the proliferation of lengthy reports, studies, workshop summaries, strategies, guidelines and plans.

RELATIONSHIP BETWEEN LAND USE AND WATER IN WATERSHEDS – IMPLICATIONS FOR THE MANAGEMENT OF WATERSHEDS

This paper was presented by Benjamin Kiersch, Assistant Professional Officer in FAO's Land and Water Department. It included the results of an FAO study aimed at increasing the understanding of how land use and water are related in rural watersheds, and identifying possible institutional or financial mechanisms that improve coordination of the linkages between upstream and downstream watershed communities. The study conclusions have direct implications for programmes that aim to introduce payment systems for watershed services, including the following:

- Land use can have a considerable (negative or positive) impact on downstream water, especially when water quality is an issue – particularly drinking-water.
- Misconceptions about the role of land-use practices are common and can lead to investments that are ineffective in terms of producing an impact downstream.
- It is practically impossible to value watershed services comprehensively.
- The feasibility of cooperation or payment schemes involving downstream and upstream stakeholders depends, largely, on the economic value of the downstream impact and the capacity to assess it reliably.
- Even when the physical impacts have not been reliably valued, watershed cooperation can still be successful if other non-directly measurable impacts are taken into consideration (image, other social concerns, etc.).

The study also identified a set of criteria for ensuring that upstream–downstream cooperation mechanisms are successful. These include the following:

- Watershed management programmes must be considered as an element of water conservation strategies.
- The biophysical impacts of watershed land use are very site- and scale-specific and should be assessed on a case-by-case basis.
- Stakeholders must share a common understanding and reliable quantification of the biophysical impacts, including the element of uncertainty.
- It must be possible to quantify the economic impact on downstream stakeholders, and this impact must be important enough to justify intervention.
- There should be a limited number of upstream and downstream stakeholder groups, and these should be well organized.
- The existing institutional and legal frameworks, including land tenure conditions, must be conducive to successful upstream–downstream linkage programmes.
- If the public sector is involved, there must be political commitment to establishing upstream–downstream cooperation.

CHAPTER 2

WORKING GROUP FINDINGS AND RECOMMENDATIONS

Working groups were asked to identify and assess the achievements, gaps and lessons learned of watershed management programmes and projects in countries of the three Latin American subregions. They then considered guidelines for the next generation of watershed management programmes and projects. Three main issues were addressed.

Innovative approaches and methodologies for the conservation and sustainable use of water: payment for environmental services; scales (project, micro-watershed, watershed); project design and implementation; and other relevant technical elements for the integrated management of watersheds and mountain ecosystems.

Strategies for research and technological transfer: relations between researchers and end users; databases (local, national and regional); and technology transfers through national, regional and global networks.

Innovative approaches and methodologies for economic and social development: participatory processes; policies and legislation; internal and external benefits; and other relevant elements for the conservation and sustainable management of water.

Based on their country of origin, participants were divided into the following subregions: Central America and the Caribbean (Cuba, El Salvador, Guatemala, Honduras, Nicaragua and the Dominican Republic); Andes and the Amazon (Colombia, Ecuador, Bolivia, Venezuela and Peru); and Southern Cone (Argentina, Brazil, Chile, Paraguay and Uruguay).

Each subregion working group submitted a report, which was discussed at the Workshop Plenary Session. The following is a summary of all the reports made by the working groups for the three subregions.

REVIEW OF WATERSHED MANAGEMENT EXPERIENCES IN LATIN AMERICA: ACHIEVEMENTS, GAPS AND LESSONS LEARNED

Achievements

- All countries of the region use an integrated watershed management approach, which is currently going through a process of regional conceptualization and validation.
- Sectoral, environmental, policy and legal frameworks take account of watershed management issues, and countries have made progress regarding the establishment of watershed entities.
- A significant number of watershed management programmes and projects are being implemented in all countries of the region. Several planning tools and technologies are available.
- The watershed, sub-watershed and micro-watershed framework is being applied to territorial planning in many countries.

- Throughout the region, public awareness of watershed management has increased, and community organizations, governments and local stakeholders are more involved in project planning and implementation.
- Decentralization processes in the region have resulted in local governments assuming responsibility for natural resource management, especially at the sub-watershed level.
- NGOs have made progress as the promoters, facilitators and implementers of community participation; strengthened NGOs have resulted in improved watershed management.
- Strategic alliances for specific projects have been set up among the public and private sectors, local government and communities. Sectoral institutions implement their programmes through these alliances.
- Collaboration and cooperation among different cultures have boosted the management of watershed natural resources, as well as helping to recover and validate traditional practices. Traditional and modern experiences have been incorporated into many activities, and gender equality is gaining increasing importance in programmes and projects.
- Significant progress has been made in the areas of human resource training and the production of information material. It is now recognized that trained and organized communities can have a significant influence at the political level.
- The issue of watersheds that are shared by more than one country has been addressed, and there has been progress in the design and implementation of border watershed management programmes and projects, with special focus on international watersheds.

Watershed management gaps

1) Legal-political framework:

- Political support for watershed management is limited; policies and regulations supporting a watershed management approach are often not applied or coordinated; and policies, plans and projects have been disrupted or discontinued in many countries of the region.
- Sectoral legislation governing the integrated management of natural resources and inter-institutional coordination is not effectively applied and enforced, which contributes to a lack of national programmes for watershed management.
- There are not enough trained personnel to meet the demands of watershed planning and management, owing to the lack of employment stability for programmes' technical staff. Programmes and projects are subject to changes of government, which affects the continuity of activities.
- There is a lack of political will to provide environmental management with sufficient investment, policies, support instruments and means of management and control, mainly owing to other national priorities.
- Watershed management programmes lack continuity because watershed issues are not sufficiently integrated into national development agendas and because governments and administrations are constantly changing.

2) Institutional framework:

- The government institutions responsible for watershed management are weak or limited, as are inter-institutional and multisectoral coordination.

- Relations between communities and political decision-makers are hampered by weak local organizations and a lack of appropriate training for community leaders.
- Public stakeholder participation and commitment are ineffective; inter-institutional coordination of the public and private sectors is limited; and there are few mechanisms for resolving conflicts of interest among watershed stakeholders.

3) Participation:

- The concept of participation needs to be more clearly defined. Many stakeholders are not participating in the planning and implementation phases, so projects never manage to establish self-management of watersheds.
- Community participation mechanisms and watershed user training programmes are often weak.
- There is little integration between upstream and downstream actors, and this often leads to conflicts of interest.

4) Information:

- Although progress has been made in the area of information administration and management, the quantity and quality of basic and applied information are not sufficient to allow proper planning, monitoring and assessment. Detailed information about the watershed is particularly inadequate.
- The information available for watershed management and planning is seldom reliable, and the public has no access to it; the exchange of information and experiences is poor.
- Information about water pollution caused by solid and liquid waste and hazardous substances is not available to many watershed management programmes and projects.

Others:

- Watershed management programmes and projects usually have poor social, economic and environmental results.
- It is difficult to obtain public sector funding to implement plans, programmes and projects, and there are no appropriate financial mechanisms to promote private sector participation.
- Small rural producers receive inadequate technical assistance and applied research results.

Lessons learned

- The use of watersheds as territorial units for planning and management can optimize human and economic resources, and achieve the sustainable development, conservation and preservation of natural resources.
- The integrated watershed management concept that has evolved is centred on participation; but watershed stakeholders' participation is still limited, as are their links with decision-makers.
- Multidisciplinary participation and consensus can strengthen watershed management and training; when decision-making takes account of all the different cultures involved, community participation is reinforced and watershed management processes facilitated.
- Strong, decentralized organizations and institutions are essential to watershed management, but lack of coordination at the local, regional and international levels has hindered watershed management. Weak management in local institutions has been a significant obstacle.

- Many watershed management projects have lost credibility because they have not addressed water quantity, quality and availability properly.
- Watershed management policies, programmes and projects are not yet capable of meeting the region's social needs in terms of poverty alleviation and the provision of basic services.
- Watershed management programmes and projects have often failed to improve people's quality of life. This situation must be improved if watershed management activities are to attract more community acceptance than they do at present.
- Although technical and financial cooperation agencies consider watershed management a top priority issue, and have increased investments accordingly, there is still a need to balance the levels of investment in physical infrastructure with those in the conservation and protection of natural resources.
- Technical cooperation has been an important factor in the implementation of integrated watershed management policies.
- Watershed management interventions have paid inadequate attention to traditional practices and knowledge, especially those of local populations.
- Internal and external migration represents a constraint for watershed management interventions owing to the loss of continuity and consistency of activities.

CONSIDERATIONS FOR FUTURE WATERSHED MANAGEMENT PROJECTS

Major approaches and methodologies for watershed management

This topic addressed innovative approaches, methodologies, major issues and solutions for effective watershed management and integrated mountain ecosystem management. It focused particularly on the conservation and sustainable use of water.

1) Financial mechanisms:

- Clean production, carbon sequestration, and efficient land and energy utilization should be promoted through the use of non-traditional financial mechanisms (payments for environmental services, certification of origin, clean production or organic agriculture, incentives, tariffs, etc.) that are tested by pilot projects.
- When applying payment schemes for environmental services, the types of service to be provided, the demand and the capacity for paying all need to be identified.
- Payments for environmental services should be used to fund watershed management activities. Payments should be set on the basis of demonstration watershed projects and the monitoring and assessment of compliance with agreements.
- When valuating environmental services, the local situation and the conditions of the country concerned should be taken into account, and practical criteria should be applied in the initial stages.
- Other countries' and regions' experiences of valuating and defining tariffs are useful. The exchange of experiences provides a basis from which to develop a harmonized payment methodology that clearly identifies services and beneficiaries, assesses different types of environmental services, and can be applied in a range of contexts.
- Strategies for compensating environmental service provision, and the creation of a national fund for managing watershed natural resources should be considered.

- Environmental service compensation schemes should be considered for communities and other areas that generate water for different users. Collection mechanisms should be based on technical, economic and social criteria.
- Incentives to establish watershed protection areas should be developed.

2) *Scale issues (project, micro-watershed, sub-watershed, watershed):*

- The scale of a programme or project can be based on such criteria as its purpose, the watershed's strategic value, demand, risks of natural disaster, ecosystem fragility, response capacity, and the availability of financial and technological resources.
- National, regional and local development plans must be taken into account when establishing the linkages required by national watershed development policies and when developing national watershed plans and priorities regarding resources, usage and conflicts.
- A methodology of multi-level planning for watersheds, sub-watersheds and micro-watersheds should be applied, in which projects and programmes are planned at the watershed level and executed at the micro-watershed level.

3) *Project design and implementation:*

- Before watershed management activities are implemented, the interests of the different stakeholders should be assessed and the management options identified from these.
- Sources of non-agricultural rural employment in non-agricultural areas, such as ecotourism, environmental service provision, agribusiness and agroforestry, should be encouraged.
- Harmonized project design can be achieved through consideration of the information available, assessment of the need for more detailed or additional research and studies, and formulation of flexible projects with appropriate deadlines.
- Watershed activities should be based on up-to-date information that is accessible to the different users and that includes studies aimed at improving the planning for different scales of intervention.
- Projects should be designed and executed with the full participation, consultation and consensus of the community involved so that it can play a leading role in self-managing the watershed.
- Community frustration is reduced when projects have sufficient resources and time.
- Projects should be implemented gradually, starting with high-priority watersheds and taking account of users' interests, fragile ecosystems and the importance of water catchments and regulation.
- The design and implementation of projects in watersheds that cross political and administrative boundaries must be flexible, and should be discussed and approved by all the parties involved in order to ensure their participation in the efficient execution of projects, based on agreement.
- Project designs should include strategies for ensuring sustainability, objectives that improve living conditions, and consideration of such aspects as risks and threats, poverty reduction, biodiversity and food security.
- Technical and institutional capabilities should be strengthened, and new private sector funding sources that can contribute to the successful implementation of projects should be identified.
- Aspects such as land tenure, clear titles and rights to different natural resources need to be considered.
- Watershed management should be addressed through multiple-use, integrated management systems that consider the availability of groundwater, apply GIS and other modern technologies, and ensure that efforts in local watersheds are assessed and followed up.

4) *Other technical elements:*

- An ecosystem approach, which considers mountain habitats, biodiversity and landscape conservation, should be applied to watershed management. Protected area management should be integrated with watershed management.
- There is a need to promote productive activities, such as non-traditional crops and organic farming, which can increase competition and environmental sustainability.
- Water resources management should focus on soil and water conservation, and consider water as a finite resource of economic value, which has to be used and managed rationally.

Appropriate strategies for research and technology transfer

1) *Relation between researchers and end users:*

- Research and the dissemination of results from watershed management activities must be based on demand and aim to solve the problems faced by different watershed stakeholders, including inhabitants of the watershed, NGOs and local governments.
- There is a need to strengthen applied research focused on users' needs, and to consider production systems that use local resources.
- Users should participate in the identification of research topics, the definition of research guidelines and the validation of management practices.
- Research results should provide watershed users with technological elements, methods and tools, and should use manuals and booklets to facilitate their adoption.
- There is a need to establish demonstration watersheds for the transfer, teaching, monitoring and assessment of actions taken. Discussion of scientific and traditional knowledge should also be fostered.
- Research results should be disseminated in non-technical language, and distance-learning training programmes for the various levels of watershed stakeholder should be implemented.
- New sources of private sector funding for research and the dissemination of results should be identified.

2) *Databases:*

- Data and information should be standardized and pooled in order to create an institutional database that provides easy access to watershed management information.
- Data, information, experiences and knowledge should be shared at the local, national and regional levels through national networks and the Latin American Technical Cooperation Network on Watershed Management (REDLACH).
- Poor rural communities must have free access to databases that support productive management.
- Criteria and indicators should be established for monitoring and assessing the operation and progress of watershed management programmes and projects, as well as the environmental and socio-economic context.

3) Technology transfer:

- Within the REDLACH framework, new national networks should be created, and existing ones strengthened, as a means of disseminating and sharing experiences. The exchange of specialists from institutions involved in watershed management-related research should be promoted.
- Links should be established between REDLACH and the water resource network of the Organization of American States in order to benefit from the experiences of both networks and to assist in the design of coherent policies for water resources and watershed management.
- Within the REDLACH framework, there is a need to create a network of universities and institutions involved in watershed management research, encourage access to and dissemination of results, and optimize economic resources.
- Research should be planned as a long-term process that includes the duplication of successful results on demonstration watersheds, which serve as areas for training and visits from interested parties.
- After they have been successfully field-tested, the results of technology, information and research should be disseminated in ways that are easily understood by decision-makers and other users.
- The farmer-to-farmer and producer-to-producer rural extension systems should be promoted.

Research priorities:

There is a need for more research in: the impact of human activities on the watershed; land cover and erosion control; sediment transport; hydrological studies, including of groundwater and glaciers; payment methodologies for environmental services; watershed ecology, hydrology and dynamics; hydrological models to assess environmental impacts at the watershed level; hydrometeorological models to assess the impact of climate change; the restoration of rivers and riverbanks; and the validation of technologies for management, soil and water conservation and technology transfer that are appropriate for local conditions.

Innovative approaches and methodologies for the efficient management of watershed ecosystems, with special focus on socio-economic considerations

1) Participatory processes:

- Watershed management plans, programmes and projects should consider participatory processes that involve watershed stakeholders and apply modern self-management and local sustainable development methods.
- When formulating watershed management projects, it is important to include awareness raising and training for the different actors involved, and to generate timely, secure and accessible information that facilitates participation in decision-making.
- Watershed management requires mutual agreement among communities, the government and the private sector. Such consensus is obtained through consensus mechanisms, watershed agencies and inter-institutional networks.
- Incentives for encouraging the participation of all watershed stakeholders should be considered.

2) Political and institutional aspects:

- Development policies should consider watersheds as planning and management units in which actions can be coordinated, human and economic resources optimized, and natural resources protected and conserved.
- Policies and legislation should consider the decentralization of institutions and establish channels for institutional linkages at the local, regional and national levels. They should take account of local and regional development aspects, and ensure medium- and long-term self-management of the watershed.
- National policies should ensure the funding required to implement watershed programmes and projects, and should be enforced by decentralized watershed entities that manage their resources autonomously.
- Project goals should be set according to national development guidelines and strategies.
- There is a need for policies and legislation that facilitate the creation of watershed authorities under different management schemes (e.g. corporations, agencies, boards, committees) and foster the implementation of programmes and projects aimed at solving socio-economic problems and ensuring conservation of the natural resource base.
- Policies and regulations should take account of the current social, cultural, economic and environmental conditions and technical capacities, and should have the consensus of the various sectors and stakeholders.
- In order to avoid conflicts arising from different guidelines and to ensure consistency with the current political, legal and institutional framework, central governments should foster, regulate, manage, support and harmonize sectoral regulations, laws and policies that specify the roles, competencies and scopes of the different institutions involved.
- International agencies' projects should collaborate with national counterparts and watershed stakeholders in order to ensure a comprehensive and integrated approach.
- Through their ministries of foreign affairs, governments should participate more actively in the implementation of environmental protocols and agreements related to watershed management.

3) Internal and external benefits:

- Value-added production, marketing and trade activities should be designed to turn environmental advantages into competitive ones.
- Watershed programmes should aim to improve production, employment, food safety and intangible, social, environmental and cultural benefits, as well as the quality of life in upper, middle and lower watersheds.
- Programmes should include infrastructure development aimed at improving production, the environment and living conditions.
- Watershed inhabitants' incomes can be increased by activities related to tourism, scenic values and value-added production. Biodiversity conservation should be rewarded and schemes for fair and equitable benefit sharing fostered.
- Territorial linkages between watershed inhabitants and other stakeholders should be fostered and strengthened.
- Environmental value should be incorporated into watershed management.
- The formation of "social capital" and "heritage accounts" should be encouraged.
- The efficiency of watershed projects for local communities should be assessed through valuation methodologies and cost-benefit ratio studies.
- Criteria and indicators should be applied for monitoring and follow-up and to validate project results.

4) Other relevant elements:

- Demonstration watersheds and integrated agroforestry plots should be established in zones close to waterways.
- Watershed management programmes should be developed in priority watersheds in each country in order to build up a demonstration, experimental watershed network.
- Bioengineering and forest protection aimed at regulating water resources, restoring forest hydrology, reducing vulnerability in areas subject to flooding, and improving wildlife habitats should be included.
- The watershed concept should be used to promote synergy among organizations, agencies and international agreements.
- The development of shared watersheds should be promoted as a mechanism for integrating countries.
- Watershed management programmes should be related to implementation of Agenda 21, the Millennium Development Goals, and the Johannesburg Plan.

CHAPTER 3

SUMMARY OF GUIDELINES FOR THE NEXT GENERATION OF WATERSHED MANAGEMENT PROGRAMMES AND PROJECTS

This chapter presents a brief synthesis of the workshop's conclusions and recommendations regarding the preparation of future programmes and projects in watershed management. The following is based on the results of the group discussions, the presentations and the plenary sessions. Results are presented under some of the major themes introduced during the sessions.

LEGISLATION AND POLICY

- It is often essential to establish policies and legislation in order to bring about changes in land use, provide continuity and ensure medium- and long-term results for national programmes and projects in watershed management.
- The formulation of policies that address the many problems and opportunities associated with watershed management requires broad stakeholder participation.
- The policies and priorities of the many institutions associated with watershed management must be harmonized in order to avoid conflicts of interest and unnecessary overlapping of functions.

PARTICIPATION

- The key elements for successful watershed management programmes and projects are the active participation and organization of land users and the achievement of positive economic, social or environmental results.
- Successful watershed management depends on having the participation of all stakeholders – local populations, beneficiaries, local authorities and interest groups – in the design, implementation and evaluation of programmes and projects.
- An approach that is either extremely top-down or extremely bottom-up is not a recipe for success in watershed management. Community participation, horizontal linkages among authorities and local organizations and mutual agreements among communities, government and the private sector are all desirable.
- It is important to consider programmes for preserving local communities' traditional technologies, knowledge, customs and sustainable land and water management systems, which have been used for many centuries throughout the region.

RESOURCES MANAGEMENT

- Farmers are most interested in resource management activities that improve production at the farm level, and should take the lead in defining the content of technical assistance and evaluating its impact.
- Maintaining areas that are still in good condition is often more effective than rehabilitating deteriorated lands in terms of providing the best and lowest-cost project outcomes. Efforts need to focus more on protected areas, especially in upper watersheds.
- Watershed land use responds to market forces, and positive results can be achieved through providing farmers with access to new markets for environmentally friendly products and through value-added processing.
- Programmes and projects that focus on preventing natural disasters are often more effective than those that focus on responding to disasters after they have already occurred.
- More attention should be paid to water issues, which have not been adequately addressed by past watershed programmes and projects.
- As the human population expands and freshwater resources decrease, both water quality and flooding will be of growing concern.

UPSTREAM–DOWNSTREAM ISSUES

- Upstream land use will have an increasingly important effect on downstream areas, especially where water quality – particularly drinking-water – is an issue.
- The impact of upstream activities on downstream resource users (such as irrigation districts, hydroelectric works, urban users and industry) will be an important issue for future programmes and projects.
- Upland people need to be supported and empowered so that they can actively manage their own resources.

FINANCING WATERSHED MANAGEMENT PROGRAMMES AND PROJECTS

- The self-financing of watershed management programmes and projects through natural resource use, the application of taxes, and payments for intangible benefits can reduce the need for external sources of funding.
- The feasibility of cooperation and payment schemes between downstream and upstream stakeholders depends largely on the economic value of the downstream impact and the capacity to assess it reliably.
- Future projects should use diverse methods of valuing environmental services and the financial mechanisms that can provide fair compensation for them.
- Payment systems for environmental services should identify the types of service to be paid for, the demand and the ability to pay.

EDUCATION AND TRAINING

- Training programmes need to recognize the great diversity of cultural and geographic conditions in Latin America. Rather than relying on set models, they should develop strategies,

methodologies and tools geared to watershed management under local conditions, and should consult with the people for whom they are planned.

- There is a need for criteria and indicators to evaluate training programmes and quantify their impacts on watershed development.
- Training for watershed management professionals should take a holistic approach that allows them to integrate multidisciplinary approaches when making decisions.
- Environmental education at all levels is essential if watershed management is to be successful.

RESEARCH AND INFORMATION

- Research should be based on demand and oriented to solving the problems that affect watershed users, including providing them with tools to assist their understanding and use of information.
- Watershed users should participate in the identification of research topics and the validation of land-use management practices.
- There is a need to establish demonstration watersheds in order to facilitate information exchange, training, monitoring and evaluation. Dialogue between scientific and traditional knowledge should also be promoted.
- Cost-effective, practical models that obtain results quickly and are useful for difficult predictions and effective in the planning and management of watershed natural resources need to be developed and used.
- Appropriate sustainable resources and land management options are major issues for further investigation.

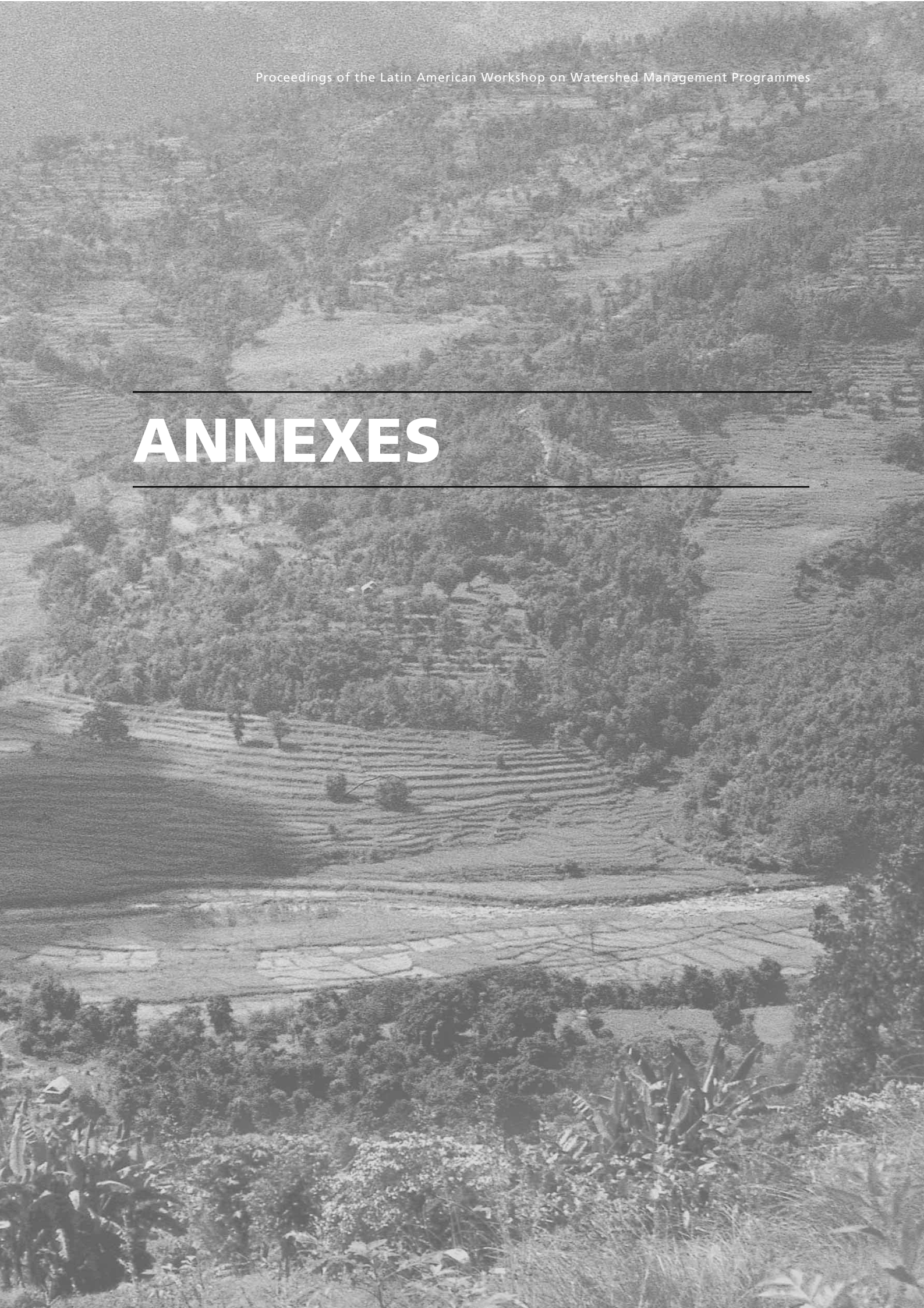
PROJECT DESIGN

- Project design and implementation should be based on community participation, consultation and consensus, in preparation for self-management of the watershed.
- In order to reduce community frustration, projects must always have sufficient resources and time to reach the desired objectives.
- Watershed management should follow an ecosystem approach that considers such aspects as habitats, biodiversity, fragile ecosystems, management of protected areas, water quantity and quality, and sustainable development strategies.

TRANSBOUNDARY WATERSHEDS

- The management of transboundary watersheds is an important instrument to support integration, cooperation and peace processes at the subregional and regional levels.
- An ecosystem approach should be applied to transboundary watersheds.
- Experiences of transboundary watersheds within the region should be used as the basis for developing a Latin American international watershed approach.

ANNEXES



ANNEX A

WORKSHOP PROGRAMME

SATURDAY AND SUNDAY, 14 AND 15 JUNE

Participant registration and technical visits

MONDAY, 16 JUNE

- 08.00-09.00 Registration
09.00-10.00 Welcome
Opening addresses: Moujahed Achouri and Larry Tennyson
10.15-10.45 *Presentation on Latin American watershed management assessment:* Pablo Sosa
10.45-11.00 *Presentation:* Henry Tschinkel
11.00-12.00 Discussion and comments
12.00-13.00 *Presentation and discussion of results of major topics addressed in congress*
14.30-16.00 *Continuation:* Presentation and discussion of results of major topics addressed in congress
16.15-18.30 *Working groups:* three groups will work on topics related to the workshop goals. (Specific topics to be defined.)

TUESDAY, 17 JUNE 17

- 08.30-11.00 *Working groups*
11.15-13.00 *Working groups*
14.30-16.30 *Working group reports and discussion*
16.45-18.00 *Continuation:* Working group reports and discussion
18.00-18.30 *Workshop closing session*

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ANNEX C

THEMES OF THE LATIN AMERICAN CONGRESS ON WATERSHED MANAGEMENT

The Third Latin American Congress on Watershed Management was held from 8 to 13 June 2003 in Arequipa, Peru, immediately prior to the Workshop on Preparing the Next Generation of Watershed Management Programmes and Projects. Nearly 1 000 specialists in various disciplines related to watershed management participated at the congress, which was organized around the five following principal themes:

- policies, legislation and institutions for integrated watershed management;
- economic and financial aspects of watershed management;
- social and cultural aspects of watershed management;
- watershed management research and capacity building;
- management instruments for watershed management in mountain areas.

Each of the themes included several areas of interest. A total of 21 workshops were held, at which nearly 300 papers were presented and discussed. The following characteristics of the next generation of watershed management programmes and projects are based on the conclusions and recommendations of these congress workshops.

THEME I – POLICIES, LEGISLATION AND INSTITUTIONS

Legislation

- Legislation that recognizes watersheds as planning and management units for natural resources.
- Rules that clearly define State authority and national-, regional- and local-level competencies regarding integrated watershed management, including technical criteria. Consistency between general and sectoral rules is necessary.
- Legislation to develop mechanisms for inter-institutional consensus that ensures the success of policies.
- Legally defined and stable incentive programmes, which are implemented in ways that ensure the sustainable management of natural resources.

Public and private institutions

- Institutional coordinating mechanisms identifying the integrated watershed management actions that stakeholders should follow.
- Political will to apply an integrated watershed management approach that includes participation, economic growth and the efficient and sustainable management of natural resources.
- Stable watershed authorities that have legal status, funding and appropriate representation at decision-making levels.

- Clear terminology and concepts for watershed and water management issues, which clarify the roles played by national, regional and local watershed institutions.
- A legal framework for formulating watershed master plans and land-use planning.
- Trained personnel who can meet the requirements of land-use planning.
- Acceptance of watersheds as the territorial units for implementing sustainable development policies, plans, programmes and projects.

National policies and strategies

- National policies that use consensus, participation and legislation to manage the water, natural resources and environment of watershed territories for the development and improvement of inhabitants' quality of life.
- All sectors' participation in the formulation of watershed management policies.
- Watershed authorities or commissions with decision-making power based on consensus from all sectors.
- Mutually beneficial incentive policies to encourage progress in watershed management.
- Watershed management's clear inclusion in public budgets as a major component of national policy.

International watersheds

- Recognition of international watershed management as a powerful instrument for promoting integration, cooperation and peace processes at the subregional and regional levels.
- Sound international watershed management agencies that represent all national and local actors.
- Incorporation of an ecosystem approach in the management of international watersheds.
- The use of experiences from Latin America as the basis for a regional approach to international watersheds.

THEME II – ECONOMIC AND FINANCIAL ASPECTS

Payment systems for watershed environmental services

- Use of the following methodologies to value the environmental services of watershed programmes: a) opportunity cost, based on the values of renewal, replacement, change in use, alternative use or avoided expenditures; b) optimization models, based on obtaining shadow prices for specific environmental and socio-economic constraints according to environmental externalities; and c) willingness to pay, based on beneficiaries' creditworthiness and perception of the value of the environmental services that are provided.
- Clear definition and quantification of users, suppliers and services, based on supply and demand for environmental services. Independent financial facilities that use external financial resources to make fair compensation for providing environmental services.
- A project monitoring system including baselines and socio-economic and environmental impact studies.
- Use of payments for environmental services as a way of enhancing the efficiency of natural, social and income-generating resource allocation and generating new sources of funding for the conservation, restoration and valuation of watershed natural resources.

Other economic and financial aspects of watershed management

- Financial mechanisms that are based on the results obtained by integrated watershed management projects.
- Development of ecotourism in strategic areas of the watershed as a way of diversifying funding sources and improving the rural population's quality of life.
- Master plans for protected natural areas that are compatible with watershed uses.

THEME III – SOCIAL AND CULTURAL ASPECTS OF WATERSHED MANAGEMENT

Community participation

- Community participation at the national and municipal levels, based on a bottom-up approach with horizontal linkages between local authorities and organizations.
- Political will to maintain continuity for sustainable local development and stakeholder participation through consensus.
- Plans, programmes, projects and activities that are based on sustainable watershed management models and community participation in order to achieve a balance between people and nature.

Role of indigenous communities

- Rational watershed management and biodiversity conservation that make use of traditional methods for conserving, managing and utilizing genetic diversity.
- Programmes that preserve multi-ethnic and multicultural technologies, knowledge and customs, and revalue traditional cultural heritage, local culture, land and water management and self-sustaining systems that have existed for millennia in Latin America and the Caribbean.

Decentralization

- Local government watershed agencies that represent all the different social and economic stakeholders in the watershed and take account of all their interests.
- A decentralization process based on the principles of equality and integration.

THEME IV – WATERSHED MANAGEMENT RESEARCH AND CAPACITY BUILDING

Community capacity building

- Training programmes with strategies, methodologies and tools that are consistent with watershed management and based on local conditions and watershed inhabitants' needs and priorities.
- Training programmes that recognize the diversity of cultures, climates, worldviews, tastes and sensations concerned, and that do not rely on standard designs but are developed to suit and make use of local knowledge and skills.
- Use of criteria and indicators for quantifying and qualifying training programmes' impacts and measuring trainees' progress.

Universities and watershed management

- A sub-network linked to REDLACH to facilitate the exchange of educational material, experiences, methodologies and research.
- Watershed management education for decision-makers that is holistic and integrates multidisciplinary knowledge, skills and experiences.
- Local government, community and university joint programmes and projects to further the institutional integration of watershed stakeholders.
- University support in developing watershed management extension and technical assistance activities and implementing practical projects with stakeholder participation.

Study and research on natural resources

- Research planning that ensures the funding and human resources necessary to achieve long-term sustainable results.
- Research based on local communities' participation and priorities.
- Evaluation of natural resources to identify the best technological and management alternatives.

Capacity building and research on socio-economic issues

- Watershed programmes and projects that include socio-economic studies of stakeholder organizations, cultural beliefs, management types and interrelations, which aim to increase community organizations', stakeholders' and professionals' participation in natural resources management.
- Research programmes that evaluate natural resources and quantify social and environmental watershed issues and their geographic distribution.
- Studies to identify and assess such issues as land tenure systems, the use of marginal lands and illegal occupation by migrant communities.

Information management

- Use of integrated territorial, socio-economic and environmental information tools, such as GIS and remote sensing, in watershed management decision-making processes.
- Decentralized information programmes that recognize how sustainable development in poor rural communities is limited by a lack of information.
- Interrelated systems based on regional networks with incentives for technology transfer between local communities and rural education institutions.
- Technologies for managing micro-watersheds through consensus and participation; interaction and Internet access provide communities with significant opportunities for sustainable development.

THEME V – MANAGEMENT INSTRUMENTS FOR WATERSHED MANAGEMENT IN MOUNTAIN AREAS

Application of models

- Implementation of experimental watershed models based on watershed realities and interactions with local actors.
- Public and private institution support to information gathering and dissemination, including the design and application of models that are based on the institutions' own positive experiences.
- Cost-effective models that deliver results quickly and are practical, useful in situations that are difficult to forecast and effective in the planning and management of watershed natural resources.

Disaster and risk prevention

- A programme focusing on disaster prevention rather than reaction, which can be used to integrate risk assessment into the planning and implementation of watershed development programmes.
- Use of risk analysis research to generate and standardize sufficient basic information for decision-making.
- Promotion of experience sharing and use of the media to disseminate information.

Water management

- Provision of environmental education at all levels, and use of successful experiences to prioritize public and private investments in water quality.
- Use of appropriate technologies, including standard indicators and methods to ensure sewage water treatment.
- Design and implementation of master plans for national programmes on water quality.
- An information network on water quality and quantity in watersheds, which collects basic data on a permanent or cyclical basis, disseminates reliable data and is accessible to the population.

Sediment management

- Decision-makers' recognition of watersheds as geographical units for erosion control policies.
- Erosion control measures that include production and socio-economic parameters for evaluating erosion control.
- Incorporation of specific erosion control regulations and secondary regulations for water quality and soil loss in Latin American countries, with the participation of watershed stakeholders.
- Creation of monitoring networks that develop models at different scales and for different ecosystems to facilitate decision-making on sediment and erosion control.
- Sharing of experiences of erosion control in Latin America.

Integrated watershed management

- Watershed development plans that are generated locally and presented to higher levels of government to obtain their support.
- Watershed management priorities that include participatory assessment of watersheds and participatory strategic planning.
- Recognition that successful integrated watershed management depends on having an economic system to fund the actions to be taken.



REDLACH



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