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

Major issues that require further investigation and in-depth analysis:

- the dynamics of intensified natural resource use;
- appropriate options for sustainable resources management;
- how to valuate 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.

Major constraints in the present:

- 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.

Major constraints for the future:

- 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.

Challenges:

- 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.

Needs:

- 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.

Opportunities:

- 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.

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 it 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 valuate 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 valuated, 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.