

PART 6

WORKSHOP FINDINGS

CHAPTER 16

CONCLUSIONS OF WORKING GROUPS

WORKING GROUP 1: UPLAND–LOWLAND LINKAGES

Working group 1 investigated the interactions between uplands and lowlands in watersheds, and the way in which these are addressed in watershed management programmes. It reviewed the current state of knowledge, existing approaches and techniques, and conflicts between interest groups and policies, and for each of these it analysed gaps and lessons learned. Special attention was given to the issues of scale and water quality. The group drafted recommendations for better understanding and integration of upstream–downstream linkages in watershed management programmes.

Knowledge

There is a serious lack of understanding of the processes of upland–lowland linkages, mainly because of the complexity of these processes, the large variety of local situations and the difficulty in generalizing findings. Appropriate tools to improve knowledge are not available, and when results are available within the research community, it is difficult to transfer these to decision-makers, planners and other stakeholders. Knowledge transfer and exchange between practitioners from developed and developing countries and among specialists from developing countries is also a limitation.

Some lessons have been learned from past experience in managing knowledge of upstream–downstream relations. First, there is a need to recognize the critical role of communication, extension and education in conveying the right messages to all stakeholders in watershed management. A good understanding of the processes, based on local experience and solid science, is needed to ensure successful planning. In this respect, the possibility to exchange experiences and expertise enhances the capacity to understand and plan at all levels. Proper linkages between researchers and practitioners from developed and developing countries are crucial.

Approaches and techniques

Watershed management programmes suffer from focusing too much on short-term interventions. There is often confusion about the objectives and intended beneficiaries, resulting in projects that try unsuccessfully to address both upstream and downstream objectives in an unbalanced way. Clarity in stating the objectives of the programmes and linking the planned interventions to these objectives can only be beneficial.

While watershed management programmes have evolved considerably over past decades, there are still cases where not enough attention is given to the populations of watersheds, resulting in the introduction of unsustainable practices. Only when populations are associated to watershed management planning and implementation, and when they can understand the

short- and long-term benefits for themselves of the proposed actions can sustainable watershed management approaches be developed. The same applies to water: only a comprehensive approach to water-related problems within a watershed can bear successful results. However, there is a need to recognize that water-centred and people-centred approaches are not always compatible in watershed management programmes, and the two objectives may need to be addressed in different ways. If farmers in watersheds are requested to modify the way they use their land for the sake of water protection, there need to be clear incentives for them to do so. In order to succeed, people-centred watershed management programmes must always focus on income and productivity.

Lessons from past experiences have shown that watershed management programmes must be comprehensive and involve all stakeholders. Project failures are due in large part to the application of top-down approaches and rigid principles that are not adapted to local conditions. The excessive emphasis on short-term visions for watershed management programmes is also a cause of failure. The absence of water rights and land property rights has been identified as a major constraint to the successful application of programmes for upstream–downstream linkages. There is also a need to link biophysical and socio-economic considerations in planning for watershed management programmes.

Conflicts among interest groups

The working group identified conflict among interest groups as one of the main issues in addressing upstream–downstream linkages in watersheds. The lack of appropriate institutional mechanisms to promote negotiation among interest groups within a watershed is often the first cause of misunderstanding and incomprehension among these groups. Another key issue is the groups' own lack of understanding of the implications of their behaviour, particularly in terms of its water-related impacts. In addition to the problem of institutional set-up, it is notable that the legislative framework in which upstream–downstream negotiations or collaboration could take place is usually absent. In most cases, land tenure is not well defined, which has serious consequences for any long-term intervention within the watershed. Depending on the geographical expanse of the watershed, there are also logistical problems in attempting to involve all stakeholders in watershed management programmes, with consequences for the level of engagement and participation in watershed management programmes by local communities.

Several mechanisms exist to overcome some of the problems related to conflicts among interest groups in watersheds. They are diverse, and their applicability varies from place to place. In some cases, appropriate legislation and regulations can go a long way in improving the sustainability of land management within watersheds. In others, local agreements between farmers in watersheds and water users downstream may prove useful. In other cases, particularly in Latin America, payment schemes for water-related services have been initiated. While it is still too early in most cases to evaluate the sustainability of such agreements, they are a promising approach and deserve to be monitored closely.

In working to improve relations among interest groups, all efforts should be made to rely on existing local structures and institutions. Where water users' associations exist, they can play a leading role in establishing a platform for negotiations between upstream and downstream communities.

Policies

While the research and practitioner community struggles to improve its understanding of the processes involved in upstream–downstream relations in watersheds, the little that is known of these interactions is not conveyed to policy-makers in an appropriate format. Policy-makers have difficulties in accepting the high level of uncertainty associated with watershed processes, and usually rely on simple, straightforward models, often with misconceptions about these processes. As a result, watershed-related investments are often based on wrong assumptions, resulting in poor or inexistent results. Part of the fault lies with professionals who do not see the importance of clarifying their findings and conveying them to policy-makers in a format that they can use in their decision-making processes. Enhanced interactions between politicians and practitioners are necessary to fill the knowledge gap on upstream–downstream linkages and improve the way in which policies are developed and applied.

Another classical problem arises from the sectoral nature of policies, in particular those related to land use, agriculture, irrigation and forestry, which leads to conflicting approaches to land management. In addition, the development agenda in poor countries is often driven by considerations dictated by developed countries, with little or no regard for the specific needs. There is little scope for decision-makers from developing countries to exchange their experience and approaches on watershed and related policies.

Scale issues

The group identified scale as one of the most important factors influencing upstream–downstream relations. A lack of clarity about the scale and possible impact of a given intervention is often the cause of inadequate policies and programmes, as most processes are highly scale-dependent. Countries are often confronted with problems arising from the upscaling of successful approaches and the lack of perception of the impact of local actions at larger scales. As a result, many programmes do not achieve expected outcomes because they lack upscaling mechanisms, while both technocrats and policy-makers do not appreciate the scale issue.

Water quality

Issues related to water quality have been discussed in the context of sub-Saharan Africa. While the problems of pollution are relatively limited in extension, they still represent a real threat in specific cases. In particular, the group considers that the impact of horticulture or other intensive agriculture on water quality is not properly understood, and there is a lack of standards and regulations for water quality management in intensive agriculture. A better understanding of the role of forests and how they affect water quality is also needed; it was recognized that well-managed watersheds can contribute substantially to improve the quality of water in watersheds and downstream.

Recommendations

In order to overcome the shortcomings related to knowledge, it is recommended that countries and institutions develop comprehensive training programmes at all levels on upstream–downstream interactions, and promote research in contentious issues, particularly the role of trees in water protection; that appropriate networks be developed to facilitate exchange of knowledge and information; and that watershed management programmes systematically include components on communication and education of stakeholders.

On the technical side, it is recommended that watershed management programmes be planned with a medium- to long-term vision and that they involve all stakeholders in an appropriate manner. Programmes should be comprehensive and flexible, so that they adapt to local conditions, and should link biophysical and socio-economic considerations. The watershed context should be used to set up sound development projects and programmes.

Watershed management is an ideal tool to enhance and improve interactions among interest groups within watersheds. Potential mechanisms to link these groups should be systematically explored and tested in order to reduce conflict and enhance collaboration. Such mechanisms should involve all relevant stakeholders in a practical way, and rely on improved institutional, legal and technical capacities. There is a need for wider dissemination of the existing tools to address conflict resolution in watersheds.

In terms of policies, watershed management programmes must be designed within the framework of country-specific poverty reduction and rural development strategies, clearly showing the integration between these programmes and high-level strategies. The exchange of knowledge and experiences in watershed management among countries should be facilitated, and countries and their financial partners should set up policies for the long-term funding of watershed management programmes. A better perception of land–water linkages within watersheds should be promoted, in particular among decision-makers. The role of the research community is crucial in providing decision-makers with clear and straightforward messages that capture the complexity of the processes, while providing them with opportunities for direct investment in the sector. A better linkage between science and policy is required. Renewed efforts should be made to address better the question of upscaling strategies in watershed management programmes.

With regard to water quality, there is a need to improve understanding and reporting on the extent of the problem, raise awareness about the possible impacts of intensive agriculture (particularly horticulture) on water quality and health, develop comprehensive strategies for water quality management in watersheds, and develop knowledge about the effects of forests on hydrological processes and water quality.

WORKING GROUP 2: POLICY AND INSTITUTIONS IN THE CONTEXT OF INTEGRATED WATERSHED MANAGEMENT

Over the last 20 years there have been some useful changes in national and transnational policies and institutions that affect watershed management. Most African countries have adopted new policies and laws on water and the environment that create useful legal foundations and

institutional frameworks for improved watershed management. There have also been some limited efforts to establish transnational agencies to deal with the continent's many transnational river basins. Successful implementation of new national laws and institutions is limited, however, by lack of information and resources. To some extent, watershed management is being affected by the same challenges that affect other aspects of governance in Africa, especially the challenges associated with decentralization and limited resources. Achievements and failures in transnational watershed management are shaped by the overall political context of inter-country relations. The working group noted achievements and gaps in a number of these key areas and articulated recommendations that can help to redress the situation.

Water policies and watershed management institutions

Since the mid-1990s, most African countries have adopted water policies and water acts that define the roles of various stakeholders in integrated water management. Most of the new water acts provide for new multi-layer water management institutions and greater recognition of water rights, human reserves and ecological reserves. Some local organizations are aware of the provisions of these acts. Most African countries have also enacted new legislation for environmental management and have established new institutions to implement that legislation. Negotiation platforms for shared resource use and management have emerged in some places.

However, the implementation of new institutional arrangements remains incomplete in most countries because of lack of funding, inadequate human resources, and inadequate involvement of local organizations and communities. Legal authority, rights to resource use and the responsibilities of different stakeholders are not clearly spelled out in some of the new laws. National water and watershed policies and laws tend to be sectoral, while effective watershed management requires multisectoral coordination.

Decentralization and involvement of local organizations

In some countries, there has been effective political decentralization, including decentralization of watershed management. Communities in some pilot implementation areas have become more involved in watershed and water resource management. However, it is important to recognize that managing decentralization is a long-term, complicated and inherently political process. In practice, it has proved to be easier to devolve powers to lower units of government and user groups than to ensure that these units have the capabilities, values, incentives and accountability necessary to fulfil their new functions.

There is now greater recognition of the needs, including water needs, of disadvantaged groups living in rural and urban areas (especially women, the elderly and youth). This has come about partly because of the poverty reduction planning processes that have been implemented in many African countries. In practice, however, local elite groups often dominate devolution processes, while many poorer resource users remain unfamiliar with their rights to obtain access to and utilize resources. Efforts to raise awareness among disadvantaged communities tend to be very partial and ad hoc.

Transnational water resource management

Africa has more transboundary river basins than any other region of the world. In the past, this has mostly been a constraint to investment, management and development. In the future, however, this constraint could be turned to advantage, with the possibility of joint management yielding a variety of social, economic and ecological benefits. Across the African continent there are a number of promising initiatives in improved transboundary basin management. These initiatives need to be greatly enhanced and sustained.

The working group noted the following transnational partnerships in different parts of Africa: the Nile Basin Initiative, the Lake Victoria Development Programme of the East African Community (EAC), Nkomati River Basin Agreement (Swaziland, Mozambique, South Africa), and the Niger Basin Authority. There are also some new transnational projects that have injected additional momentum to these initiatives, such as the Lake Victoria Environment Management Programme. In addition, there have also been some useful efforts to promote international networking on water and watershed management issues, such as WaterNet, SearNet, and the Network of Peasant Farmers' and Agricultural Producers' Organizations of West Africa (ROPPA –Réseau des organisations paysannes et de producteurs de l'Afrique de l'Ouest). There is potential to learn from successful cases of international cooperation and networking. However, there are still gaps in sustained finance for transboundary watershed management. Greater coordination is needed among countries and donors.

Information and knowledge base for improved watershed management

Effective watershed management at all levels is constrained by the poor information base and poor understanding of watershed management principles and practices. The general public and civil society organizations have not been very actively involved in watershed management programmes, in part because of low general awareness and concern for water and environmental challenges. Very few data have been compiled on watershed management programmes across the continent.

Investment

Too few resources are available for effective watershed management at all scales. Additional public resources are needed, especially at the transnational and basin levels. In addition, all countries need to understand better how to create regulatory and institutional environments that will attract additional private sector investment and participation.

Recommendations

National policies: National governments should review and harmonize the sectoral policies that affect water and watershed management within their countries (e.g. water, environment, agriculture, industry, administration, national planning). Harmonization of policies needs to recognize and address the uniqueness of watersheds and the challenges of watershed management (cultural values, hydrology, climate, geology, size/area, etc.). There is a need for

innovation of new policies that will provide new sources of finance to support watershed management for the range of situations found across Africa.

National institutions: The resource and information base of the institutions that are mandated to implement watershed management should be strengthened. Watershed resource management regimes need to be built up from local organizations to sub-watershed, watershed and basin management agencies, and watershed management councils and authorities need to go beyond water allocation to address watershed resource conservation and enhancement. There is also need for integrated planning and financing for water storage and supply, and watershed management that links local interests and concerns from water quality to conservation. Resources and finance need to be committed for the long periods that are necessary for effective watershed management.

Transnational institutions: National water laws need to be harmonized among countries sharing transnational basins and water sources.

Networking and information sharing: The flow of communication and awareness creation among stakeholders needs to be increased at all levels regarding policy and institutional requirements for effective watershed management. National-, regional- and continental-level watershed management networks need to be established and strengthened. Data and information about watershed resources should be collected more systematically and disseminated more transparently to concerned stakeholders. Data collection should be made a central responsibility of water management authorities/agencies at all levels, from the sub-basin to the transnational basin.

WORKING GROUP 3: WATERSHED MANAGEMENT EXPERIENCES: LESSONS LEARNED AND THE WAY FORWARD

Environmental services of watersheds: who should pay what?

A sufficient supply of clean water is a basic requirement for sustainable watershed management. Agriculture and industry must take into account upstream and downstream users in terms of their needs and how each user affects other users (e.g. the effects of upstream use of chemicals on downstream water users).

Effective environmental conservation practices have to be at the catchment level, and build up from the small scale. Putting people first has gained greater attention, but how far should this policy be followed at the environment's expense? While environmentalism has also gathered momentum, the question of trade-offs between livelihood and environmental concerns has arisen, especially in the context of poverty alleviation and food security.

One place to start is by examining mechanisms for the payment of environmental services in a watershed context. This would help with the maintenance and development of watersheds. Generally, urban consumers abstract the most, and should therefore pay the most. However, although urban centres pay for this water, these payments are not systematized. Added to this lack of systematization, very little of the revenue is ploughed back into the development and conservation of the watersheds that yield water for urban use. Yet, urban water users have an

important role to play in water issues and can lend a loud voice to watershed maintenance and development. Payments for environmental services can also play a more direct role by inculcating self-discipline for more judicious water use.

Water issues are economic issues

There is also need for an effective mechanism for conflict resolution among land and water users, and among water users at various points on the watershed. For this, there must be an integrated management approach regarding the quality and quantity of water at every level in order to avoid a skewed picture of reality. All actors with an economic interest in the watershed should be involved, and there should be economic benefits accruing to all. Unfortunately, socio-economic issues of this nature are often politicized and easily hijacked by politicians. To safeguard the process from becoming the prey of politicians, accurate information on water supply and quality is fundamental. Currently, this kind of information is lacking.

Technology transfer

Technology transfer regarding the benefits and impacts of watershed management activities needs more attention. A first step is to raise awareness, especially among women and youth, who have prime responsibility for family water provision. Planning has to be participatory. Positive experiences should also be disseminated and, where possible, replicated.

The knowledge gaps in resource assessment are very evident. Capacity building in geographic information systems (GIS) and Global Positioning Systems (GPS) would help in establishing a low-cost planning system for land and natural resource use, water assessments and waste treatment. Where possible, Web networks should be created, and greater use of existing electronic fora encouraged. Sometimes people are not aware of the existence of these online fora and networks, which include capacity building for integrated water resource management (Cap-Net), an international online forum. These water networks should in turn be linked to national programmes and to the International Water Management Institute's (IWMI) country-level efforts. Creating the networks is the easier part: getting them to work is more difficult.

Water basin management and natural resource management (NRM) are two sides of the same coin. Regional planners should be involved in this initiative with the right constituent of participants beyond top management; consultations at the technical level are also needed. In Latin America and the Caribbean, regional technical fora are already ongoing, including information and database sharing and exchange. Europe also has interactive networks with online discussions on various water management topics. Southern Africa, Nigeria and Morocco also have networks. Most of these initiatives fall under the Global Water Programme, and bring together institutions, researchers and technical experts.

An important consideration with respect to technology transfer is effective communication strategies, especially among and to technocrats. Equally important are the identification of benefits to primary stakeholders; the assessment of environmental benefits; the identification of factors affecting water supply; the incorporation of cultural values; and alternative livelihoods to ease the population pressure in and around watersheds. A word of caution,

however: in assessing benefits, the focus has often been heavily skewed in favour of conservation and biodiversity and/or industry, agro-industry, urban needs and mining, while the needs of the poor and smaller users are ignored.

Methodologies and measurements aside, technology transfer for development must also include people's perspectives and inputs. Watershed management has overemphasized research-based knowledge at the expense of Africa's indigenous knowledge. African societies are largely characterized by a strong tradition of "self-provisioning" and the evolution of community knowledge. There is a need to make an inventory of rural conservation technologies, evaluate their benefits and sustainability, and incorporate them into extension. Indigenous knowledge has to be acknowledged. Recognizing it also enhances the dignity of the people.

An integrated multisectoral approach

Poverty alleviation strategies and watershed management have to be linked in a multidisciplinary approach for conflict management. Policy and environment are closely intertwined. However, for the most part, there is no coordination in policy at the national level, and the arena is often marked by various sectors working at cross-purposes and even in competition, rather than complementing one another (e.g. agriculture, environment, water, planning, land, natural resources). Moreover, most African governments are driven by the foreign aid agenda and "stand-alone" poverty alleviation strategies. Yet present and potential conflicts can only be resolved by economically viable and environmentally sustainable projects and solutions. Governments have to take on board the maintenance of watershed infrastructure, especially in rural watersheds, bearing in mind that most rural communities lack the capacity to maintain such infrastructure adequately.

Furthermore, views on pollution tend to be too static, whereas the field and the issues involved are very dynamic. Local governments tend to be the main culprits in water pollution through irresponsible waste disposal in waterways and floodplains. Safe water and sanitation are a Millennium Development Goal of the United Nations (MDG) for 2022. An additional issue is migration, which is a socio-economic reality that has an impact on the environment, but which is usually ignored.

Scale and focus

This raises the question of the right scale and the right focus: should it be the household or the community? Small- or large-scale? About maintenance and conservation or about livelihoods and rights? Whatever the answers to these questions, the underlying guiding principle is that irrespective of scale, resources should never be jeopardized and the welfare of any single group should not be the overriding factor. Any interventions at a local scale should always be viewed on the "big picture" screen.

Environmental impact assessments (EIAs) should be enforced, and programmes and projects linked to them. Sometimes however the enforcers themselves are the culprits, as is the case of local governments and pollution. One possible solution is punitive payments in which the heaviest polluters pay the heaviest penalties to mitigate pollution.

Compared with industry, agro-industry and local authorities, resource-poor farmers have few options and are, more often than not, subject to the principle of “can’t pay won’t pay”. Land tenure and ownership for rural dwellers is also an important factor. Land degradation is sometimes driven by poverty and lack of tenure.

Pollution payments would call for an integration of the quality and quantity of water used, but the point of departure is who has a right to use the water? What is the quality of the water received and the water discharged? When rights are merged with quality and quantity, users can be self-regulating and free to purify and recycle their own wastewater.

For pollution payments to be equitable, full costs and benefits must be factored in. In practice, however, penalties lag far behind the economic benefits derived from pollution. Large users (urban centres, industries, agro-industries, mining) can easily pay for heavy pollution, and the penalties are not high enough to deter them. Small users suffer the most. The evolution of agriculture must also be taken into account. Agriculture is no longer wholly biological, but is also a contributor to pollution.

The way forward

For the future, an integrated vision is needed that incorporates all the actors, each of whom must have an economic interest in the watershed. Planning should be participatory and involve the young, the old and, especially, women. Access to watershed services should not be based solely on who can afford to pay, but also on efficient use and equity.

Because development approaches in Africa are primarily driven by the agenda of foreign aid and poverty alleviation programmes, development outcomes should be linked to national and regional poverty reduction strategies. There should be domestic, regional and international links, with the strategies of EAC, the Southern African Development Community (SADC) and the Economic Community of West African States (ECOWAS) linked with those of the New Partnership on Africa’s Development (NEPAD) and the MDGs.

As a result of the fragmented approach, most programmes target watershed sanitation and/or poverty alleviation as “stand-alone” problems. Yet there is a need to link the general framework for watershed management with ongoing and upcoming sectoral programmes. Ideally, a watershed management approach should avoid project-specific programmes. Assessment tools and models also need to be simplified and continually modified in order to adapt them to local realities, ensure that “toolkits” are in line with changing dynamics, especially on pollution, and facilitate the projection and modelling future scenarios.

There should also be simple indicators that reflect the impact of interventions on people’s livelihoods. However, cost–benefit analyses should cover the entire watershed in order to identify the greatest benefit and the greatest number of people: a local cost could well translate to a regional benefit. It must also be borne in mind that when enhancing resources, the tendency has largely been to overlook the benefits to local people.

Youth should be identified as a discrete group with their own issues, rights and perceptions; not all youth are children, even though the general trend is to lump them and children together.

It is therefore important to incorporate the impacts on youth welfare, especially because they are the future managers and custodians and so have an even higher stake in the sustainable management of natural resources.

The environment should be viewed through the lens of biodiversity and cultural context, as well as in terms of local flora and fauna. Agencies must work with a dynamic concept of pollution. A more flexible approach to capacity building is also necessary and should include vocational education for children, who can work elsewhere outside the watershed, and aid to technology transfer. Identifying alternative livelihoods would help to reduce the pressure on forests and other natural resources.

CHAPTER 17

WORKSHOP SUMMARY

WHAT IS SPECIAL ABOUT WATERSHED MANAGEMENT COMPARED WITH OTHER RESOURCE MANAGEMENT?

- Watersheds are integrators of people, resources and sectors.
- Watersheds link people that may never see each other, and may have vastly different wealth, livelihoods and socio-economic status.
- Watersheds include multiple resources – usually including forests, wetlands, fisheries, agricultural land, grazing land and water, and sometimes including minerals and important reservoirs of biodiversity.
- Good planning needs to be based on clear understanding of land use, hydrologic systems and interactions.
- Investments are long-term and generate benefits and costs that extend across large distances.
- Interventions that make good sense for individuals or communities may not be good for the total society that depends on the watershed.
- There is a large range of watershed management situations across the African continent, in terms of hydrology, policy, culture, governance, investment and the spatial distribution of poverty within watersheds.

WHAT IS SPECIAL ABOUT WATERSHEDS IN AFRICA?

- In general, levels of poverty are higher in Africa than in other regions of the world, and many African countries are experiencing increasing poverty. This poverty has multiple impacts on watershed management: both resource users and governments have short time perspectives; there are few resources available for investment by resource users and governments; and public investments are heavily dependent on the priorities of donors who emphasise short-term poverty alleviation rather than long-term infrastructure, resource conservation and technical capacity.
- Most countries share important river basins with other countries, and most important water resources are shared among two or more countries.
- There is heavy dependence on the priorities and programmes of multilateral finance organizations and donor agencies.
- Most countries have declining water storage in catchments, wetlands, lakes and reservoirs.
- Some countries have extremely low levels of investment in constructed water storage (water pans, dams, reservoirs), although there is large variation from country to country.
- There is a wide range of situations regarding water availability, forest cover and water quality.
- The national and regional institutions involved in watershed management generally have low and variable capacity, especially regarding integration across disciplines.

WATERSHED GOVERNANCE

- Many countries have recently enacted new policies for water and environmental management. However, there is a need to harmonize these policies across countries and with other more sectoral policies. More important, there is a need to develop the institutional capacity, financing mechanisms and enforcement mechanisms to implement these policies fully.
- There are new commitments to regional harmonization in some parts of the region.
- There is a need for nested management regimes that link local organizations to subcatchment, catchment and basin authorities and agencies. While several countries have recently enacted legislation that supports such nested regimes, there are few examples of those regimes actually working efficiently and effectively.
- Africa faces fundamental and special challenges of dealing with the consequences of transnational watersheds and river basins. Fortunately, there have been a number of early efforts to obtain better transnational water resource management (e.g. the Niger River basin, the Lake Victoria Development Programme of EAC, the Nile Basin Initiative, the Fouta Djallon, etc.).

EXPERIENCES WITH WATERSHED MANAGEMENT

- There are some cases of successful case studies in improved catchment management at the local level (e.g. Morocco), and examples of land-use practices that have beneficial effects on watershed properties (e.g. agroforestry practices, conservation agriculture).
- There is good evidence that the poor can benefit greatly from even small additional amounts of water during the dry season.
- There has been relatively little upscaling of successful watershed management to the national and regional levels. Institutional arrangements and financing mechanisms need to be put in place to scale these up to much larger areas.
- There is generally poor coordination and harmonization of organizations and agencies involved in watershed management.

UPSTREAM–DOWNSTREAM LINKAGES

- Smallholder water harvesting has good potential for increasing the availability of water for domestic and small-scale productive uses.
- There are weak controls on water abstraction and forest conversion in the headwater areas of many catchments.
- Deforestation and soil degradation in headwater areas are increasing the risk of floods in some small river basins.
- Policy-makers and farmers in many semi-arid areas have major concerns about the impacts of invasive trees on river flows and groundwater reserves.
- Many water and watershed management interventions are put in place without due regard to their downstream impacts.
- Water quality and groundwater resources have been underemphasized.

KNOWLEDGE AND INFORMATION

- There are large knowledge gaps among technicians, the general public and policy-makers about cause and effect relations in watersheds.
- There is a strong need to build the capacity of key institutions in Africa, with emphasis on developing tools and approaches in Africa that are appropriate for African conditions.
- There is very little effective monitoring and evaluation of water quantity and quality.
- Improved information and information management systems can assist in the resolution of conflicts over water and watershed management (examples from Ghana).
- Good economic and social planning must be based on good understanding of hydrological relations and good data on demand and supply of water.
- There are a number of important misunderstandings about the relations among trees, forests and key hydrologic properties (especially the effects of trees and forests on landslides and floods).
- There are unexploited opportunities for sharing concepts and lessons learned across the African continent – among scientists of different disciplines, between scientists and policy-makers and resource users, and among countries at different stages of institutional development.
- Some advances have been made in the state of science of watershed management, and these need to be more widely shared across the region.
- There has been little sustained experimentation and monitoring.
- There is need for greater awareness raising among the public and among policy-makers.
- There is need for more open sharing and more consistent collection of data.
- There is need for more training and capacity building.
- Success stories from Africa are needed, no matter how site-specific, in order to make the case for watershed management with policy-makers and donors. Especially valuable will be success stories in which science and knowledge make a difference in watershed management and watershed management makes a difference in people's lives.

PROPERTY RIGHTS – LAND, FOREST AND WATER RIGHTS

- Africa has a legacy of close interaction between land and water rights, with water rights largely following land rights.
- Water has recently been declared a national resource in South Africa and Ghana, implying the need to transfer it from locations of relative plenty to areas of relative scarcity. In South Africa, this is part of a complicated system of interbasin transfer of water resources from high-availability areas in the east of the country to high-population and low-supply areas in the central areas.
- Property rights to watershed resources are held under multiple property systems, and are sanctioned by multiple sources of authority. It is important that new agencies have real power, are articulated with property rights arrangements, and are harmonized with existing, trusted and legitimate sources of power.
- Privatization of watershed resources is a default pathway of development.

NEW FINANCING AND BENEFIT SHARING MECHANISMS

- There is a need to mobilize more consistent and long-term donor financing for conservation and investment in watershed management. Donors should be urged to address long-term investments that can reduce the need for short-term relief.
- In some instances, there may be good possibility to link investments in watersheds to people's willingness to pay for reliable and good-quality water – environmental services.
- There are many unanswered questions about who should receive compensation for watershed protection and how that compensation should be paid.
- Large questions remain about the potential for involving the private sector in watershed management, and how that potential can be enhanced.

NETWORKING

- There is a need for networks around watershed management issues; although networks that are already in place, such as WaterNet, should not be reproduced.
- There is a need for networking around catchments – linking community groups and civil society organizations with agencies and authorities with management responsibilities.
- There has been little South–South linkage within Africa and between Africa and other developing regions.
- There is a need for more cross-country sharing of lessons and experiences within Africa.
- There is a need for networks that link social and biophysical scientists.
- There is a strong need to link policy and science, based on good accepted science, receptive policy-makers, and networks between them.