

A Watershed Approach to Securing Resilient Livelihoods and Ecosystem Services

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A woman washing vegetables by a mountain stream in Tingri County, Tibet Autonomous Region, China: human health is linked to the state of the ecosystem in which people live

Water scarcity and ecological security are emerging as major development challenges. Geographically defined, watersheds are a framework for examining ecological, economic, and political issues between lowland and upland, upstream and downstream.

Watersheds as a political discourse

Discussions about ecological, technological, and managerial mechanisms for realising and distributing the benefits of watershed services have caught the attention of local, national, and international circles. Concomitant with these discussions has been the appearance of new social actors such as progressive NGOs and environmentalists, on the one hand, and local communities and rights-based social movements on the other. Although a 'watershed' is a biophysical feature, it must be seen also as a political construct which fosters a complex network of actors – from policy-makers, resource managers and NGOs to

scientists, prospectors, and local communities. This network is composed of diverse and diverging political-economic perspectives and political stakes.

Mountain watersheds are important sources of water, energy, and biological diversity. Furthermore, they may be sources of key resources such as minerals, forests, and agricultural products and be places for recreation. People in these upper watersheds are often blamed for accelerating soil erosion, floods, landslides, and loss of forest cover and biodiversity through the way they manage their natural resources. Discordant visions and unequal relationships between the uplands and the lowlands are

increasing through simplification of forest-water relationships and upland-lowland interactions by the public and policy-makers. Watershed management calls for a better understanding of people and resource dynamics. This requires moving beyond popular 'myths' – such as those stating that deforestation leads to reduced water availability and to increased soil erosion. Such myths are simplifications of cause-consequence relationships that are difficult to support empirically but which have gained sufficient public currency to influence environmental and development policies on upland watersheds. These simplifications become popular because they fit prevalent worldviews, suggest simple 'technical' solutions, and may serve the interests of groups with vested interests.

A watershed approach

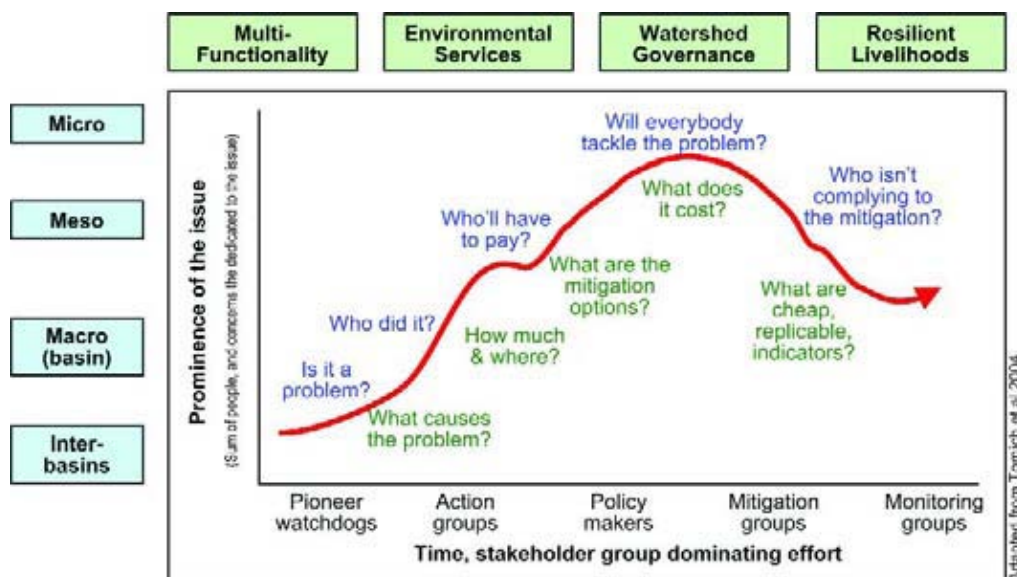
To move beyond simplifications, it is necessary to examine the **multi-functionality** of watershed services, **institutional arrangements** of watershed management, **decentralisation** for natural resource management, and **resilient livelihoods** for watershed people in the Himalayan region. To address discriminatory policies and practices aimed at upland farmers based on myths (misperceptions and misinterpretations) about human impacts in upper watersheds and unequal power relations between the uplands and lowlands, it is necessary to strengthen the capacity of local governments, NGOs, and research professionals to support good governance and sustainable livelihoods in mountain watersheds.

Focusing on watershed perspectives, our research questions are the following.

- How is the watershed defined? By whom? What watershed services are perceived by different actors?
- How do local people manage the ecosystem's capacity behind those services; viz., management practices, local institutions, and governance systems?
- How are local people affected by large-scale processes (state conservation and development policies, market economy, technology innovations, and climate changes), and how do they shape or cope with the resulting changes?
- What are the interactions between upstream and downstream? How do the local communities link with institutions and organisations on other scales and what are the roles of social networks in resilient livelihoods?
- Are there any win-win scenarios or good practices? Can they be duplicated and in which conditions?
- How can macro-watershed regional perspectives and comparative analysis contribute to new dialogue and policy-making processes?

The following four potential topics are relevant to mountain watershed discourse.

Multi-functionality of watershed services: Himalayan watersheds have suffered from widespread dramatic land-use and land-cover changes in past decades. Deforestation, land-use conversion, habitat modification, agricultural intensification, migration and urbanisation, and, most recently, afforestation have resulted from changing government policies and globalisation. Past research revealed a strong link



The watershed approach: a framework for a science-policy linked dialogue process

between watershed deterioration and land-cover changes over time. Oversimplification of the relationship between land use and water resources is predominant in land-use planning and watershed conservation. Discussions with institutions and individuals revealed a lack of data and scientific understanding, especially of the spatial and temporal dynamics of land use and hydrological processes in mountain watersheds.

Institutional arrangement of watershed services: Awareness and appreciation of mountain watershed services and their economic value are critical for developing integrated watershed management. This is believed to be the way to facilitate sustainable watershed management and site-specific reward schemes that directly take the needs of poor communities into account. Negotiations between service providers and beneficiaries and development of actual reward schemes also need to be facilitated. Specifically, we recognise the need to link research to applicable models that can measurably improve the livelihoods of the upland poor by equitably distributing the benefits of good upstream forest and land management. The Chinese Upland Conversion Programme (UCP) and the Natural Forest Protection Programme (NFPP) can be seen as state-driven environmental benefit schemes rewarding upland communities for services provided to downstream communities and to their own environment in the uplands.

Decentralisation of watershed governance: Physical inaccessibility and socio-political marginality often mean that mountain people are left out of overall socioeconomic development. Increasing demands for environmental services from mountain watersheds cause policy-makers to re-examine their social and ecological status, as well as their policies towards governing mountain people and mountain resources. To catch up with development in the lowland plains, most states in the Himalayas have devolved from a centrally controlled to a decentralised system with the introduction of a market economy, requiring new laws and regulations, policies, instruments and incentives, institutional strategies, and mechanisms to be explored, tried out, and adopted to improve the livelihoods of upland communities; manage the conflict and competition between upland and lowland communities over resource rights effectively; and guarantee equity in the distribution of land, forest, and water resources. Collective forest management in China, joint forest management in India, and forestry user groups in Nepal are examples.

Resilient livelihoods: marketing 'niche' products

Livelihood and land practices in mountain watersheds are driven basically by the needs of local communities and demands of local and regional markets. People's livelihoods often take advantage of the mountain ecology to produce and process 'niche' products for sale in lowland markets. In Himachal Pradesh, India, a women's cooperative built a thriving enterprise by producing pickles from non-timber forest products. In Yunnan, Southwest China, local farmers collect matsutake mushroom (*Tricholoma matsutake*) from oak-pine forests and sell them to Japan for over fifty millions US dollars annually. Both Nepali and Bhutanese people collect medicinal plants, particularly *Cordyceps sinensis*, earning millions of dollars. Mountain products such as honey, cheese, fruits, and vegetables, are becoming increasingly popular with urban people both locally and internationally. Increasing private investment and state support for tourism and enterprise development in mountain regions have profound impacts on local livelihoods. Such changes have led to greater mobility in terms of both labour and cash. Policy interventions should be seen as a controlling agent for preventing over-use or misuse of natural resources, preventing their depletion. Access to better infrastructure normally results in the expansion of markets and market opportunities.

People's access to natural resources and responses to economic opportunities, as regulated by institutional factors, drive resource use, including land degradation.

Conclusion

Many watershed case studies support the conclusion that neither population nor poverty is the primary cause of degradation. Rather, people's access to natural resources and responses to economic opportunities, as regulated by institutional factors, drive resource use – including land degradation. Marketing ecosystem services from the mountains provides new opportunities for mountain farmers that are continuously influenced by increasing demands and economic and policy instruments from urban centres. Extreme socioeconomic conditions (such as the Asian economic crisis in the late 1990s) and biophysical events can trigger further environmental change in mountain regions.

Land-Use Change Induced Watershed Carbon Flux and Climate Change

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Globally, land-use changes are cumulatively transforming land cover at an accelerating rate. In mountain ecosystems such changes are closely linked to the issue of sustainable socioeconomic development, since they affect essential elements of natural capital such as climate, soils, vegetation, water resources, and biodiversity.

Land transformation may result in a wide variety of changes, many of which can be significant on the global scale – including greenhouse gases and potential global warming, loss of biodiversity and loss of soil resources, and the regional impacts contributing to climate change. In the mountains, watersheds can be considered as functional units of natural resource management for sustainable development. Understanding the dynamics of watershed functions includes physical characteristics such as hydro-ecological linkages between land uses, resource dimensions, and socioeconomic conditions. Socio-

economic demands and natural resource use are interactive (Rai and Sharma 1998; Sharma et al. 1998). Increasing stresses on natural resource use and their impacts at the watershed level can also result in cumulative impacts at the regional level. Carbon is an important indicator for studying the mechanisms of change in watershed functioning as a result of changing land-use in mountain areas.

Of the estimated eight billion tons of carbon dioxide injected annually into the air by human activity, three-fourths come from the burning of fossil fuel and the remainder from land-use change and cultivation of land