A WATERSHED MANAGEMENT FRAMEWORK

During the past several decades an extensive body of knowledge and general principles has been developed under the heading of “watershed management.” Watershed management provides the basis for dealing more effectively in an integrative fashion with the biophysical and socioeconomic aspects of natural resource and environmental problems. It provides a logical framework for organizing development activities involving land and water resources.

The integrated concepts of watershed management provide a framework for sustainable development, while watershed management practices provide the tools for making the framework operational. Various institutional mechanisms-regulations, market and nonmarket incentives, public investment– provide the means for implementing the practices.

The Concepts

Awatershed management approach incorporates “soil and water conservation” and “land use planning” into a broader, logical framework by focusing on the following concepts:

1) People are impacted positively and negatively by the interaction of water with other resources; and in turn, people affect the nature and severity of such interactions by the ways in which they use resources and the quantities they use.

2) The impacts of these interactions do not follow political boundaries: water flows

downhill regardless of how people define their political boundaries. Thus, what is done in the highlands of one country can have significant effects in another country; and the use of land by farmers in one village will affect villages downstream.

3) Since such interactions cut across political boundaries, what may be sound resource use from the point of view of one political unit (country, community, or landowner) may not be sound resource use from a broader, societal point of view, because of undesirable downstream effects, ie., what economists call “externalities.”

4) Given the existence of externalities, ecologically sound management becomes good economics for all concerned only if costs and benefits are appropriately distributed among the political units, communities and individuals that carry out the watershed management activities and those who benefit from them.

A common misconception is that watershed management is based only on physical interrelationships. The above concepts indicate that sound watershed management involves economic and institutional interrelationships as well. These concepts also illustrate the focus of a watershed management approach, and they guide the design of the practices and institutional mechanisms needed to implement the approach on the ground.

Watershed Management Practices and Their Socioeconomic Impacts

In a watershed management framework, various structural and nonstructural practices are undertaken to:

1) protect a watershed or prevent damage to it;

2) mitigate the effects of land use to an acceptable level;

3) restore degraded environments.

More specifically, activities or practices such as vegetation management, controlled grazing, erosion control structures, terracing, and selected agro forestry practices are carried out to:

1) stabilize soil and steep slopes;

2) stabilize/modify water yield and stream flow; and

3) maintain or improve water quality.

The effects of these various actions translate into direct and indirect economic benefits to society, as shown in Figure 1. These are the benefits that link the on-the-ground practice of watershed management to economic development and justify the integration of a watershed management framework into economic development programs. Furthermore, indirect benefits of environmental quality also are realized in biological diversity, wildlife habitat, fishery habitat and in water quality.

In looking at Figure 1, it should be noted that the changes suggested in the boxes represent the economist's traditional view of the difference "with and without" a project or set of actions. Thus, for example, in the boxes where we say "increase reservoir/channel capacity", or "increase hydropower potential," we mean increases over what would have existed without watershed management intervention; it might still be that a reservoir is filling with silt and losing storage capacity, but the loss in capacity would have been greater without the watershed management activity than with it; thus there is a net increase in remaining capacity with the activity vs. without it at any moment in time.

This point about the "with and withoutn principle is important to keep in mind. Some watershed management practices (e.g, soil erosion control) do not stop or reverse a physical process, but they do slow the rate of environmental damage and thus create benefits. A dollar of losses prevented is fully as valuable to society as a dollar of new production. Although the short-term effects of such practices may not be readily observed by people, their cumulative long term effect can contribute directly to the success and sustainability of a development project.

A more detailed view of the most common problem situations encountered on a watershed and the alternative preventative or restorative practices for dealing with them is presented in Annex 1. Note that agricultural, forestry and other land use, and engineering practices commonly are combined to accomplish watershed management objectives.

Institutional Mechanisms

The preventative, mitigative and restorative practices of watershed management have to be accepted and implemented by people–project managers, farmers and other land users, power companies, community and other governmental organizations. In terms of project design, there are three types of institutional mechanisms which can be used to insure that the needed practices are carried out:

1) there is direct ~ublic investment to implement the practices. Examples include treeplanting on public lands, building dams and investment in streambank stabilization.

2) there are remlations and laws which guide the actions of individuals and groups. Examples include the regulation of grazing, forest cutting, road construction, mining on public land, and, of course, tenure laws which govern private and communal ownership and land use.

3) there are incentive mechanisms. These can involve subsidies linked to certain practices, or market prices, or direct payment for services, e.g., when upland land users are paid to carry out certain conservation activities that mainly benefit downstream residents.

BARRIERS TO ADOPTION OF A WATERSHED MANAGEMENT FRAMEWORK

Ironically, the basic concepts underlying a watershed management framework also explain part of the reason why more widespread adoption of this approach has not taken place. Since local political and tenure rights boundaries rarely coincide with natural watershed boundaries, the local political institutions that drive development seldom recognize the watershed as a workable unit for planning and action purposes.

Since the main effects of the water and land use practices of one political unit often are felt by people outside that unit, or by future generations who can't vote now, there has been little incentive to consider the concepts of watershed management that account for these interactions. A common question ftom upstream land users is: "why should we carry out watershed management activities when the main benefits occur downstream?" Indeed, why should we expect them to, if they are not compensated for the costs of such activities? Lack of awareness or understanding of watershed management concepts and practices by development professionals and the public also has limited the application of watershed management concepts. There has been a lack of interaction of technical experts in this field with development practitioners and administrators. Only recently have technical experts made a concerted effort to explain, in language understood by the pragmatic development professional, how watershed management concepts and practices can aid in development programs aimed at increasing food security, employment opportunities, economic growth and poverty alleviation, all within a sustainable development framework.

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