



6 Sustainable Development and Ecosystem Services

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SUSTAINABLE DEVELOPMENT AND ECOSYSTEM SERVICES

The key to sustainable development is achieving a balance between the exploitation of natural resources for economic development and conserving ecosystem services that are critical to everyone's wellbeing and livelihoods. There is no blueprint for obtaining this balance but it is essential to understand how ecosystem services contribute to livelihoods and who benefits and who loses from changes arising from development interventions.

The SDGs proposed for water and sanitation and ecosystems have specific targets for restoring and maintaining ecosystems to provide water-related services. The targets explicitly mention the need to integrate ecosystem values into planning, development processes and strategies for reducing poverty.

ECOSYSTEM SERVICES- THE BENEFITS

Ecosystem services are the benefits people get from nature. Tangible benefits include those from the supply of food and freshwater, flood mitigation and improvement of water quality. Less tangible benefits include those from contributions to local cultures.

Ecosystems often provide 'bundles' of interlinked benefits. The way this occurs is complex and specific to the type of ecosystem. Many ecosystem services depend on water and are affected by changes in water flows. Though it is often difficult to put a monetary value on an ecosystem service (some are irreplaceable), economists are increasingly demonstrating the value of different services. In 2005, the Millennium Ecosystem Assessment (MEA 2005) found that about 70% of the 1.1 billion people surviving on less than USD 1 per day depended directly on natural ecosystems. Most of these people, especially those living in rural areas, are underserved by government institutions, which intensifies their dependence on nature for their basic human needs.

Nature also contributes to the resilience of communities, by being part of defenses against natural hazards and supplying food and water following a disaster.

DEGRADING ECOSYSTEMS—THE COSTS

Many ecosystem services are perceived as public goods, accruing outside monetary systems. Until recently, many went unrecognized in planning processes, and they continue to be undervalued. Consequently, ecosystems continue to degrade at an increasing rate.

Infrastructure built primarily to provide people with water for irrigation and domestic, commercial and industrial purposes is crucial for economic growth, for alleviating poverty and for attaining many of the proposed SDGs. However, this infrastructure—especially dams—has significant impacts on aquatic ecosystems and, by altering flows of water, sediment and nutrients, can weaken the ecosystem services on which poor communities depend.

STRIKING A BALANCE

Modifying ecosystems to facilitate socioeconomic development is necessary, but how can we avoid damaging important ecosystem services? The key challenge for sustainable development is to assess trade-offs and find a balance between socioeconomic development and sustaining the more important of the ecosystem services. As a prerequisite, we need to comprehensively understand how ecosystem services contribute to people's livelihoods and wellbeing. In considering ecosystem services, the intent is not to deny people opportunities and condemn them to a life of poverty; rather, it is to identify interventions that offer people possibilities and improve their livelihoods over the long term.

Management approaches must be inclusive, negotiated and flexible.

SHIFTING OUR THINKING—AN ECOSYSTEM APPROACH TO DEVELOPMENT

There is no blueprint for finding the balance between conservation and development but in every development situation it is essential to understand how ecosystem services contribute to people's livelihoods and who will benefit and who will lose if these services change.

The Millennium Ecosystem Assessment synthesis found that: [C]ross-sectoral and ecosystem-based approaches to wetland management—such as river (or lake or aquifer basin-scale management, and integrated coastal zone management—that consider trade-offs between different wetland ecosystem services are more likely to ensure sustainable development than many existing sectoral approaches and are critical in designing actions in support of the Millennium Development Goals.

Source: MEA 2005: iii

This finding remains relevant for designing the SDGs.

By focusing more on ecosystem services, land-use planners can determine the values people place on different parts of the landscape. Currently, these values tend to go unrecognized by wider society, and a proposed land use change for development often has consequences for the poor that are not adequately compensated. The 'working wetland potential' concept is an example of an ecosystem approach to development.

CASE STUDY: Cultivation of Dambos in Southern Africa: Providing Sanctuaries from Drought

In southern Africa people have to cope with seasonal shortages of water every year. Water retained in dambos (seasonally saturated wetlands common throughout the region) is an important resource, both for domestic supply and agriculture. However, wet patches inter-mixed with dry areas mean working dambos in a uniform way is difficult and methods of large-scale farming are inappropriate. Attempts by European colonists in the first half of the twentieth century to produce uniform conditions within dambos resulted in soil erosion, environmental deterioration and eventually desiccation of many dambos, undermining their value not just for agriculture, but also for the other ecosystem services that they provide.

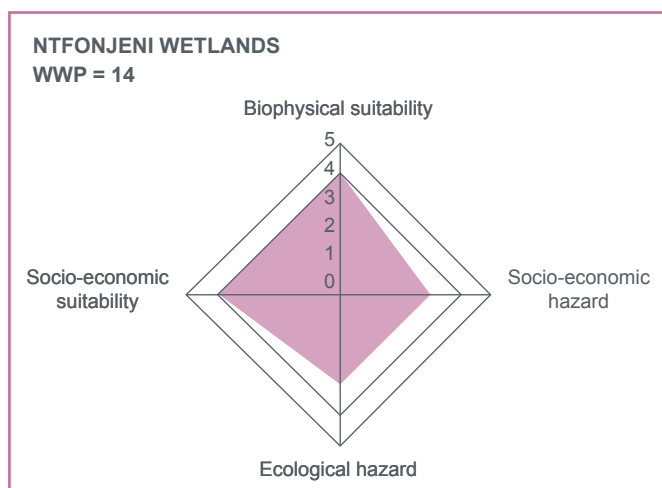
In contrast, at a small scale, farmers can use each part of the dambo in a different way, thereby reducing the risks of crop failure. The sustainable use of dambos requires flexibility in approach because the extent of moisture retention varies not just across each dambo but also from year to year, depending on the rainfall. Indigenous farming practices that combine dry upland farming with wetland cultivation have adapted to this variability. Across southern Africa many thousands of hectares of dambo are cultivated in small gardens, growing maize, rice and vegetables.

Evaluating Trade-offs in Wetland Agriculture— an Ecosystem Approach to Development

The working wetland potential (WWP) is a pragmatic approach for considering agriculture in the context of sustainable wetland development. It can be used to identify, organize and analyze the complex factors that link people, agriculture and wetlands. The approach seeks to add value to the benefits (i.e., ecosystem services) that the wetland provides, without undermining its biophysical or socioeconomic sustainability; that is, it supports the *wise use* of the wetland for agriculture, while preserving the essential elements of its ecology. The potential of proposed wetland development activities is considered in relation to the long-term use of the wetland.

The WWP approach is based on a multicriteria analysis that integrates the biophysical and socioeconomic aspects of wetland use in a single index to give an initial assessment of how suitable a wetland is for agriculture.

FIGURE 3. Suitability for agriculture of Ntfonjeni Wetlands using working wetland potential framework



Source: McCartney et al. 2005

New thinking is also needed in the construction of water infrastructure, as the resulting benefits are themselves dependent on ecosystem services. For example, the performance (i.e., yield, reliability, resilience and vulnerability) of a dam will be affected by the natural flow-regulating services in its catchment. Although their effectiveness has been questioned, schemes whereby local communities are paid to safeguard important ecosystem services are increasingly being promoted. For example, in Vietnam hydropower companies pay local communities to protect forests that, in theory, reduce sediment inputs to their reservoirs.

Also, development aimed at alleviating poverty is not simply a question of expanding the amount of built water infrastructure; we must take into account the role of ecosystems. One approach is to consider ecosystems as ‘natural infrastructure’ and, taking this concept further, consider how to design, plan and manage ‘portfolios’ of natural and built infrastructure to maximize the full suite of benefits. For example, reservoirs are not simply inert bodies of water but are also ecosystems that provide water for food, energy and—importantly—other ecosystem services.

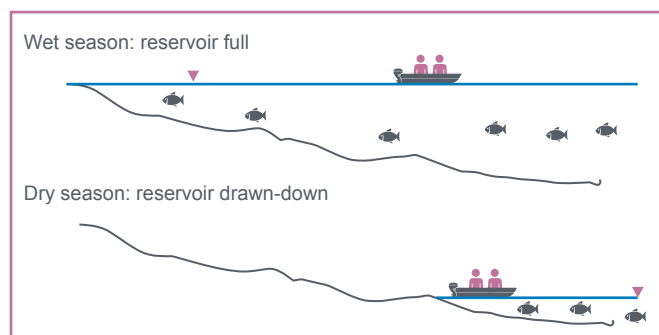
Enhancing Fisheries by Creating Wetlands on Reservoir Drawdown

Increased fish production is often promoted as a benefit of reservoirs created for hydropower, irrigation or water supply. But reservoir fisheries rarely live up to expectations or compensate for the loss of downstream fisheries.

An idea being tested in an IWMI study in Lao PDR is to increase fish production by building small wetlands on the drawdown zone of a reservoir, which is the area exposed during the dry season.

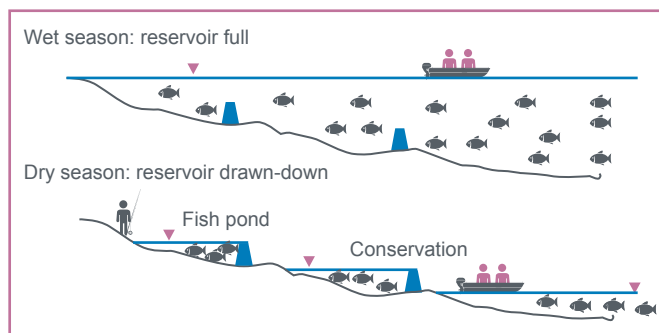
The premise is that when the water level drops, these wetlands will create more diverse habitat and provide refuges and breeding areas for fish, leading to greater fish production within the reservoir, reducing fishing effort and improving people’s returns and livelihoods.

FIGURE 4. Reservoir without wetlands



Source: IWMI 2014

FIGURE 5. Reservoir with created wetlands



Source: IWMI 2014

The key challenge for sustainable development is to find a balance between socioeconomic development and ecosystem services.

We need to consider how to design, plan and manage ‘portfolios’ of natural and built infrastructure to maximize the full suite of benefits.

A FLEXIBLE APPROACH TO MANAGEMENT

To manage natural resources sustainably, we must be flexible and able to adapt as circumstances and conditions change. Formal adaptive management approaches are iterative decision-making processes for coping with high levels of uncertainty and are based on monitoring to inform management. The challenge lies in finding the balance between gaining knowledge to improve management in the future and achieving the best short-term outcome based on current knowledge.

Ultimately, people need to manage their own ecosystems in sustainable ways. This requires them to be able to self-regulate the different uses and respond to incentives, such as demonstrable incomes or clear livelihood benefits, to support sustainable management. To be sustainable in the long term, incentives should come from market opportunities (e.g. selling wetland products) rather than, for example, subsidies. Management approaches must be inclusive, negotiated and flexible, empowering local people to manage ecosystems in their own landscapes, to the benefit of both current and future generations.

Perceptions of ecosystem value are changing slowly, but if these services are to help achieve the SDGs, policy makers and other decision makers must rapidly address the direct and indirect drivers that threaten ecosystems. Due to the intricate web of relationships that sustain ecosystems and generate services, trade-offs involving these services are unlikely to be linear: the undermining of one characteristic or ecosystem service is likely to lead to the loss of many.