



CRBOM Small Publications Series No. 19

Water-related assets of our river basins

by

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February 2010

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Summary

At the basin level, a water-related asset can be taken as a specific feature that is significant for people living in the basin and which provides some environmental, social and/or economic benefits.

While assets are not entirely overlooked in basin-level planning, they are sometimes given less attention than immediate sector development needs and opportunities.

Water-related assets span across natural resources, livelihoods and culture, and are for that reason well suited for highlighting the linkages between these perspectives. Knowledge and awareness of them can expand the decision basis for development planning, land management, cause-effect analysis and impact prediction. Due regard to assets can assist in identification of '*shared values*' within a basin, and can contribute to a visionary focus for its long-term development.

Management of assets is not merely about conservation, but can very well be oriented towards pro-active development, while paying attention to an appropriate balance between present and future needs.

Illustrated by examples from the Lower Mekong Basin, this paper suggests an asset perspective to be considered as an element in the knowledge base for basin-level planning and management.

Acronyms and abbreviations

GDP:	Gross Domestic Product
MRC:	Mekong River Commission
TEV:	Total Economic Value

Glossary

Asset: Something with a value - like an amount of money, or a piece of land, or a particular skill, or any source of present or future income or other benefits. Some assets are related to water, in one way or another - for example a hydropower potential, a wetland, a fisheries area, a waterfall, or a river front of a town. Water-related assets cannot be moved. Their value - whether economic, social, or cultural - can be immediate or potential

Endemic (species): (Species) found in one particular area only

Environmental flow: An amount of surface water (a flow rate or a water level) required at a given place and a given time of the year to maintain a desired state of the aquatic environment. In a basin-level perspective, an environmental flow is often influenced by upstream interventions and will in turn affect downstream environmental conditions

Total Economic Value (TEV) is a concept that can be used for policy formulation and planning. According to Pearce and Moran (1994), TEV includes these components: (1) Direct value, related to production and consumption of goods (primary & secondary) that can be traded (so the value becomes visible). Examples: Crops, fish, firewood, timber, non-timber products; (2) Indirect value: The benefits derived from ecosystem functions. These are usually not traded - so the value becomes uncertain - but this can be large. Examples: Flood control, storm protection, soil conservation; a beautiful scenery; value that can bring income from tourism; (3) Option value: The value derived from a possible future use, like a hydropower potential; (4) Bequest value: The value of conserving things for future generations. Example: A fish or forest resource not used today; (5) Existence value is related to the satisfaction to know that something exists - such as cultural value, heritage value, spiritual value, etc. - like the Giant Mekong Catfish, or the Freshwater Dolphin

Yin and yang: A Chinese (taoist) concept of interdependent opposites - such as female/male, or opposite banks of a river. In river basin management, the concept illustrates a balance between conservation and regulation on the one hand, and development initiatives, intervention plans and actions on the other hand



1 Introduction

This paper suggests an 'asset' perspective to be considered as one important element in the knowledge base for basin-level planning and management.

The paper builds on work by the author and colleagues in connection with Mekong River Commission's development planning for the Lower Mekong Basin at a basinwide scale, as well as her other development studies undertaken in Cambodia, Laos and Thailand at national level.

2 Rationale

At the basin level, a water-related asset can be taken as a specific feature that is significant for people living in the basin and which provides some environmental, social and/or economic benefits¹ The benefits can be actual or potential.

Along this line of thought, a water-related asset can appear as for example

- a lake, wetland, or reservoir;
- a rapid, a confluence, or a river mouth;
- an unique aquatic habitat, perhaps home to some important species of fish, wildlife or flora, including mangroves in the downstream area - in some cases- allocated as a natural reserve;
- a scenic cultural landscape, like terraced paddy fields
- some other scenic view; or a landmark waterfall;
- a riverfront, for example an urban riverfront;
- an ancient water-related structure, like a bridge or a reservoir; or
- a location with a particular history or tradition, even without any visible remains.

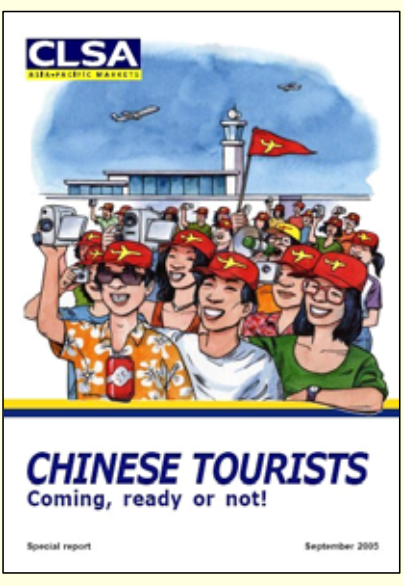
Also, a hydropower potential is an asset. Any feature that contributes to storage capacity or sediment retention, whether natural or man-made, will be of a particular value in basins with a strong rainfall seasonality.

Water-related assets in a river basin span across natural resources, livelihoods and culture, and are for that reason well suited for highlighting the linkages between these perspectives. Knowledge and awareness of them can expand the decision basis for development planning, land management, cause-effect analysis and impact prediction. Due regard to assets can assist in identification of 'shared values' within a basin, and can contribute to a visionary focus for its long-term development.

Management of assets is not merely about conservation, but can very well be oriented towards pro-active development, while paying attention to an appropriate balance between present and future needs.

¹ Different definitions are applied in literature

Notably, some assets represent a potential for boosting tourism and recreation. While it has been said that '*where there is water there is fish*',² it may equally be true that '*where there is water there are tourists*'. A **scenic river view** or a beautiful waterfall can support a substantial income generation from tourism and recreational uses for decades to come. To a degree waterfalls and reservoirs can provide attractive destinations for both domestic and international visitors. The type of tourists may vary though, due to type of landscape, whether pristine natural setting or man made.

<p>Tourism is certain to grow</p> <p>Today, tourism contributes some 10 percent of global GDP and provides 240 mio. jobs.³</p> <p>In the long term, a positive trend will prevail, with China setting a clear example. Due to higher disposable incomes and new lifestyles, a rapidly increasing number of Chinese households can afford a holiday abroad, following the trail of business travellers and students. A flow of 100-115 mio. outbound travellers per year is expected from China within a decade.⁴</p> <p>This pattern will be replicated elsewhere in Asia, along with the national economic growth, perhaps at a somewhat lower rate, but still adding up to massive numbers.</p> <p>Tourism, if properly managed, can generate national revenue, as well as livelihoods, including livelihoods in remote areas.</p>	 <p>The image shows the cover of a CLSA (China Logistics & Supply Association) report titled 'CHINESE TOURISTS Coming, ready or not!' dated September 2005. The cover features a colorful illustration of a group of Chinese tourists, including men and women wearing red caps with a yellow star, holding cameras and smiling. In the background, there is a lighthouse and a red flag flying. The CLSA logo is at the top left, and the text 'Special report' is at the bottom left.</p>
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The potential for livelihood generation should not be underestimated especially in a context of increasing agricultural production efficiency and less need of employment in this sector.

3 Example: The Lower Mekong Basin

The Lower Mekong Basin covers 609,000 km² (77% of the entire Mekong Basin) and has a population of 60 million in 4 countries, the large majority of whom live in rural areas. Traditional livelihoods are water-based or water-related. Paddy cultivation, rainfed or irrigated, is the main livelihood in terms of occupation. Thailand and Viet Nam are the World's no. 6 and 5 rice producers, but ranked 1 and 2 rice exporters.⁵

² Courtesy of Nicolaas Van Zalinge and the MRC Fisheries Programme

³ 2008 data, World Travel and Tourism Council

⁴ CLSA (Sep 05), subject to some regulatory easing

⁵ 2008/2009, US Department of Agriculture

Major economic, social and environmental challenges comprise

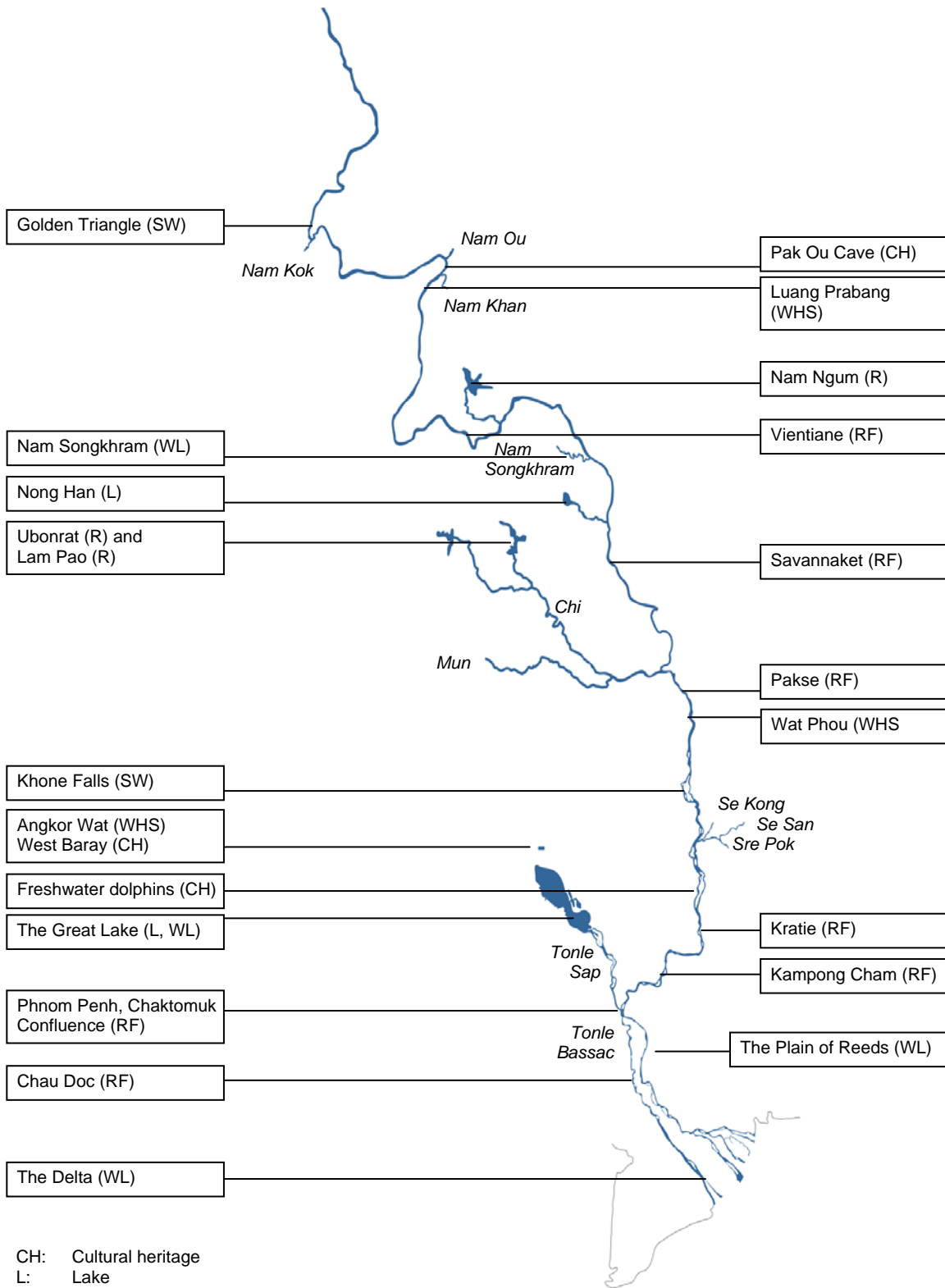
- A escalating demand of electricity;
- an escalating demand of water for irrigation;
- a need to conserve wetlands and other important habitats, fisheries resources, and important icon species;
- a need to preserve the freshwater regime of the Delta;
- effects of changed lifestyles: Per capita consumption of energy is increasing, as well as consumption of food and water, and the generation of solid waste and sewage;
- population pressure (including migration from the countryside to urban growth centres, and from neighbouring countries), partly in response to loss of employment in agriculture and new employment in other sectors;
- deforestation due to timber logging and expansion of agricultural lands; and consequential changes of maximum flows, minimum flows, and silt transport, increasing the risk of both floods and droughts;
- poor river health, affected by agrochemical pollution, including contamination of edible fish;
- side effects of river regulation, such as (i) adverse land use consequences, including habitat degradation and loss of fish spawning grounds; (ii) blocking of fish migration routes; (iii) loss of flood plain storage capacity; and (iv) river bank erosion;
- an imperfect knowledge about important *cause-effect relationships* and related management options, such as for example groundwater resources, environmental flows, flood risk, droughts, morphological processes, etc.; and
- a set of ordinary upstream/downstream divergences of water use interests.

Major development opportunities and important assets include:

- A vast immediate growth potential, notably within agriculture, hydropower, tourism, and navigation;
- highly valuable fisheries resources;
- a large scope for integrated water resources development, including intra-basin and inter-basin transfers, improved water efficiencies, and improved economic efficiencies of water uses and water-related production systems;
- unique rivers, lakes, wetlands, floodplains, and headwater habitats and ecosystems, many of which remain in a healthy state - this is future capital, and can provide food, recreation, keep traditions, and support local and national pride and identity; and
- an opportunity for prevention (rather than mitigation) of adverse social and environmental impacts of urbanization and industrialization.

Examples of assets in the basin are shown below. Since ancient times, several of these have been an inherent part of daily life, or have played an important part of cultural perception and identity.

Figure 1: Examples of assets of the Lower Mekong Basin



CH: Cultural heritage
 L: Lake
 R: Reservoir
 RF: Riverfront
 SW: Spectacular view
 WHS: World Heritage Site
 WL: Wetlands

Note: The map is an incomplete example - it shows only a few percent of assets in the basin - there are many more!

Figure 2: Photo session at Ubonrat Reservoir (near Khon Kaen, NE Thailand)



Basin-level policy formulation, water-sharing and development is supported by the Mekong River Commission (MRC), which was established in 1995, replacing the former Mekong River Committee from 1957.

4 Example: The Great Lake of Tonle Sap

A spectacular example of a water-related asset (or rather a cluster of such assets) is the Great Lake of Tonle Sap, Cambodia. The lake - Southeast Asia's largest - and its surroundings feature cultural heritages such as the Angkor temple complex, including the West Baray reservoir and irrigation system, built around 1050 and still in use. The huge inundated forests and wetlands surrounding the lake are unique habitats. The lake itself forms a rich ecosystem (although the crocodile shown in Figure 4 is now extinct).

The Great Lake of Tonle Sap

Surface area: Between 2,600 km² (low stage) and 15,000 km² (high stage)

Catchment area (at Prek Kdam gauging station): 84,400 km²

Volume: 70 km³

Active storage (taken as the accumulated annual inflow): 39 km³

Flow pattern: Inflow from the Mekong in June-September, outflow to the Mekong in October-May

38 percent of annual flow is generated in the catchment of the lake, while 72 percent is inflow from the Mekong

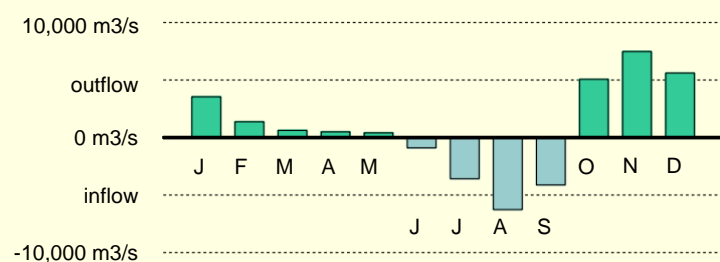


Figure 3: Satellite view of the Angkor temple complex

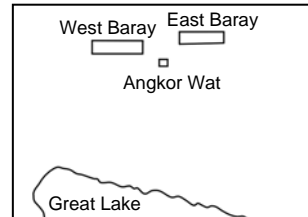


Figure 4: Stone carving, Bayon Temple (around 800 years old)



Figure 5: Fisheries in the Great Lake
(carved in history on the walls of Angkor, and feeding the present population)



The lake is an asset in different ways to different people - within and outside the area. Each group may benefit from different features of the lake.

More than 1.2 million people live in the immediate surroundings of the Great Lake and its flood plain. Many are fishers - part-time or full-time - with annual per capita incomes as low as 300 USD. The level of dependency on the lake's water and resources is very high. The depth of poverty and the dependency on natural resources are alarming, given that the resources are clearly in decline, and considering the rapid population growth.⁶

The lake is a basinwide asset for environmental functions. The lake is often referred to as *'the heart'* of the Mekong system in that it *'breathes'* with the Mekong flood's rise and fall. When the Mekong rises, it pushes into the Tone Sap, and the flood water fills up the lake, in the downstream part of the Mekong; and when the level of water in the Mekong falls, the lake releases water back into the Mekong, hereby increasing the dry season flow. Both effects are of great benefit, both within and far beyond the drainage area of the lake. The area houses important and endemic icon species, and has the highest fish productivity in the Mekong Basin. The Tonle Sap fisheries account for about two thirds of Cambodia's total inland fisheries (of 400,000 tons per year - the highest freshwater fish yield in the world after China, India and Bangladesh)^{7 8}. This feeds people in the Lower Mekong region beyond Cambodia's borders.

The seasonal water level variation sustains the fisheries, as well as cultivation based on retention of the flood water(receding rice). The higher the flood, the better for the fisheries. Farmers prefer a *'beautiful flood'*, which is regularly timed, above average, but somewhat below danger level - anything more or less will affect the productivity.

The natural reverse flow of Tonle Sap and its related ecological functions should be maintained under any Lower Mekong development scenarios and is currently under discussion among the four member countries of the Mekong River Commission.

Current management issues in the area include major hydrological, social and socio-economic challenges, such as

- Concern over possible large-scale siltation in the Great Lake
- Change in the hydrological regime and its impact on fisheries
- Entitlements and sustainable community fisheries
- Fish trading and its roles in poverty alleviation
- Migration to the Tonle Sap region, and associated needs of livelihoods
- Agricultural development and poverty alleviation

The area is covered by studies and development planning undertaken by Mekong River Commission. A new Tonle Sap Authority (TSA), replacing the former (short-lived) Tonle Sap Basin Authority, began operation in July 2009.

⁶ Saburo Matsui and others (Feb 06)

⁷ Stan, Peter (Dec 08)

⁸ In the case of the Great Lake of Tonle Sap, the value of the fisheries is normally taken as the farm gate level - such as 1 USD per kg - but is much larger if the full value chain is considered. Therefore, fisheries tends to be undervalued and overlooked when compared with other sector development opportunities.

5 Discussion

As exemplified above, assets can be numerous and diverse. Some are actual, while others are potential. Some are already under pressure, while other will come under pressure in the future. Some assets can be related to a unique tradition, ritual or technology, which may enhance their value. And the segment of people valuing the asset can be small or big. Furthermore, assets may hold different values to different people, sometimes at different times of the year and for different reasons.

The values of assets depend on the group of affected people. In connection with water allocation and water-related development planning, we must seek to understand these values in relation to different groups of stakeholders, and their implications across sectors, social strata and range (local, national and regional). Every decision has gainers and losers, and strike a balance between present and future benefits. Some stakeholders may have few alternatives, so that a loss becomes detrimental. Thus, it is important that values attached to particular assets are identified and understood by planners as far as possible.⁹

The value of an asset can be established in terms of money, in the same way as valuation of natural resources in general, although in many cases with great uncertainty. For many basin assets, however, the value is less well defined in monetary terms.¹⁰

Figure 6: River maids in the Mekong, NE Thailand - a definite cultural asset, but difficult to appreciate in economic terms



A highly accurate valuation is, however, not always of critical importance unless the purpose of valuation is for trade or substitution of asset in question. The mere identification of an asset, and an analysis of its response to alternative management measures and interventions, can add to the completeness of the decision basis. This is in accordance with the principle that *'decisions should build on the best knowledge available at the time when the decision must be made'* (which is the softer, *'political'* formulation of the sharper and rational *'full value and full costs'* principle).

⁹ Muanpong and others (Jul 06)

¹⁰ This and the following paragraph quoted from Muanpong and others (Jul 06)

One category of assets is UNESCO's World Heritage sites, which are assigned on the basis of international significance. A World Heritage is always an asset - while an asset does not at all need to be a World Heritage - its significance can be local, basinwide, or national. Criteria for a World Heritage are summarized below.

World Heritage selection criteria

A World Heritage must meet at least *one out of ten* selection criteria:

Cultural criteria

- (i) A masterpiece of human creative genius;
- (ii) an important interchange of human values;
- (iii) an exceptional testimony to a past or present cultural tradition or civilization;
- (iv) an outstanding structure or landscape with historical significance;
- (v) an outstanding example of a traditional human settlement, land-use, or sea-use;
- (vi) a feature associated with events or living traditions, ideas, or beliefs.
(This criterion should preferably be used in conjunction with other criteria).

Natural criteria

- (vii) A natural phenomenon or area of exceptional beauty;
- (viii) an outstanding example of a major stage of Earth's history;
- (ix) an outstanding example of on-going ecological or biological processes;
- (x) an important natural habitat for biological diversity.

Management aspects are also considered.

The above criteria are abbreviated. The full text is available on <http://whc.unesco.org/en/criteria>

At the basin level, however, it is not necessary to apply a very sharp characterization of which assets to consider. Rather, an asset inventory can be maintained as a *live document*, to be developed along with improved knowledge.

On the other hand, some guidelines might be useful - particularly in case of basins that are shared between countries or provinces. They can be formulated and streamlined in parallel with the inventory.

The challenges of asset-oriented management resemble those of other river basin management in general. They include for example

- Modalities and tools for multi-criteria strategy formulation and decision-making
- Modalities and tools for resolution of differences of interest
- A need of knowledge, always open-ended, about present (baseline) conditions, opportunities and threats, causes and effects, and management options

6 Basin-level implications

While 'assets' are seldom entirely overlooked in basin-level planning, they are sometimes given less attention than immediate sector development needs and opportunities.

Some assets represent attractive development opportunities in their own right. A higher visibility can expand the knowledge base and facilitate the planning process.

With this in mind, a '*river basin asset inventory*' may be prepared in support of decision-making and basin-level development planning - along with mapping of land use, flood risk, hydropower potential, '*hot spots*' and so on. *Such an inventory should draw on decentral insight.*

Asset management has a dual orientation towards pro-active development and environmental conservation - sometimes referred to as the '*yin and yang*' of river basin management. In relation to water allocation, observing the need of environmental flows, an aquatic habitat (such as a river mouth) can be considered as an asset - with a specific demand of water. This demand can then be established by a study.

Responsibilities for management of assets can be as complex as it is the case for other aspects of water-related development. It is not always clear who is responsible for a waterfall.

There is a particular need of a balance between the inter-related economic, social and environmental goals, between the local and the basinwide perspective, and between immediate and long-term opportunities. An appropriate development must have a broad perspective and must be implemented in a context of close '*horizontal*' interfaces between the various sectors and planning themes, as well as equally close '*vertical*' interfaces between the local, national, and basinwide development policies.

Management and development of water-related assets require

- inter-sector and inter-agency coordination across water allocation and utilization; land use; agriculture; fisheries; hydropower; aquatic environment and habitats; floods and drought preparedness; and general rural development. This is because a development in one sector can have positive or negative effects in other sectors, and also simply to allow for timely identification of new opportunities in one sector (for example irrigated agriculture) related to development in another sector (for example hydropower); and
- an orientation towards balance between short-term and long-term benefits; and balance between local, basinwide and national/regional benefits and impacts. In this connection, the concept of *Total Economic Value* (TEV) can serve as a useful line of thought.

A strict distinction between water-related assets and other assets is not required.

If an asset has national or even international significance, it can make good sense to consider it in a context that reaches beyond the basin boundary, even if it is managed at the basin level.

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