

## From Value to Finance: Making IWRM Work

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The discussion on Integrated Water Resource Management (IWRM) has been very rich on institutional change (basin organizations, apex water bodies, legal reform) and on process management (multi-stakeholder processes, consultation and participation), but attention to the financial dimension of IWRM has been less developed.

The gist of IWRM is that in water management there are many different functions to be managed simultaneously. Through investment and management interventions, values are created (or destroyed) in connection to these functions: productivity values, amenity values, property values, environmental conservation values, and more. The challenge in IWRM is to, at a minimum, balance these different functions and values, yet preferably to optimize them. This paper further argues that these different values need to be captured and, when possible, help finance the management of water resource systems in an integrated way. We present this as an improvement of the principle of “water as an economic good.” The economic good argument has, in our view, often led to reductionist strategies, focusing on recovering the financial cost of water only and not maximizing and recovering the values associated with the many functions of water.

This paper first clarifies some definitions and then discusses how to capture values and turn them into financial contributions to IWRM using illustrations from several parts of the world. The paper then comments on the principle of water as an economic good, long considered as the financial underpinning of IWRM. We look particularly at water pricing for demand management, closely associated with the theory of water as an economic

good. It argues that a broader financial strategy, based on balancing, improving, and capitalizing on increased values related to water management, is more promising in funding IWRM and making it work. Finally, some institutional aspects of this approach are explored.

### Functions and Values

The concept of functions describes the goods and services the natural resource system provides or performs. There is almost always a wide range of functions associated with any given resource system (Abdel Dayem et al. 2004). Table 1, for instance, is a list of functions associated with irrigated areas. Other lists can be produced for other natural resource systems.

Values is the concept through which societal preferences, perceptions, and interests with regard to functions provided by natural resources are expressed. These values are social, economic, financial and (temporal and spatial) ecological values. Values should not be seen separate from stakeholders. They are not general and abstract, but they are always values to stakeholders. These may be farmers, property owners, industries, local towns, livestock owners, fishermen, and so forth and, in many cases, the public at large.

The point of such lists is that there is usually a large number of functions, many of which in practice are overlooked in resource management, if only because the organizations that are practically managing the resource have a limited agenda and mandate. In the management process, important opportunities to create value for various stakeholders are missed.

Quite typically the many functions in irrigation

**Table 1:** Ecological functions of irrigated areas.

Agricultural water supply	Use of canal and drain banks for transportation
Controlling water table for agricultural production	Buffering water stock
Improving land accessibility	Generating water for reuse
Improving soil chemistry	Effluent disposal
Increased property values of land near water fronts	Washing functions
Leisure opportunities – water based recreation, golf resorts	Livestock water supply
Domestic water supply	Fisheries
Industrial water supply	Navigation and ferrying
Water supply to other users	Improved public health
Improved protection against floods	Reduced damage to built up property by controlling soil moisture
Use of canal and drain bank for tree cultivation	Reduced incidence of water borne vector diseases through environmental sanitation
Defense lines	Firefighting resources

Source: van Steenberg, Cornish and Perry (forthcoming).

systems, are not managed in a coherent way, if at all. Irrigation departments will manage water supply for agriculture mainly and in some cases will involve themselves in drainage and flood protection.

It is unusual however for irrigation departments as water managers to involve themselves in managing water resources for domestic use, even though in many irrigated areas the availability and quality of water for domestic use is a major function of the irrigation system. Take the example of Thatta and Badin Districts in Sindh, Pakistan. These areas at the tail of the Indus irrigation system are entirely dependent on irrigation canal supplies for local drinking water, either directly from the canals or through seepage into small fresh water pockets on canal banks because ground water in the area is saline. Even so, the irrigation department allows the main canals to be used for the disposal of untreated effluent upstream from Hyderabad city and a large industrial estate, jeopardizing the well-being of a population of 2 million people in Thatta and Badin. To make matters worse, by allowing very high and unnecessary irrigation water supplies in the peak season into this area, saline water logging is widespread, preventing the creation of buffer storage capacity in the upper soil layers, and thus preventing the development of more fresh water lenses.

While managing irrigation systems for drinking water is not common, it is even more unusual for irrigation departments to manage irrigation supplies

for fisheries production, for reduced incidence of water borne diseases or for amenity functions on the water front, even when in some cases the latter could be a major source of revenue.

This situation described is typical for arid and semi-arid countries and other areas where irrigation is the main water management intervention in the natural water system. Due to such a mono-functional focus, water management in such areas cannot be typified as “integrated.” Area-based organizations are theoretically better equipped to manage multiple functions and the values involved.

### Capturing Values

Water resource management affects the value of the different water-related functions in an area, both positively and negatively. The values of these functions accrue to different groups of stakeholders. These may be general interests (for instance improved public health or safety, sustainable ground water supply, sustained aquatic bio-diversity) or private interests (use of canal banks for cultivation, use of a reservoir for water sports, reducing flood risk in a given geographical area, using water from wells or canals). These values are directly related to the way water resources are managed as part of the development of a region. It can therefore be argued that the economic and financial values from the functions thus created should, at least partly, be captured to recover the cost of maintaining and further developing the delivery of IWRM in an area.

It is useful to distinguish three types of interests or stakes, each with its own mechanism for capturing values:

1. General interests: Examples are general environmental protection, improvement of public health functions, flood protection, improved general living environment. The values from these general interests are best recouped from general area taxes or public subsidies.
2. Direct interests associated with the consumptive use of water or its disposal or transport functions. Examples are irrigation, domestic water use, industrial water use, effluent disposal, and shipping. Water use charges, shipping fees or effluent charges should be levied to the different categories of users and polluters as a way of transforming functional value into financial value.
3. Direct interests associated with the improvements in the general environment. Examples are the development of water front property, canal bank forestry, leisure opportunities, and commercial use of vegetation in water ways. The values thus created are best exploited by concessions or public-private partnerships—the latter particularly when additional private investment is required to fully develop these functions (e.g. water front property development, leisure development or building of embankments to create security against floods for selected residential and industrial areas). In these public-private partnerships, the challenge for the public sector is to ensure that value increases are not just captured by private parties, but they are rerouted to cover investment and running costs inherent to sustaining the delivery of multiple values.

Several examples illustrate the scope for transforming functional values into financial value.

1. *The Netherlands*. In the Netherlands the strategy to capitalize on value increases from water investment and better management is called “red for blue,” use income from real estate (i.e. bricks) to pay for water investments and

functions. An example of such an integrated project is the “Nieuwe Hollandse Waterlinie,” where an area of 20,000 ha has been developed with a range of functions including leisure, water management, and housing development. The project was managed by the board representing the regional authorities and the initiative was taken by private property developers. Of the 180 Million Euro cost of the project, 40 percent was recouped from income from real estate. Similarly, investment in flood protection is recouped by giving out attractive building plots on the reinforced embankments.

2. *India*. A major program was undertaken to improve the water quality and amenity value of urban lakes in Hyderabad in Andhra Pradesh by closing sewerage outlets and improving lakesides. The costs for maintaining the program were recouped by increased property taxes on land close to the lakes and from leases on lakeside land for recreational parks.
3. *USA*. In many areas, ground water protection zones also have a second important function as recreation areas and the income from this helps maintain and pay for the protection zone.
4. *Egypt*. In the West Delta Project, there are a number of high value functions that are now sustained by finite ground water resources, but will in the future be provided by a new surface canal (e.g., a golf course and nearby high value residential condominiums. These are high value functions and should contribute accordingly to the development and operation of the new West Delta canal.
5. *West Africa*. In the Senegal river, the opportunity to use a commercial private party to “harvest” the excess weed growth in the water ways and convert it into “briquettes” for export is being considered. This would turn waste into an asset and create value and employment opportunities in the process.
6. *Mozambique*. In order to arrive at improved and integrated urban land and water management, a Land Development Corporation has been set up in the port city of Beira consisting of a public-private consortium of private operators

and municipal authorities. The Corporation's aim is to develop a low-lying urban area that is currently suffering from frequent flooding and very poor sanitation. From the municipality, the Corporation will acquire low-value land titles to sites that need landfill and infrastructure development, contract a dredging company to produce fill material, and invest in commercial land development for low-to-middle income families. The created functional value increase of the land (now benefiting from improved urban water management services) is transformed into cash through the sale of the plots. The public sector benefits are secured through the municipality's participation in the venture, the proceeds of which can be used to subsidize low-cost housing.

7. *Pakistan.* In Sindh a study was done into "non-revenue options" to pay for the maintenance of the irrigation systems (Arcadis Euroconsult 2004). This study suggested that the current dismal financial performance in the canal systems (now only based on charging very large number of farmers a very low charge per ha on the basis of a cumbersome assessment procedure) could be set right. One strategy was to start charging non-agricultural users, in particular several large and small town water supply companies, for water supply and for drainage functions. In addition, a large number of business opportunities were identified such as property and tourism development near Lake Kinjar, near some of the barrages and along the canals near to Karachi, tree planting concessions on the thousands of kilometers of canal and drain banks, and developing fishery potential. Also the Irrigation and Drainage Authority historically owned considerable land in city centers, which it neglected and allowed to encroach, thus creating an urgent need for streamlining. The same applied for its guest houses, now seldom used, but still attractive property for local functions. The estimated income from these sources was substantial and most likely of a similar order of magnitude as the charges now levied upon a large number of small farmers.

### **Exit "Water as an Economic Good"**

What the latter examples show is not only a broad range of opportunities for raising finance for managing water sources—from business development opportunities, charges to specific beneficiaries, general land taxes, and so forth—but also the limitations to the concept of water as an economic good.

In practice, water as an economic good has resulted in the treating of water as a priced and sellable commodity. The emergence of this concept initially provided for a refreshing break from the earlier dominant strategy of water as a public good only, managed by water bureaucracies with little accountability to the users of water services. The economic good approach brought new ideas such as water markets as a mechanism to transfer water from low to high productivity users, and cost recovery as an instrument for demand management. In the latter case, the reasoning was that if water users would pay more for water (in fact all cost associated with it, however defined), they would economize on water use, thus releasing water supplies for other users and for other functions, resulting in more efficient water use all around. In particular, this idea has been promoted in the irrigation sector, the largest water consumer of all, where volumetric charging was to be introduced.

There are a number of reasons why, in many cases, the "demand management through cost recovery" strategy did not work easily.

1. In most irrigation systems the cost of providing water and the price related to this is a minor expenditure item. As a result, saving on costs of water is not an important financial strategy for farmers and it is unlikely that a higher price of water creates sufficient incentives to economize on the costs of this essential commodity. Saving on cost of mechanical traction or fertilizer in most cases makes more business sense to a farmer.
2. The demand management idea is usually associated with volumetric delivery and metering; in practice this is problematic in many irrigation systems, where the scope for supplying water on demand is limited. The practical experience with water meters is, moreover, not encouraging because pilferage

and non-repair is common.

3. In many irrigation systems, non-payment of dues or manipulation of bills through underassessment is a major factor. As long as this is the case, any strategy centered on water pricing is bound to be ineffective.
4. In semi-humid areas, irrigation is a “back up” service in case rains fail; irrigation demand as a result fluctuates from year to year. In these situations, demand management through pricing could undermine the financial viability of the irrigation operations.
5. Most important, major gains in irrigation efficiency particularly in large systems, do not occur necessarily at the farm level where the pricing argument would work, but at the main supply level.

A telling example of the argument described above comes from the Krishna Delta in Andhra Pradesh, South India. During the three-year drought, a more efficient scheduling of main system irrigation supplies was introduced. This not only prevented a drop in production levels, but in fact even resulted in slightly increased crop yields. In the same drought period, irrigation supplies to the irrigation canals in Sindh Province in Pakistan decreased 20 percent, but again agricultural productivity remained at the same level. There was a drastic reduction in water logging in the Province (from 2 million ha to less than 500,000 ha) and a move towards conjunctive use of shallow ground water and surface water supplies.

The main weakness in the economic goods argument is that water has been seen as a “commodity” or “good” only in the sense that charges should be raised for providing it. In many instances, the cost recovery argument has done more harm than good. It has tended to move the attention away from improving the quality of operations or rationalizing costs. The latter is not a small issue. There are many examples of enormous financial wastages in the water sector. In the irrigation system in Punjab Province of Pakistan, for instance, energy charges for deep drainage wells made up more than 50 percent of the expenditure, long after these deep wells lost their functionality. In such situations the question

arises whether it makes sense to recover such costs from water consumers.

The other harm comes from the exclusive focus in many areas on the largest group of water consumers – farmers. In poor countries this is the most difficult group to tax, if only because of their sheer numbers in many countries and the relatively small amounts to be billed. Opportunities for charging other water users (e.g., industries, municipalities, leisure operators) have often not been exploited. It should be noted in this context that the absence of broad-based organizations focused on multiple values is an important shortcoming of governance systems.

The final drawback of the paradigm is the focus on water as a good to be allocated and paid for, turning away attention from the many other values created with water that can be capitalized and collected. From an integrated development and management point of view, water and water management should be seen as an important ingredient in local area development and sustainable management; good water management services will improve the functions and values in the area.

The “water as an economic good” paradigm, and in particular the commodification of water as a tradable asset, are reductionist approaches to making water management manageable on the basis of a measurable and quantifiable basis. Such an approach is justifiable so long as it does not lead to the notion that water management can or should be performed on the basis of the economic aspects of water only. Water has many aspects and hence many functions with different values, each of them important to a different set of legitimate stakeholders. All these values provide business opportunities that should be capitalized upon and used to finance investment and operation. In addition, water management produces values that are of a general public good nature, for instance general flood protection or maintaining ecological balances. Such values should be paid for from general taxes or public funding.

### **The Institutional Way Forward**

Integrated Water Resource Management (IWRM) with its emphasis on optimizing many functions, addressing different categories of values (economic, social, environmental), and setting up a meaningful engagement of different stakeholders is

an eminently useful approach to water management. Capitalizing on these increased values, in our view, holds more promise for promoting and financing IWRM than the more limited water cost-recovery strategies associated with the Dublin principle of water as an economic good.

There are several institutional challenges in operationalizing this values and finances framework. A first challenge is how to quantify values in a general framework. How should values be compared and related to different functions? How should priorities be set? This problem could easily translate into a complex and irresolvable question, especially if simplistic reductionist methods are to be avoided that translate all values into one quantifiable parameter, thus violating the complexity of water values. The problem, however, may not be as large as it seems. First, awareness of the many functions in water resource systems and the quantification of each of the multitude of distinguishable values would be a great leap forward in many situations. The default in many areas is that water is either not managed at all or only managed from a narrow perspective. Moreover, in many cases values are complementary rather than competitive; this changes the problem of setting priorities. A pragmatic approach in most cases seems appropriate and sufficient; that is, trying to make much out of the various functions that come along with improved water management and merely avoiding clear negative values. Involving stakeholders in the complex process can be translated into win-win situations.

In financing integrated water management, the strategy should also not be to maximize returns and thereby focus on financially valuable functions such as property development or leisure development. An example is the West Delta Project in Egypt. It is a valid question to ask whether one should have used fossil ground water resources close to the major city in the country to develop a golf course, even though in the short term this was a function that generated very high monetary values. The challenge for water resource managers — preferably in an open consultative process — is to balance the different functions, not necessarily to maximize financial returns. Once again, an institutional setting that is tasked and equipped to balance and optimize multiple functions, rather than maximize individual

ones, will be better able to handle the finance capture approach from a IWRM angle.

## Conclusions and Discussion

In this paper, we have presented various perspectives on the operationalization of IWRM. The first is that the international discourse has focused on governance issues in their institutional and legal context, while insufficiently addressing the vital issue of financing IWRM.

From the perspective of IWRM, water should be managed through multiple functions and multiple stakeholder-oriented organizations such as river basin organizations. These are also in a better position to reach a balance in the capturing of values and their transformation into financial values. Whereas mono-sectoral water management can easily lead to the commodification of water if considered an economic good only, multi-sectoral and multi-stakeholder institutions such as river basin organizations should normally be better equipped to optimize functions and their related values.

In the light of this, the challenge to capture values and to finance IWRM thus translates into a challenge to create viable area-based water management institutions that are explicitly tasked and equipped to achieve balance between functions and values. This transformation will become much easier as soon as the perspective shifts from the extra management tasks towards the extra revenue generation opportunities. To take a more business like approach to water management by quantifying the value of different functions would already be a major step forward in most cases.

As a contribution towards the discussion on how to operationalize IWRM, we propose that participatory business planning is a workable method to achieve a focus on the multiple values incorporated in the water system. Business planning, as a process for raising awareness of both water management institutions and stakeholders alike, can have various positive effects. First of all, it has the potential to change a water management institution's focus from costs (to be met from a limited, mostly government-provided budget) towards a focus on revenue and income-generation. Second, it has the potential to engage stakeholders in a discussion that focuses on multiple values and

interests, rather than only those values pertinent to the sector of society or government that they represent.

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