

# **Integrated Water Resources Management: A Path to Achieving Sustainable Development**

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**Abstract:** Water resources development is one of the most important national development factors for developing countries whereas it is a service sector issue in developed countries. Water management has become one of the conflict areas as the demand for water increases while the resources available degrade. As a solution to this, integrated water resources management has been proposed to make tradeoffs among the parties involved. This article discusses the issues of integrated water resources management with its possible links with sustainable development.

## **Introduction**

Water resources management comprises a series of water-related activities including developing water resources schemes for beneficial and protective purposes and managing the system effectively based on both supply and demand considerations. From beneficial point of view, water resources development deals with the promotion of necessary infrastructure elements to bring the water in nature to where it is to be used. Thus, it requires huge investment as it is quite large in scale and time consuming. The development side of water resources management is referred to as source management. The need for protection from the excess water, namely flood, has also resulted in the development of large flood control schemes. As such, water resources development has been one of the most important factors for the national developments of the countries. This is still true for the developing countries where the water resources have not yet fully developed. On the other hand, it is one of the issues of service sectors in developed countries and has lost its impact on the development of those countries.

Operational side of water resources management has two dimensions. One is the real operation of the system developed to sustain water supply for the use for a variety of purposes including drinking, irrigation and power generation. The other is the management of the demand for water, namely demand management, which comprises a series of activities to encourage or sometimes to force people to use less water to achieve more efficient use of water in service. The demand management issue may be shadowed in developing countries as they are still trying to develop their water resources for irrigation, power generation and even drinking. It can be seen, however, it is much more popular in developed countries as their main concern is the efficient management of their already developed water resources.

In so-called developed countries, water management issue has become one of the conflict areas as the water demanding sectors, namely stakeholders, have increased with also increased quantities as opposed to the degrading resources available to use. Therefore, integrated water resources management concept has long been spelled as a compromising tool to achieve an acceptable solution for the parties involved. If achieved, this would present an efficient regulation of a large portion of national economies of the states as water resources management covers quite a large variety of activities as mentioned previously. This article discusses the issues of integrated water resources management with its possible links with sustainable development with the brief discussions related to both sustainable development and integrated water resources management.

## Sustainable Development

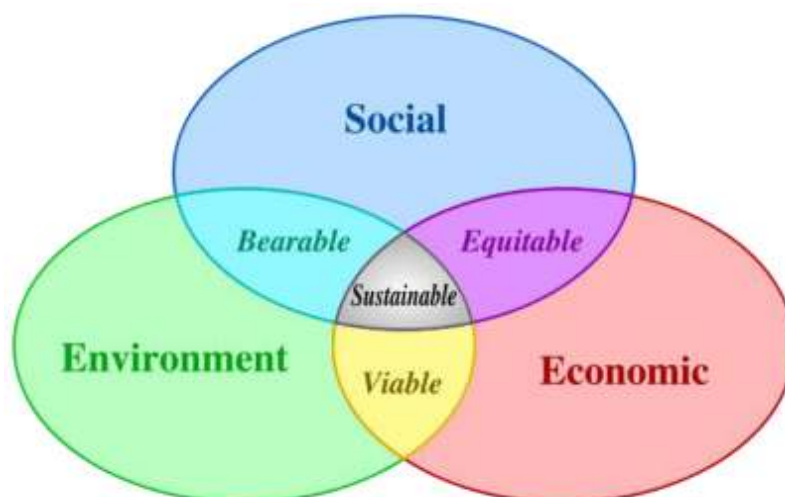
Any article on sustainable development (SD) cannot disregard mentioning the first and the most widely accepted definition given by the so-called Brundtland Report (Brundtland, 1987) as follows:

*“Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”*

Since the Brundtland Commission first defined the concept of sustainable development, much discussion has been made on the concept on scientific, technical, economical and even political platforms. From the over-twenty-year SD history, it could be possible to find many other definitions for it. Above all, it can be regarded as a reaction to what it may be called “wild development” that had been observed before. The aim was to transform the wild nature of development into the one that was acceptable by the weak. The weak are the society including the future generations and the ecology. Therefore, an acceptable development, e.g. sustainable development, should consider and integrate the social, environmental and economic issues as depicted in (Fig. 1) (The President’s Council on Sustainability, 2010). As shown in (Fig. 1), a development considering social and environmental issues could be bearable; the one with social and economic considerations could be equitable and the solution with environmental and economic ones could be viable. However, if it is to be sustainable, it should consider social, economic and environmental issues. A sustainable solution is such a solution which

- incorporates the environment and the economy,
- protects ecosystems and health of the society,
- meets international obligations,
- promotes equity,
- prevents environmental pollution, and
- respects for nature and the needs of future generations (Economic Development Agency of Canada, 2006).

To achieve such a development, an integrated approach to planning and making decisions which considers environmental and natural resource costs of different economic options and the economic costs of different environmental and natural resource options is normally required (The President’s Council on Sustainability, 2010). Having formulated such an integrated approach, it is necessary to articulate detailed principles and control measures to direct the action plans to sustainability. The action plans are equally important elements of achieving sustainable development and should be built based on the specific features of the issue and by the participation of the parties that will be affected.



**Figure 1.** Issues in Sustainable Development, taken from The President’s Council on Sustainability (2010)

# Integrated Water Resource Management

As for sustainable development, it is quite possible to find fancy verbal definitions for integrated water resources management (IWRM). One could be taken from web-based Water Encyclopedia (<http://www.waterencyclopedia.com>) as follows:

“Integrated water resources management is the practice of making decisions and taking actions while considering multiple viewpoints of how water should be managed.”

The above definition is illustrated by the same encyclopedia in (Fig. 2). As seen in (Fig. 2), IWRM describes a process of managing water resources in an integrated manner taking into account the views of parties involved such as the stakeholders, governments and interest groups to achieve certain purposes and services using the knowledge provided by several scientific disciplines. The following quotation (GWP TAC, 2000) well describes the IWRM process:

Integrated Water Resource Management (IWRM) promotes the coordinated development and management of water, land and related resources in order to maximize economic and social welfare (in an equitable manner) without compromising the sustainability of vital ecosystems. This process involves the holistic coordination and management of natural systems and human activities, which create the demands for water, determine land use and generate waterborne waste.

The concept of IWRM is somewhat new and as such it was built over more-than-half-century bad water management experience. As such, it can be regarded a response to the problems encountered in water management, which has become a major conflict area where several sides are competing for the same quantity of water.

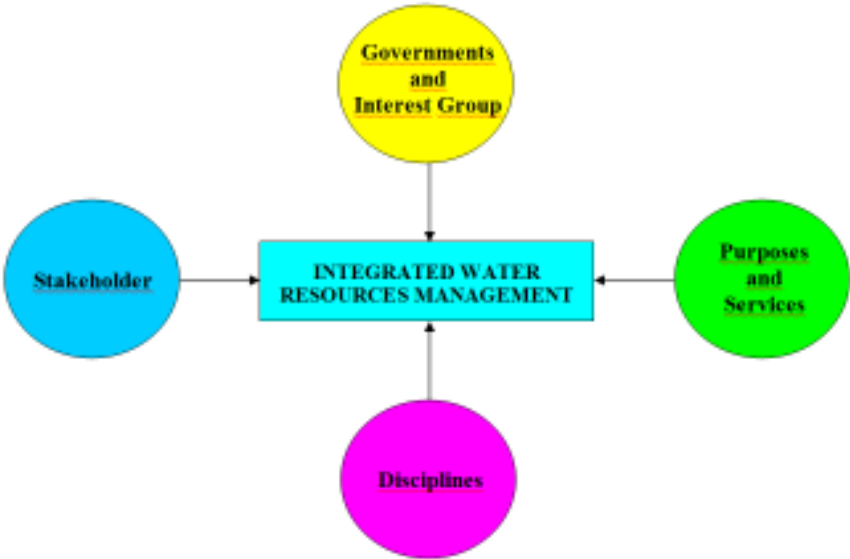


Figure 2. IWRM process, taken from <http://www.waterencyclopedia.com>.

Achieving IWRM requires the organization of water industry accordingly. Since water resources and the bodies demanding these resources spread in a certain geographical area, IWRM should normally be “place-based” or “enterprise-based”, dealing with a particular location (Clark et al., 2002). River basins have long been regarded as the spatial unit of water management. However, this should be disputed as the river basins are not isolated from each other in terms of both the origin of water resources and the close interactions among the human activities in neighboring basins. Whatever spatial unit is accepted, the main issue is to set appropriate institutional arrangements towards achieving the IWRM, where the big challenge lays. It is unfortunate to say that there are not many countries that have organized its water industry accordingly although there have been several international initiatives such as water framework directive of European Union.

From the discussion provided above, it can be paradoxically said that water resources are expected to be managed in a manner that those who demand for water including the ecological environment should be made

happy. Expectedly, this is absolutely impossible. What should/can be done is then to reach a compromising arrangement by which everybody could be a little bit happy. Experiences have shown that such a compromising solution can only be achieved by the participation of all parties. That is, a participatory approach should be followed to set up the practices for IWRM. Technical experts can, in this regard, present available methodologies or acceptable plans/programs to the sides involved. There is also another issue that should be resolved, which is what mechanism will be used to get together the sides or who are the sides. This is a case-specific issue that should be considered carefully. Probably, a perfect mechanism will not be established; but any mechanism for this purpose will somehow work and the outcome will yield much better proposals.

## **Concluding Discussions on IWRM and Sustainable Development**

The discussions provided separately on SD and IWRM have uncovered that what both IWRM and SD try to achieve is by and large the same. Sustainable development is a little bit older than IWRM. It is also broader and does not exclude any human activity. It has something to say for every development process. As such, it is much more difficult to materialize SD although it is also much more popular than IWRM. In other words, it will require much more time to have “sustainable” development activities.

Unlike sustainable development, IWRM is a little bit restricted to a specific area, water resources, and tries to realize much more efficient and helpful water management. Since it deals with water issues, there is much more chance to realize the IWRM purposes although there are several challenges to be overcome (Grigg, 2008). The world-wide experiences have shown several good examples such as fully privatized but highly regulated British water industry.

Since water is a natural monopoly, water activities and water management accordingly affect almost every development issue. A better managed water industry will make positive impact on other sectors. Therefore, the water resources of a region or a country managed in an integrated manner will contribute the sustainability of other human activities. In this sense, IWRM can be regarded as a tool, use of which will add positive contributions to the sustainable development. From another point of view, IWRM is essential to sustain our water resources. If we continue to use water, which we do not have any other option, we have to think and explore the ways where the sustainability of our water resources is to be granted.

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