

Mishra, Mukesh Kumar

Working Paper

Water Governance: effective needs for Sustainable Development

Suggested Citation: Mishra, Mukesh Kumar (2023) : Water Governance: effective needs for Sustainable Development, ZBW - Leibniz Information Centre for Economics, Kiel, Hamburg

This Version is available at:

<https://hdl.handle.net/10419/268739>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

“Water Governance: effective needs for Sustainable Development ”

Dr. Mukesh Kumar Mishra

Secretary General
Krityanand UNESCO Club, Jamshedpur
(United Nations ECOSOC Accredited NGO)
102/A, Kalpanapuri, Adityapur Industrial Area,
Jamshedpur 832109

M: +91 9279502203
E: knunesco@yahoo.com

ABSTRACT

Over the past decades, there has been increasing competition for the available water resources and increasing water pollution. Consequently, water shortages, water quality degradation, and destruction of the aquatic ecosystem are seriously affecting prospects for economic and social development, political stability, as well as ecosystem integrity. In developing countries, scarcity and degradation of water resources may have a severely limiting impact on development options, especially for poor people. In order to meet basic human and ecological needs and services, societies need to address and solve several serious water challenges and must come to terms with dwindling water resources, their uneven geographic and seasonal distribution, and an inadequate and inequitable allocation of water services.

Poor resource management, corruption, inappropriate institutional arrangements, bureaucratic inertia, insufficient human capacity, and shortages of finances for investments also undermine the effective governance of water in many places. These are also the challenges to be addressed by governance reforms. There is general agreement that improvements to water governance are a necessary part of the solution to the specific challenges that fall within this nexus of water ecosystem management and poverty reduction within the context of climate change. The objective of this paper is to contribute to integrated, participatory governance processes and a sense of urgency around the need to reclaim and rejuvenate water bodies in more effective ways to ensure the sustainable and equitable use of water resources and to expand the delivery of clean water supply and sanitation services to all, which will help the effort of the impact under "Jal-Jeevan-Hariyali Abhiyan."

Key Word: Water Governance; Integrated water management; Participation.

Agriculture cannot be made solely dependent on rains as it amounts to gambling with the nature. - Kautilya's Arthshastra, 371 BC

[Introduction]

The climate is changing and will continue to change, affecting societies mainly through water. Climate change will likely affect the availability, quality and quantity of water for basic human needs, threatening the effective enjoyment of human rights to water and

sanitation. Food security, human health, urban and rural settlements, energy production, industrial development, economic growth, and ecosystems are all water-dependent and thus vulnerable to the impacts of climate change.

Better water governance is increasingly recognised as a key to achieving socially equitable, environmentally sustainable and economically effective outcomes. What are the key issues in water governance? How can good practice be determined? The three main problem areas in water governance are water supply and sanitation, irrigation and agricultural development and river basin management.

GOVERNANCE

Governance is the exercise of economic, political and administrative authority to manage a country's affairs at all levels...it comprises the mechanisms, processes and institutions through which citizens and groups articulate their interests, exercise their legal rights, meet their obligations and mediate their differences.¹

Water governance refers to the range of political, social, economic and administrative systems that are in place to develop and manage water resources, and the delivery of water services, at different levels of society.²

Governance covers the manner in which allocated and regulatory politics are exercised in the management of resources (natural, economic, and social) and broadly embraces the formal and informal institutions by which authority is exercised. Governance matters a great deal for economic, social, and environmental outcomes. Some necessary conditions for good governance are inclusiveness, accountability, participation, transparency, predictability, and responsiveness. When the governing system does not fulfil these conditions, we speak of "poor governance." Poor governance increases political and social risk, institutional failure and rigidity, and the capacity to deal with shared problems. Of course, governance systems should facilitate action and not create obstacles to development. Getting the right balance is a source of constant debate and an on-going process that will be continually changing over time.

2. WATER GOVERNANCE

"In an increasingly globalised world, the impact of water-related decisions crosses borders and affects everyone, therefore advocating for comprehensive water governance."³

Water governance relates to the range of political, social, economic and administrative systems that are in place to develop and manage water resources and the delivery of water services at different levels of society.⁴ Water governance covers the manner in which allocative and regulatory politics are exercised in the management of water and other natural

resources and broadly embraces the formal and informal institutions by which authority is exercised.

Water is essential to life, but difficult to manage due to the nature of its physical existence. Water is used in a multitude of human activities such as agriculture, industry, domestic, and most importantly for drinking. Apart from human consumption, water is essential for animal and plant life on earth, without which human life cannot exist. Water is difficult to manage for many reasons. It is not equally distributed geographically, so it needs costly infrastructure for transportation. It is difficult to store, because it evaporates and leaks. It gets polluted easily, as it is a good solvent, rendering it unfit for human consumption without expensive treatment. Other problems related to water include water logging and flooding.⁵

Despite all the problems related to the physical nature of water, it is equally important to manage it efficiently and sustainably. The water crisis in the 21st century has more to do with poor management than scarcity and stress.⁶

Coping with current and future challenges requires robust public policies, targeting measurable objectives in pre-determined time-schedules at the appropriate scale, relying on a clear assignment of duties across responsible authorities and subject to regular monitoring and evaluation. Water governance can greatly contribute to the design and implementation of such policies, in a shared responsibility across levels of government, civil society, business and the broader range of stakeholders who have an important role to play alongside policy-makers to reap the economic, social and environmental benefits of good water governance.

The Principles of Water Governance intend to contribute to tangible and outcome-oriented public policies, based on three mutually reinforcing and complementary dimensions of water governance:

- Effectiveness relates to the contribution of governance to define clear sustainable water policy goals and targets at all levels of government, to implement those policy goals, and to meet expected targets.
- Efficiency relates to the contribution of governance to maximise the benefits of sustainable water management and welfare at the least cost to society.
- Trust and Engagement relate to the contribution of governance to building public confidence and ensuring inclusiveness of stakeholders through democratic legitimacy and fairness for society at large.

The three main problem areas in water governance are

- Water supply and sanitation
- Irrigation and agricultural development and
- River basin management

3. Water Governance; Needs

An underlying theme of social science literature is that all governing structures ‘fail’ and all markets and hierarchies have their limitations and also ‘fail’. More effective governance regimes or systems need to be designed /created to overcome government failure, market failure and system failure or a combination of these. For example, water is not a simple economic good; it is sometimes a public good, sometimes a private good and often lies somewhere in-between. Its development can lead to natural monopolies, and it presents major economic and physical side effects or externalities.

Rapid economic development and societal change are putting increasing pressure on water ecosystems and other natural resources. Available water resources are fully allocated and the political importance of effective water governance increases. At the root of the challenges facing the water and sanitation sector is governance, and governance responds to the needs of society by creating empowered institutions to act on its behalf and deliver development. In the 21st century the challenges are different. An approach called Integrated Urban Water Management is gaining ground. Cities realise that they have to depend on multiple sources of water. Groundwater and its sustainable management is a huge challenge. Treating and recycling waste-water is becoming an imperative. Managing fast disappearing urban lakes is the current flavour of the decade.

Rainwater harvesting has become de rigueur and an important supplement to the city water needs. Finally reservoirs on rivers are drying up and therefore rivers have to be understood and managed so that they preserve their ecological integrity yet supply water for the requirements of agriculture, industries and drinking water. The 20th century institutions will need to change and adapt to current requirements. For a start, hydro-geologists will need to be hired and help plan the laws around groundwater management so that the resource is used sustainably. Lake specialists will need to be appointed so that water bodies are not allowed to

deteriorate. Since waste-water flows in cities are in millions of litres per day, good design and implementation for their recycling will need to be put in place quickly. It is time that our water utilities changed themselves.

On the river management front, we have been remarkably lax. If one river dries up as a source we just move farther to another and imagine that this new source will go on forever. But cities have to understand that it is the activities in the basin which affect rivers the most. Over-use of groundwater, sand mining, agricultural practices that use water excessively and industries rampantly polluting rivers all need to be managed if people have to get water for life and livelihood. The water governance issues that need to be addressed and reflected in water policy, law, institutions and management include the following;

- Lack of mechanism for the participation of the community or other stakeholders;
- The absence of mechanisms for coordination and conflict resolution;
- The role of women in water management;

Criteria for effective Water Governance

There is a growing perception that the governance of water resources and water services functions more effectively with an open social structure which enables broader participation by civil society, private enterprises and the media, all networking to support and influence government. Moreover, examining the role of networks or distributed governance helps to overcome the sterile debate about private versus public water service delivery and the role of the community. The goal of creating a proper governance system gives the debate a more practical focus.

Effective water governance requires changes in attitudes and behaviour among individuals, institutions, professionals, decision maker. Participation by the public or stakeholders is an important tool in implementing such changes as it facilitates more informed decision-making and eases conflict resolution.

To achieve more effective water governance it is necessary to create an enabling environment which facilitates efficient private and public sector initiatives. This requires a coherent legal framework with a strong and autonomous regulatory regime. Clear transactions between stakeholders is needed in a climate of trust with shared responsibility for safeguarding water resources whose management affects many people but at present is the

responsibility of none. Actions to make water governance effective include (GWP, 2000): • Raising political will to overcome obstacles to change; • Putting integrated water resources management (IWRM) into practice; • Reforming and developing water institutions; • Realigning financial and economic practices.

Some effective Tools for Water Governance

A. Rejuvenate water bodies and river-rivulets

The term "rejuvenation," which includes "restoration," is the return of any living entity from what it is today to an agreed-upon state of previous health and wellness. Traditionally, rivers have been valued primarily as water sources to drive the economic engines of irrigation and hydropower. However, rivers provide a broader set of services that deliver immense benefits to people, economies, and nature, which include but exceed the value of the water they carry. But far too often, these benefits are not understood, recognized, or valued, and so they are not a priority for river management—until clear problems emerge from their neglect.

We need to rejuvenate rivers by leveraging technology and eco-friendly methods. At the grassroots level, we need to create awareness about reviving rivers, cleaning the water bodies, and mobilising among volunteers, students, and industries. To catalyse changes in policy and management, the value of rivers needs to be framed in terms that are compelling for those making decisions. In much of the world, minimal resources are available to monitor and measure the stocks and flows of water, and this lack of basic information is one of the greatest challenges for sustainable water management.

Accelerating trends in technology have great potential to monitor and measure the stocks and flows of water, 'Fourth Industrial Revolution' (or 4IR) offers a number of promising pathways to improve how we measure and manage environmental resources, including water. These technologies offer methods to measure rivers in ways that were nearly unthinkable even five years ago. The resulting opportunity to fundamentally re-think how we measure and track river values is immense. Cloud-based, Artificial Intelligence (AI) -enabled processing of remotely sensed data/imagery is already underway and changing our ability to understand how river processes and resources shift through time and space.

B. Irrigation Management “Sustainability with automated irrigation systems”

Irrigation management aims at increasing food production, contributing to economic development, and reducing poverty through improvements in the performance, productivity, and sustainability of irrigated agriculture and irrigation systems. With increasing competition from other sectors, irrigation is under pressure to reduce its share of water use. At the same time, irrigation is regarded as one of the main means for increasing food production and rural incomes. This is why it is imperative to modernise irrigation systems and improve irrigation governance in order to achieve high water productivity and sustain the resource base. There is a need for Equipped with advanced weather tracking systems and sensors, smart irrigation solutions allow operators to optimise water usage and sustainably maintain their landscape. The following technology can aid farmers in making management decisions and boost irrigation effectiveness.

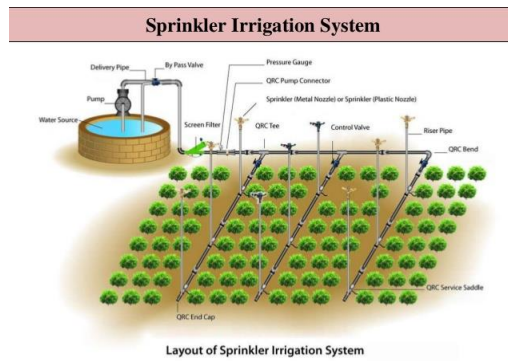
1. Centre Pivot Irrigation System



This is a mechanized irrigation system type which irrigates crops in a circular pattern around a central pivot, it consists of a radial pipe supported by towers that pivot around a centre point. Along the radial pipe nozzles are equally spaced. As it rotates, water is released from nozzles and irrigates crops. This greatly reduces the amount of time, fuel and labor needed to manage irrigation.”

2. Sprinklers Irrigation System

Sprinkler systems allows application of water under high pressure with the help of pump, have improved water-application patterns through the use of multiple streams, sizes and angles. Increasing irrigation uniformity can improve yield and reduce runoff. Under this system water saving upto 40% to 50% and reduce labour cost.

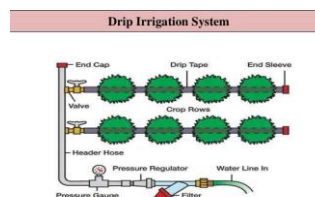


3. Soil-moisture sensors



Sensors that monitor soil-moisture, the top tools to help farmers improve irrigation decision making and practices. “Sensors can be set up to automatically start or stop irrigating when soil moisture reaches specified levels. This helps farmers better manage irrigation timing and prevent overwatering.”

4. Drip Irrigation System.



Under drip irrigation systems, water can be delivered near the root area of plants drop by drop. This irrigation system is greatly advantageous as during the process the essential nutrients of soil remains in place without getting washed away by flowing water. Furthermore, it maintains moisture and fertilizers to increase yield capacity. It increases the quality of the crop up to 100% and ensures 50% - 70% saving of water than other traditional or conventional systems because in this process water is directed to the roots of the plants.

5. Yield-modelling tools

Decision-management tools, such as computer-based crop-growth-simulation models, predict potential crop outcomes based on historic climate data, local weather patterns and management practices. This information aids farmers in determining whether additional irrigation is needed to achieve their production goals based on projected yield.

Rain water Harvesting

Rainwater harvesting is defined as the management, control, and use of rainwater, as well as its storage for future use. Rainwater harvesting is a practise that dates back to prehistoric times and still forms an integral part of many domestic and agricultural systems throughout the world. It is commonly practised in areas where the rainfall is insufficient for crop growing. The most widespread use is that of supplementary irrigation, which complements rainfall during periods of water scarcity or stress during the growth stages of plants.

Rainfall has become unpredictable in nature, with some areas experiencing longer-than-usual dry spells while others experience nonstop rain. Rain-hit regions are unable to utilise or control the excess waters, which leads to a flood-like situation. Rainwater harvesting can help overcome the problem of flooding while also helping to store excess water that can help provide water to the water-scarce region. This renewable source of water management can help in overcoming major water-related problems that are not only plaguing the world right now but can have a severe impact on the global population and environment in the future.

3. Recharge ground water

Interlinking Rivers

The purpose of interlinking the rivers is to join the rivers through reservoirs and canals. This will solve the problems of flood and will provide water throughout the year. The farmers will not have to depend on the monsoon for cultivation and also the excess or lack of water can be overcome during flood or drought. Some benefits of the river interlinking are;

Redistribution of water, Controlling of Floods as well as taking care of droughts, hydropower generation, canals can be used as inland waterways which help in faster movements of goods from one place to another.

Integrated flood management

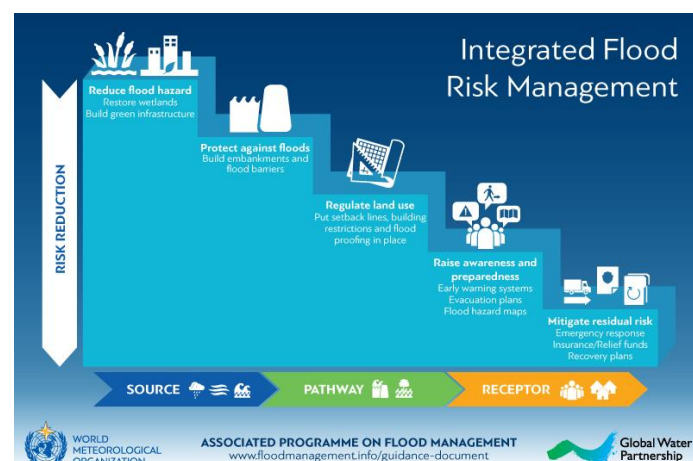
Flood risk is commonly defined as the product of hazard, exposure and vulnerability. A hazard is understood as a potentially damaging physical event (in this case a flood) that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation.

Sustainable and effective management of water resources demands a holistic approach, combining social and economic development with the management of natural ecosystems. As

flood disasters may adversely affect the sustainability of development, flood issues need to be addressed in the context of Integrated Water Resources Management (IWRM). Integrating flood risks in development strategies requires a move towards a culture of prevention by managing flood risk and living with floods.⁷

Flood risk is commonly defined as the product of hazard, exposure and vulnerability. A hazard is understood as a potentially damaging physical event (in this case a flood) that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation.

Floods are the most common natural disaster with the largest impacts on society. With its holistic approach, the IFM concept includes disaster risk management principles and applies them to floods. The disaster risk management cycle comprises four phases (Figure 2): — Prevention and mitigation: measures and activities incorporated into regional and national development planning that reduce the likelihood and/or impacts of disasters; — Preparedness: the goal of preparedness programmes is to achieve an appropriate level of readiness to respond to any emergency situation that may arise through programmes that strengthen the technical and managerial capacity of governments, organizations, and communities to respond; — Response: the goal of response programmes is to respond to any emergency situation that may arise through programmes that strengthen the technical and managerial capacity of governments, organizations, and communities to The focus in this phase is on meeting the basic needs of people until permanent and more sustainable solutions are in place; recovery: activities aimed at restoring livelihoods and supporting infrastructure, making use of opportunities to reduce future vulnerability by enhancing prevention and increasing preparedness.



Flood management methods

Agriculture takes advantage of the nutrients in the soil and the amount of water that is available. Water is the key. When crops aren't getting enough water, farmers have to find ways to bring water to the crops. This is called irrigation. Irrigation can turn dry land into fertile farmland. To get the water needed for crops, we build reservoirs and drill deep wells. Irrigation is a big part of farming.

Steps can be taken to manage flooding. This is known as river management. Often, these steps involve trying to lengthen the amount of time it takes for water to reach the river channel, thereby increasing the lag time. Hard engineering methods tend to be more expensive and have a greater impact on the river and the surrounding landscape. They will require more extensive alterations to the river to try to stop flooding. Soft engineering methods are usually more ecologically sensitive. They will attempt to manage the flood rather than prevent it.

Conclusion:

The water crisis is essentially a crisis of governance, and societies are facing a number of social, economic, and political challenges on how to govern water more effectively. The way in which societies organise their water resource affairs is critical for promoting and supporting sustainable development as an integral part of a poverty-focused development strategy. Sustainable development challenges are, at their core, a question of both governance and of how societies can balance economic and social development with ecosystem integrity. Sound and effective governance of water resources and related services are needed and demanded to facilitate and support an enabling environment for water resource management. As well as we need integrated approaches, recognition of water governance, and required reforms of policies, we also need to reform water institutions. Water governance is the set of social relations, or system, that determines who gets what water or services, when, and how. "Good governance" is thus crucial for improving access to water and sanitation services. Effective governance of water resources requires the combined commitment and effort of governments and various civil society actors, particularly at local community levels. Policies must deliver what is needed on the basis of clear objectives and informed decision-making.

¹ UNDP,2001

² Global Water Partnership,2002

³ UNESCO Director General

⁴ Rogers & Hall, 2003

⁵ Qian, Y. Sustainable Management of Water Resources. Engineering 2016, 2, 23–25

⁶ Rogers, P.P.; Llamas, M.R.; Cortina, L.M. Water Crisis: Myth or Reality? CRC Press: Boca Raton, FL, USA, 2005

⁷ Measures and Designing Strategies for Integrated Flood Risk Management, WMO
