

## Teesta River Water Management through an Integrated Approach

Swastika Pradhan

Department of Political Science, Sikkim University, Gangtok, Sikkim, India

**Abstract:** The significance of water resources and the increasing demand for it coming from various sectors has made water management vital. It is a well-known fact across the world that wherever nations have successfully addressed their water issues and adopted measures for better management of their water, economic growth and development is said to have followed. The same applies in the case of the Teesta River also. The Teesta River Water holds grave significance for both India and Bangladesh and hence the issue of water sharing and management has been a long pending and contentious issue between the two, often raising questions over the inability of the policymakers in addressing the issue of water management. The issue related is with 'equity' as the river supports the economy of millions of people residing along the basin. The paper therefore, drawing inferences on the available literatures, proposes integrated approach towards the Teesta River Water management. Integrated Water Resource Management aims at maximizing the social as well as economic benefits through coordinated development and management of water, land and related resources without compromising the sustainability factor. Therefore, it rests on three basic principles of economic efficiency, equity and environmental sustainability. The paper argues that lack of management is complicating the issue and if an Integrated Management Approach is adopted then it can help bring about a solution to the Teesta issue through the participation of all the stakeholders concerned including the users, planners and the policy makers. The basic findings of the study therefore rests on the argument for the adoption of an Integrated Water Resource Management as a viable solution to the issue of Teesta water. The paper also contends for the need to analyze the water issues from an integrated approach by understanding the various inter-linkages of water to other sectors. Apart from it, the involvement of the various stakeholders which includes both the users as well as the dependent people within the larger framework of Teesta water management can help resolving the issue and there is a need for making the data on water resources accessible and transparent. The paper, however, also points out the emerging challenges on the way and states that adopting the mechanism will not be an easy path.

**Keywords:** Integrated Water Resource Management, Water governance, Sustainability, Teesta, Resource Equity.

### INTRODUCTION

Water viewed as a key driver of economic and social development is regarded as a scarce and precious resource. The total water resources in the world are estimated to be 43750 cubic km/year, with America having a share of 45 percent, followed by Asia 28 percent, Europe 15.5 percent and Africa with 9 percent of the world's total fresh water resources (FAO). In an average year, 1,000 cubic m of water per inhabitant is considered as a minimum to sustain life. The major issue confronting the policy makers around the world is the very question of inequalities and disparity in terms of availability and access to fresh water resources. Over the years, the consumption of water resources has increased with an increase in population and further accelerated by rapid economic development. Hence, the demand for water resources is coming from various sectors while the supply is getting limited. If we go by the forecast made by the World Bank, by 2030 given the current scenario there will be a shortfall of around 40 percent between demand and supply. The World Water Council (2000), pointed out how mismanagement or rather poor management of the water resources has added to the water crisis with implications on poverty, social, cultural, economic development and the environment. So, it has affected not just the billions of people around the world but also the ecosystem. The significance of

water resources and the increasing demand for it coming from various sectors has made water management vital. It is a well-known fact across the world that, wherever nations have successfully addressed their water concerns and adopted measures for their management, economic growth and development is said to have followed. Infact, some even equate the stability of a nation upon the very management of the water resources (Rashid, 2014).

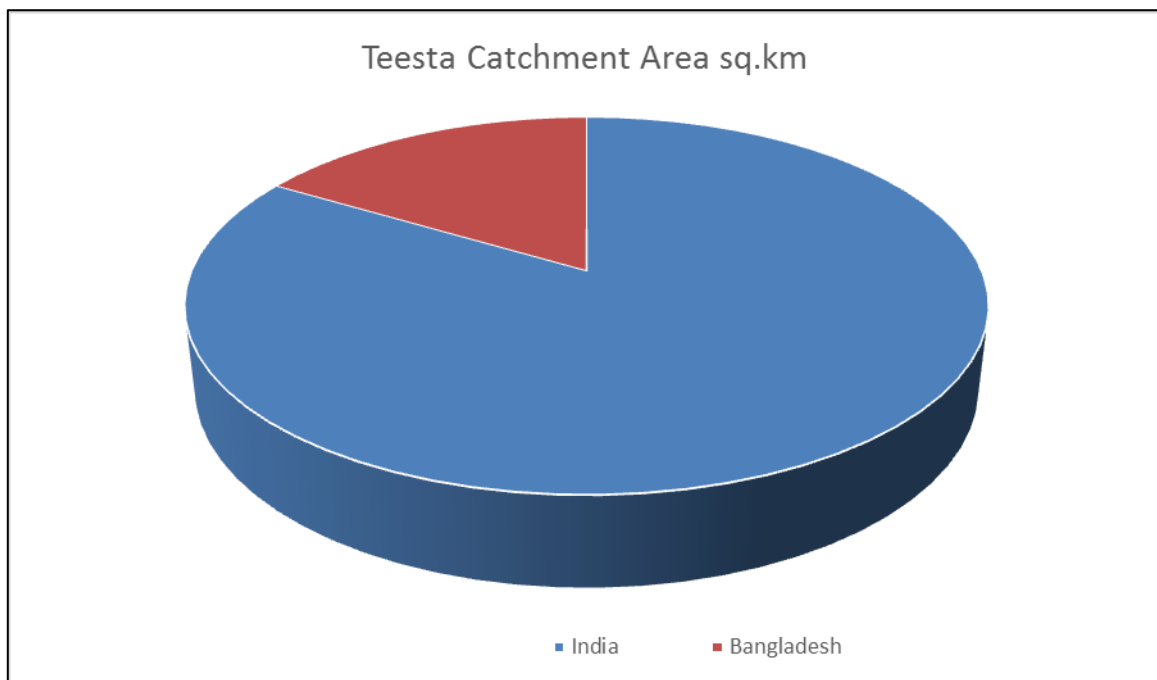
There have been instances in the past, which pointed out to the fact how mismanagement of the water resources can lead to conflicts, both inter and intra state, even though not to an extreme form. Yet one cannot ignore the possibilities. The fundamental questions often raised includes 'priority over water use' and 'water allocation' as indicated by Pierce (1979), which can be addressed only through proper water management.

Integrated Water Resource Management ensures sustainable management of water resources, which addresses not just the water concerns, but also the demands coming from various uses of water like domestic, irrigation, industrial and environmental. It further helps in understanding the inter linkages that exists between the various sectors of the society and also in identifying how decisions at the

international, national and local levels are interrelated (Burton, 2003).

The Teesta River water management has been a long pending issue between India and Bangladesh, where time and again the question of water sharing followed by water use, distribution and allocation is contested. The river owes its origin from lake Chhombu Chu in Sikkim at an elevation of 5,280 m ([sikkimforest.gov.in](http://sikkimforest.gov.in)). The river is transboundary in nature, that flows through West Bengal, enters Bangladesh and finally meets the Brahmaputra in Kurigram. It is one of the 56 rivers shared by India and Bangladesh. The river holds significance for both the countries and hence the issue of water sharing and management has been a contentious issue between the two nations, often raising the question over the inability of the policymakers in addressing the issue of water management. The issue related to is with the question of 'Equity' as the river supports the economy and livelihood of the millions of people living along the basin. The total catchment area of the Teesta Basin is 12,159 sq km with 10,155 sq km lying in India and the remaining 2,004 in Bangladesh (see Fig.1) with a population ratio of 70:30 with 21m people living in Bangladesh while,

8 million in West Bengal and half a million in Sikkim. There are many uses of the river including hydro power generation in the upper basin and irrigational purpose in the middle and lower basin. The hydro potential of the river is 8000 MW and is seen as a part of the Hydro Policy 2003 aimed at 50,000 MW hydro initiatives (Pradhan, 2021). Further, since the economy is agrarian along the basin, agricultural production accounts to 23.50 per cent for Bangladesh (Ministry of Agriculture, Bangladesh, 2012) and 14.2 per cent for India (Central Statistical Organization, India, 2011). To facilitate agriculture and sustain food security, the Teesta Irrigation Project was developed by Bangladesh in Dalia and later by India in Gazaldoba. But this has been a major source of discord between the two countries, as enforcement of the project requires an adequate amount of water resources to be maintained. The demand of water is 43,905 cuses and 25,714 cuses for India and Bangladesh respectively whereas the supply is limited especially during the lean season (Syed, *et al.*, 2017). Therefore, since the Teesta River is vital for ensuring food and energy security the question of Equity pose a serious challenge.



**Fig.1:** Teesta Catchment Area

**Source:** ([sikkimforest.gov.in](http://sikkimforest.gov.in))

**Objectives of the Paper:** The paper has two basic objectives:

1) To understand the concept of Integrated Water Resource Management (IWRM).

2) To explore the concept of Integrated Water Resource Management with regard to the Teesta River.

## METHODOLOGY

The paper has employed Qualitative methods where inferences have been drawn from the available literatures. Primary sources include Governmental reports and data from India and Bangladesh. For the secondary source books, articles have been used.

### Integrated Water Resource Management

The concept of Integrated Water Resource Management (IWRM) emerged at the international level since 1977 at the UN Water Conference and further developed since World Summit on Sustainable Development, Johannesburg in 2002, where emphasis was laid by governments on the application and implementation of IWRM. It has been defined by the Global Water Partnership (GWP);

*IWRM is a process which promotes coordinated development and management of water, land and related resources in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystem.*

(GWP, 2000)

Smith & Clausen (2015), based on the similar lines viewed it as reconciling multiple, competing uses of water, with legitimacy attained through public participation and with coordination and technical competence assured through specialized basin entities or agencies where they exist. It is seen as a viable solution to sustainable and equitable development and management of water resources. It brings together both water dependent sectors, as well as policy makers to work together in bringing about a solution to competing demands and uses of water. Adopting 'integration' approach to water management implies negotiation of tradeoffs between the various stakeholders from local-national- to regional levels. Tradeoffs also implies maintaining a proper balance between meeting the needs of various sectors and establishing adapting governance mechanism to cope with various issues emerging at the environmental, societal and economic levels. The basic idea stems from the fact that it does not view water issues in isolation but rather links it with other issues that includes social, economic development and ecosystem protection. And since, it works both horizontally as well as vertically, it is considered a holistic approach that seeks to integrate and coordinate efforts towards the sustainable management of the water resources (Born & Sonzogni, 1995; Mitchell, 2005; Ofori & Mdee, 2021) and seen

integral to the achievement of Sustainable Development Goals (SDG) 6. Target 6.5 of the SDG seeks to implement IWRM at all levels, including through transboundary water cooperation as appropriate.

Burton, (2003) has further discussed the three phases of IWRM: 1) Documentation wherein detailed information is abstracted relating to the various uses of water which in turn helps in identifying the core issue and setting the priorities. 2) Planning which involves the policymakers and stakeholders, their dialogue and consultations which further helps in identifying the issue and defining an action plan to resolve the issue; and 3) Action which ensures that the planning and strategies adopted can reap maximum benefits and resolve the issue. It consists of projects and monitoring. Therefore, IWRM emphasize on equity, sustainability, optimal beneficial uses and redressal among other things.

## DISCUSSION

To facilitate the integrated approach the first and foremost step happens to be the development of a National Integrated Water Resource Management policies, taking into consideration the river basin management. In case of the Teesta, India needs to take an initiative towards Integrated Management by involving downstream Bangladesh. In India, the concept of IWRM is not new. Infact, India via the Central Water Commission has provided for a guideline on 'Integrated Water Resource Development and Management' as a part of the National Water Mission Strategy in March 2010 (Ministry of Jal Shakti, GoI). The National Water Policy 2012, envisages the vision of Integrated approach to Water Resource Management.

Para 2.3 states, *there is a need for comprehensive legislation for optimum development of inter-state rivers and river valleys to facilitate inter-state coordination ensuring scientific planning of land and water resources taking basin/sub basin as unit with unified perspective of water in all its forms and ensuring holistic and balanced development of both the catchment and command areas.*

Para 12.4 further states, *IWRM taking river basin/sub basin as unit should be the main principle for planning, development and management of water resources. The department/organization of Centre/State government levels should be restructured and made multi-disciplinary accordingly.*

Apart from it, there is also the National Hydrology Project (NHP) under the Ministry of Water Resources River Development and Ganga Rejuvenation funded under the World Bank which follows the World Bank guidelines. It aims at improving Planning, Development and Management of the Water resources as well as flood forecasting and reservoirs operations. The components herein can facilitate Integrated Water Management like Improving the Water Resources Monitoring System (WRMS); Improving the Water Resources Information System (WRIS); and, Promoting Water Resources Operation and Planning System (WROPS) (MoWR, India).

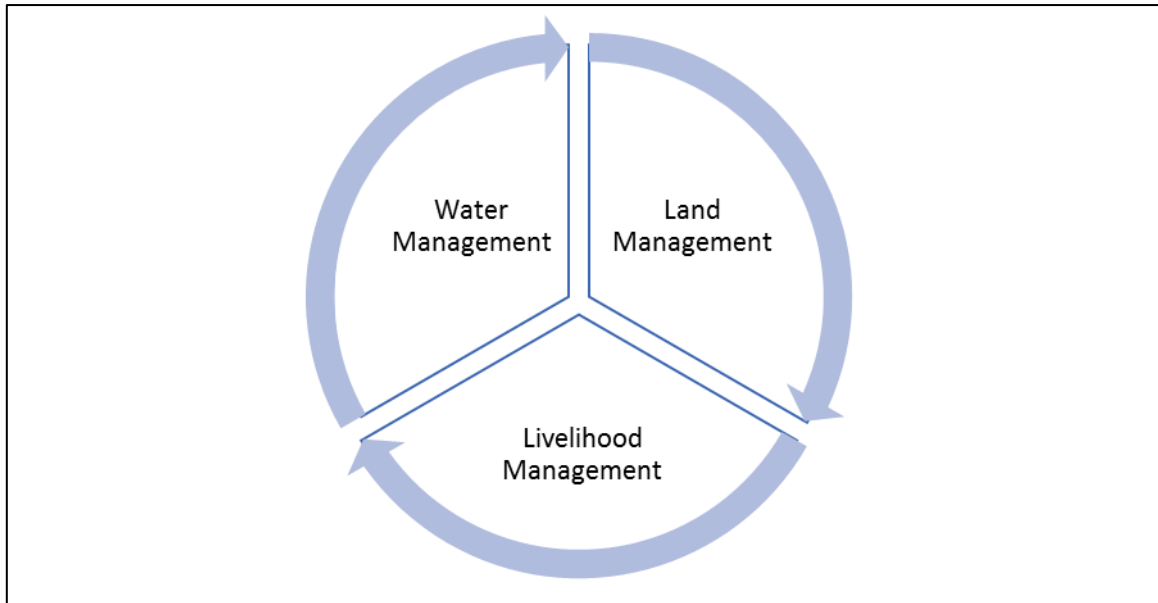
The approach can help in addressing the issue of water governance by involving all the stakeholders. In doing so their respective and diverse interest can be taken into consideration which is very significant in the case of Teesta River. As already stated above, the river Teesta serves multiple purposes but these benefits and uses are not integrated leading to conflicts amongst the stakeholders, regarding the very access to water resources, particularly, those at the lower basin areas. There have been arguments and counter arguments regarding the very availability of the Teesta waters where they often link it to the developmental projects upstream which is said to have affected the flow of the water downstream, which in turn is impacting their benefits.

There have been concerns related to the use of waters of the Teesta downstream and with reduced water availability particularly during the lean season, they fear their economy which substantially thrives upon the Teesta waters. Hence, there has been arguments in favor of channelizing the other potential benefits of the waters of the Teesta which can be shared between both the countries as a solution to the dwindling economy of northern Bengal and particularly of the northwestern Bangladesh. Similarly, there have been major discontentment amongst the people living along the Teesta Irrigation Project in Gazaldoba (India) regarding the unequal

distribution of the waters of the Teesta from the main canal to the various sub canals which is affecting their agricultural output thereby impacting their livelihood. Another major issue which is similar both upstream and downstream, has been flooding, which has led to loss of lives as well as their agricultural land.

Therefore, one needs to look at the issue from a holistic approach and accordingly, the focus should be on developing a plan which would ensure effective utilization of the water, land resources which in turn would ensure livelihood management. For instance, in the case of the Teesta, lack of water management has led to escalating water demands for irrigation both at Gazaldoba Barrage (India) as well as Dalia barrage (Bangladesh). Not only that Observation in both these regions showcase the implication of less and uneven water availability upon the very livelihood of the farmers, at time threatening their very existence as they are struggling to maintain their bare minimum sustenance. So, if integrated approach is adopted then it will help in a holistic management of water and land resources linked to the vulnerabilities and livelihood opportunities.

Integrated Teesta River Water Management would imply utilizing the resources of both water and land, integrating it for livelihood benefits (See Fig. 2). It can reap benefits as the basin thrives on water for its economy which is agrarian in nature. Hence, the aim would be to maintain a balance between the demand (water users) and supply of water resources of the Teesta as it invariably affects the agriculture. Further, through land management it can serve the purpose of improved agricultural practices and efficient irrigation techniques (Goyal, *et al.*, 2020) to ensure sustainability which at present is lacking. It would also ensure providing an alternative source of water during the lean season through planning of storages of water during the rainy season. This in turn can support the livelihood of the people of the basin.

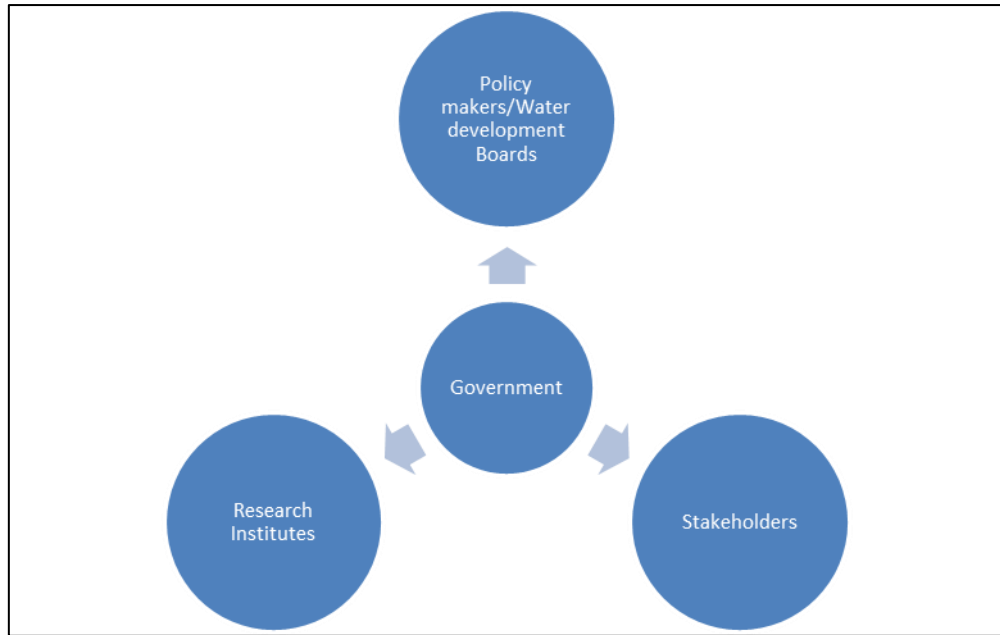


**Fig 2.** ITWRM Plan in Three sections

**Source:** (Inferences drawn from Goyal, *et al.*, 2020)

Again, the Integrated Approach is determined to a large extent by the involvement of the various actors, who, directly or indirectly influence and affect the policy formulation as it emphasizes on sustainability and equity. With regard to Integrated Teesta River Water management, the major players include both the riparian nations India and Bangladesh government; the Policy makers; the Water Boards of respective nations (Central Water Commission and the Bangladesh Water Development Board); stakeholders including the people residing along the basin, farmers, Civil society organizations; the NGO's and the Environmentalist. The role of the government is seen vital as they are responsible for the creation of a conducive environment to IWRM by formulating national water policies, enacting water legislations and enabling dialogue (GWP, 2000). Hence, to implement IWRM in case of Teesta, there is a need for institutional and infrastructural development which requires funding and that can be provided by the governments both at the local, national as well as regional level. These investment and management schemes can be developed to reap maximum economic benefits. There can also be collaboration and partnerships mostly Public-Private to enhance capacity building processes. Grey, *et al.*, (2003) have also talked about redistribution of the benefits wherever applicable especially amongst the downstream and upstream riparian. Hence, creation of Joint

Committees between India and Bangladesh is essential to further regional cooperation. The NGO's and the Environmentalist plays a two-way role of providing information to the stakeholders and also in assisting them in participation at the decision-making process. In this context, the role of the press also cannot be ignored who acts as a medium between the people (users) and the policymakers. Further, it will also help in identifying the underlying stress with regard to water use and demand which can be aided by the research institutes. More and focused research on Teesta water issues, its competing uses, the nexus, can help understand the issue more clearly. This in turn can help in prioritizing the issue. In India, there are Research Institutes like the Asia Foundation, the Observer Research Foundation, TROSA, IIT Guwahati to name a few. The concept of Governance apart from being transparent, ensures that policy makers are able to identify the real issue and accordingly prioritize those issues that requires urgent attention and action and IWRM can help in achieving the said goal. Analyzing and uncovering the stress and involvement of the various actors can in turn also help in developing the IWRM indicators which can range from Assessment indicators to Integration indicators to Consultation and Awareness indicators to Management resource indicators (Ben-Daoud, *et al.*, 2021).



**Fig 3:** Major Players in Integrated Teesta River Water Management

**Source:** Based on the study

Now, after identifying the stress, next step is the implementation which determines the very success of Integrated approach. Hence, it needs to be implemented at all the levels simultaneously (see Fig. 4) only then effective policies and action plan can be furthered. It has been analyzed closely by Goyal, *et al.*, 2020 with regard to the management plan at the district level. At the regional and national level, the demand for water is integrated from various sectors and balanced it with water availability and coordinate upstream and downstream uses. Local level also helps in linking

water demand and uses, water supply and water resource management in a sustainable manner by involving the local communities in the decision-making process. This in turn can help in understanding the water issues at the local level ranging from water shortages to uneven distribution, land degradation, floods, water contamination. These issues and concerns have been backed through informal Observations with the local farmers along the Teesta Basin. Therefore, in IWRM not just the sectors but also the levels are to be integrated and interrelated.



**Fig.4:** Implementation of the Integrated Teesta Water Resource Management

**Source:** Based on the study

## CONCLUSION

Water determines the stability of a nation, as various aspects of life which includes the society, economy, environment as well as politics depends upon the very availability and management of the water resources. The Teesta River water management has been a long pending issue which needs to be seen from an integrated and holistic approach. Adopting the Integrated Management to Teesta Waters would help in addressing the issue more broadly by incorporating the various stakeholders which inturn would help in better formulation of decisions and policies. India can also take example of Mekong Basin which has adopted the approach involving the ministers of the countries sharing the water resources together including the high-level representatives of the Dialogue Partners China and Myanmar. They have adopted Basin Development Plan at the National level, basin and tributaries at Provincial levels and at sub-basin and district levels and involves all the stakeholders from the public sector, private sector and civil society. However, while the paper advocates for an Integrated Teesta Water Resource Management, it does not undermine the challenges associated with it particularly concerning the diverse interest of the stakeholders concerned associated with the issue of funding and capacity building. Susskind & Islam, (2012) have raised the issue of Uncertainty- Uncertainty of information, action and perceptions which is affecting the very management of the water resources and also pose a serious challenge to ITWRM.

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**Source of support:** Nil; **Conflict of interest:** Nil.

**Cite this article as:**

Pradhan, S. "Teesta River Water Management through an Integrated Approach." *Sarcouncil journal of Arts humanities and social sciences* 3.4 (2024): pp 1-8.