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WATER MANAGEMENT IN WEST BENGAL

CHALLENGES, OPPORTUNITIES, AND INTERCONNECTIONS WITH CONSUMPTIVE SECTORS

Founded in 2008, the Environment Conservation Society (ECS), also known as SwitchON Foundation, is a nonprofit organization dedicated to fostering equitable and sustainable development in India. Our vision is to build a sustainable and equitable India, focusing on Clean Energy, Clean Air, Sustainable Mobility, Climate Smart Agriculture, Conservation and Integrated Management of Natural Resources, Just Transition, Skilling, and Sustainable Cities. Our mission is to promote sustainable livelihoods and address environmental challenges through innovative business models and technologies, aiming to create opportunities for 10 million people at the bottom of the pyramid by 2030.

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Executive Summary

The study **"Water Management in West Bengal"** discusses the challenges and opportunities in the water sector in West Bengal, focusing on its interlinkage with agriculture and domestic sectors. West Bengal is physiographically diverse and can be divided into the Himalayan region, the Eastern fringe of Chotanagpur regions, the Deltaic areas, and the flat land area respectively. West Bengal can also be classified based on agro-climatic zones of The northern hill zone, the Gangetic alluvial zone, the Terai-Teesta alluvial zone, the Laterite zone, and the Coastal saline zone.

Therefore, there is a significant variance among all these regions regarding rainfall. This variation and occurrence of rainfall leads to different water-related challenges, all quite unique to each other. It is to be noted that West Bengal is one of the larger states of the country area-wise and has a huge rural population who are heavily dependent on rural activities that are basically dominated by agricultural practices. Huge areas under agriculture are in vulnerable positions due to water-related challenges and have become a prime area of concern. Rural communities are highly dependent on groundwater and freshwater supplies and it is necessary to ensure they get safe, secure, and adequate water and help the rural communities to improve their economic value.

After studying the data and present scenario, it can be established that at this present time, depleting groundwater levels will result in more irrigation challenges and create challenges for traditional crop patterns practiced in West Bengal districts. All types of cash crops like tea, maize, pulses, and water-intensive crop harvesting rates are declining due to water issues. According to MAUSAM (2023), districts such as **Purulia, Howrah, and Bankura** are ranked as the lowest rainfall regions in 2023, with **-70%, -60%**, and **-59%** of rainfall, respectively, in West Bengal. The report has classified the needs, challenges and opportunities of water resources in West Bengal primarily into agricultural and domestic needs.

Whereas, North Bengal districts are facing floods on a regular basis now in the monsoons. Monsoon floods in West Bengal have a significant impact on agriculture and rural livelihood. The effects of these floods on agriculture can be both immediate and long-term, affecting crop production, soil health, infrastructure, and the overall agricultural economy. The report is based on inductive research logic by studying collected data from various trusted non-government and government sources.

A detailed discussion is made on the different regions of West Bengal; Northern hill and Terai regions, Gangetic Alluvial Zone, Old Alluvial Zone, Laterite Zone and the Coastal Zone about the rainfall records, recent trends of rainfall, irregularities of monsoon rains, groundwater levels and associated socio-economic issues that are caused. In the Terai region, where there is no lack of rain in the monsoons and therefore groundwater level is high too. But, at the same time, rivers like Teesta, Jaldhaka, and Torsha have repeatedly caused multiple floods in this region which have heavily disrupted the economy, soil quality, and existing infrastructure.

In the Gangetic Alluvial Zone, which consists of areas in the east part of Murshidabad, Nadia, North 24 Pargana, South 24 Pargana, most of Hooghly, Kolkata, and Howrah have witnessed issues with collecting groundwater. Another part of this region; Murshidabad district, has witnessed arsenic pollution. The arsenic-affected blocks are Domkal, Jalangi, Lalgola, Beldanga I and II, Berhampur, and many others. In the Old Alluvial Zone, the Damodar River is considered a flood-prone river and water is used to supply to the drier places of this region. Even with the existence of a flood-prone river, most districts in this region are dry and suffer from lack of water.


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However, it is not exclusive to only this problem as places like Burdwan districts, Katwa, Kalna, and Purbasthali are the most arsenic-contaminated blocks. The Laterite Zone of West Bengal has a moderate level of ground water supplies and a serious enough number of rural families struggling to get fresh water from the tube wells and canals. Despite the presence of the Damodar, Kangsabati, Dwarakeswar, and Subarnarekha rivers, drought-prone zones create issues for crop production. **10–13.4% of lateritic arid and semi-arid zones are capable of cultivation, which is highly challenging for rural community people.**

In these districts, various villages such as Chayanpur, Mohoda, Gloamara, and Lalbazar have major drought issues, causing a decline in agriculture production and domestic consumption. Arsenic and Fluoride contamination is again a problem in this zone and contributes to water crisis especially in the summer months. Finally the coastal region is prone to extreme levels of salinity issues and is considered unfavorable for agricultural and drinking purposes. Crop damage and loss, sedimentation, salt-water intrusion, and heavy siltation are some of the serious issues that have hit the coastal belts of West Bengal.Groundwater is given special importance as it is a very essential source of water that is used for agriculture as well as for drinking purposes.

Conclusions can be made that even with adequate levels of monsoon rains in the state, at least in most districts, several agricultural and domestic challenges are encountered. The major reasons that can be put forward to explain these challenges are floods in the northern districts during monsoon, drought situation in some of the districts like Howrah, Bankura and Birbhum, inadequate monitoring of groundwater levels and floods, and contamination of groundwater due to Arsenic and Fluoride contamination. All these factors have resulted in major challenges in rural West Bengal and thus, **sanitization, monitoring processes** need to be checked.

1. Introduction

Water resources depend on any region's soil patterns, weather, and vegetation positions. It is significantly related to agricultural production and domestic purposes. West Bengal is the most agriculturally productive state, which helps to increase the total GDP rate of India. In all districts, groundwater and surface water are equally important for developing the irrigation procedure. Mandal et al. (2023) stated that the **net surface water amount of West Bengal is 132.905 BCM and the groundwater amount is 27.580 BCM.** However, According to CGWB (2023), West Bengal's net groundwater availability rate is 21.41 BCM. Water resources are highly used for Aus paddy, Aman paddy, and Boro paddy productions, which are considered West Bengal's most important crop productions. Apart from paddy production, cereal, pulses, oilseeds, potatoes, fiber crops, and sugarcane production are highly influenced by existing water resources.

West Bengal state is divided into four physiographic divisions: the Himalayan regions, the Eastern fringe of Chotanagpur regions, the Deltaic areas, and the Flat land area (CGWB, 2023). West Bengal's agro-climatic zone is mainly divided into six parts: The northern hill zone, the Gangatic alluvial zone, the Terai-Teesta alluvial zone, the Laterite zone, and the Coastal saline zone. Surface water and groundwater help identify water availability and its potential gaps. During pre-monsoon and post-monsoon time periods, river basins and river flows maintain total water availability in all states.

In all of West Bengal, an area of about 52.05 lakh ha is available for crop production (WB, 2023). Approximately 160.485 BCM of water is available for total irrigation in this state (Mandal et al., 2022). As an opportunity, it can be stated that numerous rivers and their tributaries help with overall crop production and domestic consumption in West Bengal. However, arsenic and fluoride contamination are the most vital issues for drinking water. Lack of water sanitization and monitoring processes enhances the health risk in rural communities. Coastal regions of Bengal face salinity-related issues that directly decline irrigation rates.

Regarding agriculture or domestic work, rainfall is a major issue for West Bengal. As per the meteorological data of India, without Darjeeling, Jalpaiguri, Coach Bihar, and East Medinipur, the rest of the districts face issues concerning rainfall. Purulia, Howrah, and Bankura are ranked as the lowest rainfall regions in 2023, with -70%, -60%, and -59% of rainfall, respectively, in West Bengal (MAUSAM, 2023). Low rainfall is directly linked to crop production, ground or surface water recharge, or domestic usage. As an example, it can be stated that in 2022, -40% rainfall in Bardhaman's districts will create drastic issues in paddy production rates. Due to the lack of rainfall, DVC has a shortage of water supplies. In the monsoon season, DVC releases 70,000 cusecs of water instead of 180,000 cusecs, and it has impacts on aman paddy cultivations all over East Bardhaman.

This study mainly focused on major challenges and opportunities in West Bengal's agriculture and domestic consumption. Rural communities and urban communities are equally evaluated to understand the role of water resources, and all types of traditional water bodies, groundwater rates, and surface water rates are evaluated in this study.

2. Literature Review

2.1 Water resources opportunity and challenges in crop production

In the northern regions of West Bengal, surface water, especially rivers, has potential for developing crop production. The river Jaldhaka, which is a tributary of the Brahmaputra, is highly important for crop production in Cooch Behar districts. According to Mikhail & de Bruin (2019), it enhances multi-crop agriculture in Maynaguri District by 163% and 192% in Cooch Behar District. Northern Bengal's rainfall rates and river flows help it adapt to changing crop patterns. In the groundwater context, the electrification process enhances the profit of rice production in West Bengal. Evans, Giordano, & Clayton (2012) stated that electric pump owners are achieving more profit by using a hand pump to utilize groundwater. Apart from Murshidabad and Nadia Districts, Malda, Bankura South 24 Pargana, Hooghly, and Coach Bihar's farmers face opportunities for better groundwater quality. Rainwater helps develop the overall production rate by diversifying the crop mix.

As issues in crop production, arsenic pollution, methane emissions, and chromium toxicity affect crop profitability rates. Different districts on the Northern side of West Bengal, like Darjeeling, Kalimpong, and Jalpaiguri, face issues regarding groundwater developments. The presence of hard rock terrain in the western side of Bengal, like Purulia, Bankura, and Birbhum, also has low groundwater resources, which have negative impacts on crop production. Farmers are not capable of producing water-intensive crops such as rice and sugarcane. According to Mahanta et al., (2019), in the coastal zone of the Sundarban region, agriculture is highly affected due to low productivity rates and an imbalance of soil salinity. Due to limited percentages of freshwater resources, implementing drip irrigation systems increases vegetable crop profitability in coastal regions. However, overmulching systems create issues on the land.

2.2 Water resources opportunity and challenges for domestic purpose

Water resources help increase the economic value of rural communities. According to Chowdhury & Behera (2021), at this present time, the commercial fishing process helps increase income sources. Various types of water bodies, such as ponds, rivers, and jhils, are used for increased commercial fishing in these districts. In this fishing system, shells, medical plants, sand/gravel, and leafy vegetable collections have the potential to develop economic conditions.

Groundwater is a vital source of freshwater that is highly used for drinking purposes in rural Bengal. At this present time, due to climate change and the deficit in precipitation rates, groundwater developments face major challenges. According to Halder, Roy, & Roy (2020), in arid and semi-arid regions, a lack of rainfall generates a drought situation and a shortage of freshwater. In the coastal regions of Bengal, there is a major problem with arsenic and fluoride contamination. Biswas, Pal & Saha (2023), stated that in coastal regions, people face issues regarding domestic uses like drinking and cooking. Apart from coastal belt rivers, groundwater aquifers also have arsenic and fluoride-related hydrochemical properties, which are responsible for building diseases.

3. Methodology

3.1 Study Design

This study is based on secondary research, utilizing data from government reports and research publications issued between 2018 and 2023. It primarily focuses on water resources and their use for agricultural and domestic purposes across West Bengal.

3.2 Research Approach

An inductive research logic was adopted, using secondary data to acquire insights. The research process was guided by a qualitative research approach, empowered by an in-depth evaluation of the observed data.

3.3 Data Collection and Analysis

All secondary data were collected from relevant government reports and research documents. These data were systematically analyzed to visualize the impacts and implications of water usage in rural irrigation practices across various regions of West Bengal. The qualitative nature of the research approaches helps to contextualize the major study outcomes from the secondary sources.

4. Findings and Discussion

This research report mainly aims to identify the water resources positions of West Bengal and its opportunities and challenges. With the help of literature reviews, theoretical discussions are established in this study. However, actual scenarios are recognized after evaluating all government-published reports for all of these districts. At this present time, depleting groundwater levels increase irrigation challenges and create challenges for traditional crop patterns. All types of cash crops like tea, maize, pulses, and water-intensive crop harvesting rates are declining due to water issues. Apart from agriculture, it is capable of increasing food production issues and drinking water conservation issues. There are six ACZs in West Bengal: Northern hill zone, Terai–Teesta alluvial, Gangetic alluvial, Old alluvial zone, undulating red laterite and coastal saline zone (Figure 1). Each zone has its characteristic features and soil-related problems, which have been discussed in detail in the following sections.

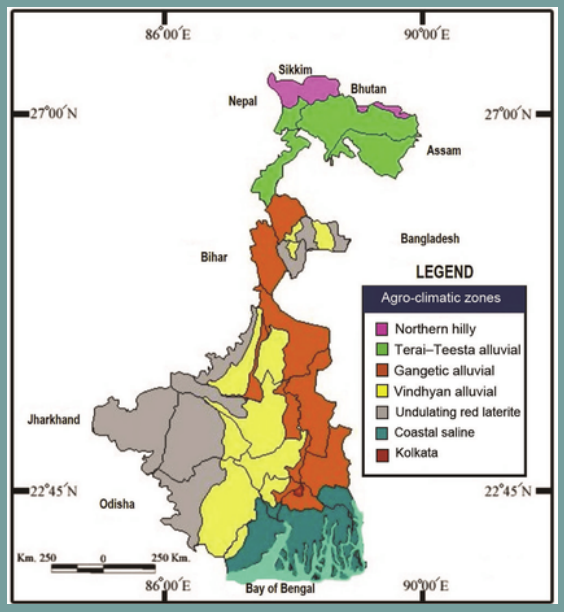

Figure 1: Six different agro-climatic zones of West Bengal

(Source: Mandal et al., 2022)

4.1 Northern Hill and Terai Regions

In the northern hill zone of West Bengal, the average rainfall rate is approximately 2500 to 3500 mm (Mandal et al., 2022). Due to the poor water-holding capacity of soils, crop performance is low. High rainfall is diverted into streamflow and contributes to the groundwater baseflow of northern regions. The northern hilly region's average groundwater level is 2-4 meters deep (Mikhail & de Bruin, 2019).

According to the CGWB report, in the monsoon season, 34592.39 ham rainfall and in the non-monsoon season, 6834.32 ham rainfall help for groundwater recharge in Darjeeling districts. There are 2132.70 hams of groundwater used for irrigation purposes, as well as 3335.13 hams of groundwater used for domestic purposes. With the help of a diesel pump, an electric pump, or a hand pump, the tea irrigation process in the North West Bengal region is helped. In Kalimpong Districts, 3207.91 hams of rainfall in the monsoon season and 515.35 hams of rainfall in the non-monsoon season help recharge the groundwater. In this district, due to a lack of cultivation, no groundwater is used, and only 62.24 hams of water are used for domestic purposes.

Within the Terai zone, Cooch Behar district has the highest groundwater capacity, and in all West Bengal comparisons, it holds the second-highest district. In the monsoon season, 145,710.25 ham of rainfall and 30,343 ham of rainfall help the district's overall groundwater recharge. High groundwater and surface availability help farmers farm multi-crops and cash crops inCooch Behar In these districts, 78,238.80 hams are used for the irrigation process, and 6803.36 hams are used for domestic purposes. In Cooch Behar districts, 65% of families belong below the poverty line, and cash crop farming and multi-cropping patterns help build their economic capacity. Jalpaiguri is considered a major district that has 73498.93 hams of total groundwater. From this groundwater level, 9650.50 ham is used for cultivating paddy crops and jute wheat, and 6112.41 ham is used for other domestic purposes.


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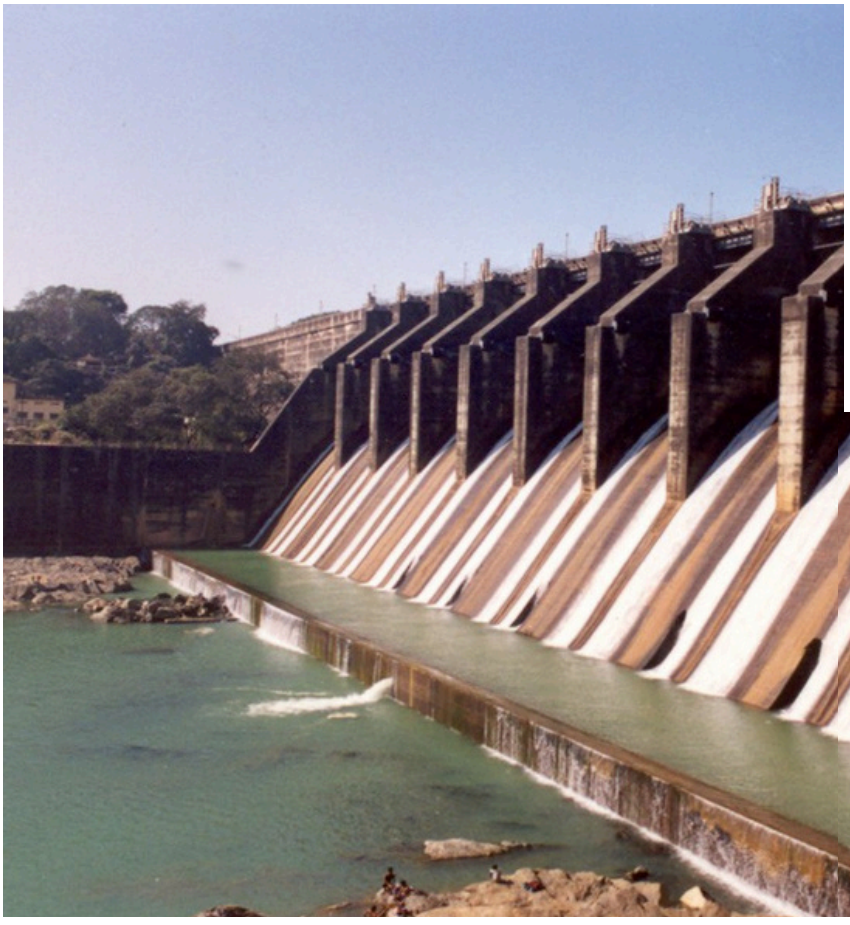
In this Terai region, four major rivers, such as Teesta, Torsha, Jaldhaka, and Mahananda, are highly associated with livelihood activity. Within the northern hill zone, Tista has the highest surface water capacity, which is 32,124 mm3, and it contributes 439 mm3 of groundwater in this zone. However, in the rainy season, Teesta, Jaldhaaka, and Torsha generate 14, 18, and 14 floods, as per more than 25 years of observations (Raha, Gupta & Biswas, 2023). Jaldhaka River floods destroy croplands, land fertility rates, and socioeconomic losses in Jalpaiguri, Cooch Behar, and Alipurduar districts. Due to the existence of flood plains, major environmental degradation and soil erosion have an impact on existing agriculture and seasonal cropping. In domestic activities or agricultural productions, floods create major issues in the northern hill and terai regions. Although WBDMD (2023), considers poor natural drainage systems to be responsible for the North Bengal floods. In the years 1978, 84, 91, and 2000, above 20,000 sq km of area were affected by floods in north Bengal.

4.2 Gangetic alluvial zone

The Gangetic alluvial or new alluvial zone comprises the east part of Murshidabad, Nadia, North 24 Pargana, South 24 Pargana, most of Hooghly, Kolkata, and Howrah. In this region, the average rainfall rate is 1300 mm to 1600 mm. Female or poor farmers have also faced issues collecting groundwater with any pump. In this alluvial zone, Murshidabad district has the highest observed groundwater amount, which is 185,382.39 ham. With the help of monsoon season rainfall, 78,721 hams of water helped develop the groundwater condition of Murshidabad.

More water canals, tanks, open wells, and bore wells are used for agricultural purposes. In the pre-monsoon period, the average depth of the groundwater is 5.22 m bgl. The approximate average rainfall of this district is 1179.64 mm (DLLROMSD, 2023).



With the help of surface water and groundwater, rice, wheat, and pulses are the most cultivated crops in this district. With the availability of water sources, local farmers have the opportunity for crop production. In most of the districts of this Gangetic alluvial zone, paddy, jute, and rabi crops are cultivated for surface water and ground movement.

Nadia has a total of 159,723.59 hams of groundwater, of which 116,768.00 hams are utilized in irrigation activity and 11,249.59 hams for domestic purposes. The water bodies help with rice, jute, and oilseeds. In Nadia district, jute cultivation and diversified productions make huge contributions to all local people. It is directly related to women's self-growth and helps to develop their economic conditions. In Nadia districts, Chakdaha, Hanshali, Haringhata, Karimpur I and II, and Krishnanagar have been identified as arsenic-affected zones. In Murshidabad districts, arsenic-affected blocks are Domkal, Jalangi, Lalgola, Beldanga I and II, Berhampur, and many others (ABD, 2018).

Bhagirathi-Hooghly rivers are considered floodplain areas because of issues with bank erosion in monsoon seasons (Islam, & Guchhait, 2017). Due to these erosion procedures, irrigation, and human habitation face issues in this alluvial zone. In the years 1993 and 1994, 60–80% of Murshidabad districts, as well as in the years 2000, 80–100% of the districts, were affected by floods. Urban regions such as Kolkata and some parts of Howrah have water-logging-related issues that are directly connected with domestic activity. In Kolkata, the annual rainfall rate is 1600mm, and regarding poor drainage systems, major waterlogging has occurred. Regular life vehicle movement faced issues for these water lodging systems in Kolkata and urban regions of the Howrah districts.

4.3 Old alluvial zone

High humidity and high temperatures are the basic climatic conditions in those districts, and kharif-season crops are the most suitable for harvesting in this region. Apart from paddy cultivation, jute, sugarcane, and pulse are considered the most important crops in this region. In this region, the Damodar River is considered a flood-prone river. On this river, 8,924 mm3 of surface water flows, and after implementing the flood protection systems, 364,000 ha area is capable of irrigation. With the help of river management and the Central Water Commission (CWC), the Damodar Valley Reservoir Regulation Committee (DVRRC) structured dam operations that concentrated on irrigation, overall drainage, and water supply. The old alluvial zone consists of the western part of Murshidabad, the eastern part of Burdwan, Malda, and South Dinajpur, some parts of Bankura, and the northern part of Hooghly.
East Burdwan district's overall crop production is directly related to the DVC water supply rate. Last year, a lack of rainfall created a major water shortage in east Bardhaman District's crop production. In the monsoon season, east Burdwan faces -24% rainfall, and DVC releases 70,000 cusecs of water instead of 180,000 cusecs, which impacts aman paddy cultivations all over East Bardhaman.
Apart from the Damodar and Kangsabati rivers, Mayurakhshi, Ajoy, and Darkeshwar are also important rivers in this old alluvial region. The annual rainfall of the region is approximately 1300mm to 1500 mm, and the most important domestic challenge is water availability in non-monsoon periods. In Burdwan districts, Katwa, Kalna, and Purbasthali are the most arsenic-contaminated blocks.

4.4 Laterite Zone

This zone consists of West Burdwan, Birbhum, Bankura, Jhargram, and Purulia districts, and the average rainfall of the laterite zone is 1100–1400 mm (IJCRT, 2023). Birbhum and Purulia districts have 180,881.86 ham and 67,784.32 ham of groundwater, respectively. In the context of groundwater, Jhargram districts have 97,074.46 hams of groundwater. Within all of these districts, Purulia uses only 2001.20 ham groundwater in its irrigation sectors. According to Bera & Das (2021), the water tank and the canal have major potential for developing the agricultural sector of Purulia districts. Apart from Baghmundi and Raghunathpur I and II, most of the blocks of Purulia have moderate groundwater availability.

Despite the presence of the Damodar, Kangsabati, Dwarakeswar, and Subarnarekha rivers, drought-prone zones create issues for crop production. 10–13.4% of lateritic arid and semi-arid zones are capable of cultivation, which is highly challenging for rural community people. In these districts, various villages such as Chayanpur, Mohoda, Gloamara, and Lalbazar have major drought issues, causing a decline in agriculture production and domestic consumption. Approximately 700 to 800 families are facing issues with not working tubewells in rural communities in Purulia districts. Jhargram districts are also facing the same water crisis issues in their rural communities. However, Purulia districts have major fruit diversity, with mango, grape, and pomegranate commonly found in these districts. Commercial fruit cultivation helps to develop the overall economic condition in this zone.

The sub-humid zone of Bankura districts has 1300 mm of annual rainfall, which impacts the total cropping intensity. The total groundwater level of the district is 158,835.50 ham, which is the second highest in this zone. 48,584.50 hams of water are used for irrigation purposes, and 8546.17 hams of groundwater are used for domestic purposes.

The North-West part of this district is considered a drought-prone zone, which creates water scarcity in different villages such as Saltora, Khatra, and Taldanga blocks. However, high rainfall and flooding also negatively impact major crop losses and house property damage in these districts. In Birbhum District, arsenic and fluoride contamination in groundwater causes major problems for maintaining domestic activity. From the water, Adenovirus Infections, Amebiaasis, and Cholera diseases are mostly common in those districts.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4.5 Coastal Regions

This zone consists of some parts of South 24 Pargana, East Midnapur, and numerous islands in the Sundarbans. During the monsoon season, 1500 mm to 1800 mm of heavy rainfall is common in this region, and major rivers' presence helps with chili, watermelon, sunflower, and groundnut cultivations in this district.

East Midnapur district's total groundwater is 71,090.40 ham, of which 17,103.20 ham are used for irrigation purposes and 4751.40 ham are used for domestic purposes. As per the rainfall graphs (2002–2019), its annual rainfall amount is 1671.79 mm. Apart from the three types of paddy, pulses, oilseeds, and potatoes are the major crops in these districts. The Rupnarayan and Kangsabati rivers are highly responsible for floods occurring in this zone during the monsoon season. Floods negatively impact rural community development in this zone. These floods cause socio-economic disruption in the local communities and huge environmental disruptions in those regions. Potashpur II, Ramnagar I, and Moyna blocks are considered flood-prone zones in these districts (Gayen, Villalta & Haque, 2022).

Besides the coastal fishing activity, the paddy cultivation process is considered a major crop production process in the Sundarban islands. Numerous places in the Minakha, Haroa, Sandeshkhali, and Hingalgang regions are the most cultivated zones. Most of the islands face issues with groundwater quality, which has impacts on drinking water. According to Biswas, Pal & Saha (2023), As, F- and NO3- concentrations have impacts on groundwater in different districts of East Medinipur and South 24 Parganas. As a domestic risk, a high probability of cancer cells developing through this concentration.

5. Conclusion

This study aims to assess the status of water resources in West Bengal and concludes that, instead of the high availability of surface and groundwater, drought and floods majorly impact agricultural and domestic activity. In the Northern Hill and Terai regions, high rainfall is responsible for flooding. According to the CGWB report, Cooch Bihar has a high amount of groundwater, and monsoon rainfall is the main recharge contributor. The Jaldhaka River greatly contributes to the Cooch Behar district's crop production. Along with the Jaldhaka, Teesta, and Torsha rivers, they are majorly responsible for flooding in northern regions. Land sloping and suitable soil characteristics are responsible for cash crop production like tea in this region. It creates opportunities for both the agricultural and domestic sectors.

In gangetic alluvial regions and old alluvial zones, the rainfall rate is almost similar. Some parts of the Murshidabad and Nadia districts have major paddy and jute productions, which help the local people become economically strong. In urban regions like some parts of Howrah and Kolkata, there are major water lodging problems, which have negative impacts on the traffic system. Burdwan District's crop production rates are directly linked to the DVC projects. Katwa, Kalna, and Purbasthali are the most arsenic-contaminated blocks in this district. Arsenic is the most important household issue in rural Bengal. In Nadia districts, Chakdaha, Hanshali, Haringhata, Karimpur I, II, and Krishnanagar have been identified as arsenic-affected zones. In Murshidabad districts, arsenic-affected blocks are Beldanga I and II, Berhampur, Domkal, Jalangi, Lalgola, and many others.

Instead of the high presence of water bodies, salinity is the most vital issue for drinking water in coastal regions. It is also not permitted for crop production in these districts. However, chili, watermelon, sunflower, and groundnut cultivations are processed on coastal soils. The laterite zone consists of West Burdwan, Birbhum, Bankura, Jhargram, and Purulia districts. Flood zones and drought zones are both equally present in this zone. Chayanpur, Mohoda, Gloamara, and Lalbazar villages are identified as major drought zones for high water levels. In these districts, Baghmundi and Raghunathpur I and II blocks have major groundwater stress. The same climatic results also exist in the Saltora, Khatra, and Taldanga blocks of the Bankura districts.

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