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# District Ganga Plan for Shahjahanpur

September 2023



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Martina Burkard

Support to Ganga Rejuvenation (SGR, GIZ India)

Deutsche Gesellschaft für  
Internationale Zusammenarbeit (GIZ) GmbH  
4th Floor, B-5/1, Safdarjung Enclave  
New Delhi-110029, India  
T +91 11 4949 5353  
F +91 11 4949 5391  
E [Martina.Burkard@giz.de](mailto:Martina.Burkard@giz.de)  
I [www.giz.de/india](http://www.giz.de/india)

## Contributions & Supervision

DGC Shahjahanpur – Umesh Pratap Singh (DM); S. B. Singh (CDO); Prakhar Gupta (DFO)  
Adelphi-CTRAN: Bart Hilhorst; Ronjon Heim; Rakesh Kumar; Anika Conrad; Kader Mridha; Nilanjan Saha  
GIZ India: Martina Burkard; Anjana Pant; Merajuddin Ahmad; Nikolai Smith  
NMCG: S. P. Vashishth (Executive Director Admin); Brijesh Sikka  
SMCG UP: Rajesh Kumar Pandey (Former Additional Project Director); Mithilesh Mishra; Sitaram  
Taigor; Sonalika Singh  
Gender consultant: P. Nagasayee Malathy

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## In consultation with

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# Abbreviations

|                |   |                    |  |
|----------------|---|--------------------|--|
| <b>AMRUT</b>   | Atal Mission for Rejuvenation and Urban Transformation    | <b>NGO</b>         | Non-Governmental Organisation                        |
| <b>ARS</b>     | Artificial Recharge Structures                            | <b>NIUA</b>        | National Institute of Urban Affairs                  |
| <b>CBO</b>     | Community Based Organisation                              | <b>NMCG</b>        | National Mission for Clean Ganga                     |
| <b>CETP</b>    | Central Effluent Treatment Plant                          | <b>NP</b>          | Nagar Panchayat                                      |
| <b>CGWB</b>    | Central Ground Water Board                                | <b>NPP</b>         | Nagar Palika Parishad                                |
| <b>CWC</b>     | Central Water Commission                                  | <b>NWP</b>         | National Water Policy                                |
| <b>DEP</b>     | District Environment Plan                                 | <b>NWM</b>         | National Water Mission                               |
| <b>DGC</b>     | District Ganga Committee                                  | <b>RBM</b>         | River Basin Management                               |
| <b>DGP</b>     | District Ganga Plan                                       | <b>RD &amp; GR</b> | River Development and Ganga Rejuvenation             |
| <b>DIP</b>     | District Irrigation Plan                                  | <b>SMCG</b>        | State Mission for Clean Ganga                        |
| <b>DoWR</b>    | Department of Water Resources                             | <b>SPMG</b>        | State Program Management Group                       |
| <b>ETP</b>     | Effluent Treatment Plant                                  | <b>STP</b>         | Sewage Treatment Plant                               |
| <b>FGD</b>     | Focus Group Discussion                                    | <b>SWA</b>         | State Wetlands Authority                             |
| <b>FSM</b>     | Fecal Sludge Management                                   | <b>SWaRA</b>       | State Water Resources Agency                         |
| <b>GIZ</b>     | Gesellschaft für Internationale Zusammenarbeit            | <b>SWaRDAC</b>     | State Water Resources Data Analysis Centre           |
| <b>GRBMP</b>   | Ganga River Basin Management Plan                         | <b>ToT</b>         | Training of Trainers                                 |
| <b>GW</b>      | Ground Water  | <b>UPPCB</b>       | Uttar Pradesh Pollution Control board                |
| <b>IEC</b>     | Information, Education and Communication Incl including   | <b>UPSOCA</b>      | Uttar Pradesh State Organic Certification Agency     |
| <b>IIT</b>     | Indian Institute of Technology                            | <b>ULB</b>         | Urban Local Body                                     |
| <b>IPNM</b>    | Integrated Plant Nutrient Management                      | <b>WASCA</b>       | Water Security and Climate Adaptation in Rural areas |
| <b>KWMI</b>    | Key Water Management Issues                               | <b>WWF</b>         | Worldwide Fund for Nature                            |
| <b>MC</b>      | Municipal Corporation                                     | <b>WWTP</b>        | Waste Water Treatment Plant                          |
| <b>MGNREGS</b> | Mahatma Gandhi National Rural Employment Guarantee Scheme |                    |  |
| <b>MoHUA</b>   | Ministry of Housing and Urban Affairs                     |                    |  |
| <b>MRF</b>     | Material Recovery Facilities                              |                    |  |

# Executive summary

The District Ganga Plan for Shahjahanpur (UP) has been developed in a joint effort with the members of the District Ganga Committee Shahjahanpur, NMCG, SMCG UP and GIZ experts. The scope of this plan is to provide an assessment of the current issues related to the rejuvenation and protection of the catchment area of the Ganga in this district and to come up with interventions, specific targets and an action plan for addressing these.

The elaborated actions have the objective of addressing the 6 identified key water management issues (KWMIs). These aim to reduce pollution from agriculture runoff, improve sanitation and reduce pollution from domestic sewage, improve liquid waste management and reduce untreated industrial effluents entering the rivers, improve solid waste management, increase water storage capacities of natural water sources and restore wetlands, protect floodplains and address encroachment. Additional objectives aim to develop capacities for effective river protection, rejuvenation and to improve the livelihood situation in line with the Arth Ganga programme.

Hotspots have been identified to address the main issues and gaps within the 6 KWMIs. Shahjahanpur has been identified as a major city for improvement of domestic sewage and septage; water quality monitoring; and source segregation of waste. River encroachment is to be addressed at Khannaut and Garra rivers. In order to implement the DGP actions, a dedicated supporting cell is envisaged that includes district authorities trained on river rejuvenation, the RBM cycle, and operation, maintenance and monitoring of Sewage Treatment Plants (STPs) and Central Effluent Treatment Plants (CETPs).

A planning cycle of 5 years is foreseen, which started in 2022 with the preparation of the DGP. The progress is monitored and evaluated during the implementation which then leads to the selection of KWMIs for the next 5-year planning cycle and the elaboration of new interventions, specific targets and concrete action plan. The members of the DGC are committed to implementing the action plan of this DGP in the first planning cycle with the goal of developing a healthy river basin which provides a basis for healthy ecosystems, a prospering society and sustainable economy in the district.



# A Introduction

## Section

### 1 Context

#### 1.1 GRBMP and its vision for Ganga and tributaries rejuvenation

The Ganga River Basin Management Plan (GRBMP) has the vision to restore the “wholesomeness” of rivers in the Ganga basin. Its main missions are related to Aviral and Nirmal Dhara (uninterrupted and unpolluted flows), ecological health and basin governance lay the framework for the activities for each of the Ganga tributaries when looking into the rejuvenation, protection and management of the rivers. Important activities, to contribute to the overall vision on the basin level, are to be implemented at a local scale in the districts. While the vision for the District Ganga Plan (DGP) would focus on river rejuvenation at the district level, goals, objectives and outcomes for each river may vary, though in totality contribute to the single vision.

#### 1.2 Mandate for District Ganga Plan

As per the Authority Notification of 2016 each district in the Ganga basin is to prepare a periodic DGP. The plans are concerned with the reach of river Ganga, its tributaries, and associated riverine zone within the specific district. The plan shall include the activities to be undertaken by the District Ganga Committee (DGC) for protection, control, and abatement of environmental pollution in river Ganga and its tributaries, and their riverbed area abutting the specified district.

#### 1.3 Past and ongoing work around similar exercises and its linkages with District Ganga Plans

Efforts to clean the Ganga date back over 30 years. In 2014, the Government of India launched the ambitious ‘Namami Gange Programme’ as an integrated conservation mission to achieve the goal of effective pollution control, conservation and rejuvenation of the Ganga. The National Mission for Clean Ganga (NMCG) was established as the nodal agency for the implementation of this programme. Initially, the focus was on cleaning the mainstem of the Ganga, but since many tributaries are also heavily polluted, the approach has now been expanded to the entire Ganga basin.

Under this flagship, several programmes have already been implemented and plans and guidelines have been developed. When developing DGPs, synergies with these programmes should be sought and used to avoid duplication and needless effort.

The DGPs need to align with previously prepared Ganga sub-basin (Ramganga basin) management plans as well as the overall GRBMP, developed by NMCG through a consortium of seven IITs. While all the aspects of the GRBMP, may or may not have direct bearing on the District Ganga Planning exercise; the basin principles of Aviral Dhara (uninterrupted flows) and Nirmal Dhara (unpolluted flows) must remain the central theme of the DGP.

A lot of work has been done in the Ganga basin, and this chapter cannot give a comprehensive overview. Here, only a few selected activities are mentioned which are directly related to the development of this DGP.

### **Action plans for the rejuvenation of tributaries**

The Namami Gange Programme is an integrated conservation mission by the Union Government of India, with a budget of INR 20,000 crores, that aims to combat pollution, support conservation, and rejuvenation of the National River Ganga. Various achievements under the Namami Gange Programme were creating additional sewage treatment capacity, river front development, river surface cleaning, biodiversity conservation, afforestation, public awareness through events, workshops, seminars, conferences and numerous IEC activities for public awareness and community mobilisation, industrial effluent monitoring, creation of Ganga Grams etc.

In 2001, the State Water Resources Agency (SWaRA) was created in Uttar Pradesh for better management, planning and sectoral allocation of water resources to various agencies. A data analytics centre named State Water Resources Data Analysis Centre (SWaRDAC) was set up by the Uttar Pradesh government to provide water related data for all river basins in the state to SWaRA to create all other central/ state water plans. A total of eight river basin assessments were conducted and basin plans prepared viz. Gandak Basin Plan, Ghagra Basin Plan, Gomti Basin Plan, Ganga Basin Plan, Ramganga Basin Plan, Rapti Basin Plan, Sone Basin Plan and Yamuna Basin Plan.

The Worldwide Fund for Nature India (WWF India) has a programme named Ganga / Ramganga Mitra Programme to conserve Ganga and its tributary - the Ramganga. The name 'Ramganga Mitras' translates to Friends of Ramganga and is a strong volunteer group of more than 4,000 people. This platform has been created for discussions, debates and to encourage design initiatives for mitigating ongoing threats to rivers. The initiatives have covered various ways to reduce pollution load to rivers, such as, promoting the use of organic fertilizers, reducing the dependency on various harmful agro-chemicals, promoting organic farming, and highlighting the best management practices on Sustainable Agriculture.

### **Urban River Management Framework**

NMCG and the National Institute of Urban Affairs (NIUA) have drafted the Urban River Management Plan (URMP) framework for the development of URMPs in all Ganga towns that share the "Vision Ganga" principles published by NMCG in 2017. The main goal of URMPs will be to help cities along the Ganga river improve the condition of the river in their stretches. The URMP is a planning framework created to assist in organizing interventions systematically and comprehensively in order to revitalize and sustainably maintain the rivers in their territories. It is ingrained in the fundamental notion that improving the liveability of the towns requires preserving healthy rivers in the Ganga towns.

The plan for each city shall include the following three components in accordance with the URMP's design philosophy -

1. Environmental (corresponding to the environmentally responsible trait of the philosophy)
2. Financial (corresponding to the economically beneficial trait of the philosophy)
3. Social (corresponding to the socially inclusive trait of the philosophy)

### **District Environmental Plans**

The District Environment Plan (DEP) focuses on overall environmental protection and management, addressing the various pollution sources at the district level. Some of the district action points indicated in the DEP are to inventory the quality of waterbodies in the district, to protect rivers/lakes, to inventory sources of water pollution, and to rejuvenate groundwater. This DGP has been developed in alignment with these plans and builds on information collected (in chapter 7) and actions suggested (in chapter 8) from these plans. The selected information has been sorted according to the key issues identified for this DGP.

### **Flood and Disaster Management Plans**

In 2011, the Uttar Pradesh State Disaster Management Institute (UPSDMI) was founded. This institute has trained more than 6,000 officials from various departments, as well as other stakeholders, on disaster management through the organisation of 89 trainings, workshops, seminars, and conferences. For several probationary/in-service training programmes in the state, such as PCS Foundation, Medical Officer Foundation, Teacher's Training, etc., UPSDMI assisted in the development of Disaster Management Modules. Numerous training guides, manuals, and IEC materials have been created in Hindi and distributed. All districts have established District Disaster Management Authorities. The state education board's curriculum has been updated to include a disaster management curriculum.

### **WASCA districts plans**

The Water Security and Climate Adaptation (WASCA) project is an Indo-German initiative to "improve water resource management through an integrated approach at national, state, and local levels with regard to climate adaptation in rural regions. WASCA project, which was initially designed for three years period starting from April 2019 to March 2022, has been extended to November 2024 (WASCA 2). "The project is commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ) in partnership with the Ministry of Rural Development (MoRD) and Ministry of Jal Shakti (MoJS) in India and is being implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. The project increases the knowledge and capability of stakeholders at all levels, including public and private organisations, to plan and carry out actions related to the management of water resources.

Additionally, the initiative seeks to improve the financing of climate-adapted water security by encouraging cooperation between various government agencies and other stakeholders. To do this, comprehensive pilot projects at the sub-basin/catchment level will be conducted in a few districts. Effective strategies will be extended to the state and federal levels. Additionally, considering the role the private sector plays in the water sector, closer collaboration is anticipated to develop sustainable practices for local water security and to use public-private finance.

## **Development of Ramganga River Basin Management Plan**

To promote the application of the River Basin Management (RBM) Cycle in India and to familiarize Indian authorities with the approach, a modular training concept on the RBM Cycle has been developed and pilot trainings for around 100 national and state level participants have been implemented in 2020. Building upon the above achievements, GIZ is working towards adopting the RBM Cycle approach to develop a RBM Plan for the Ramganga river basin in collaboration with NMCG.

The following five KWMIs have been identified and agreed upon through series of stakeholders' consultations in Ramganga basin:

1. Water quality deterioration at point source
2. Water quality deterioration due to non-point sources including agriculture activity
3. Alteration in river hydrology and water quantity
4. Alteration in groundwater regime impacting on sub-surface flow
5. Flood risk including encroachment and sand mining

## **Ramganga Plan by WWF India**

WWF India has drafted Ramganga RBM plan, consistent with the Ganga RBM plan 2015, for the development, management and conservation of the Ramganga river basin for the next 20 years. The Ramganga RBM plan is built upon two traditional concepts i.e. Aviral Dhara and Nirmal Dhara. This plan mainly has four goals –

- 1. River and basin ecosystem health:** physical condition of the river ecosystem itself;
- 2. Social, economic, and cultural benefits:** the extent to which the basin provides benefits to society;
- 3. Basin governance and stakeholder practices:** the way the basin is being managed and the activities of stakeholders with the basins and
- 4. Disaster and risk management:** these goals and objectives relate to reducing the risk, frequency, and severity of disasters (notably floods and droughts).

## 2 Vision and scope

The vision for developing the district ganga plan for Shahjahanpur is to address the primary issues with respect to the protection, control, and abatement of environmental pollution in the Ramganga river and its tributaries and prioritise the key water management issues relevant to the district and identify the probable gaps. It also aspires to list the ongoing programmes and schemes addressing the identified issues. All these concerns are to be dealt with during the first RBM cycle (2020-2025) in the district with gender inclusive approach.

Additionally, Arth Ganga is also a key aspect where the NMCG is engaged in, aligning some of the tasks under Arth Ganga with Ganga rejuvenation. Thus, the DGP considers various elements of Arth Ganga. In addition to that, there may be other proposed interventions in the states to rejuvenate several smaller streams at district or inter-district level, which can be dovetailed into DGP.

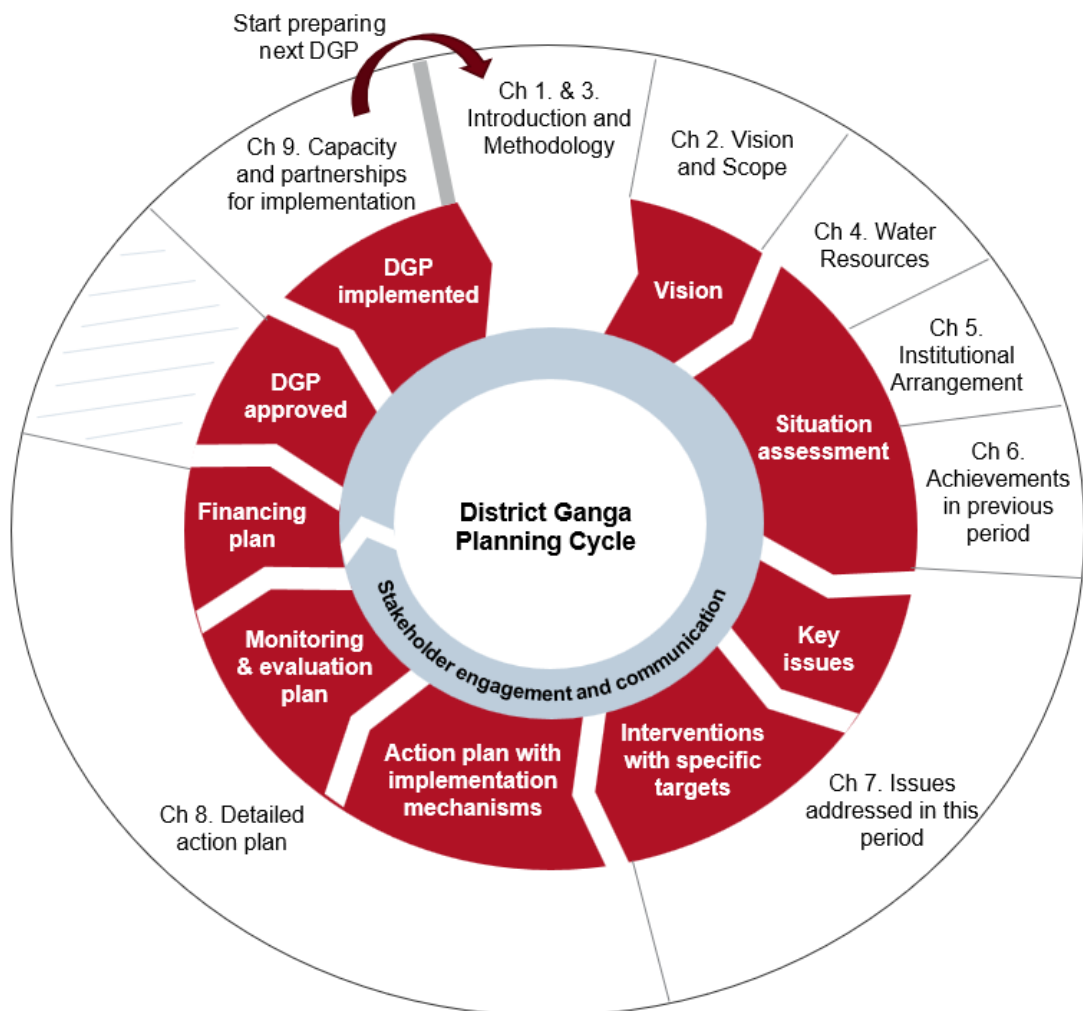


Figure 1: Step-wise approach for preparing the DGP

### **3 General approach and methodology**

The RBM cycle is a spiral process, where each cycle of the spiral comprises of several steps. Ganga rejuvenation is a collective and continuing responsibility. Developing the District Ganga Plan (DGP), therefore is understood as a spiral process, in which plans are made and implemented, new information is reviewed, feedback is received, priorities are modified and refined, and plans are adapted to changing circumstances. The RBM cycle approach is adopted for this DGP preparation which will be repeated after five to six years. It is expected that the next cycle of the spiral will be better managed than the previous one, after evaluation and lessons have been learned. Figure 1 shows the development process of the different chapters of the DGP along the District Ganga Planning Cycle.

#### **District Ganga Plan Framework**

A Handbook on the process to be adopted for the preparation of DGP, content and framework of DGP was drafted in consultation with the NMCG and other central and state level nodal agencies. Lessons learned, experience gathered, and challenges faced in drafting pilot DGPs are also addressed in the handbook document. Specially tailored approach and methodology given in the practical handbook was adopted for the preparation of this DGP.

1. Water quality deterioration at point source
2. Water quality deterioration due to non-point sources including agriculture activity
3. Alteration in river hydrology and water quantity
4. Alteration in groundwater regime impacting on sub-surface flow
5. Flood risk including encroachment and sand mining

- Step
1. Develop a vision
  2. Prepare a baseline report and description of the water resources in the district
  3. Map the institutional arrangements and relevant stakeholders
  4. Implement a stock tacking exercise
  5. Identify the key issues (4-6) that will be addressed in this management cycle
  6. For each selected key issue, prepare an analysis and define the specific targets
  7. For each specific target, prepare an action plan including budget estimations
  8. Develop a monitoring and evaluation plan
  9. Specify a funding source for each proposed intervention
  10. Finalise the draft District Ganga Plan
  11. Submit the draft District Ganga Plan for review from the relevant authorities and stakeholders; adapt DGP as needed
  12. Submit the District Ganga Plan for approval by the SMCG
  13. Implement DGP

The detailed methodology for each of the above steps is described in the DGP Handbook.

The DGPs are not developed in isolation but are integrated in several plans at different levels, which sometimes overlap. For instance, the DGPs need to align to national and state policies and adhere to the objectives and directions set in higher-level plans such as a (sub) River Basin Management Plan. The DGPs should also consider the (sometimes complex) transboundary dimension.

The information used for the DGP is compiled from existing secondary sources (references are given) and is not assessed specifically for the DGP.

**Gender Inclusive Approach:** The DGP also adopts a gender-sensitive and a gender-inclusive approach. Women form about 50 percent of the population and therefore, it is important that the plan ensures their needs, perspectives, ideas and involvement. Tools like surveys, focus group discussions (FGDs), consultations and dialogues should be made use of to ensure an inclusive process where the voices of women (and other vulnerable groups) are heard.



# **B** Section **Biophysical And Non-Biophysical Characteristics**

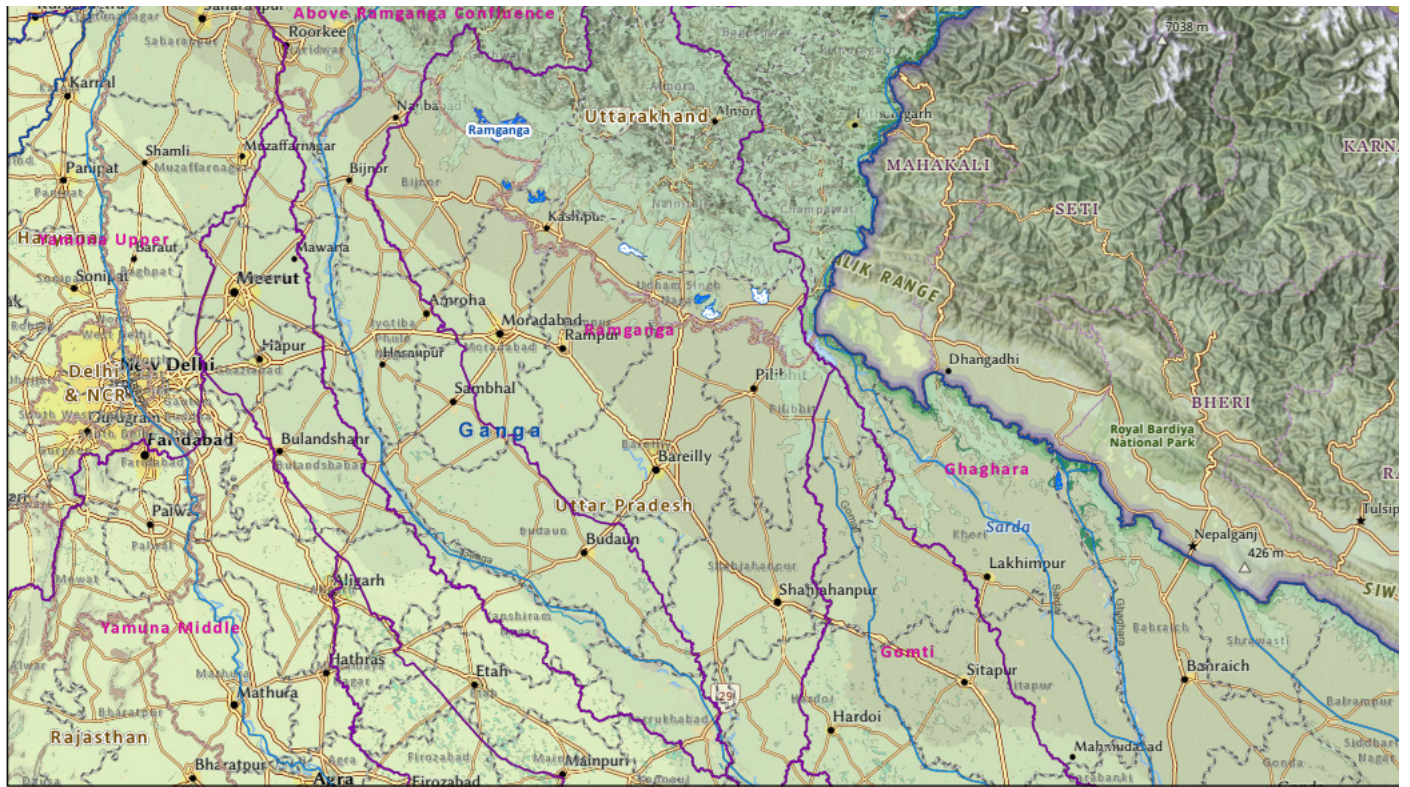
## **4 The water resources of the district**

### **4.1 Basin overview**

The river Ramganga originates as two streams, Western and Eastern Ramganga, that flow down into the plains independently. Western Ramganga originates near Gairsain (Uttarakhand) of Doodha Toli ranges in the lower Himalayas. It rises at an altitude of about 3,100 m in the lower Himalayas near the Lohba village in the Garhwal district of Uttaranchal. The river flows down through Patli Dun of lower Shivalik and then flows through Corbett National Park, Moradabad, Rampur, Bareilly, Badaun and Shahjahanpur and joins Ganga downstream of Farrukhabad. The total length of the river is 596 km with a catchment area of 32,493 km<sup>2</sup>. Khoh, Gagan, Aril, Kosi and Deoha (Garra) are its major tributaries and the Kalagarh dam (embankment dam) is situated in this basin. Eastern Ramganga merges with river Sarju at Rameshwar ghat and finally confluences with river Kali and joins Ganga at Farrukhabad adjacent and opposite Ramganga.

The complete Ramganga basin lies between the Eastern longitudes of 78°16'23" and 80°07'35" and the Northern latitudes of 27°07'03" and 30°06'37" in Uttarakhand and Uttar Pradesh. The portion of Ramganga basin falling in Uttar Pradesh lies between the Eastern longitudes of 78°16'23" and 80°07'35" and the Northern latitudes of 27°07'3" and 29°45'56", covering an area of 20,416.66 km<sup>2</sup> in Uttar Pradesh. The Ramganga basin is bounded by the Ganga basin to the West and Southwest, the Gomti basin to the Northeast and Southeast, while the Ghaghra basin slightly touches it in the upper Northeast. There are six sub-basins within the Ramganga basin namely Upper Ramganga, Kosi, Bhakra, Lower Ramganga, Aril and Garra, draining areas of 4,317.36 km<sup>2</sup> (21.15%), 1,023.51 (5.01%), 2,081.27 km<sup>2</sup> (10.19%), 5,085.06 km<sup>2</sup> (24.91%), 2,240.11 km<sup>2</sup> (10.97%) and 5,669.34 km<sup>2</sup> (27.77%), respectively, within Uttar Pradesh. The basin covers 12 districts (3 fully and 9 partially) and 82 blocks (49 fully and 33 partially) of Uttar Pradesh. The Ramganga river, which drains through the highlands of Chamouli, Uttarakhand and debouches into the plains of Uttar Pradesh, is one of the major tributaries of the Ganga river, joining from the left bank. Rivers Kho, Dhela, Kosi, West and East Baigul, Garra and Ramganga along with other tributaries originating in Uttarakhand state used to bring high floods into Bijnor, J.P. Nagar, Moradabad, Rampur, Bareilly, Shahjahanpur and Hardoi district.





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- |                           |                           |  |
|---------------------------|---------------------------|--|
| Basin Boundary            | Reservoir >2000 - 5000 Ha | Land Use/ Land Cover   |
| Sub Basin Boundary        | Reservoir > 5000 Ha       | Barren rocky   |
| Major Rivers              | Waterbodies               | Deciduous; Evergreen / Semi evergreen; Forest Plantation; Scrub Forest |
| Reservoir > 500 - 2000 Ha |                           | Mining   |

1:2,311,162  
 0 15 30 60 mi  
 0 25 50 100 km  
 Esri, © OpenStreetMap contributors, HERE, Garmin, FAO, NOAA, USGS  
 Sources: Esri, USGS, Esri, USGS, Goutam Bhati

Geoview  
 National Hydrology Project

Figure 2: Overview and surrounding of Ramganga basin (Source: <https://indiawris.gov.in/wris/#/Geoviewer> )

## 4.2 District overview

Shahjahanpur district is situated southeast of Bareilly Circle and was established in 1813. Prior to its formation it was a part of district Bareilly and is now located in the Southeast of Rohilkhand Division. This district is the last district of the Western Region and is situated between Garra, Khannaut, Ramganga and Gomti rivers. Geographically, it is situated at 27.35 N latitude and 79.37 E longitude. The neighbouring districts of Shahjahanpur are Lakhimpur Khiri, Hardoi, Farrukhabad, Bareilly, Budaun, and Pilibhit. The geographical area of Shahjahanpur is 4575 km<sup>2</sup>.



Figure 3: Map of Ramganga river basin showing Shahjahanpur

The district is administratively divided into 4 tehsils and 15 development blocks, with 124 Nyay Panchayats and 922 Gram Panchayats. The urban sector has 3 Nagar Palika Parishads (Shahjahanpur, Tilhar and Jalalabad) and 7 town areas with Nagar Panchayats (Katra, Powayan, Kanth, Khutar, Allahganj, Khudaganj and Railway Settlement Roza). The total number of villages is 2331 out of which 2080 are inhabited and 251, uninhabited.

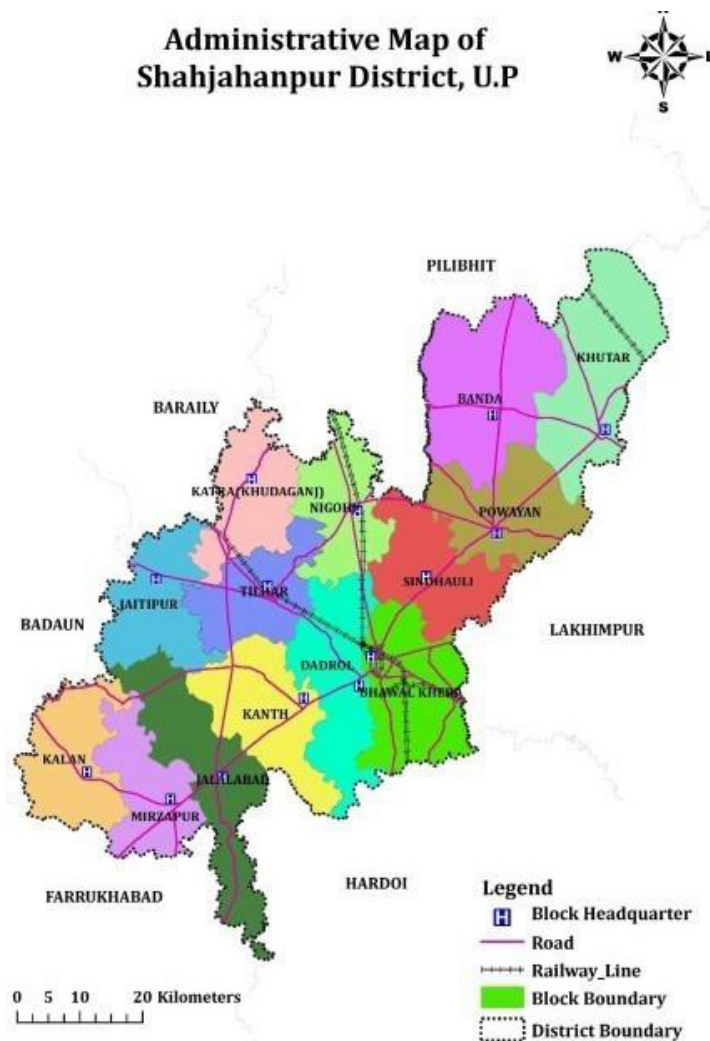


Figure 4: Administrative map of Shahjahanpur district, UP<sup>1</sup>

The district is administratively divided into 4 tehsils and 15 development blocks, with 124 Nyay Panchayats and 922 Gram Panchayats. The urban sector has 3 Nagar Palika Parishads (Shahjahanpur, Tilhar and Jalalabad) and 7 town areas with Nagar Panchayats (Katra, Powayan, Kanth, Khutar, Allahganj, Khudaganj and Railway Settlement Roza). The total number of villages is 2331 out of which 2080 are inhabited and 251, uninhabited.

### 4.3 Topography and drainage network

The major drainage system of Shahjahanpur is Ramganga and Gomti with their tributaries – Garra, Khannaut, Bahgul, Jokhaland. The district Shahjahanpur forms part of Central Ganga Plains and has a flat topography with the overall slope towards south and southeast. The district’s northern part merges imperceptibly into Terai marked by thick forests and marshy lands<sup>2</sup>.

<sup>1</sup> (Department of Water Resources, 2020-21) Aquifer Mapping and Management of Ground Water Resources, Shahjahanpur District, UP

<sup>2</sup> Shahjahanpur.pdf (cgwb.gov.in)



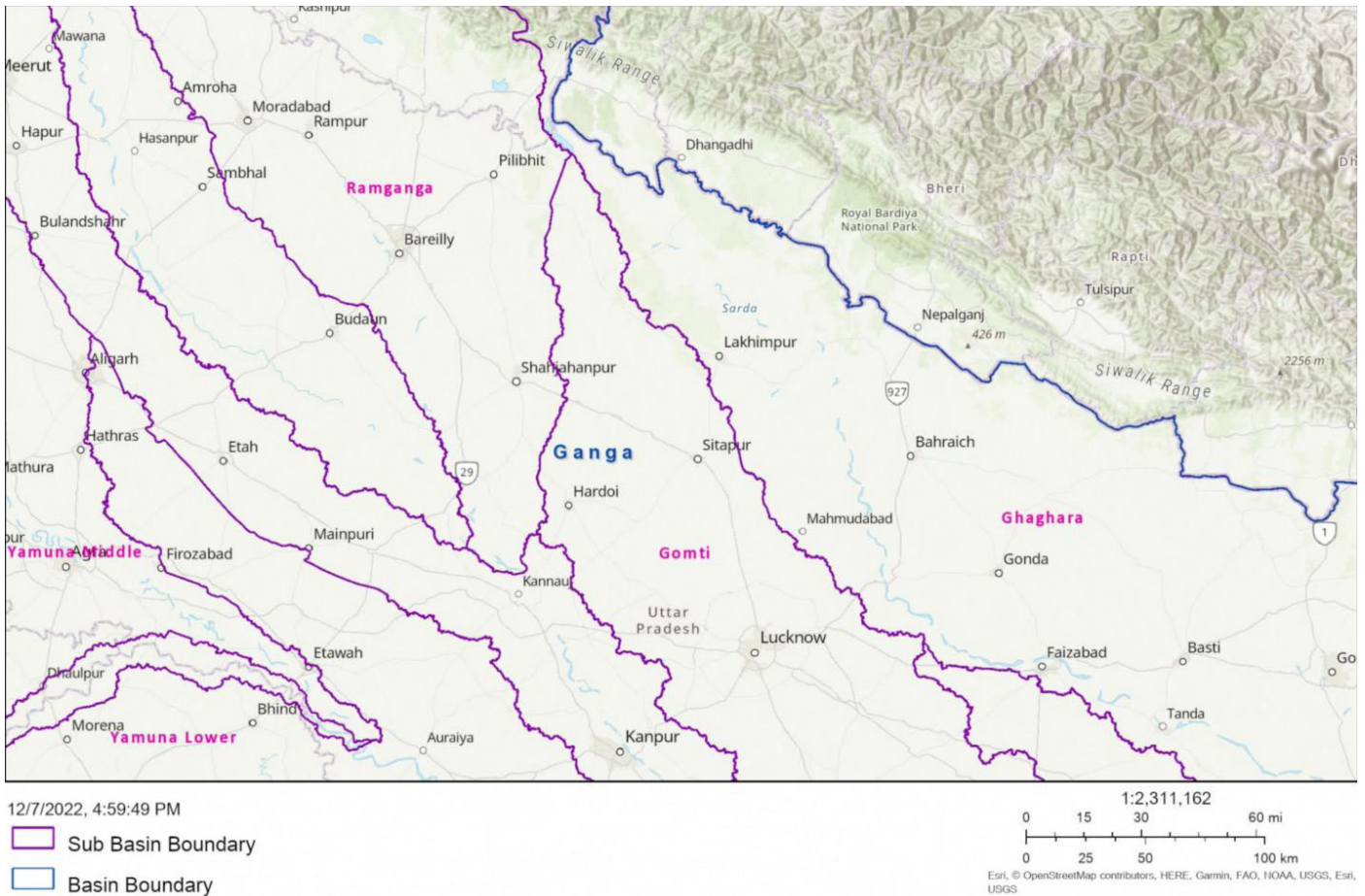


Figure 5: Topography map of basin and river delineation (Source: <https://indiawris.gov.in/wris/#/RiverMonitoring>)

The Ramganga river, which flows NNW-SSE in the western part of the district, forms the principal drainage. The southwestern periphery is drained by the river Ganga. Other important rivers are Garra, Khannaut, Bahgul, Jokhal and Kathana. River Garra divides the district into almost equal halves.

In the district, there are about 118<sup>3</sup> -120 sewer drains (cumulative length of approx. 928.96 km.)<sup>4</sup> which are discharging to a nearby river. Out of total 9 Urban Local Bodies (ULBs) (1-MC, 2-M and 6- NP) present in the district, MC- Shahjahanpur is a major source of river pollution due to the discharge of untreated sewage. A total of 17 major sewer drains originating from MC-Shahjahanpur are identified as major sources of river pollution.

<sup>3</sup> Source: DEP- Shahjahanpur

<sup>4</sup> Source: Drainage | Official website of Irrigation and Water Resources Department, Ministry of Jal Shakti, Government of Uttar Pradesh, India. ([idup.gov.in](http://idup.gov.in))

Table 1: Major drain-wise discharge capacity

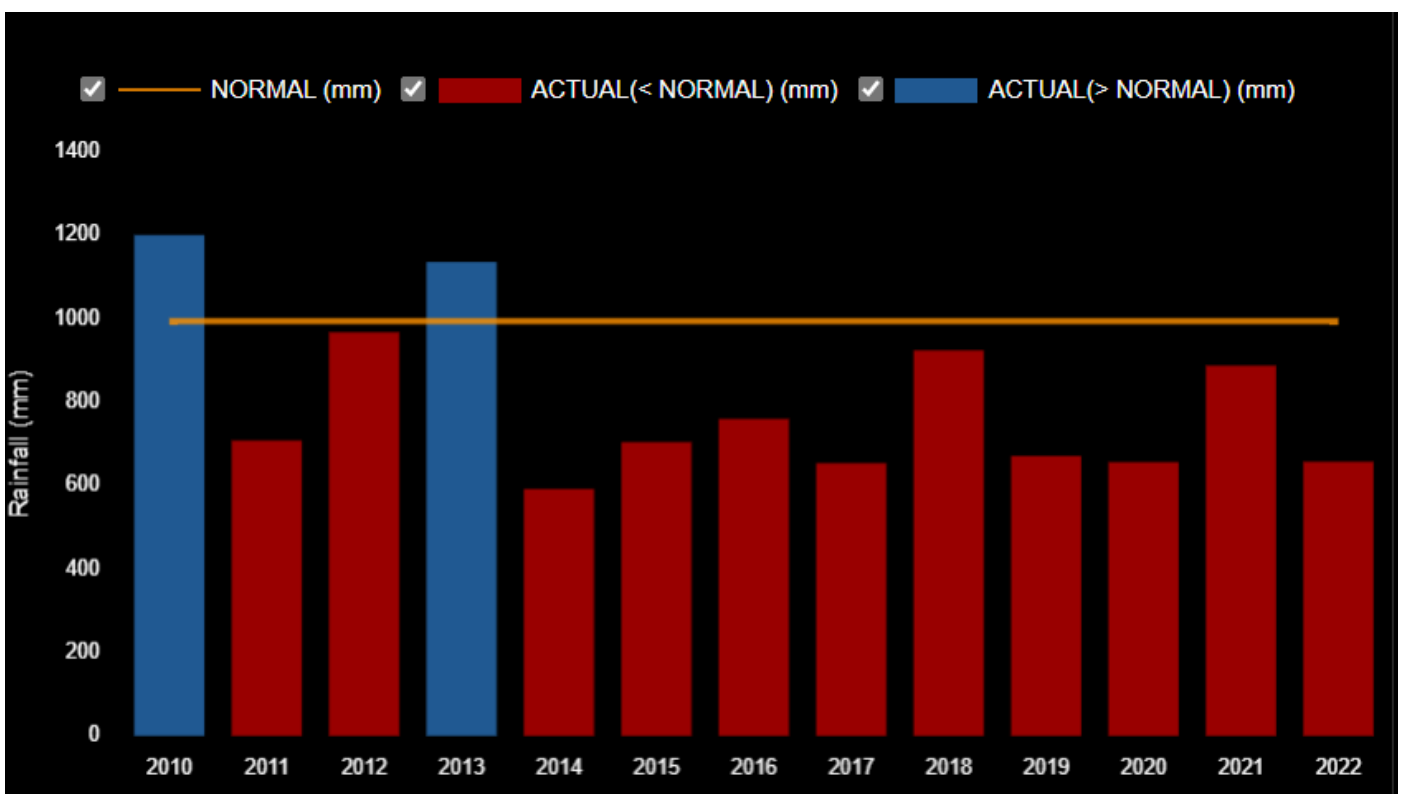
| S. No. | Drain Location                   | Drain Width (in m) | Drain Total Depth (in m) | Estimated Drain Discharge (in mld) | Drain Total Depth (in m) |
|--------|----------------------------------|--------------------|--------------------------|------------------------------------|--------------------------|
| 1      | Maghaitola                       | 4.5                | 2                        | 2.4                                | Khannaut                 |
| 2      | Roshanganj (D/S at Hanumat Dham) | 4.5                | 3                        | 3.5                                | Khannaut                 |
| 3      | Husainpura at Hanumat Dham       | 0.6                | 0.6                      | 0.5                                | Khannaut                 |
| 4      | Hanumat Dham                     | 3                  | 1.2                      | 1                                  | Khannaut                 |
| 5      | Banka Ghat (Left)                | 3                  | 3                        | 2                                  | Khannaut                 |
| 6      | Banka Ghat (Right)               | 1                  | 1.5                      | 0.5                                | Khannaut                 |
| 7      | Lodhipur Pul                     | 7                  | 1.8                      | 3.9                                | Khannaut                 |
| 8      | Mahmuriya/ Jalalnagar            | 5                  | 4                        | 4                                  | Garra                    |
| 9      | Chhota Kakra                     | 3                  | 3                        | 4                                  | Garra                    |
| 10     | Yunush Khel                      | 4                  | 2.5                      | 5.6                                | Garra                    |
| 11     | Azeez Ganj                       | 2                  | 4                        | 1.3                                | Garra                    |
| 12     | Roza/Ahmadpur Reti               | 3                  | 2                        | 1.3                                | Khannaut                 |
| 13     | Fattepur Rati                    | 1.5                | 2                        | 0.4                                | Khannaut                 |
| 14     | Khwaja Firoz                     | 1.4                | 1.5                      | 0.7                                | Khannaut                 |
| 15     | Dalel Ganj                       | 2                  | 1.55                     | 1.3                                | Khannaut                 |
| 16     | Saray Kaiyan Police Chowki       | 3                  | 3.5                      | 2.1                                | Khannaut                 |
| 17     | Rambag Mishripur                 | 2.6                | 1.5                      | 0.5                                | Khannaut                 |
| Total  |                                  |                    |                          | 35                                 |                          |

## 4.4 Climate

Over a year, Shahjahanpur district has both dry and wet climate with average temperature ranging between 3°C to 41°C. Shahjahanpur has 3 major distinct seasons – summer, monsoon and mild autumn. The typical summer season falls between March to May with daily maximum temperatures ranging from 36°C to 44°C. The rainy season falls between June to September and July being the wettest month of the year. Winter lasts from November to February and temperatures range from 3°C to 22°C (Department of Water Resources, 2020-21).

### 4.4.1 Rainfall

The amount of precipitation varies in the district of Shahjahanpur as shown in the figures below. The differences in precipitation occur between years, e.g. with a variation between 592 mm/year average rainfall in 2011 and 1200 mm/year in 2010 (a). During a typical year, the rainfall pattern is distinctly determined by the monsoon, which brings the majority of precipitation (b). During the last 6 years, the distribution of monthly precipitation has varied as shown in Table 2. The geographically distribution of rainfall within the district also varies and increases from west to east (c).



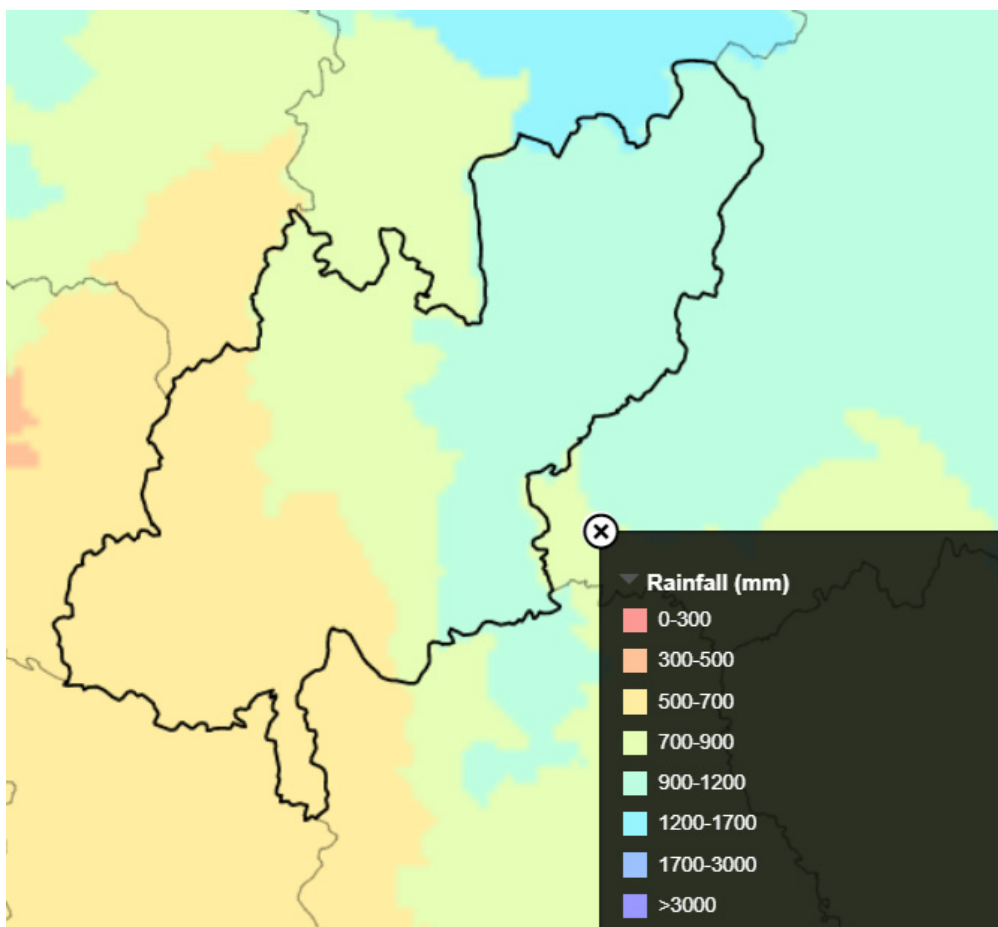
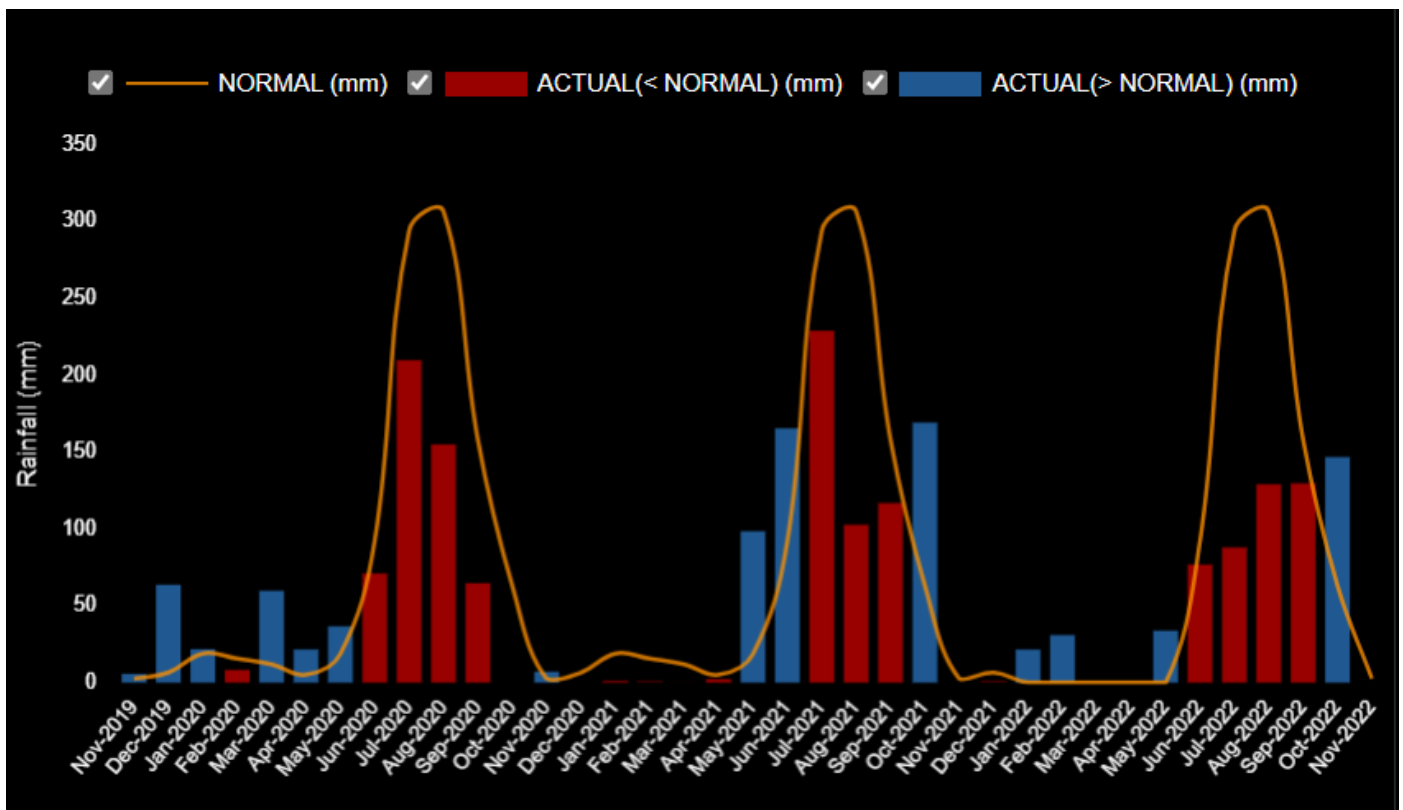


Figure 6 Rainfall pattern of District Shahjahanpur, a) annual average from 2010 until 2021, b) monthly distribution over last 3 years and c) spatial distribution of annual average in the district

Table 2: Rainfall data of Shahjahanpur for 6 years

| Month        | Normal (mm) | Actual rainfall (mm) |               |               |               |               |              |
|--------------|-------------|----------------------|---------------|---------------|---------------|---------------|--------------|
|              |             | 2017                 | 2018          | 2019          | 2020          | 2021          | 2022         |
| January      | 19          | 29.86                | 1.19          | 3.37          | 21.81         | 1.1           | 21.54        |
| February     | 15.7        | 0.32                 | 11.35         | 24.48         | 8.27          | 0.8           | 30.98        |
| March        | 12          | 9.06                 | 0.58          | 9.17          | 59.81         | 0.15          | 0            |
| April        | 5.1         | 0.08                 | 5.99          | 3.27          | 21.59         | 2.31          | 0            |
| May          | 18.6        | 20.82                | 5.68          | 1.04          | 36.64         | 98.55         | 33.86        |
| June         | 92.3        | 40.53                | 47.38         | 53.51         | 71.07         | 165.59        | 76.87        |
| July         | 294.2       | 227.81               | 339.02        | 329.61        | 209.94        | 229.1         | 87.99        |
| August       | 306.9       | 186.52               | 408.02        | 97.79         | 155.08        | 102.81        | 129.16       |
| September    | 158.1       | 138.48               | 101.72        | 77.5          | 64.72         | 116.9         | 129.76       |
| October      | 63          | 0.02                 | 1.62          | 1.76          | 0             | 169.33        | 146.87       |
| November     | 2.6         | 0                    | 1.41          | 5.71          | 7.12          | 0             | 0            |
| December     | 6.5         | 0.08                 | 0             | 63.75         | 0             | 0.88          | 0.04         |
| <b>Total</b> | <b>994</b>  | <b>653.58</b>        | <b>923.96</b> | <b>670.96</b> | <b>656.05</b> | <b>887.52</b> | <b>380.4</b> |



## 4.4.2 Potential evapotranspiration

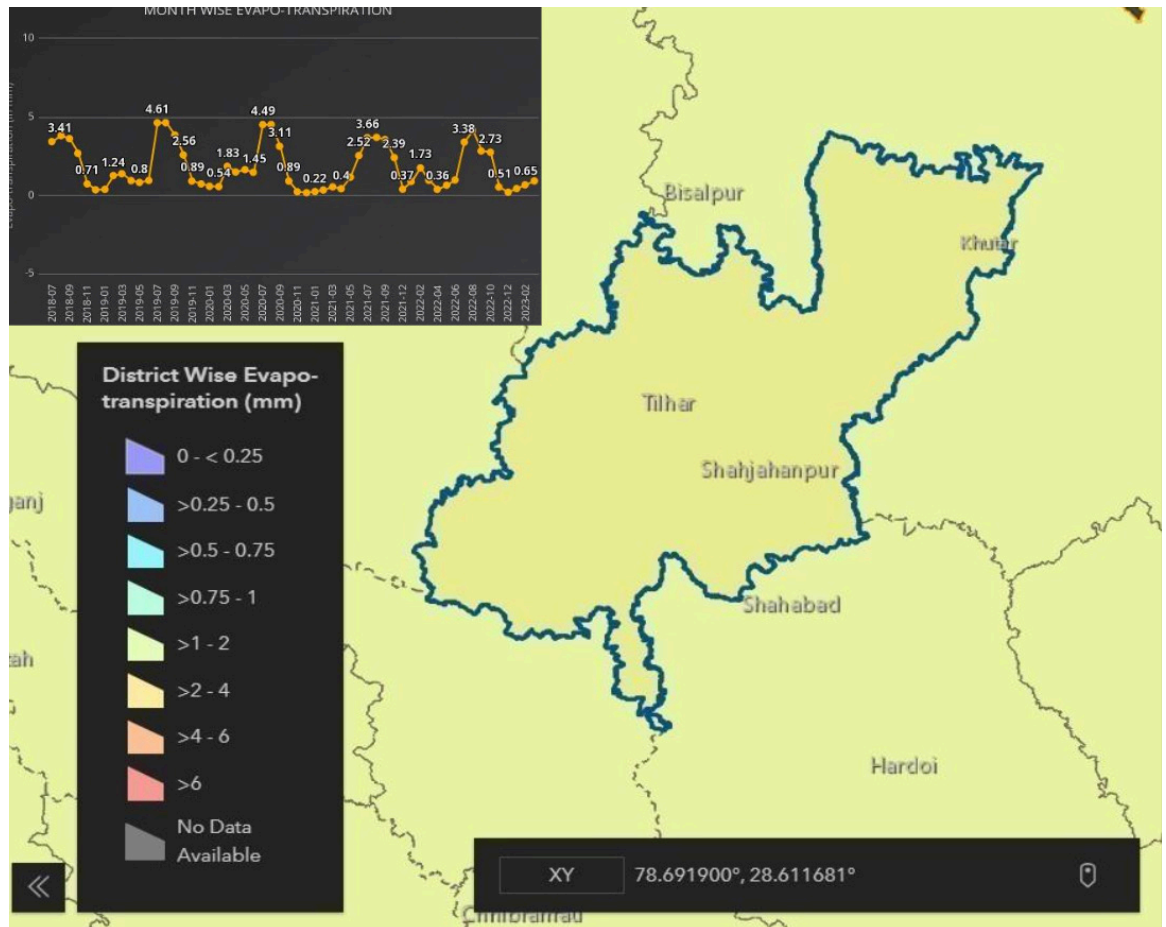


Figure 7 Evapotranspiration rate of Shahjahanpur (2018-2023)

The average evapotranspiration of Shahjahanpur district during the last five years (2018-2022) was 1.74 mm/day. It remains highest during monsoon (July – August) and lowest during winter (November – December). During the monsoon period, it ranges between 3.38 to maximum 4.49 mm/day, whereas during winter it varies from 0.15 (November 2022) to 0.89 mm/day (November 2019)<sup>5</sup>.

## 4.5 River basins

### 4.5.1 Surface water

The Shahjahanpur district forms a part of the upper Ganga basin's central Ganga plains, which have a continuous flat topography with a dominant slope to the south and southeast. The Ramganga river forms the main drainage system, which runs NNW-SSE across the western portion of the area. The Ramganga, the Garra and the Gomti are the main rivers of the district where the Kathana, the Jhukma the Mensi rivers flow into the Gomti.

<sup>5</sup> Source: India-WRIS ([indiawris.gov.in](http://indiawris.gov.in))

## **River Ramganga**

The Ramganga river rises on the southern slopes of Dudhatoli Hill in the Chamoli in the Uttarakhand state and forms the most important drainage system in the Shahjahanpur district. From there, it flows through the districts of Badaun, Shahjahanpur, and Hardoi and eventually joins the Ganga river at the village of Katri Chandapur in the Hardoi district of U.P., after travelling a distance of about 596 km.

## **River Garra**

River Garra is located adjacent to the Kathana river, which flows through a major industrial area in the district with a length of about 46.51 km. The river is one of the sources of water for life, agriculture, and irrigation, particularly during the dry season, and has also had issues with water quality due to massive industrialisation and urbanisation. The Khannaut, the Suketa and the Kai rivers feed the Garra River.

## **River Gomti**

Gomti River is a tributary of Ganges, which originates from Gomat Taal in the Pilibhit district of Uttar Pradesh and extends about 960 km throughout the state crossing the Shahjahanpur district. The river is contaminated at several points throughout its course due to several industrial waste products, effluent from sugar refineries and distilleries, as well as domestic wastewater and sewage as it passes through a region which is the potential source of industrial and human contamination.

In the Shahjahanpur district, Kalagarh is the largest reservoir with a storage capacity of 2.8 BCM, the remaining storage capacity is limited to approximately 0.9 BCM.

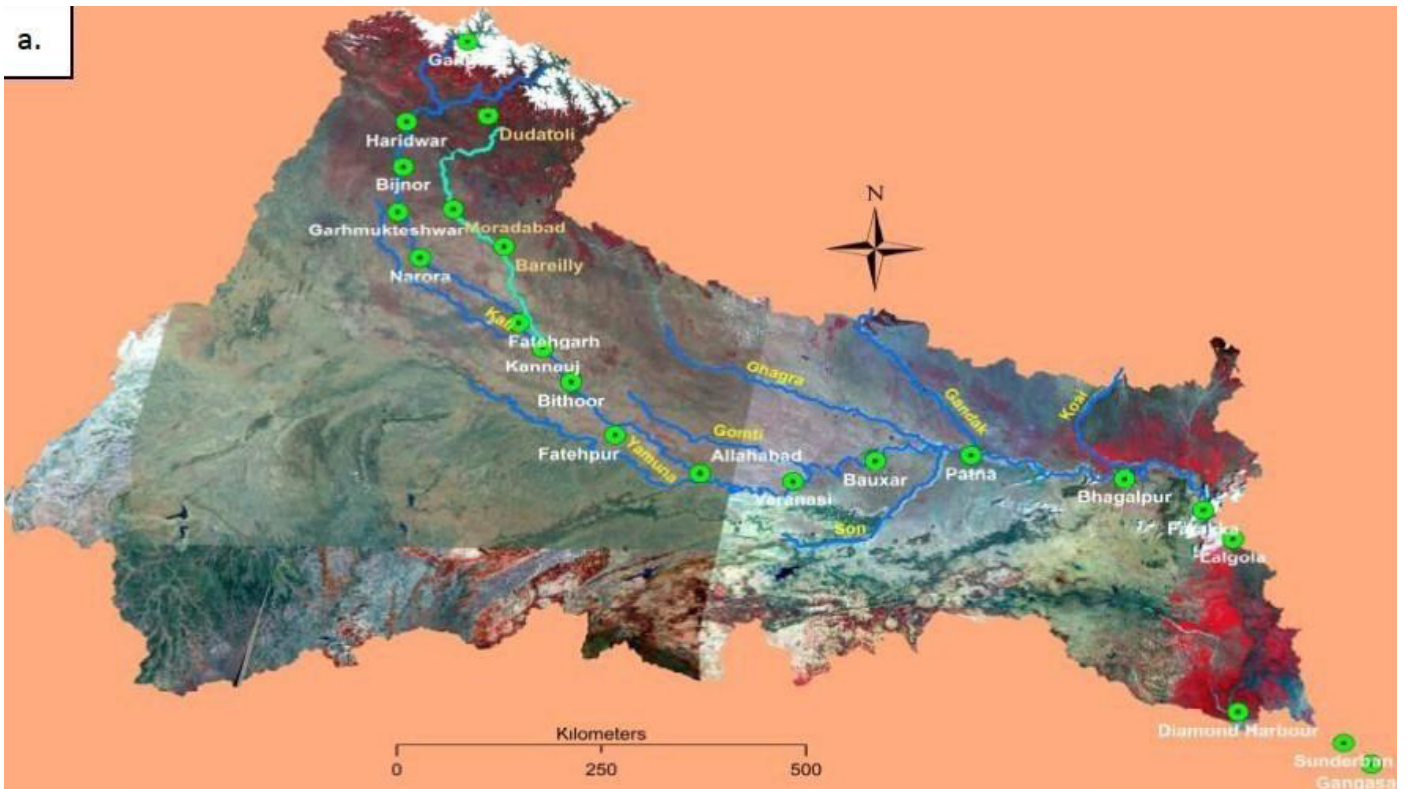


Figure 8: Ganga basin map showing the confluence of Ramganga at Farrukhabad<sup>6</sup>

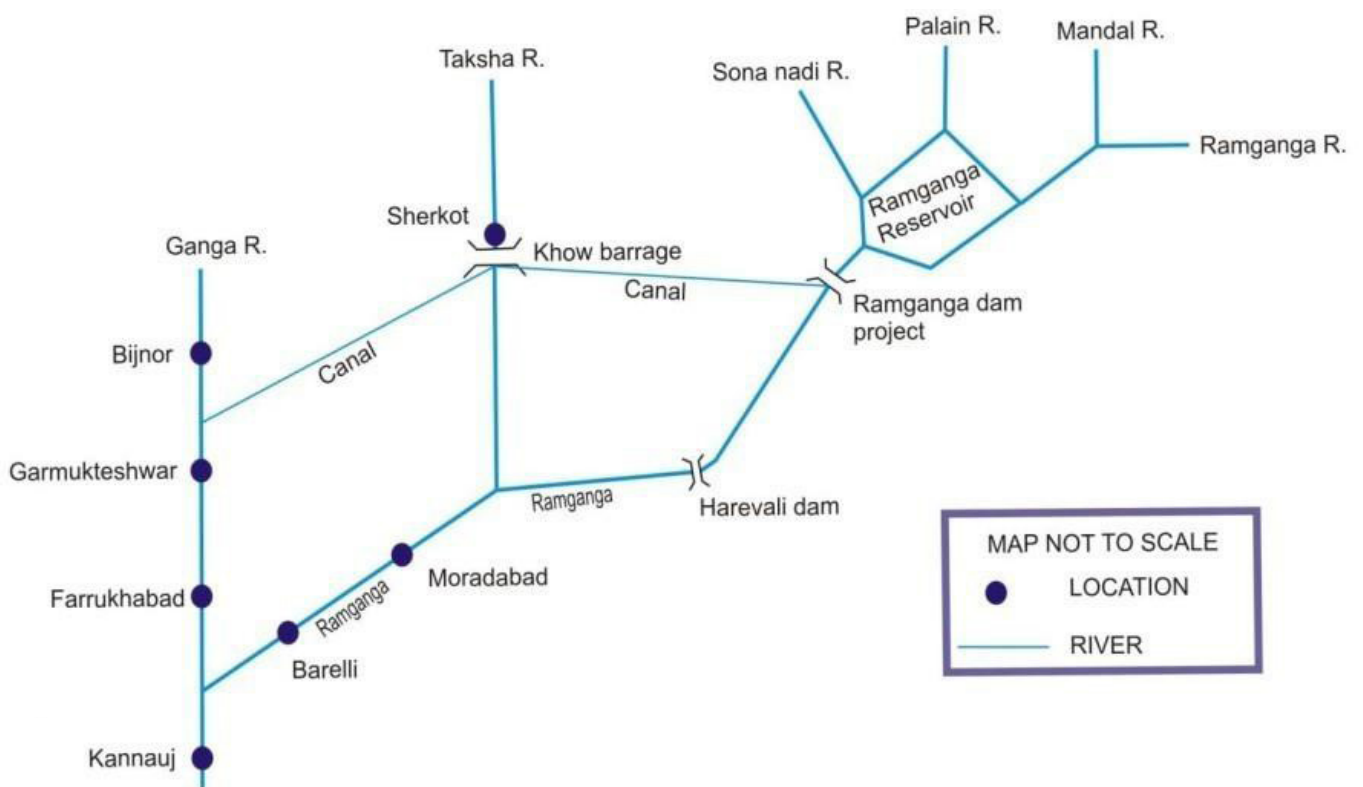


Figure 9: Line diagram of the Ramganga river<sup>7</sup>

<sup>6</sup> 035\_ENB\_RAMGANGA.pdf (cganga.org)

<sup>7</sup> National Wetland Atlas: Uttar Pradesh, 2010, Space Applications Centre, ISRO

The total wetland area in the district is 19,803 ha, most of which are natural wetlands. Besides rivers/streams, the major natural wetland types are riverine wetlands (23.2%), waterlogged (10.4%) and lakes/ponds (8.7%). In manmade category, waterlogged is the major one. In addition, there are 1,089 small wetlands (<2.25 ha). Detailed estimates of wetlands in Shahjahanpur are given in Table 3.

The area under aquatic vegetation in pre-monsoon season is 1,948 ha. Water spread area in post-monsoon season is 11,717 ha., whereas in pre-monsoon season it is 6,291 ha. Moderate turbidity is observed in most of the wetlands. High turbidity is observed in rivers and streams during post-monsoon season.

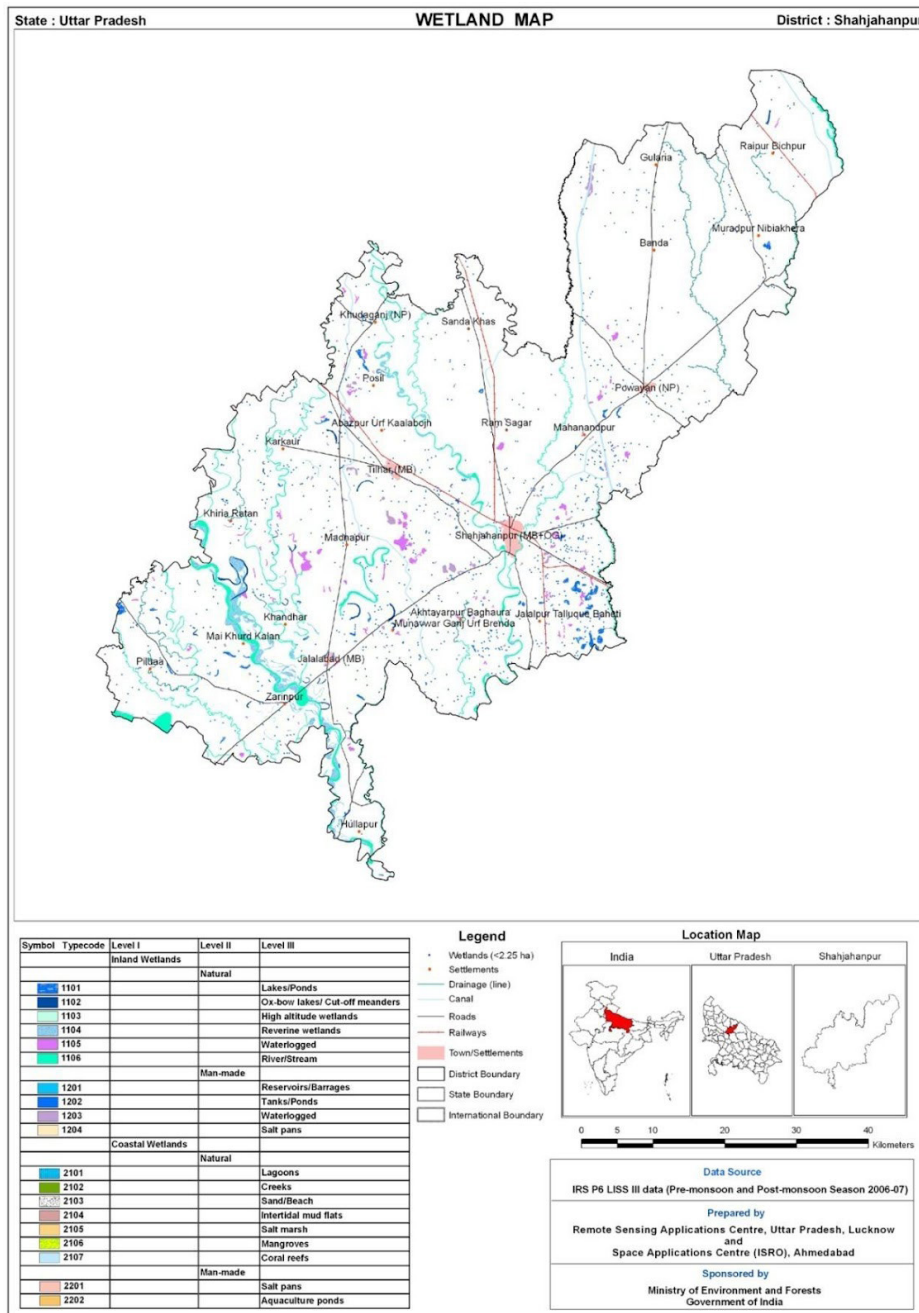


Figure 10: Wetland map of Shahjahanpur, UP<sup>7</sup>

<sup>7</sup> National Wetland Atlas: Uttar Pradesh, 2010, Space Applications Centre, ISRO

Table 3: Area estimates of wetlands in Shahjahanpur<sup>8</sup>

| Wet code | Wetland Category                  | No. of wetlands | Total wetland areas (ha.) | % of wetland areas (ha.) | Open Water              |                        |
|----------|-----------------------------------|-----------------|---------------------------|--------------------------|-------------------------|------------------------|
|          |                                   |                 |                           |                          | Post-monsoon area (ha.) | Pre-monsoon area (ha.) |
| 1100     | Inland Wetlands - Natural         |                 |                           |                          |                         |                        |
| 1101     | Lakes/Ponds                       | 75              | 1728                      | 8.73                     | 682                     | 376                    |
| 1102     | Ox-bow lakes/ Cut-off meanders    | 38              | 789                       | 3.98                     | 494                     | 207                    |
| 1103     | High altitude wetlands            | -               | -                         | -                        | -                       | -                      |
| 1104     | Riverine wetlands                 | 130             | 4,597                     | 23.21                    | 3524                    | 1,656                  |
| 1105     | Waterlogged                       | 94              | 2,066                     | 10.43                    | 874                     | 398                    |
| 1106     | River/Stream                      | 178             | 8,285                     | 41.84                    | 5517                    | 3,376                  |
| 1200     | Inland Wetlands-Man-made          |                 |                           |                          |                         |                        |
| 1201     | Reservoirs/Barrages               | -               | -                         | -                        | -                       | -                      |
| 1202     | Tanks/Ponds                       | 11              | 55                        | 0.28                     | 50                      | 41                     |
| 1203     | Waterlogged                       | 75              | 1,194                     | 6.03                     | 577                     | 239                    |
| 1204     | Salt pans                         | -               | -                         | -                        | -                       | -                      |
|          | Sub-Total                         | 601             | 18,714                    | 94.5                     | 11,718                  | 6,292                  |
|          | Wetlands (<2.25 ha), mainly Tanks | 1,089           | 1,089                     | 5.5                      | -                       | -                      |
|          | Total                             | 1,690           | 19,803                    | 100                      | 11,718                  | 6,292                  |
|          | Area under Aquatic Vegetation     |                 |                           |                          | 4,239                   | 1,948                  |
|          | Area under turbidity levels       |                 |                           |                          |                         |                        |
|          | Low                               |                 |                           |                          | 1,543                   | 1,263                  |
|          | Moderate                          |                 |                           |                          | 10,175                  | 4,122                  |
|          | High                              |                 |                           |                          | 0                       | 907                    |

<sup>8</sup> Source: [https://indianwetlands.in/uploads/NationalWetlandAtlas\\_UttarPradesh.pdf](https://indianwetlands.in/uploads/NationalWetlandAtlas_UttarPradesh.pdf)



## 4.5.2 Groundwater

The major aquifer system of the Shahjahanpur district is quaternary alluvial deposits, which are considered to be older alluvium in major aquifer groups and are mainly comprised of sand and clay. The major lithological formations are sand and clay. Silt is found admixed with sand and clay. Net groundwater availability in the district is 40,974.03 ham., and groundwater draft (all uses) is 83,111.52 ham., hence the level of development of the groundwater is 58.96%.

There are three aquifer groups in the Shahjahanpur district, with depths ranging from 10 m to below 300 m. Overall, the water quality is good except in the deeper aquifer at Imaliya in the southern part, where it is brackish.

Table 4: Aquifer groups in Shahjahanpur district, UP<sup>9</sup>

| Aquifer system   | Bottom Depth Range (mbgl) |     | Thickness of Aquifer (m) |     |
|------------------|---------------------------|-----|--------------------------|-----|
|                  | From                      | To  | Min                      | Max |
| Aquifer Group -1 | 90                        | 130 | 90                       | 130 |
| Aquifer Group -2 | 170                       | 235 | 75                       | 120 |
| Aquifer Group -3 | Beyond 300                | -   | -                        | -   |

### Aquifer Group -1

Aquifer Group -1 which is phreatic in nature begins from the ground level and extends up to variable depths. The height of bottom of the first aquifer group varies from 10 mbgl to 70 mbgl. According to the Figure 11 (map) the minimum thickness of the first aquifer is in the central part of the district whereas maximum thickness is in the south-eastern part of the district. The depth of the aquifer group 1 varies from 90 m (central parts) to 130 m (south-eastern part). Although primary constituent of the aquifer is sand, but mixing does occur. Sand content is variable from 80% to 85%.

Aquifer group 1 is underlain by a regional clay layer. This clay layer acts as a top confining layer for aquifer group 2. Thickness of this layer is in the range of 10 to 20 m.

### Aquifer Group -2

Aquifer group 2 begins just after above confining layer at the top. Top of the aquifer group 2 is below 100 to 130 mbgl, while the bottom is below 175 to 230 mbgl. Sand is the most important constituent of this aquifer group. Mixing with variable size particle is observed too. The bottom of this aquifer group is bound by a moderately thick clay layer having a thickness in the range of 10 to 30 m. Hence, the top confining clay and bottom confining clay layer together give rise to confined aquifer system.

### Aquifer Group -3

Aquifer group 3 begins from the bottom of the second confining clay layer and extends beyond 300 mbgl depth. Once again sand is the most dominating constituent of this aquifer.

<sup>9</sup> Source: Shahjahan UP.pdf (cgwb.gov.in) <Page 41 – 45>

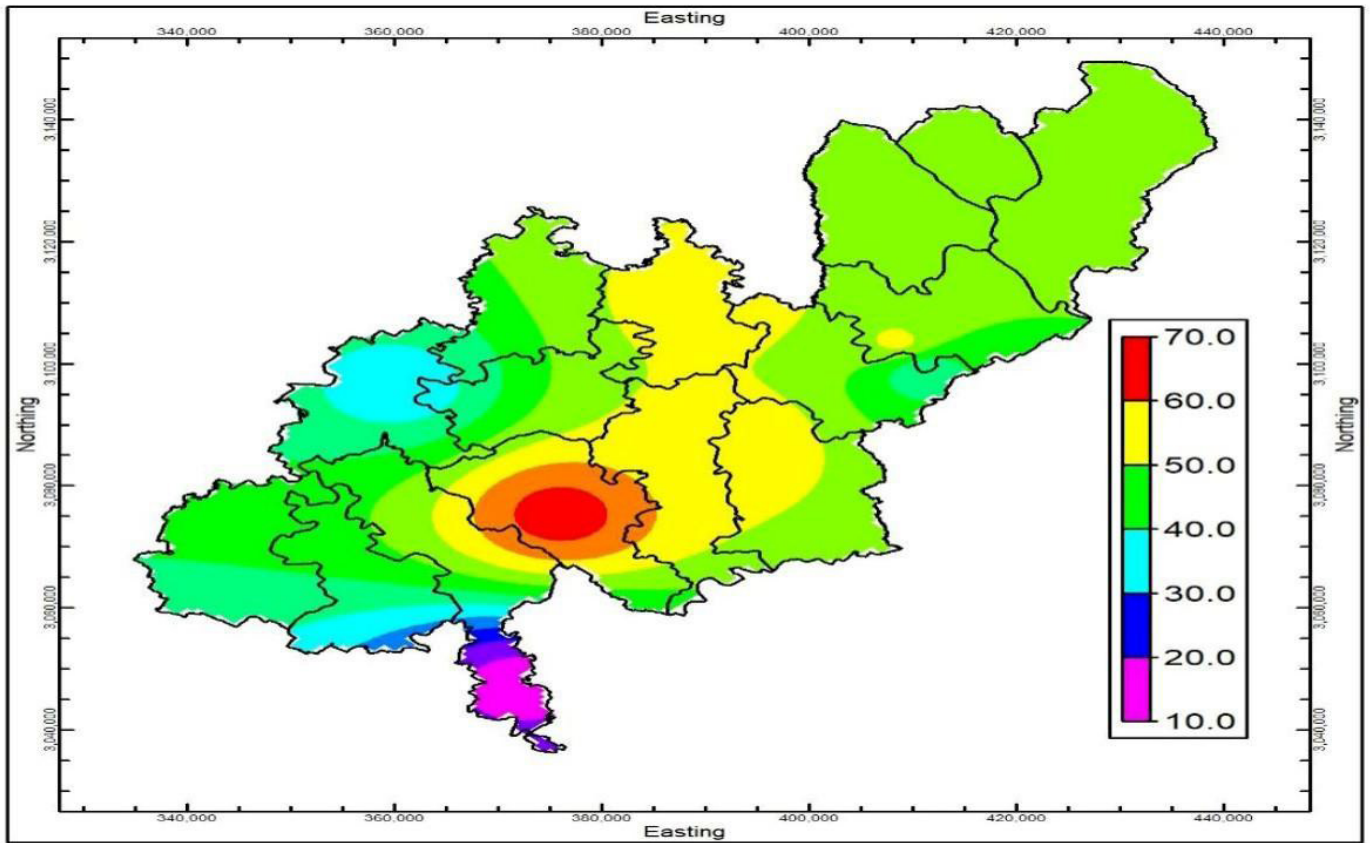


Figure 11: Bottom of the first aquifer from above mean sea level (Source Shahjahan UP.pdf (cgwb.gov.in))

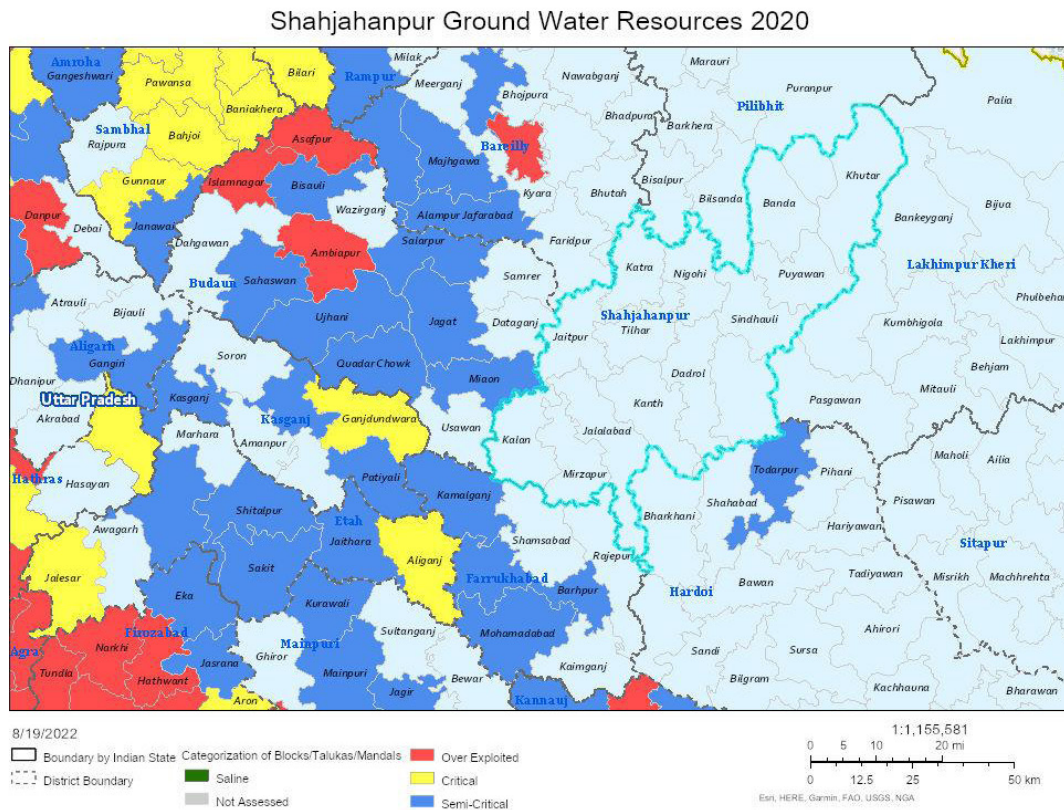


Figure 12: Groundwater resources map of Shahjahanpur district, UP<sup>10</sup>

<sup>10</sup> <https://indiawris.gov.in/wris/#/GWResources>

### 4.5.3 Water use per sector

Table 5: Projected additional water demand for various sectors (for the year 2020)<sup>11</sup>

| S. No. | Block              | Additional Demand (in MCM) |         |            |            |                  | Total   |
|--------|--------------------|----------------------------|---------|------------|------------|------------------|---------|
|        |                    | Domestic                   | Crop    | Live-stock | Industrial | Power Generation |         |
| 1      | Banda              | 12.22                      | 512.28  | 2.29       | 0.00       | 0.00             | 526.79  |
| 2      | Khutar             | 8.81                       | 467.26  | 2.33       | 0.00       | 0.00             | 478.40  |
| 3      | Powayan            | 11.77                      | 357.67  | 2.27       | 0.00       | 0.00             | 371.71  |
| 4      | Sindhauli          | 11.63                      | 404.35  | 1.77       | 0.00       | 0.00             | 417.75  |
| 5      | Khudaganj<br>Katra | 10.98                      | 324.79  | 2.05       | 0.00       | 0.00             | 337.82  |
| 6      | Jaitipur           | 8.92                       | 281.64  | 1.97       | 0.00       | 0.00             | 292.52  |
| 7      | Tilhar             | 12.04                      | 353.28  | 2.15       | 0.00       | 0.00             | 367.47  |
| 8      | Nigohi             | 9.20                       | 319.26  | 2.05       | 0.00       | 0.00             | 330.51  |
| 9      | Kanth              | 8.35                       | 297.28  | 1.98       | 0.00       | 0.00             | 307.61  |
| 10     | Dadrol             | 9.53                       | 288.53  | 2.64       | 0.00       | 0.00             | 300.70  |
| 11     | Bhawal<br>Khera    | 35.46                      | 324.25  | 2.77       | 0.00       | 0.00             | 362.49  |
| 12     | Kalan              | 9.50                       | 356.56  | 2.92       | 0.00       | 0.00             | 368.98  |
| 13     | Mirzapur           | 7.71                       | 274.04  | 3.02       | 0.00       | 0.00             | 284.76  |
| 14     | Jalalabad          | 13.46                      | 334.76  | 2.90       | 0.00       | 0.00             | 351.12  |
| 15     | Madanapur          | 7.89                       | 357.04  | 0.36       | 0.00       | 0.00             | 365.29  |
|        | Total              | 177.48                     | 5253.00 | 33.46      | 0.00       | 0.00             | 5463.94 |

Note: Setting up of any new water consuming industry and power plan since 2016 to 2020 was not anticipated while this water demand was calculated in the year of 2016. Hence, any additional water demand for industrial and power generation purpose is not considered.

<sup>11</sup> Source: <https://pmksy.gov.in/mis/Uploads/2016/20161124030340830-1.pdf> (Section: 4.7, Pg 93)



## 4.6 Water quality

### 4.6.1 Ground water quality

Chemical data of groundwater from shallow aquifer indicates that the groundwater is fresh. Generally, groundwater is suitable for irrigation purposes and in some areas suitable for drinking purposes as well. The groundwater quality problem may be grouped into two categories viz. geogenic and anthropogenic. The geogenic ground water quality problem mainly includes the occurrence of saline, brackish ground water and the presence of Fluoride, Iron, and Chloride concentrations beyond the maximum permissible limit. The higher concentration of Nitrate may be due to Anthropogenic activities. The blocks having ground water quality problems in shallow, phreatic aquifers have been identified in the district.

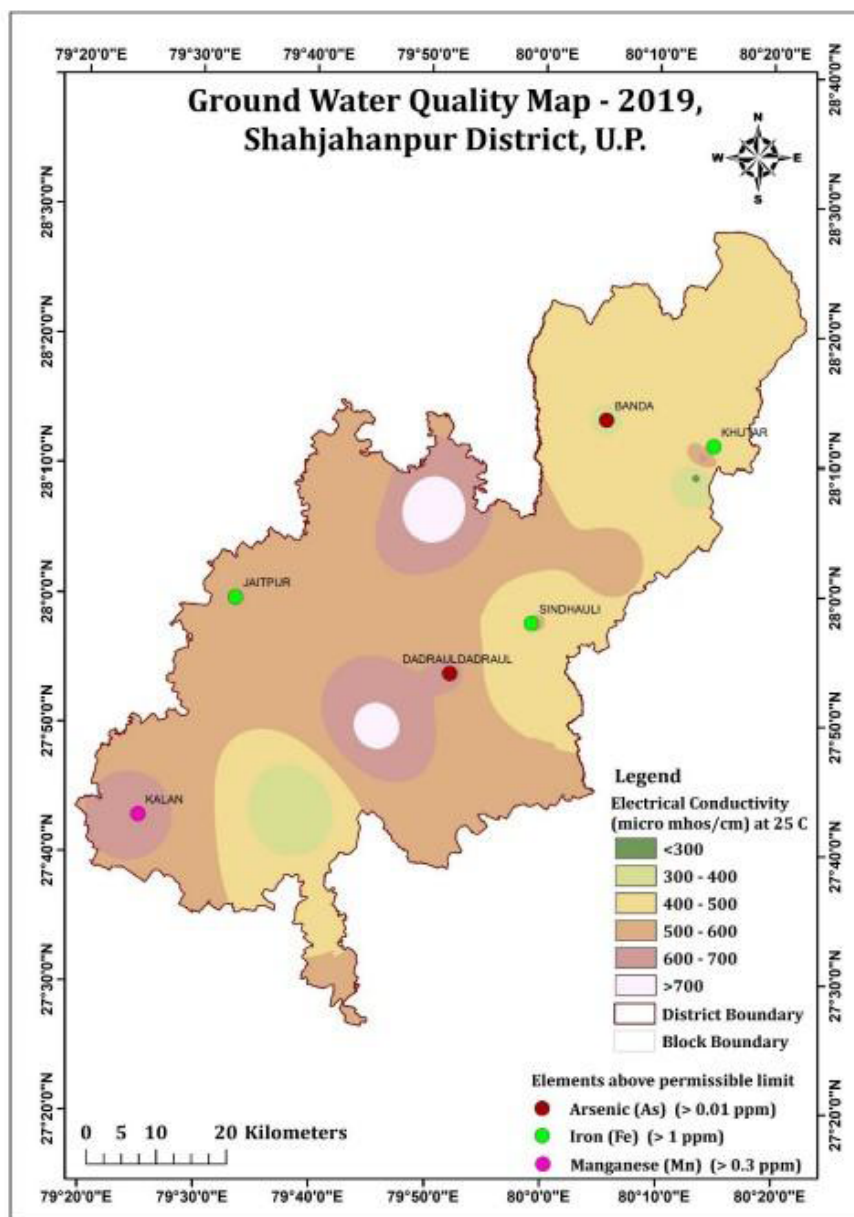


Figure 13 Groundwater Quality of Shahjahanpur District<sup>12</sup>

<sup>12</sup> [http://cgwb.gov.in/AQM/NAQUIM\\_REPORT/UP/Shahjahan%20UP.pdf](http://cgwb.gov.in/AQM/NAQUIM_REPORT/UP/Shahjahan%20UP.pdf)

Six blocks in the district have a groundwater quality beyond the permissible limit. The constituents, above permissible and acceptable limits of Bureau of Indian Standards (BIS), are highlighted in red colour in Table 6

Table 6: Blockwise groundwater quality (Pre-monsoon, 2019)<sup>13</sup>

| Block        | NO <sub>3</sub> | Fe    | Mn    | Zn    | As    | Pb    |
|--------------|-----------------|-------|-------|-------|-------|-------|
|              | (ppm)           | (ppm) | (ppm) | (ppm) | (ppb) | (ppb) |
| Banda        | BDL             | 0.90  | 0.15  | 0.04  | 12.00 | 1.00  |
| Bhawal Khera | BDL             | 0.09  | 0.12  | 1.61  | 5.00  | 2.00  |
| Dadraul      | BDL             | 1.45  | 0.10  | 0.13  | 17.00 | 1.00  |
| Jaitpur      | BDL             | 2.70  | 0.19  | 0.03  | 4.00  | 2.00  |
| Jalalabad    | BDL             | 0.41  | 0.10  | 0.04  | 3.00  | 1.00  |
| Kalan        | BDL             | 3.11  | 0.45  | 0.03  | 1.00  | 1.00  |
| Kanth        | BDL             | 0.08  | 0.03  | 0.03  | 2.00  | 1.00  |
| Katra        | BDL             | 0.05  | 0.11  | 0.41  | 2.00  | 2.00  |
| Khutar       | BDL             | 4.83  | 0.20  | 0.54  | 6.00  | 1.00  |
| Madanapur    | BDL             | 0.60  | 0.10  | 0.03  | 4.00  | 1.00  |
| Mirzapur     | BDL             | 0.47  | 0.01  | 0.05  | 1.00  | 2.00  |
| Nigohi       | 61              | 0.18  | 0.15  | 0.14  | 2.00  | 2.00  |
| Puyawan      | BDL             | 0.23  | 0.03  | 0.11  | 0.00  | 1.00  |
| Sindhauli    | BDL             | 2.72  | 0.19  | 0.03  | 4.00  | 1.00  |
| Tilhar       | BDL             | 0.83  | 0.14  | 0.15  | 9.00  | 1.00  |

BDL = below detection limit

<sup>13</sup> Shahjahan UP.pdf (cgwb.gov.in) <Page 32- 35>

Table 7: Quality problem in the ground water resources of shallow phreatic aquifer

| Chemical constituent responsible for quality problem | Maximum permissible limit in the absence of alternate source (mg/ lit) | Concentration (mg/lit) | Affected blocks                  | Possible adverse effects  |
|--|--|------------------------|----------------------------------|---|
| Nitrate (NO <sub>3</sub> )                           | 45   | 61                     | Nigohi                           | May cause "Methemoglobinemia" (Blue Baby) disease.                          |
| Iron (Fe <sup>3+</sup> )                             | 1  | 1.45 to 4.83           | Dadraul, Jaitpur, Kalan & Khutar | May be used with caution after taking suitable treatment measures.          |
| Manganese (Mn)                                       | 0.3  | 0.45                   | Kalan                            | Change in appetite and reduction in metabolism of iron to form haemoglobin. |
| Arsenic (As)   | 10 (ppb)   | 12 to 17 (ppb)         | Banda & Dadraul                  | Causes skin damage, circulatory problems, risk of skin cancer               |

#### 4.6.2 Surface water quality

The Shahjahanpur district has an old and deteriorated drainage system which results in sewage/sullage stagnation and water contamination. Domestic pollution of surface water and groundwater sources form the major reason for deteriorated water quality. Untreated domestic sewage/sullage flowing into the rivers Garra and Khannaut from Shahjahanpur City results in river pollution. At the Garra river, there are around 18 to 20 untreated drainage discharge points.

The Uttar Pradesh Pollution Control Board (UPPCB) monitors the surface water quality of Ramganga river tributary at D/S Ramganga FBD road bridge, Shahjahanpur. The water quality of Ramganga river tributary at D/S Ramganga FBD road bridge, Shahjahanpur is not within the desirable limits set by CPCB under "Designated Best use" criteria. The yearly average water quality data of UPPCB is given in Table 8.

Table 8: Water quality downstream of Ramganga FBD road bridge, Shahjahanpur<sup>14</sup>

| Parameters        | D/S Ramganga FBD road bridge, Shahjahanpur |         |         |         |         |         |
|-------------------|--|---------|---------|---------|---------|---------|
|                   | Year                                       |         |         |         |         | Average |
|                   | 2022                                       | 2021    | 2020    | 2019    | 2018    |         |
| pH                | 7.4  | -       | -       | -       | -       | 7.4     |
| DO (mg/l)         | 8.8  | 9       | 9.5     | 10.1    | 7.6     | 9       |
| BOD (mg/l)        | 2.9  | 3       | 2.8     | 3       | 2       | 2.74    |
| COD (mg/l)        | 17.8                                       | 20      | -       | -       | -       | 18.9    |
| T.C (MPN/ 100 ml) | 8742.0                                     | 12250.0 | 13167.0 | 14500.0 | 26750.0 | 15081.8 |
| F.C (MPN/ 100 ml) | 5614.0                                     | -       | -       | -       | -       | 5614.0  |

## Primary water quality criteria for designated - best - use - classes

| Class of water  | Tolerance limit |                 |                     |          |
|---|-----------------|-----------------|---------------------|----------|
|   | DO (mg/l), min  | BOD (mg/l), max | TC (MPN/ 100ml) max | pH       |
| A: Drinking water source without conventional treatment but after disinfections | 6               | 2               | 50                  | 6.5- 8.5 |
| B: Outdoor bathing (organized)  | 5               | 3               | 500                 | 6.5- 8.5 |
| C: Drinking water source after conventional treatment and disinfections         | 4               | 3               | 5000                | 6.5- 8.5 |
| D: Propagation of wildlife and fisheries  | 4               | -               | -                   | 6.5- 8.5 |
| E: Irrigation, industrial cooling, controlled waste disposal                    | -               | -               | -                   | 6.5- 8.5 |
| Below E: Not meeting A, B, C, D & E criteria                                    | -               | -               | -                   |          |

The analysis of river water quality data of UPPCB reveals that dissolved oxygen is above the required level of 4mg/l and ranges up to 10.1 mg/l. During pre-monsoon period. The monsoon to post-monsoon period, the dissolved oxygen is > 4mg/l. In the same way BOD is within desirable limit. Faecal coliform is beyond desirable limit of >2500 MPN/100ml and it ranges between >3300 mpn/100ml (pre-monsoon, 2022) to 8400 MPN/100ml (monsoon, 2022). The average value of the total coliform is also above 5000 MPN/100ml except it is <5000 MPN/100ml in the month of October and December (2022).

<sup>14</sup> UP Pollution Control Board, Lucknow ([uppcb.com](http://uppcb.com))

Major sources of industrial pollution are not found in Shahjahanpur district, except in one nala (canal) which originates from the KR Pulp and Papers mill located at Rampura village, Sadar Tehsil, Shahjahanpur district and is connected with Ramganga at Hardoi district. Contaminated dark black water is directly discharged from the KR Paper factory which adds to the sewage system. There are 9 GPIs in the district where each of them has an Effluent Treatment Plant (ETP) with a cumulative treatment capacity of 25.34 MLD. There is significant water pollution through municipal and biomedical waste; waste and packaging materials from the sabzi mandis or vending units operating below the dilapidated bridge located at Raj Ghat on Garra river, adding to the deteriorating water quality levels. Since the water of Garra, Khannaut and Ramganga is generally very turbid and coloured brownish to black people do not use it.

#### 4.7 Land cover and land use

The land use and land cover areas of Shahjahanpur of year 2017-2018 are given in the table below<sup>15</sup>.

Table 9: Land cover and land use of Shahjahanpur district

| S.No | Classes                 | Area (km <sup>2</sup> ) |
|------|-------------------------|-------------------------|
| 1    | Built up                | 257.93                  |
| 2    | Kharif crop             | 510.59                  |
| 3    | Rabi crop               | 137.05                  |
| 4    | Zaid crop               | 0.39                    |
| 5    | Double / Triple Crop    | 3,232.89                |
| 6    | Current fallow          | 54.37                   |
| 7    | Plantation              | 16.34                   |
| 8    | Evergreen forest        | 0                       |
| 9    | Deciduous forest        | 106.64                  |
| 10   | Degraded / Scrub Forest | 1.04                    |
| 11   | Littoral swamp          | 0                       |
| 12   | Grassland               | 0                       |
| 13   | Shifting cultivation    | 0                       |
| 14   | Wasteland               | 49.46                   |
| 15   | Rann                    | 0                       |
| 16   | Waterbodies max         | 108.53                  |
| 17   | Waterbodies min         | 20.34                   |
| 18   | Snow cover              | 0                       |

<sup>15</sup> India-WRIS ([indiawris.gov.in](http://indiawris.gov.in))



### Shahjahanpur Land Use & Land Cover Area

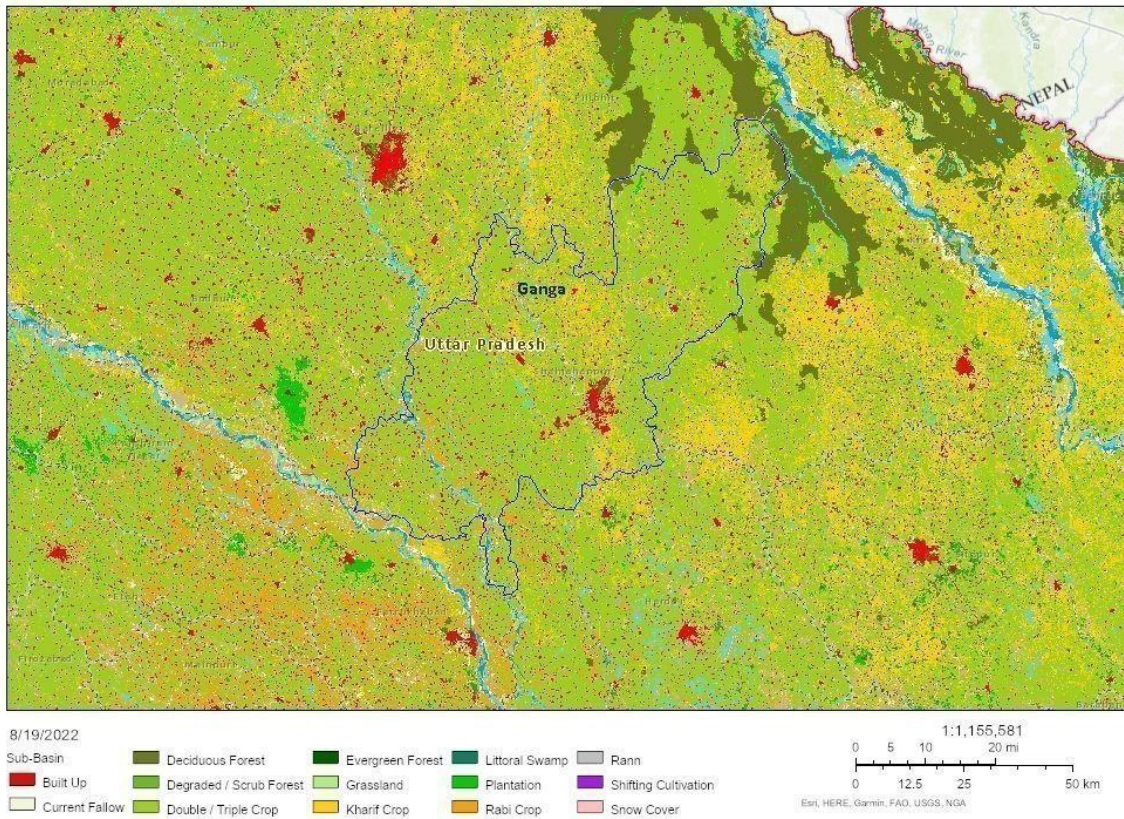


Figure 14: Land use and land cover of Shahjahanpur district<sup>16</sup>

### Land Use & Land Cover Area Distribution of Shahjahanpur(Uttar Pradesh)

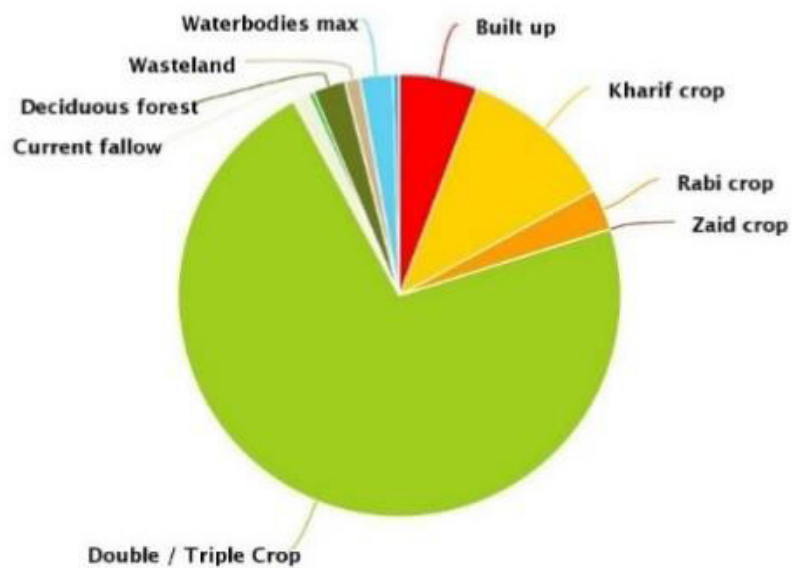


Figure 15: Pie-chart showing LULC distribution of Shahjahanpur<sup>17</sup>

<sup>16</sup> <https://indiawris.gov.in/wris/#/lulc>

<sup>17</sup> <https://arcgis.com/apps/instant/media/index.html?appid=fc92d38533d440078f17678ebc20e8e2>



## 4.8 Protected areas and environmental resources

The wildlife sanctuaries present in the district are Kishanpur Wildlife Sanctuary and Pilibhit Tiger Reserve. The illustrated Map shows the Wildlife Protected areas in Uttar Pradesh.

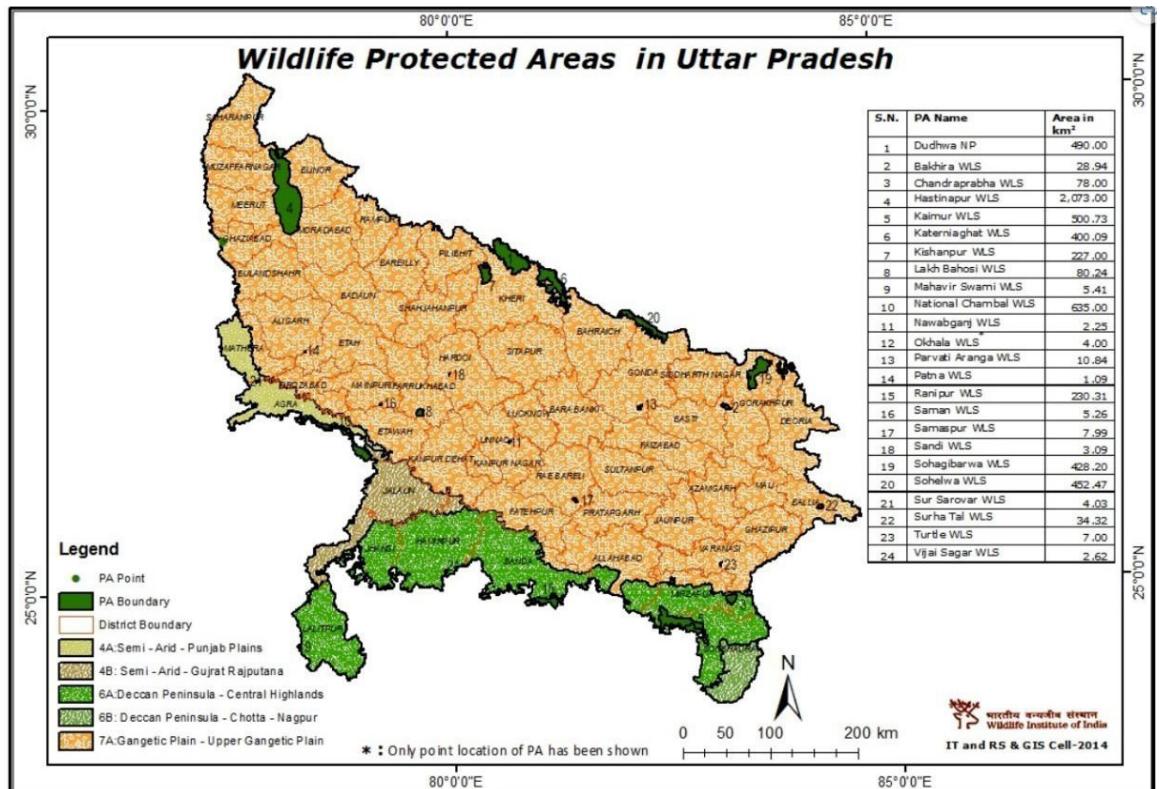


Figure 16: Wildlife Protected Areas in Uttar Pradesh<sup>18</sup>

## 4.9 Ecology and biodiversity

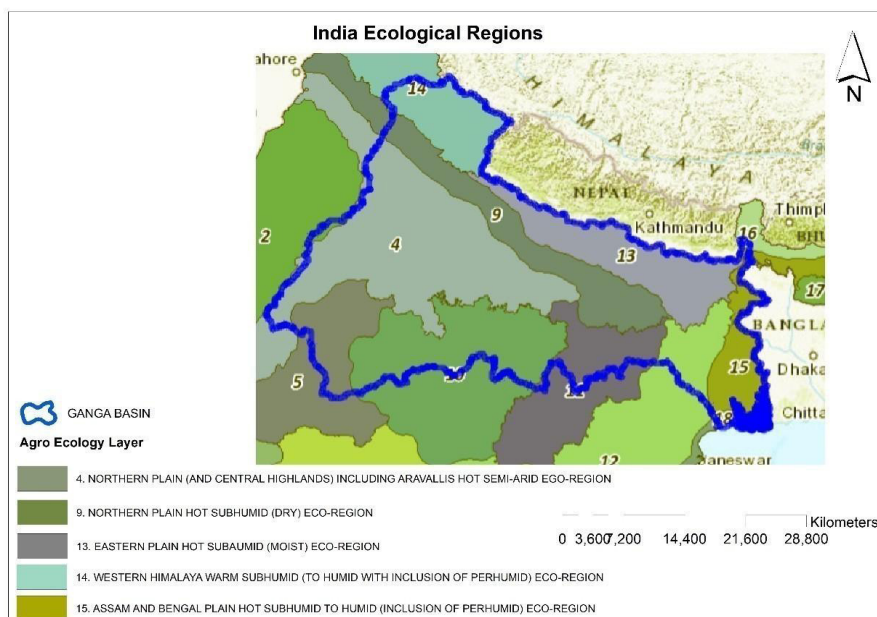


Figure 17: Shahjahanpur district falls within the northern plains ecological regions.

<sup>18</sup> [http://wiienviis.nic.in/Database/Maps\\_PAs\\_1267.aspx](http://wiienviis.nic.in/Database/Maps_PAs_1267.aspx)

## Flora and Fauna<sup>19</sup>

The water quality is good and supports biodiversity up to Kalagarh and deteriorates downstream of Harveli barrage. Diatoms constitute the dominant group of phytoplankton and some blue-green algae and green algae are also reported in good numbers. Gharials and Mugger are the two higher forms reported in the river.

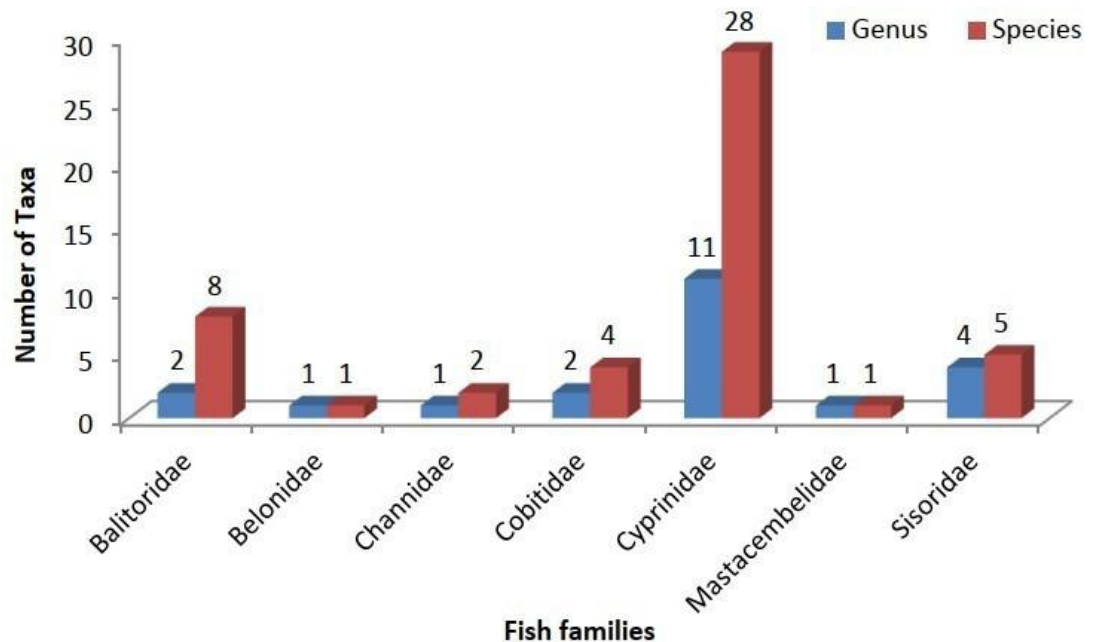


Figure 18: Distribution of fish in Ramganga

## 4.10 Socio-economic features

### 4.10.1 Population

The total population of Shahjahanpur is 3,006,538 according to the Census 2011<sup>20</sup>. The total area is 4,388 km<sup>2</sup> and the population density accordingly is 685 per km<sup>2</sup>. 4 tehsils are situated in Shahjahanpur district i.e. Shahjahanpur, Jalalabad, Powayan, Tilhar under which 10 ULBs are located. In Shahjahanpur NPP, maximum population of 329,736 is counted where in Tilhar NPP, population of 61,444 is counted. In Jalalabad NPP, the population of 38,202 is observed and in Powayan NP, population of 28,613 is located (as per census 2011). The population count of ULBs of Shahjahanpur district is given in Table 10.

<sup>19</sup> [http://cganga.org/wp-content/uploads/sites/3/2018/11/035\\_ENB\\_RAMGANGA.pdf](http://cganga.org/wp-content/uploads/sites/3/2018/11/035_ENB_RAMGANGA.pdf)

<sup>20</sup> [http://updes.up.nic.in/updes/data/s\\_abstract/abstract\\_2021.pdf](http://updes.up.nic.in/updes/data/s_abstract/abstract_2021.pdf)

Table 10: Population count of ULBs in Shahjahanpur District

| Name of ULBs                 | Population |
|------------------------------|------------|
| Shahjahanpur (NPP)           | 329,736    |
| Tilhar (NPP)                 | 61,444     |
| Jalalabad (NPP)              | 38,202     |
| Allahganj (NP)               | 14,755     |
| Powayan (NP)                 | 28,613     |
| Khutar (NP)                  | 17,423     |
| Kanth (NP)                   | 27,137     |
| Katra (NP)                   | 32,440     |
| Khudaganj (NP)               | 14,737     |
| Railway Settlement Roza (NP) | 11,489     |

From the district's 3,006,538 the total male population of the district is 1,606,403. The total female population is 1,400,135, the sex ratio is 872. The percentage of male literates in the district is 68.18%, whereas the percentage of female literates is 49.57%.

Table 11: Socio-economic profile of Shahjahanpur district<sup>21</sup>

| Description       | Details   |
|-------------------|-----------|
| Total Population  | 3,006,538 |
| Male Population   | 1,606,403 |
| Female Population | 1,400,135 |
| Sex Ratio         | 872       |
| Urban population  | 594,092   |
| Rural population  | 2,412,446 |
| Literates         | 59.54%    |
| Male Literates    | 68.18%    |
| Female Literates  | 49.57%    |

Shahjahanpur has 498,735 households, of which 405,601 are rural households, total urban households are 93,134, houseless rural the 0.06%, whereas there is no urban houseless population. Male headed households in rural areas stands at 92.77%, whereas female headed households percentage stands at 7.23%. The total rural population of Shahjahanpur is 2,376,415. 52 % of this population is literate, whereas there is 15% literacy rate below primary education.

The sources of income in rural areas are listed below.

<sup>21</sup> DEP Shahjahanpur

<sup>22</sup> Socio Economic and Caste Census (SECC)

Table 12: Sources of income in Shahjahanpur district<sup>9</sup>

| Total House-hold | % involved in cultivation | % Manual Casual Labour | % Part-time, full time domestic service | % Foraging, rag picking | % Non-agricultural own account enterprise | % Begging/charity/ alms collection | % Others |
|------------------|---------------------------|------------------------|---|-------------------------|---|------------------------------------|----------|
| 104,086          | 36.1                      | 55.09                  | 1.14                                    | 0.05                    | 0.35                                      | 0.22                               | 7.05     |

The sources of income in urban areas are listed below. In the urban areas of Shahjahanpur, beggars consisted of 0.03%, domestic workers consisted of 2.1%, street vendors consisted of 1.69%, and construction workers consisted of 9.31%, sanitation.

Workers consisted of 0.34%, homebased workers consisted of 3.11%, transport workers consisted of 1.06%, shop workers /assistants consisted of 2.62%, electricians / mechanics / assemblers consisted of 0.72%, washer-men consisted of 0.23%, other workers consisted of 11.46%, non-workers consisted of 3.46% and non-income from any sources consisted of 63.87%<sup>22</sup>.

| Source of income        | %    | Transport worker                 | 1.06            |
|-------------------------|------|----------------------------------|-----------------|
| Domestic Worker         | 2.1  | Shop worker/ Assistant           | 2.62            |
| Beggars                 | 0.03 | Electrician/ Mechanic/ Assembler | 0.72            |
| Street Vendor           | 1.69 | Washer men                       | 0.23            |
| Construction worker     | 9.31 | Other Worker                     | 11.46           |
| Sanitation Worker       | 0.34 | Non-work                         | 3.46            |
| Home Based worker       | 3.11 | No income from any source        | 63.87           |
| <b>Total population</b> |      |                                  | <b>5,42,686</b> |

#### 4.10.3 Gender and vulnerable groups

As given under the population section, there are 872 females per 1000 males in the district and close to 50% women are literate as against about 60% literate men.

A focus group discussion was conducted with women farmer groups in village Noorpur Karahi – Jalalabad, Shahjahanpur in Dec 2022. This discussion was scheduled soon after a farmers' group meeting. In the farmer group meeting, 49 out of 100 farmers were women farmers.





Figure 19 FGD in Shahjahanpur district with women farmers



Figure 20 FGD with farmers in Shahjahanpur district

Observation from the FGD with women farmers:

- The larger farmers' meeting was called by the district level government agencies to inform them about the support extended by government with reference to good quality seeds at a subsidized cost, crop insurance schemes, fertilizers, pesticides, as well as trainings and exposure visits for organic farming.
- The women farmers constituted 49 percent of the farmer group.
- A large proportion of the participating women had completed their intermediate education, a few of them were graduates and about 5 were post-graduates.



- In terms of age, over 80-85% of the women were below the age of 40 years. There were also a few senior women above the age of 70 years.
- The women farmers were involved in all stages of farming, from seed sowing to tending, harvesting and selling.
- Women including the seniors, openly participated in the discussion and expressed their views confidently.
- The information regarding meetings of farmer and other groups with government is not always inclusively extended as a common practice but mostly targets men farmers. Despite this, some women do participate in the meetings. For this meeting, an inclusive approach was followed in sharing information regarding the meeting resulting in an overwhelming number of women participants. This goes to say that inclusive approaches in themselves result in improved participation of women and perhaps other vulnerable groups too.

There is a need for including women in such meetings. The explanation that women are busy with household jobs is disempowering. Our experience says that if the process is enabling and empowering and the time of meeting is adjusted to include women, they do participate and engage.

#### **4.10.4 Dominant livelihood systems**

In rural areas of Shahjahanpur, 36.1% people were involved in cultivation, 55.09% in manual casual labour, 1.14% were involved in part-time or full-time domestic service, 0.05% were involved in foraging or rag picking, 0.35% people were involved in non-agricultural own account enterprise, 0.22% were either involved in begging, charity, alms collection<sup>20</sup>.

In the urban areas of Shahjahanpur, beggars consisted of 0.03%, domestic workers consisted of 2.1%, street vendors consisted of 1.69%, construction workers consisted of 9.31%, sanitation workers consisted of 0.34%, homebased workers consisted of 3.11%, transport workers consisted of 1.06%, shop workers/assistants consisted of 2.62%, electricians/mechanics/assemblers consisted of 0.72%, washer (women) consisted of 0.23%, other worker consisted of 11.46%, non-workers consisted of 3.46% and non-income from any sources consisted of 63.87%<sup>20</sup>

#### **4.10.5 Basic amenities**

According to the National Family Health Survey – 5 (2019-21), the overall percentage of households having access to improved drinking water source is 100%. 69.2% household have improved sanitation facilities. Apart from drinking water and sanitation facility, only 40.4% of household use clean fuel for cooking. However, in the district, 84.1% of household had electricity services.<sup>23</sup>

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<sup>23</sup> [http://rchiips.org/NFHS/NFHS-5\\_FCTS/UP/Shahjahanpur.pdf](http://rchiips.org/NFHS/NFHS-5_FCTS/UP/Shahjahanpur.pdf)

## 5 The institutional arrangement in the district

Holistic and integrated strategic approaches of river rejuvenation address entire river basins and consider not only the problem of the sewage generated by human settlements. Other pressure factors such as industry, irrigation water withdrawal, hydropower utilisation, solid waste discharge and riverbank degradation are to be considered. Therefore, it is required to have planning, financing, monitoring, and coordinating authorities for strengthening the collective efforts of the Central Government and the State Governments and stakeholders in line with the NMCG Authority Notification Order, 2016 for effective abatement of pollution and rejuvenation, protection and management of the river Ganga.

### 5.1 NMCG, SMCG and DGC

#### **National Mission for Clean Ganga (NMCG)**

Prepare guidelines for district planning, mandate to DGCs in accordance with the Authority Notification. Approves the district plans and make financial arrangements for implementation.

#### **State Mission for Clean Ganga (SMCG) Uttar Pradesh**

State Mission for Clean Ganga (SMCG) Uttar Pradesh is an extended arm of NMCG for the state of Uttar Pradesh and implementing the Namami Gange and other programmes through various executing agencies.

#### **District Ganga Committee Shahjahanpur (DGC – Shahjahanpur)**

Mandated to prepare District Ganga Plan in line with Authority notification.

### 5.2 Key stakeholders

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#### National Level

#### **Key stakeholders at national level**

- **Central Groundwater Board (CGWB)**  
Contributions in district planning for sustainable development and management of ground water resources of the country.
- **Central Water Commission (CWC)**  
Contributions in district planning for components related to water resource management and monitoring of river water quality

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<sup>23</sup> [http://rchiips.org/NFHS/NFHS-5\\_FCTS/UP/Shahjahanpur.pdf](http://rchiips.org/NFHS/NFHS-5_FCTS/UP/Shahjahanpur.pdf)

- **National Water Academy (NWA)**  
Contributions in district planning based upon international RBM cycle approach. NWA has been involved with NMCG and GIZ in implementation of RBM cycle trainings.
- **Ministry of Jal Shakti, Department of Water Resources, River Development and Ganga Rejuvenation (DoWR, RD & GR)**  
MOJS, DoWR, RD & GR will not be directly involved in the planning stage of district plans. However, MoJS is the nodal ministry at central level to support Ganga and sub basin water framework development by the states.
- **Ministry of Jal Shakti, Department of Drinking Water and Sanitation and (DWS)**  
MOJS, DWS will not be directly involved in the planning stage of district plans. However, MoJS is the nodal ministry at central level to support Ganga and sub basin water framework development by the states.
- **Ministry of Housing and Urban Affairs (MoHUA)**  
will not be directly involved in the planning stage of District Plans. However, the policies, strategies and guidelines are being provided by CPHEEO to the States & Uts Governments including Municipal Corporations / Committees.
- **Central Pollution Control Board (CPCB)**  
Contributions in data/information on pollution abatement and water quality monitoring in the Basin
- **Centre for Ganga River Basin Management and Studies (cGanga)**  
Coordination and synergies of District Ganga Plan with the Ganga Basin Plan
- **Wildlife Institute of India (WII)**  
Coordination on biodiversity aspects, local awareness activities
- **National Institute of Urban Affairs (NIUA), MoHUA**  
Synergy with urban river management plan framework and urban river management plan for ULBs
- **National Institute of Hydrology, Roorkee, Ministry of Jal Shakti, Department of Water Resources, River Development and Ganga Rejuvenation, Govt. of India**  
Provide leadership in hydrology research through effective scientific solutions for achieving sustainable development and self-reliance of the water sector in India. Study scenarios of water resource availability under varying hydrological, climatic, sociocultural conditions through modelling techniques. Provide scientific advice to the various stakeholders on water related issues.

## Key stakeholders at state level

- **Uttar Pradesh Jal Nigam**

Will be primarily involved in water supply and liquid waste management planning component of the District Plans. It is also to be involved for designing and execution of projects related to faecal sludge and septage treatment facilities
- **Uttar Pradesh Pollution Control Board**

Provides recommendations and measures on matters concerning prevention and control of water & air pollution with the collection, compilation & preparation of data related to water & air pollution and organizing the IEC activities on the prevention, control of water & air pollution and waste management
- **Urban Development Department, Govt. of Uttar Pradesh**

Works to implement the major schemes by Urban Development Directorate
- **Department of Rural Development, Govt. of Uttar Pradesh**

Implements several programs in the area of self-employment, employment, rural housing, rural connectivity, village developments, etc. for rural economy and infrastructure development
- **Board of Revenue, Uttar Pradesh**
- **Uttar Pradesh Forest Department**

Implements the National Forest Policy in order to ensure the ecological stability through the protection and sustainable management of natural resources
- **Irrigation and Water Resources Department, Govt. of Uttar Pradesh**

Maintains information on hydropower projects, irrigation, water resources planning development and management
- **Remote Sensing and Application Centre, Uttar Pradesh**

Involve in geophysical surveys, soil and water testing techniques for assessment, monitoring, utilisation and management of various natural resources of the state with a view to achieve sustainable development. RSAC-UP is carrying out the work in crop area and production estimation of different crops, space based information support for decentralized planning, wetland inventory assessment, monitoring of integrated watershed, vulnerability assessment, desertification and land degradation, assessment of plantation, water sector restructuring, unauthorized colony mapping within the area of Development Authorities of U.P., asset mapping, ground water targeting, rural & urban planning including smart city and infrastructure planning.

- **State Water Resources Data Analysis Centre (SWaRDAC)**

SWaRDAC is technical arms of Uttar Pradesh Water Management and Regulatory Commission (UPWaMReC). It provides technical advice to commission and provides water related data to the SWaRA and other central/ state water plans for all river basins of the State.

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District Level

### **Key stakeholders at district level**

- **District administration authorities**

Law & order, planning, development, and management activities.

- **Urban local bodies (ULBs) falling in the district**

- **Nagar Nigam**

Planning, development, upkeeping and management activities.

- **Jal Nigam**

Jal Nigam is responsible for planning, survey, design and execution of urban as well as rural water supply and sewage schemes in the state of Uttar Pradesh. In addition to above the Nigam has also been authorized as a construction agency

- **Irrigation Department**

Canal Construction, tube wells, flood protection works and construction of reservoirs for the purpose of water conservation and generation of electricity and anti-erosion works.

- **Public Works Department**

Construction, maintenance and planning of roads, bridges and government buildings.

- **Division/ District Office of Environment, Forest and Climate Change Department**

Forest officers are responsible for the forests, environment and wildlife-related issues of forest.

- **ULBs, Shahjahanpur**

- **Agriculture Department**

The main work of Department is to encourage food & nutritional security. The department provides various schemes, public friendly plans, soil testing, seeds & pesticides and information about machines for agriculture and soil conservation schemes.

- **Industrial associations**

- **District Panchayat Raj Department**

The civic functions relating to sanitation, cleaning of public roads, minor irrigation, public toilets and lavatories, primary health care, vaccination, the supply of drinking water, constructing public wells, rural electrification, social health and primary and adult education, etc.

- **District Education Department**

Education laws, policies and regulations; Implementing approved education and sports development plans, strategies. And programmes.

- **District e-Governance Department**

National Informatics Centre (NIC) provides nationwide ICT infrastructure to support e-Governance services and various initiatives of Digital India in design, development and implementation of various e-Governance initiatives and Digital India programme.

- **Individual community representatives or organisations**

Local representatives of the community and involvement of community-based organisations (CBOs), non-governmental organisations (NGOs) or water user groups is essential to highlight the local concerns.

### 5.3 Existing policies and programs

#### **National Water Policy (2012)**

The National Water Policy (NWP) (2012) insists on incorporating a participatory approach in various aspects of planning, design, development and management of the water resources schemes with a view to eventually transfer the management of created facilities to the user groups/ local bodies. The NWP 2012 mandates the centre, the states, the local bodies to ensure access to a minimum quantity of potable water for essential health and hygiene to all its citizens, available within easy reach of the household. Second the women's special concern related to water remain subsumed under that of the household which is the officially recognized social unit in all the NWP documents.

The main objectives of this policy are:

- Ensure preservation and optimal utilisation of the available resources
- Qualitative improvement in water resource management
- Maintain surface and underground water quality
- Maintain ecological and environmental balance while developing water resources.



## National Water Mission

The main objectives of National Water Mission (NWM) are conserving water, minimizing wastage and ensuring more equitable distribution of water, both across and within states through integrated water resources development and management.

NWM has five goals as under:

- Comprehensive water database in public domain and climate change impact assessment on water resources.
- Promotion of citizen and state actions for water conservation, augmentation and preservation.
- Focused attention to vulnerable areas including over-exploited areas.
- Increasing water use efficiency by 20%, and
- Promotion of basin level integrated water resources management

**Budget allocation:** INR 50 crore budget allocated for research and development and implementation of NWM for the period 2023-24 (source: allsbe.pdf (indiabudget.gov.in) Item no.- 26, Page 221).

## National Hydrology Project

Objective is to improve the extent, quality and accessibility of water resources information and to strengthen the capacity of targeted water resources management institutions. The project involves modernizing the monitoring network, transforming knowledge access, enhancing analytical tools and modernizing institutions.

### **Achievements:**

- It establishes a nationwide 'Nodal' 'one point' platform for all states to collaborate and share data pertaining to water resources.
- Significant progress has been made in the fields of WRMS, WRIS, WROPS and WRICE.
- Nationwide repository of water resources data, NWIC has been established.
- Focusing on establishment of Real Time Data Acquisition System (RTDAS) on pan India basis.
- Integrated water resources management using cutting-edge technology.

**Budget allocation:** Total budget of INR 500.0 crores for National Hydrology Project and INR .3.95 crore for establishment of National Water informatics Centre (NWIC) for the period of 2023-24.

## Master plan for artificial recharge for groundwater in India

The revised master plan for artificial recharge to groundwater has been made for the whole country at the district and block level. The plan is macro-formulated to work out the feasibility of various structures for the different terrain conditions of the country and respective estimated cost.

**Budget allocation:** The total cost for implementation of this revised master plan is INR 1,33,529.69 Cr, with INR 96,735.45 Cr (72%) for rural areas and INR 36,794.23 Cr (28%) for urban areas.

### Achievements:

- Under Master Plan, an area of 11.23 km<sup>2</sup> has been identified for artificial recharge.
- The water required for artificial recharge has been worked out for each state. The surplus available for recharge after deducting the committed supply has been estimated for each State.

## State Specific Action Plan (SSAPs) for the water sector under NWM

The NWM is supporting states and UTs to formulate state specific action plans for the water sector. SSAP is a comprehensive policy for the promotion of basin level integrated water resource management. It is a multidisciplinary activity requiring active participation of all government departments related to water from supply side, demand side, governance side, technology side and environment and climate change perspective and also that of non-government agencies and citizens. Thus, the formulation of plans involves convergence and synergy of all governmental and non-governmental stakeholders.

**Budget allocation:** Uttar Pradesh State Government has approved 51 Lakhs for this plan.

## Jal Shakti Abhiyan

Focuses on saving and conserving rainwater. It involves the states and all stakeholders to create rainwater harvesting structures suitable to climatic conditions and sub-strata. It aims to accelerate water harvesting, conservation and bore well recharge activities in 256 water-stressed districts. to promote water conservation and water resource management by focusing on accelerated implementation of five targeted interventions viz. water conservation and rainwater harvesting, renovation of traditional and other water bodies, reuse of water and recharging of structures, watershed development and intensive afforestation. Besides, the special interventions included development of Block Water Conservation Plans and District Water Conservation Plans, Krishi Vigyan Kendra Melas, Urban Wastewater Reuse and 3D contour mapping of all villages.

### Achievements:

- Has delivered over 3.5 lakh water measures in 256 districts. Out of these, 1.54 lakh are of water conservation and rainwater harvesting measures, 20,000 related to the rejuvenation of traditional water bodies, over 65,000 are reuse and recharge structures and 1.23 lakh are watershed development projects.
- An estimated 2.64 crore people have already participated in the Abhiyan making it a Jan Andolan. (Source: reference note, Jal Shakti Abhiyan, 2019)

## National Policy for Women 2016

It is a generic policy framework that guides various sectors to issue more detail policy documents that are sector specific. The policy is created with a vision to build a society in which women attain their full potential and are able to participate as equal partners in all spheres of life and influence the process of social change. The mission is to create an effective framework to enable the process of developing policies, programmes and practices which will ensure equal rights and opportunities for women in family community, workplace and in governance.

### **Salient features of the National policy for women empowerment:**

- To create a society with women working as equal partners in all spheres of life
- To develop a framework to ensure equal rights and opportunities for women
- To carry out skill development and provide equal employment opportunities.
- To address all forms of violence against women

**Budget allocation:** The funds directed to women-only schemes in various ministries of the government together have increased from ₹11,388.41 crore in 2015-16 to ₹17,412.01 crore in 2016-17. Allocation for Women Training Programmes for women police officers increased from ₹12 lakh in 2015-16 to ₹16 crore in 2016-17. The overall budget for women is generally calculated as a combination of Part A (100% provision is for women) and Part B (allocations for women constitute at least 30% of the provision), which budget stands at ₹90,624.76 crore in 2016-17 as against ₹81,249.12 crore in 2015-2016 (source: <https://www.livemint.com/Home-Page/h0s3Phn00d6v2VK2DHio0L/Budget-2016-Mixed-bag-for-women.html>)

## Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)

The objective of this scheme is to provide up to 100 days of unskilled manual work in a financial year to every household in rural areas as needed resulting in the creation of productive assets. Another aim of MGNREGS is to create productive assets (such as roads, canals, ponds, wells) of prescribed quality and durability, strengthening the livelihood resource base of the poor, proactively ensuring social inclusion and strengthening Panchayati Raj Institutions (PRIs). Labour-intensive tasks like creating infrastructure for water harvesting, drought relief and flood control are preferred.

**Budget allocation:** The financial allocation under MGNREGS for financial year 2020-21 was enhanced from INR 61,500 crore at Budget Estimate stage to INR 1,11,500 crore at Revised Estimate stage. In financial year 2021-22, the financial allocation for MGNREGS was increased from INR 73,000 crore at Budget Estimate stage to INR 98,000 crore at Revised Estimate stage. (source: <https://rural.nic.in/en/press-release/allocation-funds-under-mgnregs#:~:text=The%20financial%20allocation%20under%20Mahatma,crore%20at%20Revised%20Estimate%20stage>)

## Mission Amrit Sarovar

Main objective of this mission is to harvest and conserve water for future generations. The purpose of this mission is conserving water as well as expediting the infrastructural projects with soil and silt from the ponds, generating employment opportunities, irrigation, augmentation of tourism, fisheries etc. The salient features of the Mission Amrit Sarovar is as follows:

- Every district of the country will construct or rejuvenate at least 75 Amrit Sarovars.
- Every Amrit Sarovar will have a pondage area of at least 1 acre with a water holding capacity of about 10,000 cubic meters.
- Every Amrit Sarovar will be surrounded by trees like Neem, Peepal and Banyan etc.
- Every Amrit Sarovar will be a source of generation of livelihoods by using the water for different purposes like irrigation, fisheries, duckery, cultivation of water chestnut, water tourism and other activities.

## AMRUT

Atal Mission for Rejuvenation and Urban Transformation (AMRUT) focuses on developing basic urban infrastructure in water supply sectors with the expected outcome of universal access to portable water for every household in mission cities. The AMRUT 2.0 scheme was launched for 5-year period (FY 2021-22 to 2025-26). The purpose of Atal Mission for Rejuvenation and Urban Transformation (AMRUT) is to:

- Ensure that every household has access to a tap with the assured supply of water and a sewerage connection.
- Increase the amenity value of cities by developing greenery and well-maintained open spaces (e.g. parks) and

### Achievements:

- The scheme has provided 79 lakhs of household tap water connections and 45 lakhs of sewer connections.
- The scheme promoted energy efficiency by replacing 76 lakhs of streetlights with energy efficient LED streetlights

**Budget allocation:** AMRUT 2.0 outlay - ₹2,99,000 crore including Central outlay of ₹76,760 crore for five years. This outlay includes funding of ₹22,000 crore (₹10,000 crore as Central Assistance) for ongoing projects of AMRUT till March 2023.

Against the total plan size of INR .77,640 crore of all the SAAPs (State Annual Action Plans), INR .39,011 crore (50%) has been allocated to water supply, INR .32,456 crore (42%) to sewerage and septage management, INR .2,969 crore (4%) storm water drainage projects. The Government of India has so far allocated INR 39,011 crore for drinking water supply projects and INR 32,546 crore for sewerages and septage projects under the scheme.

**Budget 2023-24:** Urban Rejuvenation Mission - 500 Cities (under AMRUT) is INR 8000.0 Crore. [for-women.html](#))

## **Programmes under Tourism Dept., Govt. of Uttar Pradesh**

The tourism Dept. of Uttar Pradesh had a budget of 2.10 Cr for Ghat beautification near Hanumat dham near Khannaut river.

## **Projects under Nagar Vikas Nigam / Jal Nigam**

Various projects at District level were taken up by the Govt. of Uttar Pradesh under Nagar Vikas Nigam/Jal Nigam.

- Construction of 32 KLD faecal sludge treatment plant on a budget of 5.23 Cr.
- Construction of a Central sewerage zone on a budget of 377.51 cr under sewerage scheme.
- Construction of RCC nala near Roja Mathiya Colony on a budget of 1.10 cr.
- Construction of RCC nala near CHINNAUR on a budget of 1.65 cr.
- Construction of 130 TPD capacity of solid waste management plant on a budget of 12.69 cr.
- Construction of nala from Madrakhel to Garra river on a budget of 6.55 cr.
- Construction of nala in Bahadurpura on a budget of 1.49 cr.
- Construction of RCC SW drain from Shiv Mandir to Bhuyyar Baba Mandir on a budget of 0.81 cr
- Amrut payable water yojana phase -2 on a budget of 32.60 cr.
- Nagar Vikas Nigam/Jal Nigam, Deen Dayal Upadhaya Nagar Vikas Yojana payable water yojana zone 4a, on a budget of 4.95 cr.

## **Swachh Bharat Mission**

Swachh Bharat Mission (SBM) was launched with two components: SBM (Gramin) and SBM (Urban). The Mission aims to construct household and community owned toilets, their usage and Solid and Liquid Waste Management (SLWM) for achieving Open Defecation Free (ODF) Plus India. The rural component is implemented by the Department of Drinking Water and Sanitation, the urban one is implemented by the Ministry of Housing and Urban Affairs. The government made a provision of INR 12,000 per toilet as financial incentive for promoting the toilet construction and its usage.

Urban Swachh Bharat Mission 2.0 was launched in October, 2021 with the mission to make all our cities 'Garbage Free'. SBM-Urban 2.0 will focus on:

- i. sludge management,
- ii. waste-water treatment,
- iii. source segregation of garbage,
- iv. reduction in single-use plastics and
- v. control of air pollution caused by construction, demolition, and bio-remediation of dumpsites.

**Achievements:**

- Under SBM (Gramin), 10.28 crore toilets have been constructed in 36 states/UTs. 603,175 villages were declared open defecation free in five years.
- More than 30 crore people participated in the behaviour change campaigns.
- On 2020, an Audio-Video Experience Centre, Rashtriya Swachhata Kendra (RSK) has been set up in New Delhi to bring to the people the unique story of continuous promotion for cleanliness and the success of Swachh Bharat Mission.
- SBM-Urban aims at making urban India free from open defecation and achieving 100% scientific management of municipal solid waste in 4,000+ towns in the country. Construction of 66 lakh individual household toilets (IHHLs) was conducted by October 2, 2019 under SBM Urban. However, this target was then lowered to 59 lakh IHHLs by 2019. This target was achieved by 2020
- 55 crore people changed their behaviour and started using toilets. With the attainment of Swachh Bharat, there has been a significant reduction in water and sanitation related diseases. The Swachh Bharat Mission has resulted in an annual profit of more than INR 50,000 per household in rural India. (source: <https://pib.gov.in/FactsheetDetails.aspx?Id=148579>)

**Budget allocation:**

SBM (Rural) - INR 7192.0 crore for the year 2023-24

SBM (Urban) – INR 5000.0 crore for the year 2023-24

**Namami Gange Mission**

Namami Gange Programme is an integrated conservation mission to accomplish the twin objectives of effective abatement of pollution, conservation and rejuvenation of National River Ganga. It is being operated under the Department of Water Resources, River Development and Ganga Rejuvenation, Ministry of Jal Shakti and implemented by the NMCG, and its state counterpart organisations i.e. State Programme Management Groups (SPMGs). Considering the need and spread of the programme, Govt. of India has further approved Namami Gange Mission –II.

**Achievements:**

- 374 projects on cleaning the main stem of river Ganga and its first order tributaries are taken up along the main stem towns of river Ganga and 15 tributaries. Out of these 374 projects, 210 projects are completed and the remaining projects are at various stages of completion.
- 49 sewage management projects are under implementation and 98 sewage projects have been completed in 9 states. 28 sewage projects are under tendering and 1 new sewage projects launched in these states. Work is under construction for creating a sewerage capacity of 5175.87 (MLD).



- Construction and modernisation of 70 Ghats/Crematoria and renovation of 267 Ghats/Crematoria and Kunds/Ponds have been initiated.
- Projects to develop science - based aquatic species restoration plan for Ganga river along with conservation & restoration of aquatic biodiversity.
- A series of public outreach and community participation activities such as events, workshops, seminars, conferences and numerous IEC activities were organized. Various awareness activities through rallies, campaigns, exhibitions, shram daan, cleanliness drives, competitions, plantation drives and development and distribution of resource materials were organized and for wider publicity the mass mediums such as TV/Radio, print media advertisements, advertorials, featured articles and advertorials were published.
- Regulation and enforcement through regular and surprise inspections of GPIs is carried out for compliance verification against stipulated environmental norms. Action has been taken against 110 non-complying GPIs and are issued closure directions. Online Continuous Effluent Monitoring Stations (OCEMS) connectivity established to CPCB server in 885 out of 1072 GPIs.
- 1674 Gram Panchayats of 5 Ganga basin States have been identified for construction of toilets. Out of the targeted 1,527,105 units, MoDWS has completed construction of 853,397 toilets. Preparation of Ganga river basin Plan and development of 65 model villages is under progress.

**Budget allocation:**

Namami Gange Mission –II: INR 22,500 Cr. budgetary outlay till 2026<sup>24</sup>.

National Ganga Plan under NGM-II: INR 4000 Cr budget for FY 2023-24<sup>25</sup>

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<sup>24</sup> Source: <https://pib.gov.in/PressReleaselframePage.aspx?PRID=1739094>

<sup>25</sup> Source: <https://www.indiabudget.gov.in/doc/eb/allsbef.pdf>

# **C** Stock Taking and Analysis of Key Issues Section for this Planning Cycle

## **6 Summary of the achievements in the previous planning period**

As the current District Ganga Plan is prepared for the 1st planning cycle, this section is not a part of the DGP; ongoing actions are mentioned in chapter 7 and prior work feeding into the GDP is mentioned in chapter 1.2.

There are several other existing plans on the district level which contribute to the rejuvenation and protection of the rivers in the district. The District Environment Plan focuses on conservation of the environment and natural resources including the assessment, mitigation and monitoring of adverse impacts of various pollution sources at district level. District Irrigation Plans focus on an efficient storage and allocation of the available water resources and the recently drafted 2016. PCB Action Plans for the major rivers in the district including action plans for pollution abatement. This DGP has been developed in line with these plans and partially builds on information collected (in chapter 7) and actions suggested (in chapter 8) from these plans. The selected information has been sorted according to the key issues identified in this DGP.

## **7 Prioritised issues & gaps that will be addressed in this RBM cycle**

### **7.1 Situation analysis, key issues, and ongoing actions**

Rapid urbanisation has put stress on its already existing problems of land, housing, water supply usage, sanitation and health facilities which led to development of domestic and commercial infrastructure in a haphazard and unplanned manner. Unavailability of sewage treatment facilities adds to the problem of sewage treatment and disposal. Usage of chemical fertilizers, pesticides and their run-off from agricultural fields creates both land and water pollution. Uncontrolled garbage dumping near river bodies like Garra and Khannaut contributes further to the pollution. The drainage network in the city is old and outdated and many portions are dilapidated which causes sewage/ sullage stagnation and water pollution.

The issues existing in the district are classified into 4 clusters:

1. water quality
2. water quantity
3. ecological integrity
4. capacity building and public participation.

## 7.1.1 Water quality

### Point source pollution

#### Domestic sewage and sanitation / septage - Contamination of surface water

##### Total sewage generation

- Average water supply rate from ULB and Non-ULB sources – 149.5 lpcd<sup>26</sup>
- Total sewage generation - 42.58 MLD<sup>27</sup>
- Per capita sewage generation- 119.62 lpcd<sup>28</sup> (Calculated based on 2011 census)
- No sewage collection in the district
- Means of wastewater disposal: river disposal
- Name of river for wastewater disposal: Khannaut & Garra
- Number of untapped drains or nallah for wastewater disposal: 17
- Entire district has 928.96 km<sup>29</sup> long concrete drainage system out of which 55 km lies at Shahjahanpur city which is old, outdated and dilapidated causing sewage/ sullage stagnation and water pollution.

##### Treatment facilities

- There are no STPs at present in the district and all drains are directly discharged to Garra and Khannaut without any kind of treatment.
- There are about 17 untapped sewer drainage discharge points at the Garra river and Khannaut and since these are two of the major rivers in the district, it contributes to the surface and groundwater pollution.
- One STP with 40 MLD capacity is under construction at Keruganj, Shahjahanpur it will cater 70% area of the Shahjahanpur municipality.
- 45 km out of total planned 186 km long drainage network is under construction.
- One private FSTP with 32 KLD capacity is operating at City Park Colony, Lodhipur (constructed under AMRUT funding, UP Jal Nigam).
- The wet waste to compost plant is under construction
- There are no e-waste and biomedical waste processing units in the district.

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<sup>26</sup> 066\_GBP\_IIT\_EQP\_SR\_16\_Ver-1\_DEC-2014.pdf (cganga.org) – Page 11

<sup>27</sup> CONTROL OF URBAN POLLUTION (cpcb.nic.in)

<sup>28</sup> CONTROL OF URBAN POLLUTION (cpcb.nic.in)

<sup>29</sup> Source: Drainage | Official website of Irrigation and Water Resources Department, Ministry of Jal Shakti, Government of Uttar Pradesh, India. (idup.gov.in)

## Water quality

- According to limits set by CPCB under “Designated Best use” criteria, the BOD (mg/l) of water under the D/S Ramganga FBD road bridge, Shahjahanpur is within the desirable limit.
- DO is above required level of 4mg/l and ranges up to 10.1 mg/l. During pre-monsoon period and monsoon to post-monsoon period, it is >4 mg/l.<sup>30</sup>
- Faecal coliform is beyond desirable limit of >2500 mpn/100 ml and it ranges between >3300 mpn/100 ml (pre-monsoon, 2022) to 8400 mpn/100 ml (Monsoon, 2022). Average value of total coliform are also above 5000 mpn/100 ml except it is <5000 mpn/100 ml in the month of October and December (2022) in the river water sample collected from D/S Ramganga FBD road bridge, Shahjahanpur by UPPCB

The water quality of Ramganga river tributary at D/S Ramganga FBD road bridge, Shahjahanpur is not within the desirable limits set by CPCB under “Designated Best use” criteria. The yearly average water quality data of UPPCB is given in Table 8 Per capita pollution load contribution (domestic)<sup>31</sup>

| BO          | DO           | TK          |
|-------------|--------------|-------------|
| 9614.8 kg/d | 16345.1 kg/d | 1923.0 kg/d |

## Sanitation coverage including type, function status and usage of toilets<sup>32</sup>

- About 1,160 community sanitary complexes and 30 community soak pits have been constructed.
- 2811 households were given toilet under IHHL (Individual Household Latrine)/ under Swachh Bharat, 101 community toilets, 220 public toilets and 50 soak pits constructed under Swachh Bharat
- Shahjahanpur district is declared as ODF ++ which indicates 100% of households have a toilet facility. (All households located within 500 m radius of community toilet is considered as HH with toilet facility, even though all of the HH may not have own individual toilet facility)
- Out of 527,501 households, only 395,136 households have constructed toilets. This gap results in pollution of land and watercourses and several diseases.
- Every HH has to provide connection in rural area under Jal Jeevan mission
- Jal Jeevan Mission aims to connect about 2 lakh village households spread across 607 villages by the year 2024

<sup>30</sup> [http://www.uppcb.com/pdf/Ramganga\\_080922.pdf](http://www.uppcb.com/pdf/Ramganga_080922.pdf)

<sup>31</sup> [066\\_GBP\\_IIT\\_EQP\\_SR\\_16\\_Ver-1\\_DEC-2014.pdf](http://066_GBP_IIT_EQP_SR_16_Ver-1_DEC-2014.pdf) (cganga.org) Page 11

<sup>32</sup> <https://sbm.gov.in/odfplusdashboard/phasell/DistrictsDashboard.aspx>

**Percentage Households dependent on onsite sanitation systems (complete septic tanks with soak pits/ only pits/direct discharge in drains)<sup>33</sup>**

- District is declared as ODF ++ which indicates 100% households have a toilet facility
- 1160 community sanitary complex and 30 community soak pits constructed
- 2811 households provided with toilets under IHHL (Individual Household Latrine)/ Swachh Bharat
- 101 community toilets, 220 public toilets and 50 soak pits constructed under Swachh Bharat

**Number of drains tapped in the STP/SPS/MPS<sup>22</sup>**

- There are no STPs at present in the district and all drains are directly discharged to River Garra and Khannaut without any kind of treatment.

**Number of drains tapped in the STP/SPS/MPS<sup>22</sup>**

- There are about 17 untapped sewer drainage discharge points at the Garra and Khannaut rivers. Since these are the major rivers in the district, it contributes to surface and groundwater pollution.
- There is no separate storm water drain in entire Shahjahanpur city

**Volume of untreated sewage in each of the drains<sup>22</sup>**

- Bar screen attached with 17 nos. drainage discharge point at Garra and Khannaut Removing large objects and plastics is not sufficient to meet the discharge standards in the river.
- Shahjahanpur city, situated on the river Ramganga, uses ground water as the sole source for meeting the domestic demand.

Table 13: Sewage fact sheet of Shahjahanpur district<sup>34</sup>

|   |   |
|---|---|
| Surface Water Supply (MLD)                                  | Nil   |
| Ground Water Supply (MLD)                                   | 52  |
| Number of Bore Wells  | 19  |
| Ground Water Extraction per Bore Well (MLD)                 | 2.737   |
| Number of Hand Pumps/ tube wells                            | 2500  |
| Ground Water Extraction per Hand Pump (lpcd)                | 500   |
| Average Water Supply Rate from ULB Sources (lpcd)           | 146.03  |
| Average Water Supply Rate from ULB & Non-ULB Sources (lpcd) | 149.5   |
| Total Water Supply from ULB and Non-ULB Sources (MLD)       | 44.9  |
| Total Sewage Generation (MLD)* (TBC)                        | 42.5835   |
| Per Capita Sewage Generation (lpcd)                         | 119.62 lpcd <sup>36</sup> (Calculated based on 2011 census) |
| Sewage Collection (MLD)                                     | Nil   |
| Percentage of Sewage Collection (%)                         | Nil   |

Figure 21 shows the ground water extracted and the corresponding sewage generated in Shahjahanpur city.

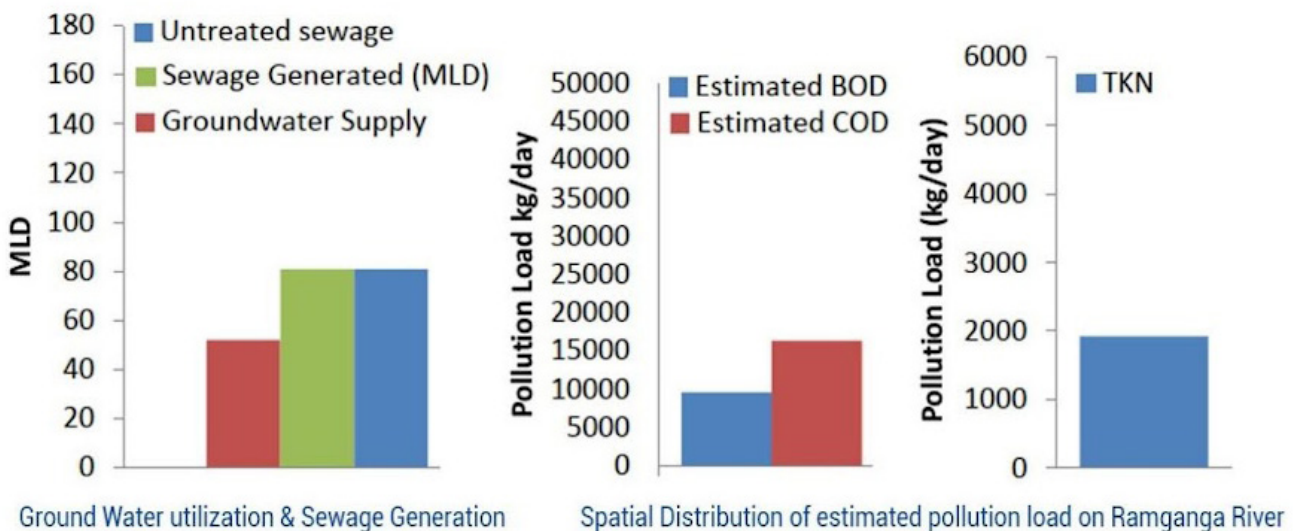


Figure 21: Ground water extraction vs sewage generation from Shahjahanpur district<sup>37</sup>

<sup>34</sup> Source: 066\_GBP\_IIT\_EQP\_SR\_16\_Ver-1\_DEC-2014.pdf (cganga.org)



The main discharge into the river Ramganga occurs in Shahjahanpur city. There are 17 sewer drains which are originated from Shahjahanpur city and discharging to Garra and Khannaut River.

Table 14: Discharge of untapped drains in Shahjahanpur

| S. No. | Drain Location                   | Drain Width (in m) | Drain Total Depth (in m) | Estimated Drain Discharge (in mld) | Drain Total Depth (in m) |
|--------|----------------------------------|--------------------|--------------------------|------------------------------------|--------------------------|
| 1      | Maghaitola                       | 4.5                | 2                        | 2.4                                | Khannaut                 |
| 2      | Roshanganj (D/S at Hanumat Dham) | 4.5                | 3                        | 3.5                                | Khannaut                 |
| 3      | Husainpura at Hanumat Dham       | 0.6                | 0.6                      | 0.5                                | Khannaut                 |
| 4      | Hanumat Dham                     | 3                  | 1.2                      | 1                                  | Khannaut                 |
| 5      | Banka Ghat (Left)                | 3                  | 3                        | 2                                  | Khannaut                 |
| 6      | Banka Ghat (Right)               | 1                  | 1.5                      | 0.5                                | Khannaut                 |
| 7      | Lodhipur Pul                     | 7                  | 1.8                      | 3.9                                | Khannaut                 |
| 8      | Mahmuriya/ Jalalnagar            | 5                  | 4                        | 4                                  | Garra                    |
| 9      | Chhota Kakra                     | 3                  | 3                        | 4                                  | Garra                    |
| 10     | Yunush Khel                      | 4                  | 2.5                      | 5.6                                | Garra                    |
| 11     | Azeez Ganj                       | 2                  | 4                        | 1.3                                | Garra                    |
| 12     | Roza/Ahmadpur Reti               | 3                  | 2                        | 1.3                                | Khannaut                 |
| 13     | Fattepur Rati                    | 1.5                | 2                        | 0.4                                | Khannaut                 |
| 14     | Khwaja Firoz                     | 1.4                | 1.5                      | 0.7                                | Khannaut                 |
| 15     | Dalel Ganj                       | 2                  | 1.55                     | 1.3                                | Khannaut                 |
| 16     | Saray Kaiyan Police Chowki       | 3                  | 3.5                      | 2.1                                | Khannaut                 |
| 17     | Rambag Mishripur                 | 2.6                | 1.5                      | 0.5                                | Khannaut                 |
| Total  |                                  |                    |                          | 35                                 |                          |

## Number and location of drains directly discharging in the river including information on the volume of untreated sewage<sup>22</sup>

There are almost 17 nos. untapped sewer drainage discharge point at Garra and Khannaut river. Drain wise discharge is given at Table 14.

## Number of drains with bar screen<sup>22</sup>

All the untapped drainage discharge points at the Garra river pass through bar screens to remove large objects and plastics, from wastewater. But this method not sufficient to meet the discharge standards in the river.

## Remedial measures taken for the treatment of untreated drains<sup>22</sup>

- Bar screen attached with each drain to remove large objects and plastics is not sufficient to meet the discharge standard in the river
- Weekly cleaning of bar screen is carried out
- Regular cleaning of city drains is carried out
- One STP with 40 MLD capacity is under construction at Keruganj, Shahjahanpur it will cater 70% area of the Shahjahanpur municipality. However, there is one private FSTP with 32 KLD capacity is operating at City Park Colony, Lodhipur.
- DPR preparation is under process to augment bio-remediation in Unis Khel drain

Figure 22:  
Consultation  
with Municipal  
Commissioner



Figure 23:  
Consultation  
with Jal Nigam  
(Urban)



Figure 24:  
Consultation  
with DGC,  
Shahjahanpur



Figure 25:  
Consultation  
with SMCG, UP



### Sewerage network system and number of connected households<sup>22</sup>

- Out of 186 km, 45 km is planned for construction of long drainage network, which will serve the demands of 80% of the households in the city.
- Entire district has 55 km. long concrete drainage system which is old, outdated and dilapidated which causes sewage/ sullage stagnation and water pollution

### % of treated sewage recycled / type of use<sup>22</sup>

There is no STP at present. All drains are directly discharging to river Garra and Khannaut without any kind of treatment.

### Encroachment sites in urban areas (no. and length)<sup>22</sup>

Encroachment reported on river side setback zone (balm land) at Aziz Nagar and Lodhipur bridge over Khannaut river.

Figure 26:  
Encroachment  
on river  
Poramboke near  
Rajghat



Figure 27:  
Encroachment  
on Garra river  
near Aziz Nagar  
Bridge



## Industrial pollution – contamination of surface water in urban areas

### Total number of polluting industries sector-wise highlighting grossly polluting industries<sup>38</sup>

- There are 3 major industrial areas in the district, namely – Roza, Tilhar and Powayan<sup>39</sup>
- There are 10,063 registered industrial units.
- There are 9 GPIs in the district, where each of them has ETPs with a total capacity of 25.34 MLD.

Table 15: GPIs in the Shahjahanpur district

| Sl. No. | Name of Industry  | Type       | ETP Capacity (KLD) | Treatment (KLD) | Effluent Discharge (KLD) |
|---------|---|------------|--------------------|-----------------|--------------------------|
| 1       | Bajaj Hindustan Ltd. (Sugar Unit), Unit Maqsudapur, Block Banda, Shahjahanpur | Sugar      | 1000               | 1000            | 1000                     |
| 2       | Kisan Sahkari Chini Mills Ltd., Tihar, Shahjahanpur                           | Sugar      | 500                | 500             | 250                      |
| 3       | Dalmiyan Chini Mills, Nigohi, Shahjahanpur                                    | Sugar      | 3200               | 1500            | 1450                     |
| 4       | K.R. Pulp & Papers Ltd. (Unit I) Shahjahanpur                                 | Paper      | 2100               | 1500            | 1200                     |
| 5       | K.R. Pulp & Papers Ltd. (Unit II) Shahjahanpur                                | Paper      | 12000              | 8000            | 5000                     |
| 6       | Kribhco Fertilizers Ltd., Piprola, Shahjahanpur                               | Fertilizer | 4320               | 3600            | 1000                     |
| 7       | Rosa Power Supply Co. Ltd., (Stage- I & II), Roza Shahjahanpur                | Power      | 720                | 720             | Zero                     |
| 8       | Avadh Sugar & Energy Unit, Roza, Shahjahanpur                                 | Sugar      | 1000               | 900             | 450                      |
| 9       | Kisan Sahkari Chini Mills Ltd., Puwayan, Shahjahanpur                         | Sugar      | 500                | 500             | 250                      |
|         |   | TOTAL      | 25340              | 18220           | 10600                    |
|         |   | in MLD     | 25.34              | 18.22           | 10.6                     |

<sup>38</sup> [http://www.uppcb.com/pdf/rwq\\_180216.pdf](http://www.uppcb.com/pdf/rwq_180216.pdf)

<sup>39</sup> DIP Shahjahanpur VK Bhatt AD EI.pdf (dcmsme.gov.in)



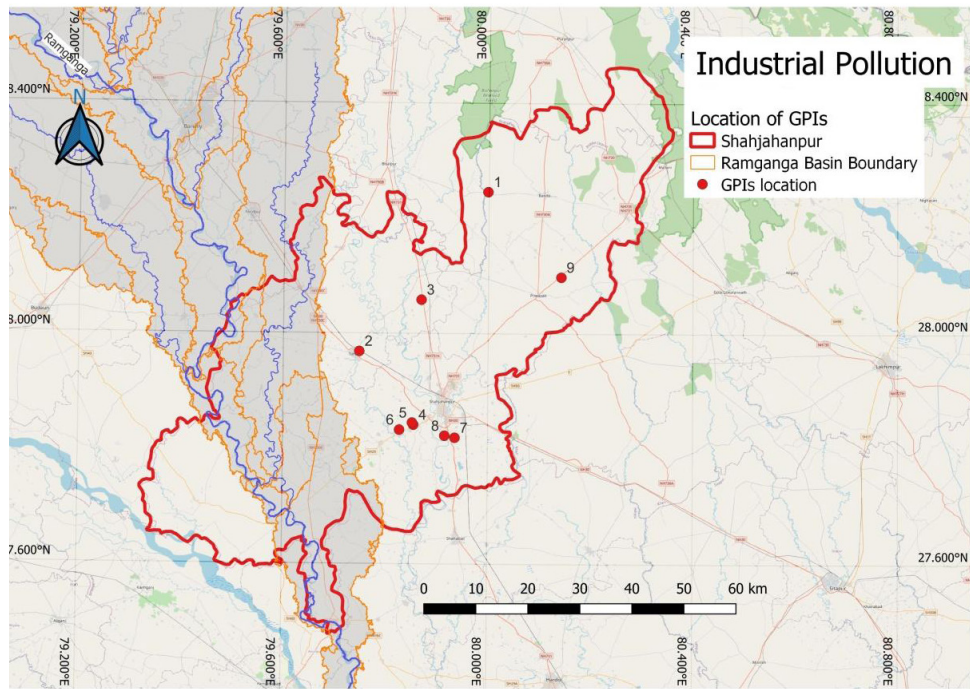


Figure 28: Location of GPIs in Shahjahanpur District as per SL No.

One of the concerning GPIs, as observed, is from KR Pulp and Papers mill located at Rampura village, Sadar Tehsil, Shahjahanpur district connected with Ramganga at HarDOI District



Figure 29: Effluent discharge from KP Pulp and paper mill

Figure 30:  
Wetland



Figure 31: STP construction and laying of underground sewer line in progress



#### **Total industrial effluents generated<sup>40</sup>**

There are 9 GPIs in the district, where each of them has ETPs with a total capacity of 25.34 MLD.<sup>41</sup>

#### **Total capacity of treatment facilities available and its utilisation<sup>25</sup>**

Each of the 9 GPIs has ETP with cumulative treatment capacity of 25.34 MLD.

#### **Number of ETPs/CETP installed and functioning condition in the district<sup>25</sup>**

There are no CETP installed in the district at present

#### **Status of connectivity of ETPs with CETP/ untreated discharge in drains<sup>25</sup>**

There are no CETP installed in the district at present.

#### **Existing law enforcement instruments / policies**

- Industries in operation without consent under Water (Prevention and Control Pollution) Act, 1974 and Air Act 1981 directed to UEPPCB to obtain consent, otherwise closure
- Hazardous & Other Waster (Management & Transboundary Movement) Rules 2016
- Effluent outlet standards prescribed under Environment (Protection) Rules 1986
- Charter for Prevention and Control of Pollution on Pulp and Paper Industries 2015
- Solid Waste Management Rules 2016

#### **Water quality (indicator parameter BOD, COD and DO and parameters of main concern) downstream of major industrial pollution stretches**

The water quality of Ramganga river tributary at D/S Ramganga FBD road bridge, Shahjahanpur is not within the desirable limits set by CPCB under “Designated Best use” criteria. The yearly average water quality data of UPPCB is given in Table 8.

- According to limits set by CPCB under “Designated Best use” criteria, the BOD (mg/l) of water under the D/S Ramganga FBD road bridge, Shahjahanpur is within the desirable limit.
- DO is above required level of 4mg/l and ranges up to 10.1 mg/l. During pre-monsoon period and monsoon to post-monsoon period, it is > 4mg/l. 42
- Faecal coliform is beyond desirable limit of >2500 MPN/100ml and it ranges between >3300 mpn/100ml (pre-monsoon, 2022) to 8400mpn/100ml (Monsoon, 2022). Average value of total coliform is also above 5000mpn/100ml except it is <5000 MPN/100ml in the month of October and December (2022) in the river water sample collected from D/S Ramganga FBD road bridge, Shahjahanpur by UPPCB

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<sup>40</sup> DEP Shahjahanpur

<sup>41</sup> Source: List of GPIs and attached ETP data provided by CPCB



## Water pollution through municipal solid and biomedical waste

Municipal solid and biomedical waste generation trends and typology of waste<sup>25</sup>

Shahjahanpur district's population is projected to increase at 19.9%/ decade, which will also lead to an increase in municipal solid waste generation.

- Currently, the district produces approximately 413.15 tonnes per day municipal waste and only 35% of the population practices segregation of waste.
- Approximately 1200 kg/day biomedical waste is generated in the district where the treatment capacity is 150 kg/hr (3600 kg/day).

Table 16: Current status related to solid waste management

| Sl. No. | Name of Industry                                     | No. of Wards | No. of House-holds | Population | Solid Waste Generation per day |
|---------|--|--------------|--------------------|------------|--------------------------------|
| 1       | Municipal corporations<br>Shahjahanpur (Nagar Nigam) | 60           | 76,349             | 392,437    | 143.68                         |
| 2       | Municipalities (Nagar Palika)                        | 75           | 23,605             | 127,617    | 30.04                          |
| 3       | Nagar Panchayat (Town Area)                          | 65           | 19,243             | 106,194    | 22.24                          |

| Sl. No. | Name of Industry             | No. of Wards | No. of House-holds | Population | Solid Waste Generation per day |
|---------|------------------------------|--------------|--------------------|------------|--------------------------------|
| 1       | Block/ Taluk/ Mandal Tehsils | 15           | 411,982            | 2,336,585  | 217.19 t                       |
| 2       | Village/ Gram Panchayats     | 1069         | 411,982            | 2,336,585  | 217.19 t                       |

Source: DEP Shahjahanpur

**Disposal practices (% of unregulated disperse, informal dump sites, official collection spots, good and bad practices)<sup>25</sup>**

- Aquatic pollution because of indiscriminate dumping of municipal solid and biomedical waste into river water or waterbody.
- River water pollution due to throwing of vegetable waste and packaging materials from the sabji mandis and vending units operating on dilapidated bridge located at Raj Ghat on Garra river.
- Dumping of solid wastes on riverbanks of Garra and Khannaut rivers by local residents/ shop owner from ROB at Lodhipur, Aji Ganj bridge; Subhas Nagar bridge; Keruganj bridge adds to water pollution.
- Waste segregation at source is practiced only by 35% household
- Manual sweeping is being carried out at Shahjahanpur city
- 48 waste collection and segregation shed and 260 community compost pits
- 90% of block/ wards are covered under door-to-door collection of wastes
- Purchase of 135 e-rickshaw vehicles is in progress
- Information, Education & Communication (IEC) activities are being carried out
- One disposal centre available

Figure 32:  
Indiscriminate  
disposal of  
municipal waste  
from bridges  
over Garra &  
Khannaut



Figure 34: Cattle  
bathing on  
Khannaut river  
near Rajghat



Figure 33:  
Debris of old  
Lodhipur bridge



### Treatment facilities, their capacities and functioning conditions

- 48 waste collection and segregation sheds, 260 community compost pits, deposition centres<sup>43</sup>.
- As only 35% households follow source segregation practice in the district, the wet and dry wastes are not processed properly.
- The wet waste to compost plant which was supposed to start from March 2022 is still under construction
- Compost site is still under construction
- Shahjahanpur MS is operating one waste segregation unit at Jail road near fire station and one Material Recovery Facility (MRF) Centre at Kakra, Shahjahanpur.
- Few volunteers with motivational support from municipal authority are organizing an awareness programme on river cleaning twice a month at Raj Ghat area.
- There are no e-waste processing units in the district.<sup>44</sup>



Figure 35: Waste segregation unit at Jail Road near fire station

### **Total solid waste generated in main cities / entire district<sup>25</sup>**

Waste generation rate in the Shahjahanpur district is 413.15 TPD municipal ward wise generation details is given at Table 16.

### **Legacy waste sites (number and size)<sup>25</sup>**

There are no legacy dump sites in the district.

### **Segregation at source / waste collection & transportation / processing capacity/ disposal and recycling facilities<sup>25</sup>**

- There are 48 waste collection and segregation sheds, and 260 community compost pits in the district.
- 35% of the population practices waste segregation at source and actions are now being taken to reach 100% waste segregation at individual household level.
- 135 e-rickshaw vehicles are purchased, IEC activities are being initiated, sufficient trolleys and mini collection trucks are available for efficient waste collection and transportation.
- One deposition centre and another implement adequate system are present, however the number has to be increased for an effective waste management system.

### **Interventions and actions to improve solid waste management<sup>25</sup>**

- Extensive IEC activities are being carried out.
- Fine/penalty on defaulters shall be imposed.
- Activities like Nukkad Natak and Music shows shall be conducted for communities and public awareness.
- The gap of 20% in sweeping will be met out by mechanical road sweeper.
- To install adequate number of bulk generators, notices for the compliances of the same are already issued but Bulk Generators are still not processing their wet & dry Waste at Source. Final notice for the compliance needs to be issued again.
- Wet waste to compost plant is proposed and has been approved by the district level committee.
- MRF centre is functional with NGO and linkage with PW recyclers will be made.
- Plastic waste is being handed over to Nagar Nigam Shahjahanpur at district level cement plants for processing.
- Management plan for C&D waste.
- Uses of recycle C&D waste in non-structural concrete paving blocks lower layer of road paramount colony and rural road will be included in the policy through board of ULB.



## Non-point source pollution

### Rural & urban sanitation: Contamination of surface and groundwater

#### Number of villages/ULBs and their total households

- MC (60 Nos. Wards)- 76,349 (HH);
- Municipalities (75 nos. Wards – 23,605 (HH);
- Nagar Panchayat (65 Nos. wards)- 19,243 (HH).

The data has been summarized in the table below.<sup>25</sup>

Table 17: No of wards and households in the district

| Sl. No. | Urban Local Bodies                                   | No. of ULBs <sup>45</sup> | No. of Wards | No. of Households | Population |
|---------|--|---------------------------|--------------|-------------------|------------|
| 1       | Municipal corporations<br>Shahjahanpur (Nagar Nigam) | 1                         | 60           | 76,349            | 3,92,437   |
| 2       | Municipalities (Nagar Palika)                        | 3                         | 75           | 23,605            | 1,27,617   |
| 3       | Nagar Panchayat (Town Area)                          | 6                         | 65           | 19,243            | 1,06,194   |

#### Household sanitation coverage by type of sanitation

- District is declared as ODF ++ which indicates 100% household has toilet facility
- 1160 community sanitary complex and 30 community soak pits constructed
- 2811 households provided with toilets under IHHL (Individual Household Latrine)/ Swachh Bharat
- 101 community toilets, 220 public toilets and 50 soak pits constructed under Swachh Bharat

#### Amount and type (black, grey, mix, storm) of wastewaters draining into rivers

- The drainage network in the city is old and outdated and many portions are dilapidated which causes sewage/ sullage stagnation and water pollution.
- There are about 17 untapped sewer drainage discharge points at the Garra river and Khannaut and since it is one of the major rivers in the district, it contributes to the surface and groundwater pollution.
- Total sewage generation – 42.58 MLD<sup>46</sup>

<sup>45</sup> Nagar Nigam/N.P.P./N.Panchayat | District Shahjahanpur, Government of Uttar Pradesh | India

<sup>46</sup> 066\_GBP\_IIT\_EQP\_SR\_16\_Ver-1\_DEC-2014.pdf (cganga.org)

- Per capita sewage generation – 119.62 LPCD
- Pollution load (domestic) - Per capita contribution (kg/d) – BO- 9614.8// CO-16345.1// TK- 1923.0
- Wastewater disposal means – river disposal
- Name of river/streams for wastewater disposal - Khannaut & Garra
- Number of drains/nallah for wastewater disposal - 17

### Agricultural runoff: Growing pollution from agricultural chemicals

#### Land under agriculture<sup>47</sup>

- 607,162 ha of land in the district is under agriculture.
- Cultivable area – 3,49,958 ha
- Net sown area – 3,49,958 ha
- Gross cropped area – 61,258 ha
- Cropping intensity % - 175.04
- Area under wheat crop is 2,52,570 ha and yield of the crop is 30.3 q/ha.
- The second main crop is paddy, grown over an area of 2,09,742 ha with an average productivity of 23.59 q/ha.

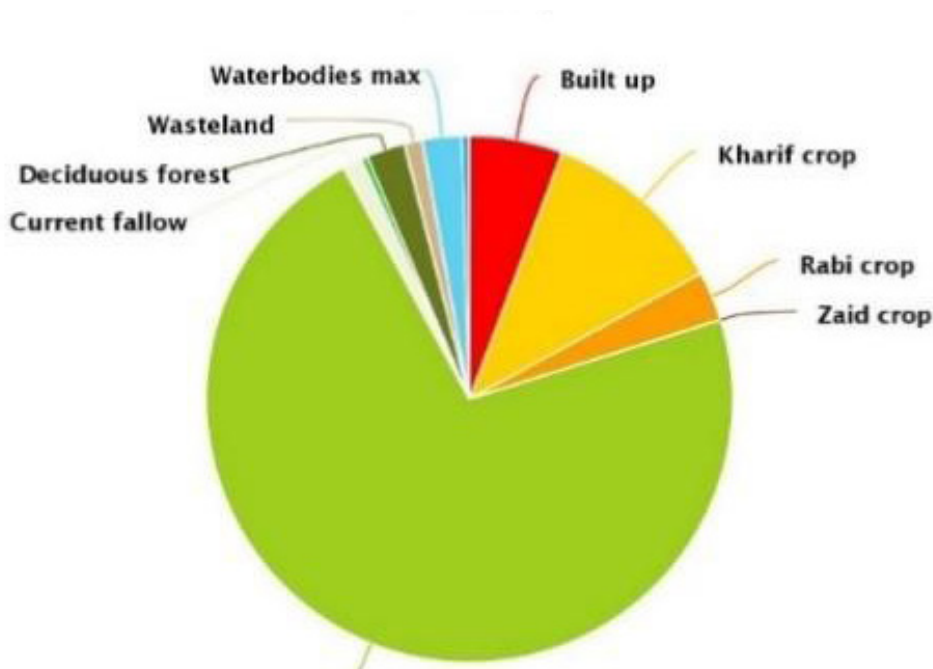


Figure 36: LULC distribution of Shahjahanpur district

<sup>47</sup> [https://www.indiastatpublications.com/District\\_Factbook/Uttar\\_Pradesh/Shahjahanpur](https://www.indiastatpublications.com/District_Factbook/Uttar_Pradesh/Shahjahanpur)



### Amount and types of fertilizers and pesticides used (in kg/ha)

Rate of fungicide and insecticide (liquid) application is lowest among all Ramganga river basin districts whereas application rate of insecticides (aerosol), mouse killer and weed killer are moderately high among all districts.

Table 18: Pesticides and Fertilizer uses in Shahjahanpur District (2019-22)

| Pesticide & Fungicide     | 2019-20  | 2020-21  | 2021-22  | 3 year average | GCA'000 ha | Usage /1000 ha |
|---------------------------|----------|----------|----------|----------------|------------|----------------|
| Insecticide aerosols (kg) | 1,36,425 | 1,15,892 | 1,19,073 | 1,23,797       | 582.9      | 212.38         |
| Insecticide liquid (l)    | 15,899   | 20,829   | 23,423   | 20,050         | 582.9      | 34.40          |
| Fungicide (kg)            | 20,146   | 26,434   | 25,731   | 24,104         | 582.9      | 41.35          |
| Weed killer (kg)          | 49,272   | 71,284   | 76,950   | 65,835         | 582.9      | 112.94         |
| Mouse killer (kg)         | 2,633    | 3,402    | 3,352    | 3,129          | 582.9      | 5.37           |
| Biopesticide (kg)         | 111,705  | 94,120   | 105,292  | 103,706        | 582.9      | 177.91         |

## Fertilizer usage

Table 19: Average fertilizer usage for the period 2017-2020 in Shahjahanpur district<sup>48</sup>

| Average total in MT   |            |        |        |       |                  | Usage per hectare in (kg/ha) |      |      |                  |
|-----------------------|------------|--------|--------|-------|------------------|------------------------------|------|------|------------------|
| Crop                  | Area in ha | N      | P      | K     | Other fertilizer | N                            | P    | K    | Other fertilizer |
| Paddy                 | 210,760    | 27,765 | 7,487  | 669   | 824              | 131.7                        | 35.5 | 3.2  | 3.9              |
| Maize                 | 2,300      | 102    | 132    | 0     | 0                | 44.4                         | 57.5 | NA   | NA               |
| Bajra                 | 3,380      | 186    | 0      | 0     | 0                | 55.1                         | NA   | NA   | NA               |
| Wheat                 | 247,700    | 35,023 | 16,918 | 1,509 | 8,766            | 141.4                        | 68.3 | 6.1  | 35.4             |
| Barley                | 260        | 0      | 0      | 0     | 0                | NA                           | NA   | NA   | NA               |
| Arhar (Tur, Red Gram) | 310        | 0      | 0      | 0     | 0                | NA                           | NA   | NA   | NA               |
| Bengal Gram           | 190        | 0      | 0      | 0     | 0                | NA                           | NA   | NA   | NA               |
| Groundnut             | 3,870      | 0      | 0      | 0     | 0                | NA                           | NA   | NA   | NA               |
| Sesame                | 8,850      | 0      | 0      | 0     | 0                | NA                           | NA   | NA   | NA               |
| Rapeseed & Mustard    | 14,440     | 1,709  | 1,106  | 66    | 23               | 118.4                        | 76.6 | 4.6  | 1.6              |
| Sugarcane             | 45,740     | 8,914  | 2,320  | 697   | 598              | 194.9                        | 50.7 | 15.2 | 13.1             |
| Potato                | 8,760      | 1,478  | 772    | -     | -                | 168.7                        | 88.2 | NA   | NA               |

Note:

1. NA = either the crop is not grown OR data is not available - may be that particular input is not used.
2. Total area cultivated for each crop - taken from ICRISAT for 2014-2015.

Wheat, paddy, pulses, groundnut are the major crops in the district and their yields are given below in the table.

Table 20: Average yield of major crops in Shahjahanpur district<sup>49</sup>

| Major crops | Average yields (in ton per ha) |
|-------------|--------------------------------|
| Wheat       | 385.8                          |
| Paddy       | 247.3                          |
| Pulses      | 70.88                          |
| groundnut   | 113.42                         |

<sup>48</sup> Source: NPK data from plot level data collected by Ministry of Agriculture (average of 2017-2020)

### Farming practices/techniques

Double and multiple cropping are widely practiced. Besides, shifting, and intercultivation, micro/drip/sprinkler irrigation are also practiced.<sup>50</sup>

### Burning practices

Any such recorded information is not available. However, stubble burning practice is insignificant in comparison with Punjab or Haryana state.

### Crops grown in Shahjahanpur district

The table below highlights the crops grown in riverbeds and riverbanks.<sup>51</sup>

Table 21: Major crops in Shahjahanpur District

| Major field crops cultivated | Kharif (Area ('000 ha) | Rabi (Area ('000 ha) |
|------------------------------|------------------------|----------------------|
| Rice                         | 162.992                |                      |
| Wheat                        |                        | 253.928              |
| Sugarcane                    |                        | 49.86                |
| Sesame                       | 22.675                 |                      |
| Sorghum                      | 9.267                  |                      |
| Pearl millet                 | 7.208                  |                      |
| Maize                        | 6.619                  |                      |
| Blackgram                    | 2.691                  |                      |
| Groundnut                    | 4.722                  |                      |
| Pigeon pea                   | 1.507                  |                      |
| Barley                       |                        | 3.295                |
| Mustard                      |                        | 14.219               |
| Toria                        |                        | 23.994               |
| Chickpea                     |                        | 2.384                |
| Lentil                       |                        | 26.393               |

<sup>49</sup> <https://shahajahanpur.kvk4.in/district-profile.html>

<sup>50</sup> [https://agricoop.nic.in/sites/default/files/UP1-Shahjhanpur-26.7.2012\\_0.pdf](https://agricoop.nic.in/sites/default/files/UP1-Shahjhanpur-26.7.2012_0.pdf)

<sup>51</sup> <http://www.icar-crida.res.in/CP-2012/statewiseplans/Uttar%20Pradesh/UP1-Shahjhanpur-26.7.2012.pdf>

### **% of land under organic farming<sup>52</sup>**

- The exact area under organic farming could not be assessed.
- APEDA is providing 0 Year, 1 Year, 2 Year certification facility for organic product
- 38 villages which are located within a five-km trilogic distance from the Ganga rivers are included under Namami Gange project. Various welfare schemes including organic farming runs under Namami Gange project is being implemented in these villages on priority basis.
- There are three (3) UP State Organic Certification Agency (USOCA) registered operator working on organic certification in Shahjahanpur district<sup>53</sup>

| <b>Name of Operator</b> | <b>Product</b>     |
|-------------------------|--------------------|
| Krishan Kumar           | Grains             |
| Mahendra Kumar Dubey    | Grains & Sugarcane |
| Jitendra Pandey         | Grains             |

### **Involvement of women in farming and their roles<sup>54</sup>**

Women are involved as both agricultural labourers and cultivators. There are 13,207 women cultivators and 10,962 women agricultural labourers.

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<sup>52</sup> Départemental Consultation, Dept. of Agriculture

<sup>53</sup> [https://apeda.gov.in/apedawebsite/Organic/LIST\\_OF\\_OPERATORS\\_\(USOCA\).pdf](https://apeda.gov.in/apedawebsite/Organic/LIST_OF_OPERATORS_(USOCA).pdf)

<sup>54</sup> [https://www.indiagrowing.com/Uttar\\_Pradesh/Shahjahanpur\\_District](https://www.indiagrowing.com/Uttar_Pradesh/Shahjahanpur_District)

## 7.1.2 Water quantity

### Surface water

#### Inadequate (surface) water storage capacity

##### Surface Basin water budgets (including precipitation, seasonal water levels and river flow trend during the year)

The annual normal rainfall of the district is 994 mm. The year wise actual rainfall in the district is summarized in the table below.<sup>55</sup>

Table 22: Year wise actual rainfall in the district

| Month     | Normal (mm) | Year Wise Actual Rainfall (mm) |        |        |        |        |        |
|-----------|-------------|--------------------------------|--------|--------|--------|--------|--------|
|           |             | 2017                           | 2018   | 2019   | 2020   | 2021   | 2022   |
| January   | 19          | 29.86                          | 1.19   | 3.37   | 21.81  | 1.1    | 21.54  |
| February  | 15.7        | 0.32                           | 11.35  | 24.48  | 8.27   | 0.8    | 30.98  |
| March     | 12          | 9.06                           | 0.58   | 9.17   | 59.81  | 0.15   | 0      |
| April     | 5.1         | 0.08                           | 5.99   | 3.27   | 21.59  | 2.31   | 0      |
| May       | 18.6        | 20.82                          | 5.68   | 1.04   | 36.64  | 98.55  | 33.86  |
| June      | 92.3        | 40.53                          | 47.38  | 53.51  | 71.07  | 165.59 | 76.87  |
| July      | 294.2       | 227.81                         | 339.02 | 329.61 | 209.94 | 229.1  | 87.99  |
| August    | 306.9       | 186.52                         | 408.02 | 97.79  | 155.08 | 102.81 | 129.16 |
| September | 158.1       | 138.48                         | 101.72 | 77.5   | 64.72  | 116.9  |        |
| October   | 63          | 0.02                           | 1.62   | 1.76   | 0      | 169.33 |        |
| November  | 2.6         | 0                              | 1.41   | 5.71   | 7.12   | 0      |        |
| December  | 6.5         | 0.08                           | 0      | 63.75  | 0      | 0.88   |        |
| Total     | 994         | 653.58                         | 923.96 | 670.96 | 656.05 | 887.52 | 380.4  |

<sup>55</sup> <https://indiawris.gov.in/wris/#/rainfall>

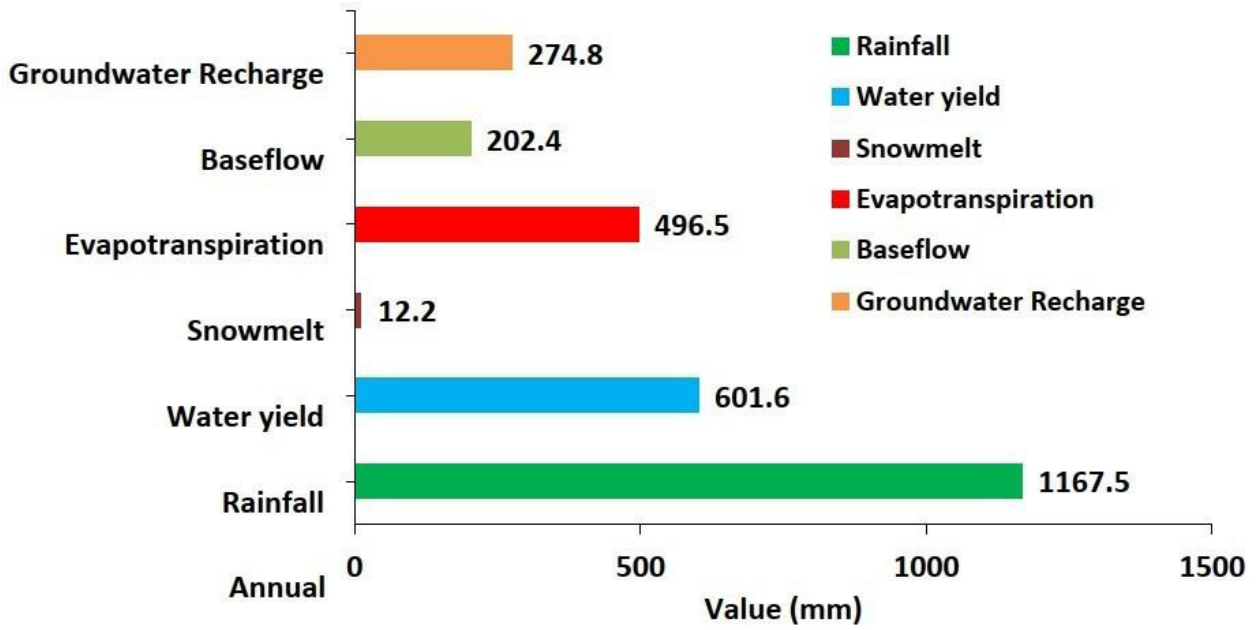


Figure 37: Average (1969-2006) annual water balance of the modeled Ganga basin

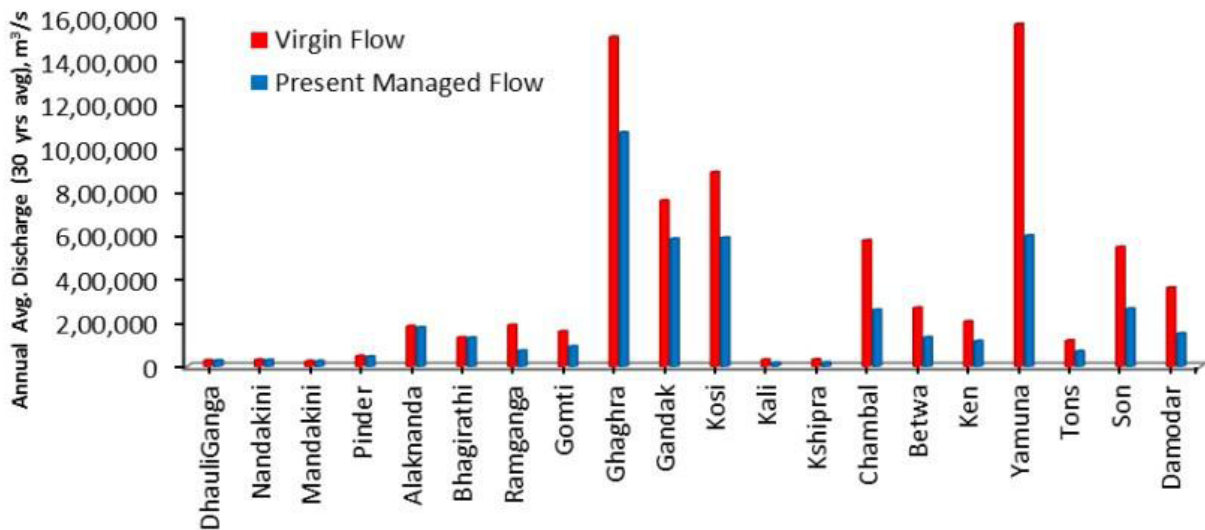


Figure 38: Annual flow contributions of different tributaries (sub-basins) to river Ganga



**List and status of dams, barrages, anicuts, embankments, small pond areas etc. and their design storage capacities**

Details provided under section 4.5, Table 3 and Figure 10

- The total wetland area in the district is 19803 ha.
- Water spread area is post-monsoon season is 11717 ha., whereas in pre-monsoon season it is 6291 ha.
- Moderate turbidity is observed in most of the wetlands. High turbidity is observed in river/ stream during post-monsoon season.
- Bio-filter is augmented in wetland.

**Siltation status of surface water bodies<sup>56</sup>**

Sediment load is measured by CWC at two locations i.e. Bareilly and Dabri in Ramganga basin. The analysis of sediment data is presented in Figure 39, Figure 40, Figure 41, Figure 42, Table 23 and Table 24

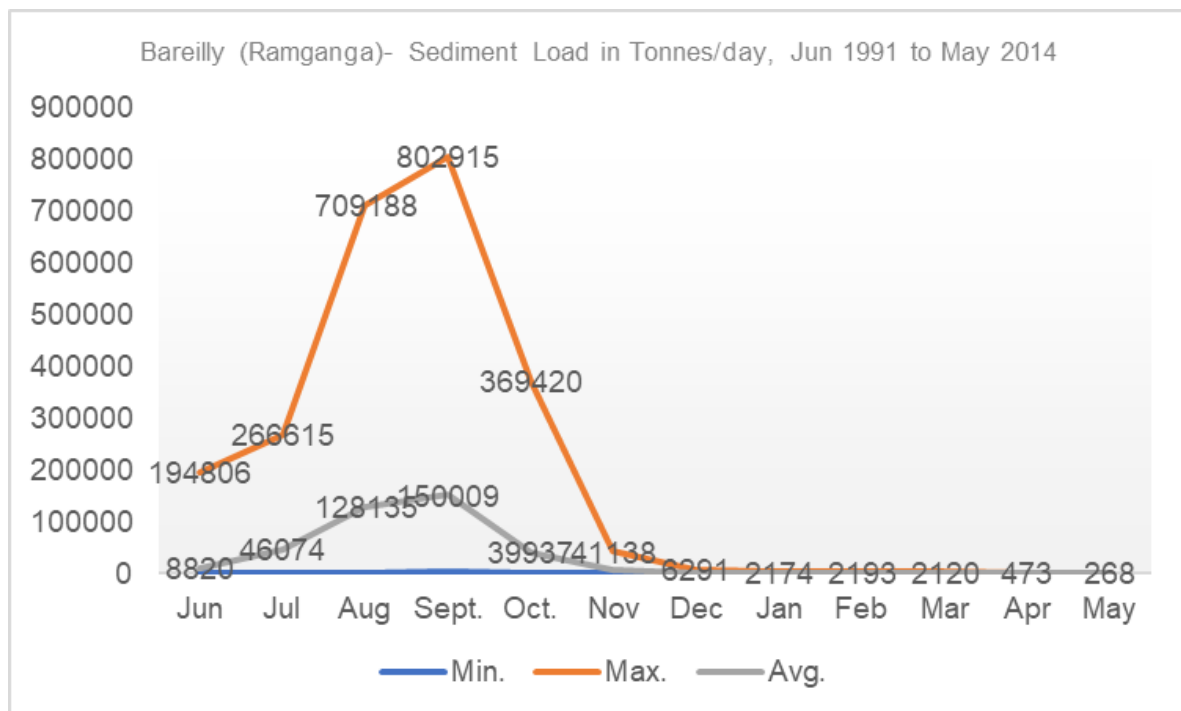


Figure 39: Sediment load in past 21 years at Bareilly (Ramganga)

<sup>56</sup> GRBMP - Interim (nmcg.nic.in)

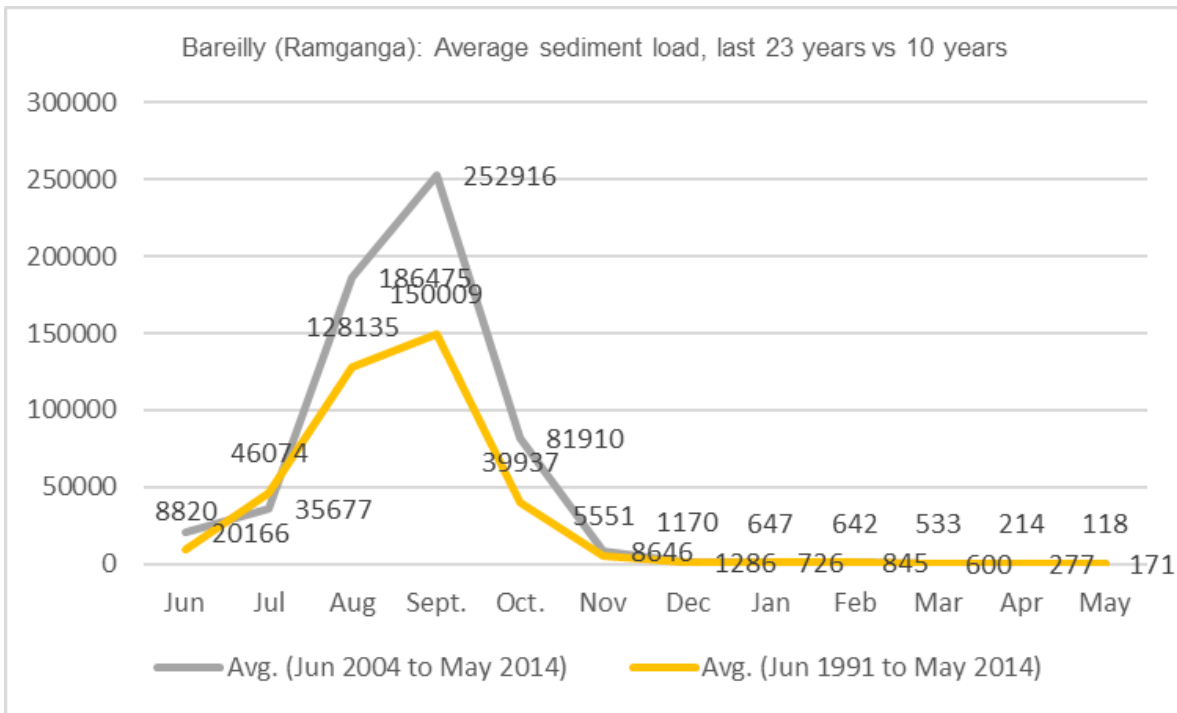


Figure 40: 23 years vs 10 years average sediment load at Bareilly

Table 23: Sediment Load at Bareilly (Ramganga river)

| Location: Bareilly (Ramganga) Catchment Area, km <sup>2</sup> : 18,340 |        |        |        |        |        |       |      |      |      |      |     |     |            |
|--|--------|--------|--------|--------|--------|-------|------|------|------|------|-----|-----|------------|
| Sediment Load in Tonnes/day, 23 years data (Jun 1991 to May 2014)      |        |        |        |        |        |       |      |      |      |      |     |     |            |
|  | Jun    | Jul    | Aug    | Sept   | Oct    | Nov   | Dec  | Jan  | Feb  | Mar  | Apr | May | Daily Avg. |
| Min.   | 2      | 57     | 300    | 3863   | 93     | 30    | 18   | 5    | 1    | 1    | 1   | 0   | 361        |
| Max.   | 194806 | 266615 | 709188 | 802915 | 369420 | 41138 | 6291 | 2174 | 2193 | 2120 | 473 | 268 | 200766     |
| Avg.   | 8820   | 46074  | 128135 | 150009 | 39937  | 5551  | 1170 | 647  | 642  | 533  | 214 | 118 | 31975      |
| Sediment Load in Tonnes/day, 10 years data (Jun 2004 to May 2014)      |        |        |        |        |        |       |      |      |      |      |     |     |            |
| Min.   | 55     | 279    | 3789   | 14721  | 651    | 276   | 176  | 161  | 331  | 207  | 147 | 84  | 1729       |
| Max.   | 194806 | 104151 | 709188 | 802915 | 369420 | 41138 | 3005 | 1538 | 2193 | 1375 | 439 | 268 | 186569     |
| Avg.   | 20166  | 35677  | 186475 | 252916 | 81910  | 8646  | 1286 | 726  | 845  | 600  | 277 | 171 | 40304      |

Average sediment load at Bareilly site in past 23 years is 31975 tonnes per day (or 11.67 million tonnes/year or 8.39 million m<sup>3</sup>/year) for 18340 km<sup>2</sup> i.e. 1.74 tonnes per day per km<sup>2</sup>. This corresponds to a catchment denudation rate of 0.46 mm/year. While considering the last 10 years data, the sediment load at Bareilly site is 49034 tonnes per day (or 18.00 million tonnes/year or 12.93 million m<sup>3</sup>/year) for 18340 km<sup>2</sup> i.e. 2.67 tonnes per day per km<sup>2</sup>. This corresponds to a catchment denudation rate of 0.71 mm/year. In low flow years the sediment load is low while the high flow years have high sediment load. The sediment load is maximum in the month of September in correspondence to stream flow.

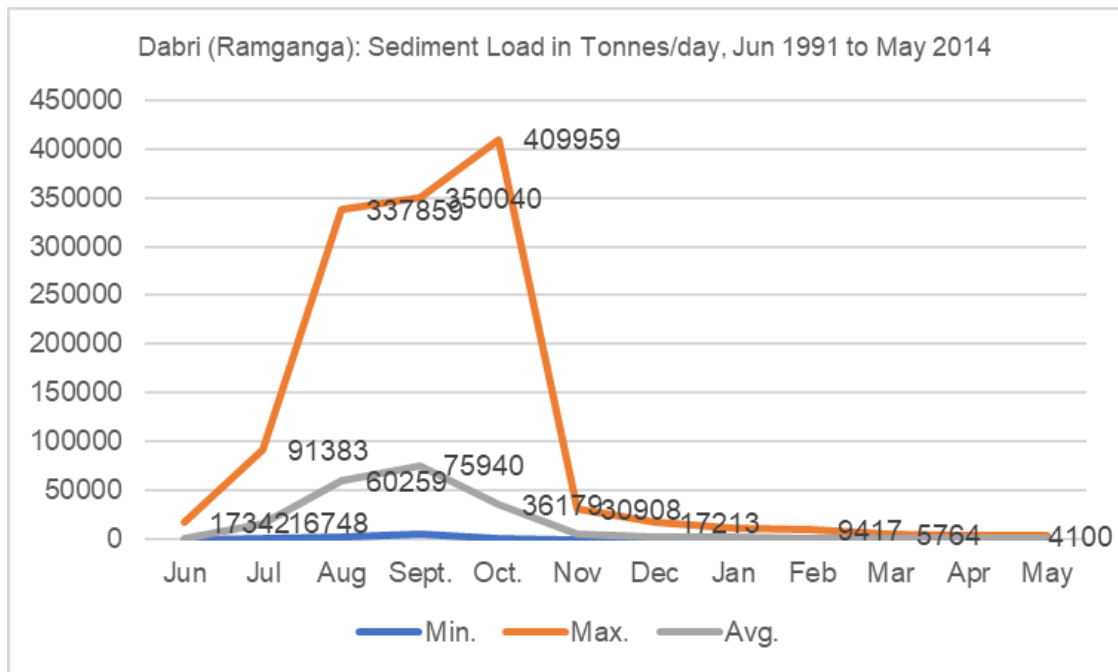


Figure 41: Sediment load in past 21 years at Dabri (Ramganga)

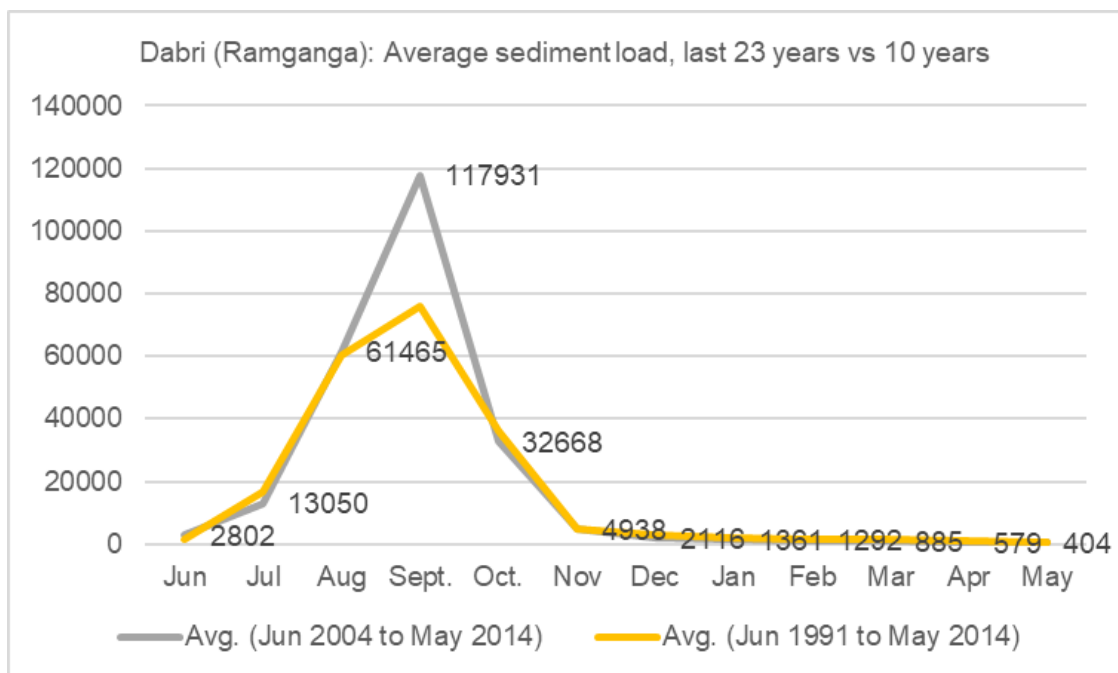


Figure 42: 23 years vs 10 years average sediment load at Dabri

## List and status of dams, barrages, anicuts, embankments, small pond areas etc. and their design storage capacities

Details provided under section 4.5, Table 3 and Figure 10

- The total wetland area in the district is 19803 ha.
- Water spread area is post-monsoon season is 11717 ha., whereas in pre-monsoon season it is 6291 ha.
- Moderate turbidity is observed in most of the wetlands. High turbidity is observed in river/ stream during post-monsoon season.
- Bio-filter is augmented in wetland.

Table 24: Sediment Load at Dabri (Ramganga river)

| Location: Dabri (Ramganga)  |       |       |        |        |        |       |       |       |      |      |      |      | Catchment Area, km <sup>2</sup> : 23,919 |  |
|---|-------|-------|--------|--------|--------|-------|-------|-------|------|------|------|------|--|--|
| Sediment Load in Tonnes/day, 23 years data (Jun 1991 to May 2014) |       |       |        |        |        |       |       |       |      |      |      |      |  |  |
|   | Jun   | Jul   | Aug    | Sept   | Oct    | Nov   | Dec   | Jan   | Feb  | Mar  | Apr  | May  | Daily Avg.                               |  |
| Min.  | 21    | 367   | 2331   | 5598   | 918    | 214   | 123   | 111   | 136  | 60   | 28   | 27   | 827                                      |  |
| Max.  | 17342 | 91383 | 337859 | 350040 | 409959 | 30908 | 17213 | 12335 | 9417 | 5764 | 3758 | 4100 | 108389                                   |  |
| Avg.  | 1576  | 16748 | 60259  | 75940  | 36179  | 5042  | 2821  | 2112  | 1714 | 1344 | 876  | 699  | 17195                                    |  |
| Sediment Load in Tonnes/day, 10 years data (Jun 2004 to May 2014) |       |       |        |        |        |       |       |       |      |      |      |      |  |  |
| Min.  | 132   | 367   | 9006   | 16794  | 2915   | 619   | 349   | 242   | 253  | 135  | 105  | 49   | 2580                                     |  |
| Max.  | 17342 | 32514 | 197095 | 350040 | 121808 | 8881  | 4212  | 2732  | 2209 | 2567 | 1215 | 991  | 61933                                    |  |
| Avg.  | 2802  | 13050 | 61465  | 117931 | 32668  | 4938  | 2116  | 1361  | 1292 | 885  | 579  | 404  | 19984                                    |  |

Average sediment load at Dabri site in past 23 years is 17195 tonnes per day (or 6.28 million tonnes/year or 4.51 million m<sup>3</sup>/year) for 23919 km<sup>2</sup> i.e. 0.72 tonnes per day per km<sup>2</sup>. This corresponds to a catchment denudation rate of 0.19 mm/year. While considering the last 10 years' data, the sediment load at Dabri site is 19984 tonnes per day (or 7.29 million tonnes/year or 5.24 million m<sup>3</sup>/year) for 23919 km<sup>2</sup> i.e. 0.84 tonnes per day per km<sup>2</sup>. This corresponds to a catchment denudation rate of 0.22 mm/year. In low flow years the sediment load is low while the high flow years have high sediment load. The sediment load is maximum in the month of September in correspondence to stream flow.

## Current effective Surface water storage capacity per rainfall

Table 25: Surface water storage in MCM<sup>57</sup>

| Blocks         | Check Dam | Stream Development | Nala Bunds | Ponds | Total Storage (MCM) |
|----------------|-----------|--------------------|------------|-------|---------------------|
| Banda          | 0.07      | 0.11               | 0.06       | 0.15  | 0.39                |
| Bhawal Khera   | 0.04      | 0.07               | 0.03       | 0.09  | 0.23                |
| Dadraul        | 0.05      | 0.07               | 0.03       | 0.09  | 0.24                |
| Jaitipur       | 0.03      | 0.05               | 0.03       | 0.07  | 0.18                |
| Jalalabad      | 0.07      | 0.10               | 0.05       | 0.14  | 0.36                |
| Kalan          | 0.04      | 0.06               | 0.03       | 0.09  | 0.22                |
| Kanth          | 0.04      | 0.06               | 0.03       | 0.08  | 0.21                |
| Katra          | 0.04      | 0.06               | 0.03       | 0.08  | 0.21                |
| Khutar         | 0.07      | 0.11               | 0.05       | 0.14  | 0.37                |
| Madanapur      | 0.04      | 0.06               | 0.03       | 0.08  | 0.22                |
| Mirzapur       | 0.05      | 0.07               | 0.04       | 0.10  | 0.26                |
| Nigohi         | 0.05      | 0.07               | 0.03       | 0.09  | 0.24                |
| Puwayan        | 0.04      | 0.06               | 0.03       | 0.08  | 0.22                |
| Sindhauli      | 0.04      | 0.07               | 0.03       | 0.09  | 0.23                |
| Tilhar         | 0.03      | 0.05               | 0.02       | 0.06  | 0.17                |
| District Total | 0.69      | 1.03               | 0.54       | 1.43  | 3.76                |

### Encroachment status of surface water bodies – Ganga, key rivers, ponds and wetlands<sup>58</sup>

Encroachment reported on river side setback zone (balm land) at Aziz Nagar and Lodhipur bridge over Khannaut river

### Surface water usages (including floods)<sup>59</sup>

Encroachment reported on river side setback zone (balm land) at Aziz Nagar and Lodhipur bridge over Khannaut river

<sup>58</sup> Field visit and Departmental Consultation

<sup>59</sup> DIP Shahjahanpur

<sup>57</sup> [http://cgwb.gov.in/AQM/NAQUIM\\_REPORT/UP/Shahjahan%20UP.pdf](http://cgwb.gov.in/AQM/NAQUIM_REPORT/UP/Shahjahan%20UP.pdf)

## Existing rainwater harvesting structures<sup>60</sup>

Table 26: Artificial Recharge Systems (ARS) in the district

| S.No. | ARS Type                                      | No of ARS |
|-------|---|-----------|
| 1     | Check Dam                                     | 68        |
| 2     | Desilting tanks                               | 0         |
| 3     | Percolation tanks                             | 159       |
| 4     | Subsurface Dyke                               | 0         |
| 5     | Recharge Shaft                                | 68        |
| 6     | Roof Top Rainwater Harvesting                 | 0.1211    |
| 7     | Spring shed Development/Watershed Development | 0         |
| 8     | Others  | 0         |

### Type, no and capacity of rejuvenated water bodies and further scope for rejuvenation (type, no and capacity)

Total 115 no. waterbodies are rejuvenated out of targeted 327 nos. under mission Amrit Sarovar.

Table 27: Status of Amrit Sarovar implementation in Shahjahanpur district<sup>61</sup>

| Block                         | Total Number of Sites Identified | Total Number of Works Commenced out of Total Identified Sites | Total Number of Works Completed out of the Commenced Works |
|-------------------------------|----------------------------------|---|--|
| Jalalabad                     | 60                               | 28  | 24   |
| Powayan                       | 106                              | 58  | 35   |
| Shahjahanpur                  | 94                               | 45  | 24   |
| Tilhar                        | 67                               | 38  | 32   |
|                               |                                  |   |  |
| Total - Shahjahanpur District | 327                              | 169   | 115  |

Note: Status as on 13th February, 2023

<sup>61</sup> Source: Mission Amrit Sarovar

<sup>60</sup> India-WRIS (indiawriss.gov.in)



## Groundwater

### Unknown groundwater potential

#### Zonal Groundwater budget (including groundwater abstraction rates, natural groundwater recharge etc.)

The table below highlights the total annual groundwater recharge in the district which is 25391.20 Ham. and the annual extractable ground water resource is 127221.07 Ham.<sup>62</sup>

Table 28: Total annual groundwater recharge in the District

|   |                    |                                    |           |
|---|--------------------|------------------------------------|-----------|
| Ground Water Recharge                                   | Monsoon Season     | Recharge from rainfall (Ham.)      | 88882.69  |
|   |                    | Recharge from other sources (Ham.) | 17119.02  |
|   | Non-monsoon Season | Recharge from rainfall (Ham.)      | 5231.84   |
|   |                    | Recharge from other sources (Ham.) | 25391.20  |
| Total Annual Ground Water Recharge (Ham.)               |                    |                                    | 136624.75 |
| Total Natural Discharge (Ham.)                          |                    |                                    | 9403.68   |
| Annual Extractable Ground Water Resource (Ham.)         |                    |                                    | 127221.07 |
| Current Annual Ground Water Extraction                  | Irrigation (Ham.)  |                                    | 69330.63  |
|   | Industrial (Ham.)  |                                    | 0.00      |
|   | Domestic (Ham.)    |                                    | 8071.57   |
|   | Total (Ham.)       |                                    | 77402.20  |
| Annual GW Allocation for Domestic Use as on 2025 (Ham.) |                    |                                    | 9367.31   |
| Net Ground Water Availability for future use (Ham.)     |                    |                                    | 48523.13  |
| Stage of Ground Water Extraction (%) (Ham.)             |                    |                                    | 60.84     |

<sup>61</sup> Source: Mission Amrit Sarovar

<sup>62</sup> [http://cgwb.gov.in/GW-Assessment/GWR-2020-Reports%20State/Uttar%20Pradseh\\_State\\_Report\\_Resource\\_2020.pdf](http://cgwb.gov.in/GW-Assessment/GWR-2020-Reports%20State/Uttar%20Pradseh_State_Report_Resource_2020.pdf)

### Areas with groundwater pollution and pollution type

The table below shows the groundwater quality in the district. The red mark demarcates above the permissible limit. The Fe concentration in most of the blocks is high followed by As and Mn. <sup>63</sup>

Table 29: Groundwater quality in the District

| Block        | Fe    | Mn    | Zn    | As    | Pb    |
|--------------|-------|-------|-------|-------|-------|
|              | (ppm) | (ppm) | (ppm) | (ppm) | (ppb) |
| Banda        | 0.90  | 0.15  | 0.04  | 12.00 | 1.00  |
| Bhawal Khera | 0.09  | 0.12  | 1.61  | 5.00  | 2.00  |
| Dadraul      | 1.45  | 0.10  | 0.13  | 17.00 | 1.00  |
| Jaitpur      | 2.70  | 0.19  | 0.03  | 4.00  | 2.00  |
| Jalalabad    | 0.41  | 0.10  | 0.04  | 3.00  | 1.00  |
| Kalan        | 3.11  | 0.45  | 0.03  | 1.00  | 1.00  |
| Kanth        | 0.08  | 0.03  | 0.03  | 2.00  | 1.00  |
| Katra        | 0.05  | 0.11  | 0.41  | 2.00  | 2.00  |
| Khutar       | 4.83  | 0.20  | 0.54  | 6.00  | 1.00  |
| Madanapur    | 0.60  | 0.10  | 0.03  | 4.00  | 1.00  |
| Mirzapur     | 0.47  | 0.01  | 0.05  | 1.00  | 2.00  |
| Nigohi       | 0.18  | 0.15  | 0.14  | 2.00  | 2.00  |
| Puyawan      | 0.23  | 0.03  | 0.11  | 0.00  | 1.00  |
| Sindhauli    | 2.72  | 0.19  | 0.03  | 4.00  | 1.00  |
| Tilhar       | 0.83  | 0.14  | 0.15  | 9.00  | 1.00  |

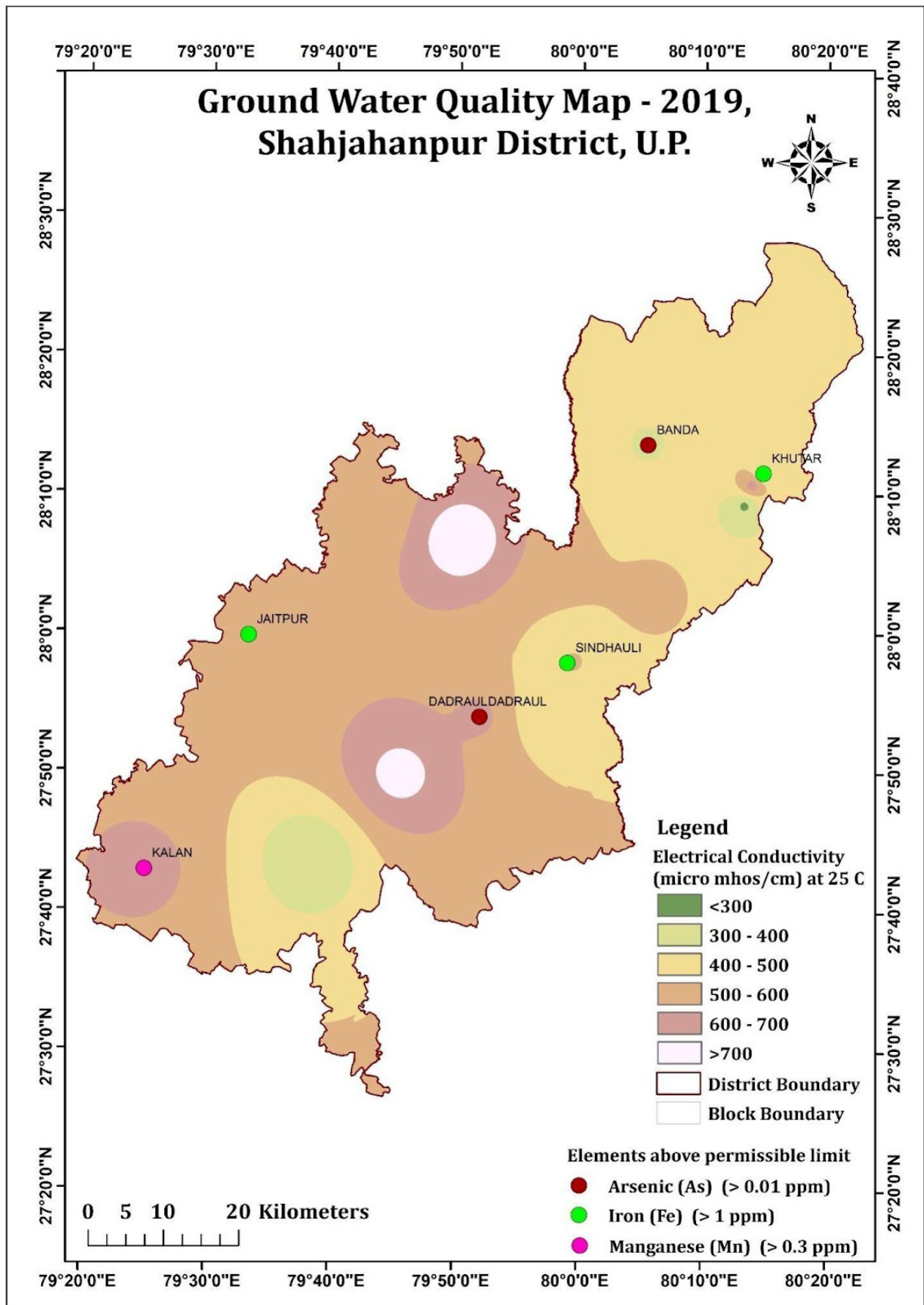


Figure 43: Groundwater quality map of Shahjahanpur district<sup>64</sup>

<sup>64</sup> [http://cgwb.gov.in/AQM/NAQUIM\\_REPORT/UP/Shahjahan%20UP.pdf](http://cgwb.gov.in/AQM/NAQUIM_REPORT/UP/Shahjahan%20UP.pdf)

### Zones where surface-groundwater interaction is high

The Shahjahanpur district falls under safe zone in terms of groundwater extraction.

In the pre-monsoon season the groundwater table lies at 6.8 MBGL whereas it is 5.83-6.79 MBGL during rainy reason and 5.47 – 6.45 in the post-monsoon season.

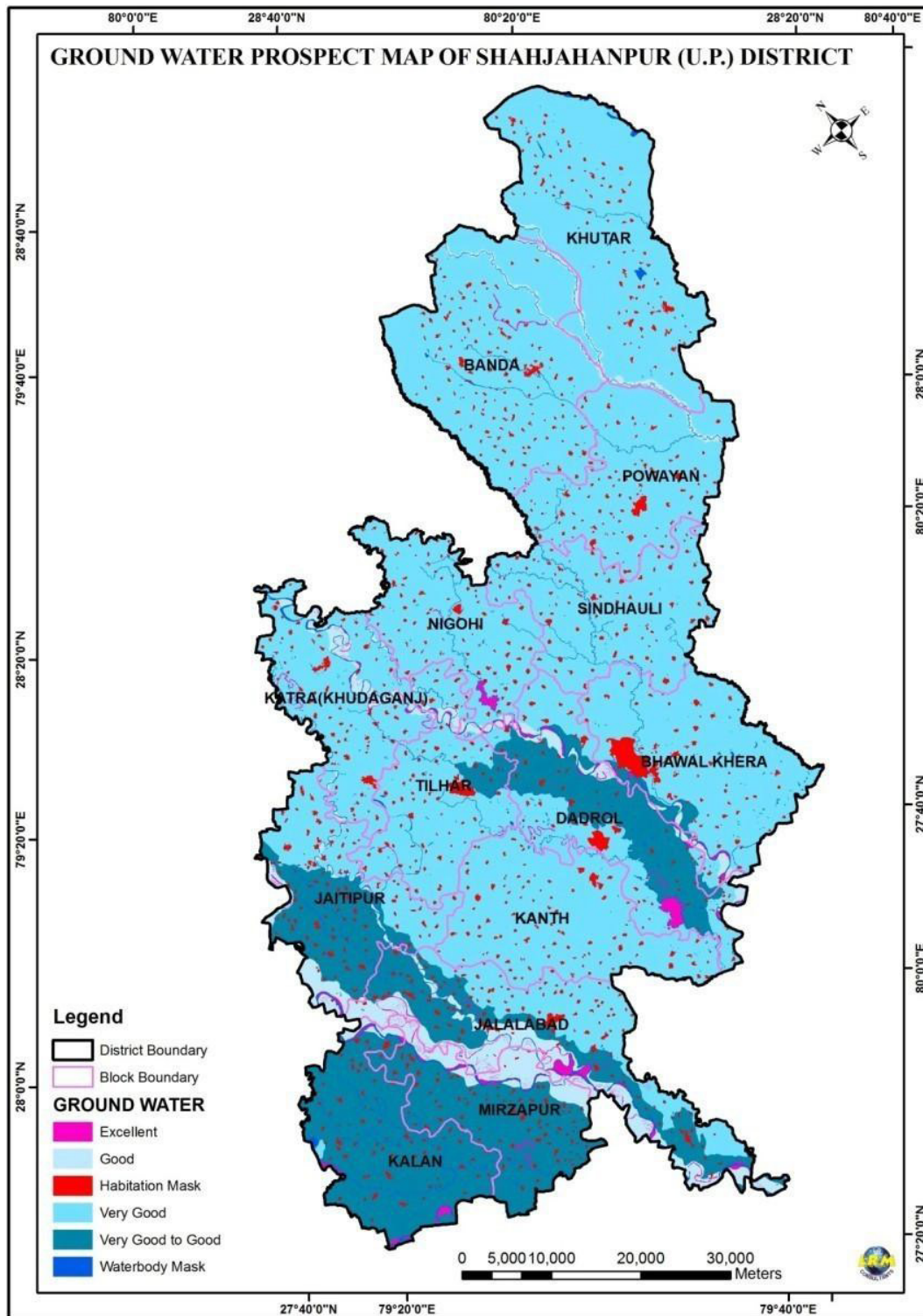


Figure 44: Groundwater map of Shahjahanpur district<sup>65</sup>

<sup>65</sup> DIP, Shahjahanpur

### Existing Managed Aquifer Recharge (MAR) systems

The Shahjahanpur district falls under safe zone in terms of groundwater extraction.

In the pre-monsoon season the groundwater table lies at 6.8 MBGL whereas it is 5.83-6.79 MBGL during rainy season and 5.47 – 6.45 in the post-monsoon season.

Table 30: No. of existing ARS structures in Shahjahanpur District

| S.No. | ARS Type                                      | No of ARS |
|-------|---|-----------|
| 1     | Check Dam                                     | 68        |
| 2     | Desilting tanks                               | 0         |
| 3     | Percolation tanks                             | 159       |
| 4     | Subsurface Dyke                               | 0         |
| 5     | Recharge Shaft                                | 68        |
| 6     | Roof Top Rainwater Harvesting                 | 0.1211    |
| 7     | Spring shed Development/Watershed Development | 0         |
| 8     | Others  | 0         |

### Scope for groundwater recharge / MAR systems (locations / area, capacity, water source and usage purpose)

There is a scope for 507.00 MCM water required for recharging groundwater. Hence, surplus water required for recharge is 29.0 MCM<sup>66</sup>

Table 31: Scope of groundwater recharge

|  |         |
|--|---------|
| Total Geographical Area (km <sup>2</sup> ) | 4569.00 |
| Area Identified for ARS (km <sup>2</sup> ) | 875.00  |
| Volume for Unsaturated Zone (MCM)          | 3110.00 |
| Available Sub-surface Volume for ARS (MCM) | 382.00  |
| Water Required for Recharge (MCM)          | 507.00  |
| Surplus Water Required for Recharge (MCM)  | 29.00   |

<sup>65</sup> DIP, Shahjahanpur

<sup>66</sup> <https://indiawris.gov.in/wris/#/arsViewer>

## Unregulated groundwater use

### Local abstraction regulations<sup>37</sup>

To control ground water exploitation in over-exploited and critical blocks in the state, there is a complete ban on the new government irrigation schemes such as minor irrigation tube wells, state tube wells and other such schemes.

### GW budget (incl. GW abstraction rates and purposes)

The groundwater budget is summarized in Table 28.

About 80% area of the district is under agricultural use, with paddy and wheat grown on a large scale. Net irrigated area is about 92% of the net sown area, of which almost 97% contribution comes from ground water. Tube well is the most important method of irrigation in the district. An area of 225,089 ha is irrigated by tube wells which comprises 65.60% of Net Sown Area. Second most important method or source of irrigation is dug-well. A total of 107,450 ha i.e. 31.17% of Net Sown Area is irrigated by this method. Tube-well and dug-well together contributes to 96.47 % of total irrigation in the district. It shows very high dependency of irrigation on groundwater. Canal, although present, contribute very less (0.49%) in irrigation. This is due to easy access to ground water as water levels are not deep and ground water is directly under control of the individual farmer or user.

Figure 45:  
Percentage  
Distribution  
showing  
Methods of  
Irrigation in  
Shahjahanpur

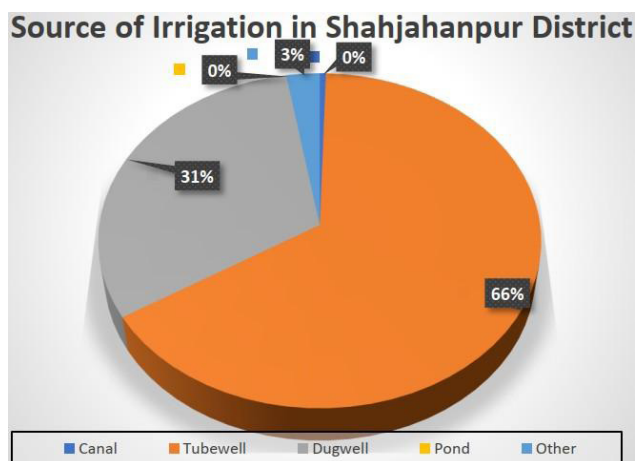
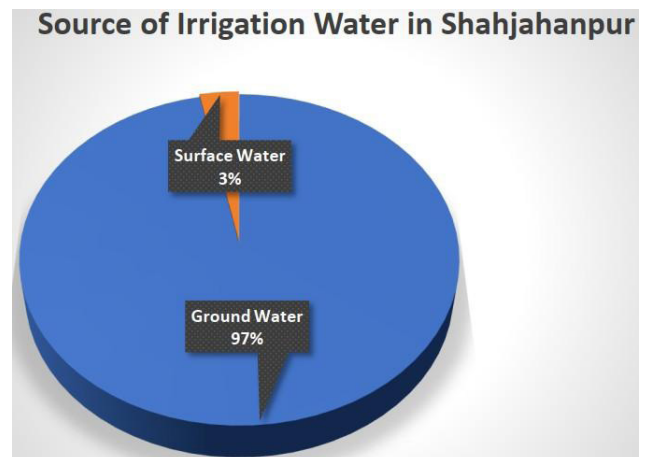


Figure 46:  
Source of  
Irrigation Water  
in Shahjahanpur  
District (U.P.)



Source: Shahjahan UP.pdf (cgwb.gov.in)



### Trend of water levels<sup>67</sup>

To control ground water exploitation in over-exploited and critical blocks in the state, there is a complete ban on the new government irrigation schemes such as minor irrigation tube wells, state tube wells and other such schemes.

Table 32: Trends of water levels at pre- and post-monsoon in Shahjahanpur district

| Hydrograph Location                | Pre Monsoon 2019 | Post Monsoon 2019 | Pre Monsoon 2020 | Post Monsoon 2020 |
|------------------------------------|------------------|-------------------|------------------|-------------------|
| C.M.O. Office Campus               | 0                | 0                 | 0                | 0                 |
| Ganna Shodh Sansthan Campus        | 8.75             | 8.2               | 8.63             | 8.2               |
| Primary School Jalalabad           | 6.44             | 6.55              | 6.85             | 6.9               |
| Junior High School Meeranpur Katra | 5                | 2.95              | 5.05             | 3.6               |
| Primary School Navadia             | 0                | 0                 | 0                | 0                 |
| Primary School Sisaua              | 0                | 0                 | 0                | 0                 |
| Vikas Bhawan Campus                | 12.98            | 12.6              | 12.65            | 12.7              |
| Primary School Viriyaganj          | 0                | 0                 | 0                | 0                 |
| Primary School Yakoobpur           | 4.7              | 4.98              | 5.2              | 5.05              |

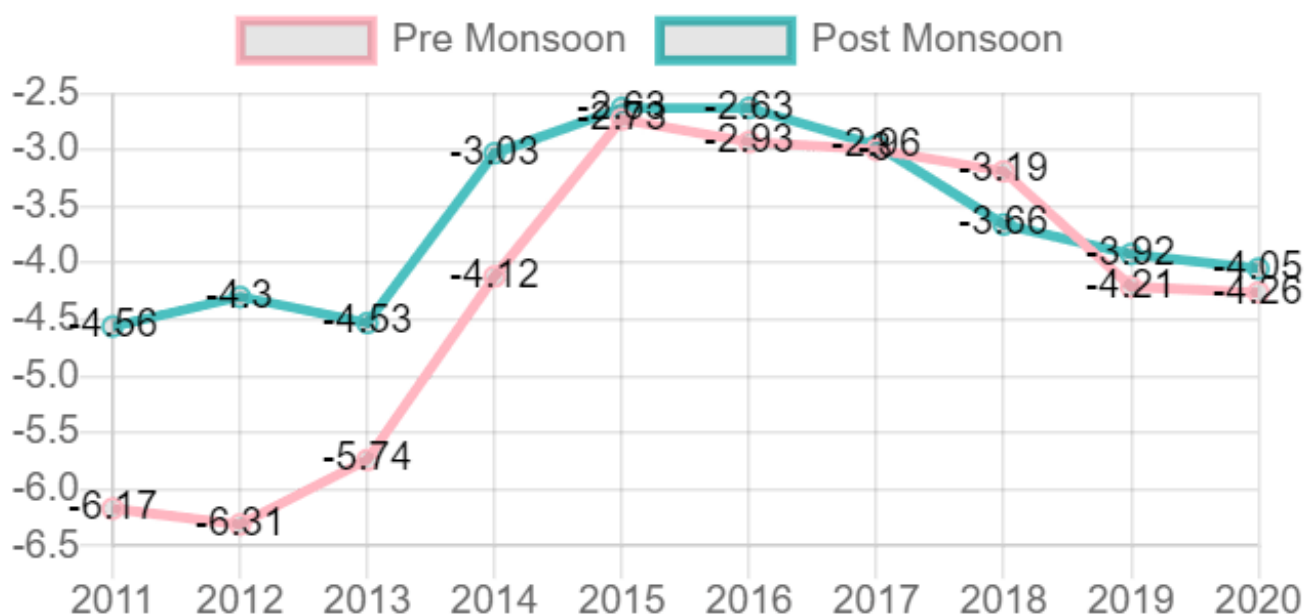


Figure 47: Water level trends pre- and post-monsoon<sup>68</sup>

<sup>67</sup> <https://jjmup.org/wq/gwdof2.php>

<sup>68</sup> [http://cgwb.gov.in/AQM/NAQUIM\\_REPORT/UP/Shahjahan%20UP.pdf](http://cgwb.gov.in/AQM/NAQUIM_REPORT/UP/Shahjahan%20UP.pdf)

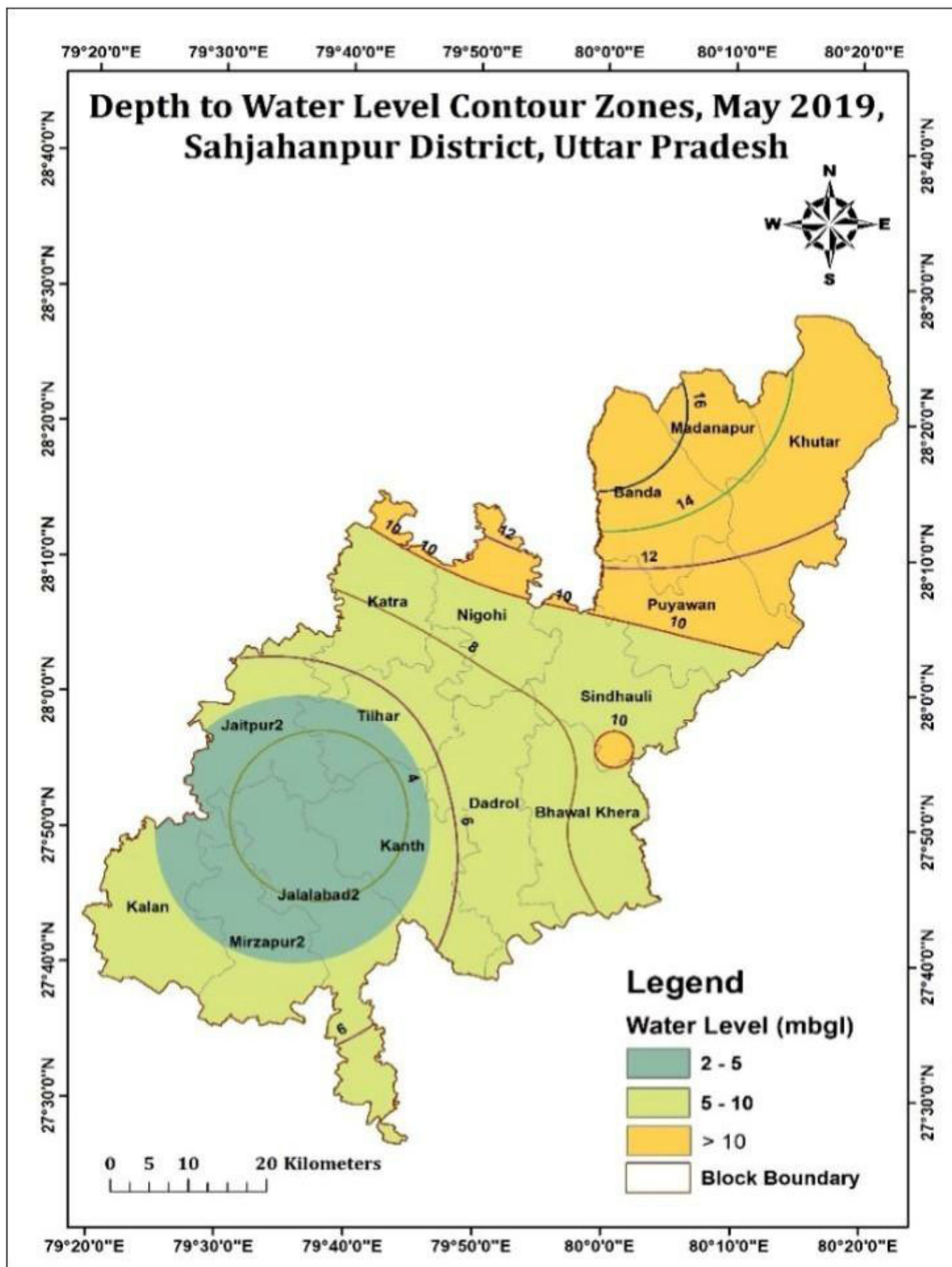


Figure 48: Depth to water level contour zones, pre-monsoon,Shahjahanpur<sup>69</sup>

<sup>69</sup> [http://cgwb.gov.in/AQM/NAQUIM\\_REPORT/UP/Shahjahan%20UP.pdf](http://cgwb.gov.in/AQM/NAQUIM_REPORT/UP/Shahjahan%20UP.pdf)

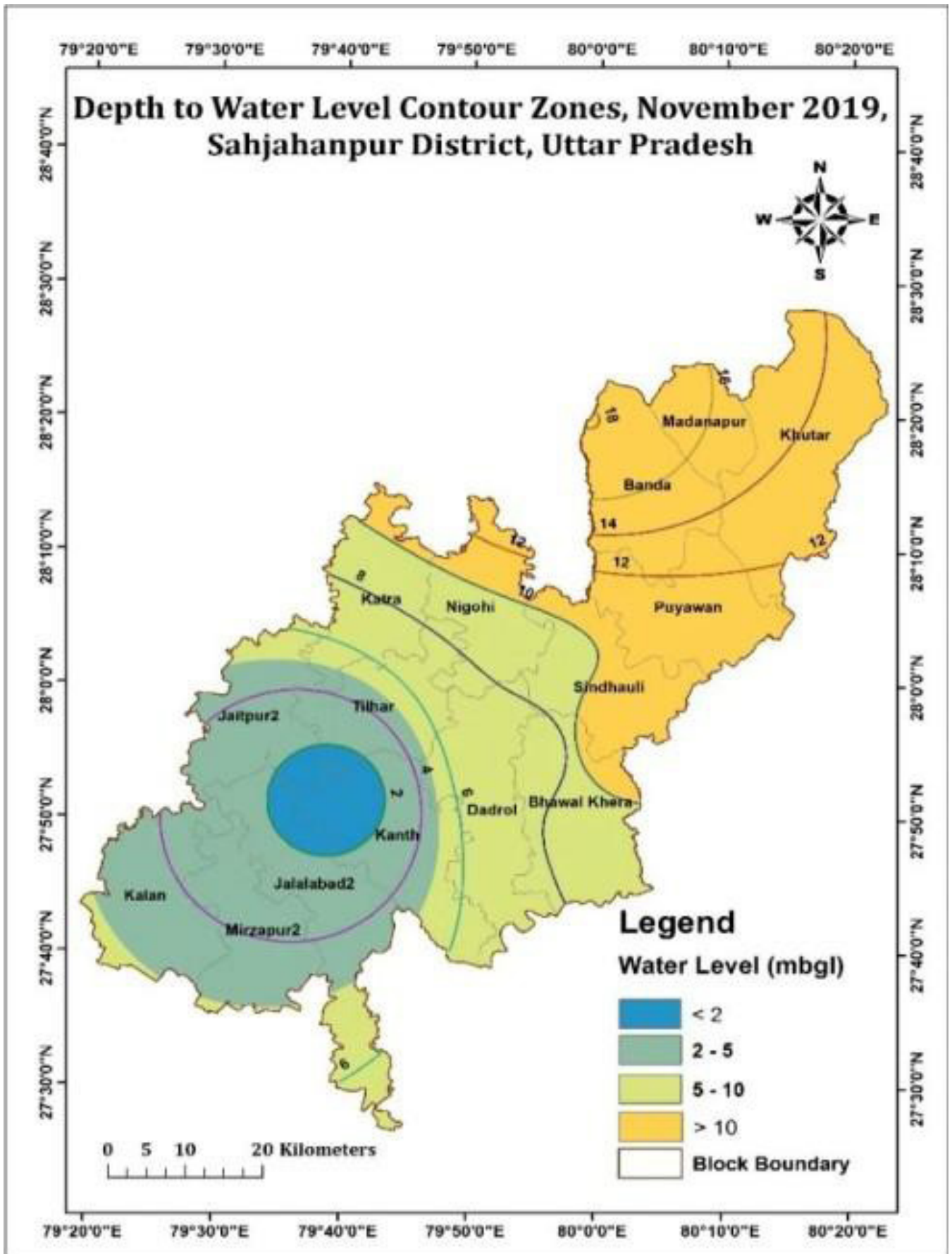


Figure 49: Depth to water level contour zones, post-monsoon, Shahjahanpur

## Groundwater sources are drying up

### Districts Water budget

About 80% area of the district is under agricultural use and almost 97% irrigation contribution comes from groundwater. Crop water demand is the highest out of all other categories of water use. Nine (9) GPIs covering sugar, paper, fertilizer, power plant and many other small scale industries (SSI) operating in the whole districts also consume significant amounts of water from different sources.

Table 33: Additional water demand for various sectors (estimated on 2016)<sup>70</sup>

| Block           | Domestic, MCM | Crop, MCM | Livestock, MCM | Industrial, MCM | Power Generation, MCM | Total, MCM |
|-----------------|---------------|-----------|----------------|-----------------|-----------------------|------------|
| Banda           | 11.10         | 445.46    | 1.91           | 0.00            | 0.00                  | 458.47     |
| Khutar          | 8.01          | 406.31    | 1.94           | 0.00            | 0.00                  | 416.26     |
| Powayan         | 10.69         | 311.02    | 1.89           | 0.00            | 0.00                  | 323.60     |
| Sindhauli       | 10.56         | 351.61    | 1.48           | 0.00            | 0.00                  | 363.65     |
| Khudaganj Katra | 9.97          | 282.43    | 1.71           | 0.00            | 0.00                  | 294.11     |
| Jaitipur        | 8.10          | 244.91    | 1.64           | 0.00            | 0.00                  | 254.64     |
| Tilhar          | 10.94         | 307.20    | 1.79           | 0.00            | 0.00                  | 319.93     |
| Nigohi          | 8.36          | 277.62    | 1.71           | 0.00            | 0.00                  | 287.68     |
| Kanth           | 7.59          | 258.50    | 1.65           | 0.00            | 0.00                  | 267.74     |
| Dadrol          | 8.66          | 250.90    | 2.20           | 0.00            | 0.00                  | 261.75     |
| Bhawal Khera    | 32.21         | 281.96    | 2.31           | 0.00            | 0.00                  | 316.48     |
| Kalan           | 8.62          | 310.05    | 2.44           | 0.00            | 0.00                  | 321.11     |
| Mirzapur        | 7.00          | 238.30    | 2.52           | 0.00            | 0.00                  | 247.81     |
| Jalalabad       | 12.23         | 291.09    | 2.42           | 0.00            | 0.00                  | 305.74     |
| Madanapur       | 7.17          | 310.47    | 0.30           | 0.00            | 0.00                  | 317.93     |
| Total, MCM      | 161.18        | 4567.82   | 27.89          | 0.00            | 0.00                  | 4756.89    |

<sup>70</sup> <https://pmksy.gov.in/mis/Uploads/2016/20161124030340830-1.pdf>

## **Irrigation practices**

Micro/ drip/ sprinkler irrigation under govt. Schemes<sup>71</sup>

## **Water management**

### **Irrigation water usage pattern (water use per ha and crop or yield)<sup>72</sup>**

- Detailed numbers on how much net irrigated area
- Crops listed: Wheat, pulses, paddy, groundnut
- Divided into 2 seasons; Kharif, Rabi
- Table of water requirement/demand is provided.

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<sup>71</sup> Microsoft Word - 93bb-0d06-7617-da43 (agricoop.nic.in)

<sup>72</sup> District Ground Water Brochure Of Shahjahanpur District

Table 34: Net irrigated area of Shahjahanpur district<sup>49</sup>

| Block              | Total area | Area other than agriculture use* | Net Area sown | % Net Area Sown | Net Area Irrigated | % Net Ir-rigated to net sown |
|--------------------|------------|----------------------------------|---------------|-----------------|--------------------|------------------------------|
| Banda              | 44,125     | 8,985                            | 35,140        | 79.64           | 32,375             | 92.13                        |
| Khutar             | 40,653     | 10,534                           | 30,119        | 74.09           | 28,647             | 95.11                        |
| Powayan            | 28,369     | 5,102                            | 23,267        | 82.02           | 21,940             | 94.3                         |
| Sindhauli          | 29,366     | 4,537                            | 24,829        | 84.55           | 22,848             | 92.02                        |
| Khudaganj<br>Katra | 26,464     | 4,259                            | 22,205        | 83.91           | 20,731             | 93.36                        |
| Jaitipur           | 24,498     | 5,497                            | 19,001        | 77.56           | 17,983             | 94.64                        |
| Tilhar             | 21,985     | 3,866                            | 18,119        | 82.42           | 17,133             | 94.56                        |
| Nigohi             | 25,036     | 3,723                            | 21,313        | 85.13           | 18,164             | 85.22                        |
| Kanth              | 26,089     | 4,545                            | 21,544        | 82.58           | 19,068             | 88.51                        |
| Dadrol             | 26,314     | 6,851                            | 19,463        | 73.96           | 17,922             | 92.08                        |
| Bhawal Khera       | 29,016     | 5,628                            | 23,388        | 80.6            | 19,535             | 83.53                        |
| Kalan              | 29,158     | 6,151                            | 23,007        | 78.9            | 20,609             | 89.58                        |
| Mirzapur           | 24,179     | 5,006                            | 19,173        | 79.3            | 18,009             | 93.93                        |
| Jalalabad          | 32,633     | 6,554                            | 26,079        | 79.92           | 25,161             | 96.48                        |
| Madanapur          | 28,117     | 5,018                            | 23,099        | 82.15           | 21,953             | 95.04                        |
|                    |            |                                  |               |                 |                    |                              |
| Total Rural        | 436,002    | 86,256                           | 349,746       | 80.22           | 322,078            | 92.09                        |
| Total Urban        | 1,467      | 1,030                            | 437           | 29.79           | 134                | 30.66                        |
| Total District     | 437,469    | 87,286                           | 350,183       | 80.05           | 322,212            | 92.01                        |

### Interventions and measures<sup>49, 73</sup>

Improving upon the existing irrigation structures and prevent soil erosion due to frequent flooding the department has prepared schemes under the Pradhan Mantri Krishi Sichai Yojna (PMKSY). PMKSY will broadly focus on:

<sup>73</sup> Source: DIP Shahjahanpur



- a. Creation of new water sources; repair, restoration and renovation of defunct water sources; construction of water harvesting structures, secondary & micro storage, groundwater development, enhancing potentials of traditional water bodies at village level like Jal Mandir (Gujarat); Khatri, Kuhl (H.P.); Zabo (Nagaland); Eri, Ooranis (T.N.); Dongs (Assam); Katas, Bandhas (Odisha and M.P.) etc.
- b. Developing/augmenting distribution network where irrigation sources (both assured and protective) are available or created;
- c. Promotion of scientific moisture conservation and run off control measures to improve ground water recharge so as to create opportunities for farmers to access recharged water through shallow tube/dug wells;
- d. Promoting efficient water conveyance and field application devices within the farm viz, underground piping system, Drip & Sprinklers, pivots, rain-guns and other application devices etc.;
- e. Encouraging community irrigation through registered user groups, farmers, producers, organisations, NGOs;
- f. Farmer oriented activities like capacity building, training and exposure visits, demonstrations, farm schools, skill development in efficient water and crop management practices (crop alignment) including large scale awareness on more crop per drop of water through mass media campaign, exhibitions, field days, and extension activities through short animation films etc.

### 7.1.3 Ecological integrity

#### Freshwater biodiversity and habitats

Freshwater ecosystems are incredibly diverse and are hotspots of biodiversity. Freshwater habitats such as lakes, rivers, streams, wetlands and aquifers host an incredible proportion of world's biodiversity. Freshwater is less than 1% of total available water on earth.

#### Mapping of wetlands in the area and status of wetland health

The wetland map and category wise details of wetlands present in Shahjahanpur district is given at Figure 10 and Table 3

A total of 601 wetlands are present in the district.<sup>74</sup>

The inventory of the health card of only 5 wetlands in Shahjahanpur viz. Bharatpur, Bharatpur 2, Islamganj, Noorpur Tarsouna, Rajepur, Raipur are updated on the website, while the rest are still not uploaded.<sup>75</sup>

<sup>74</sup> [https://vedas.sac.gov.in/vedas/downloads/atlas/Wetlands/National%20Wetland%20Atlas\\_Uttar%20Pradesh.pdf](https://vedas.sac.gov.in/vedas/downloads/atlas/Wetlands/National%20Wetland%20Atlas_Uttar%20Pradesh.pdf) (Page – 110)

<sup>75</sup> <https://indianwetlands.in/resources-and-e-learning/health-card-dashboard/>

Table 35: Freshwater Biodiversity and Habitats<sup>52</sup>

| <b>General Description</b> |   |  |                 |  |                 |  |
|----------------------------|---|--|-----------------|--|-----------------|--|
|                            | Wetland Name  | <b>Bharatpur</b>                                     |                 | <b>Bharatpur 2</b>                                 |                 |  |
|                            | Area (hectares)   | 0.61   |                 | 1.07   |                 |  |
|                            | Wetland Type  | Natural (Inland)                                     |                 | Natural (Inland)                                   |                 |  |
| <b>Code</b>                | <b>Indicator</b>  | <b>Actual Value</b>                                  | <b>Category</b> | <b>Actual Value</b>                                | <b>Category</b> |  |
| A-01                       | % wetland converted to non-wetland use since 2000   | 0%   | A               | 0%   | A               |  |
| H-01                       | Ratio of number of natural inlets choked and diverted to total number of natural inlets   | 0-0.2  | A               | 0-0.2  | A               |  |
| H-02                       | Ratio of number of natural outlets choked and diverted to total number of natural outlets | 0-0.2  | A               | 0-0.2  | A               |  |
| Q-01                       | % of samples conforming to desired BOD/DO/COD levels                                      | 60-80% sample meet the criteria                      | B               | 60-80% sample meet the criteria                    | B               |  |
| B-01                       | % wetland area covered by invasive macrophytes  | <10%   | A               | <10%   | A               |  |
| G-01                       | Clearly demarcated wetlands map   | Wetlands map prepared and under consideration of SWA | B               | Wetlands map prepared & under consideration of SWA | B               |  |
| G-02                       | Wetland Management Plan   | Management plan under preparation                    | D               | Management plan under preparation                  | D               |  |
| G-03                       | Wetland Notification  | Regulation planned process initiated                 | D               | Regulation planned process initiated               | D               |  |

| Islamganj  |          | Noorpur Tarsouna                                   |          | Rajepur Raipur                                     |          |  |
|--|----------|--|----------|--|----------|--|
| 0.61   |          | 1.07   |          | 3.91   |          |  |
| Natural (Inland)                                   |          | Natural (Inland)                                   |          | Natural (Inland)                                   |          |  |
| Actual Value                                       | Category | Actual Value                                       | Category | Actual Value                                       | Category |  |
| 1-5%   | B        | 0%   | A        | 0%   | A        |  |
| 0.3-0.4  | B        | 0-0.2  | A        | 0-0.2  | A        |  |
| 0.3-0.4  | B        | 0-0.2  | A        | 0-0.2  | A        |  |
| 60-80% sample meet the criteria                    | B        | 80-100% sample meet the criteria                   | A        | 80-100% sample meet the criteria                   | A        |  |
| 11-20%   | B        | <10%   | A        | <10%   | A        |  |
| Wetlands map prepared & under consideration of SWA | B        | Wetlands map prepared & under consideration of SWA | B        | Wetlands map prepared & under consideration of SWA | B        |  |
| Management plan under preparation                  | D        | Management plan under preparation                  | D        | Management plan under preparation                  | D        |  |
| Regulation planned process initiated               | D        | Regulation planned process initiated               | D        | Regulation planned process initiated               | D        |  |

### **Status of Urban Wetlands in all ULBs<sup>76</sup>**

- No wetland pollution reported in ULB's
- The inventory of the health card of only 5 wetlands in Shahjahanpur are updated on the website, while the rest are still not uploaded.<sup>77</sup>

### **Water-allocation mechanisms**

- Water allocation mechanisms are present at eight locations of the Ramganga river, however, no specific data related to Shahjahanpur found.

### **River Water Quality during dry season**

Described under section 4.6.2 Surface Water Quality.

## **7.1.4 Capacity building and public participation**

### **Training needs**

#### **Topics relevant for capacity development**

Fostering and Capacity Enhancement of Water Users Organisations, e.g., WUAs – proposed for Uttar Pradesh

Training and capacity building of DGC on RBM cycle planning and implementation

#### **Topics not covered by existing training institutes and courses**

Long term planning for 20 to 30 years, GIS based land use assignment, E-Flow assessment. Information provided in

- [https://nmcg.nic.in/writereaddata/fileupload/59\\_Mainstreaming%20Urban%20River%20report%20-%20compressed.pdf](https://nmcg.nic.in/writereaddata/fileupload/59_Mainstreaming%20Urban%20River%20report%20-%20compressed.pdf)
- <https://edukemy.com/current-affairs/gazette/2021-07-16/urban-river-management>
- [https://urbanrivers.niua.org/themes/contrib/corporate\\_blue/pdf/vVol\\_1\\_-\\_Main\\_document.pdf](https://urbanrivers.niua.org/themes/contrib/corporate_blue/pdf/vVol_1_-_Main_document.pdf)

#### **Identification of potential training institutes**

- Sam Higginbottom University of Agriculture, Technology, and Sciences (SHUATS)
- District Institute of Education and Training Shahjahanpur
- Bank of Baroda under Scheme RSETI provides training on Agriculture in Shahjahanpur

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<sup>76</sup> <https://indianwetlands.in/wetlands-overview/threats-and-management/>

<sup>77</sup> <https://indianwetlands.in/resources-and-e-learning/health-card-dashboard/>

Available other training options

- Anil Agarwal Environment Training Institute (AAETI), Nimli, Rajasthan - Both online and offline options
- River Cities Alliance (RCA)
- National Water Academy (NWA)

## **7.2 Selected Issues with situation analysis and specific targets**

The situational assessment of the key issues by the DGC and the SMCG and the stakeholder consultation process concluded that the following key issues are to be dealt with in the first RBM cycle (2020-2027) in Shahjahanpur.

1. Pollution from non-point sources ( fertilizer and pesticides) in irrigated agriculture
2. Liquid waste management (domestic sewage) in urban areas and household sanitation in rural areas
3. Wetland management, declining groundwater tables and decreased baseflow in rivers
4. Industrial pollution
5. Solid waste management in rural and urban areas
6. Capacity building and public outreach (including Arth Ganga)

To prepare for a meaningful action plan, the assessment of these issues is briefly analysed, potential measures identified, and specific targets concluded on. For these targets detailed action plans are elaborated in the next chapter.

## **Key Issue 1: Non-point source pollution (fertilizer and pesticides) in irrigated agriculture**

### **Assessed gap:**

Fertilizers and pesticides leaching from agricultural fields located at both banks of the Ramganga river during floods cause river water pollution. Chemical leaching from agriculture practice at almost 100-meter-wide setback zone (balm land) located in both banks of the Ramganga river. Runoff of soil, pesticides, and fertilizer from agricultural fields is causing pollution of water resources that damages valuable riverine and aquatic ecosystems. Excess nitrogen leads to harmful algal blooms in water bodies while simultaneously polluting groundwater resources over time. Contamination of water resources from agricultural runoff will probably worsen since the use of chemical fertilizer and pesticides is expected to increase due to the promotion of double and multiple cropping.

### **Potential interventions:**

- Demonstration on integrated pest and nutrition management techniques
- Phased reduction in application of chemical fertilizers through sensitisation and providing training in the rate, timing, method of application
- Promoting organic cultivation in setback zone
- Implementing conservation tillage and bund plantation
- Managing livestock access to river
- Conduct comprehensive awareness campaigns on reduced and less harmful pesticide application in close collaboration with respective Water Use Organisations (in the irrigation schemes)
- Establish a riparian zone—some 10 m in width—along rivers, creeks, and drainage channels that will provide a natural filtration zone for agricultural runoff
- Promotion of micro (drip/ sprinkler) irrigation.

### **Specific targets:**

- Implementation of IPNM strategy
- Promotion of organic cultivation and welfare schemes
- Taking measures to reduce flow of pollutants from agriculture field to the river



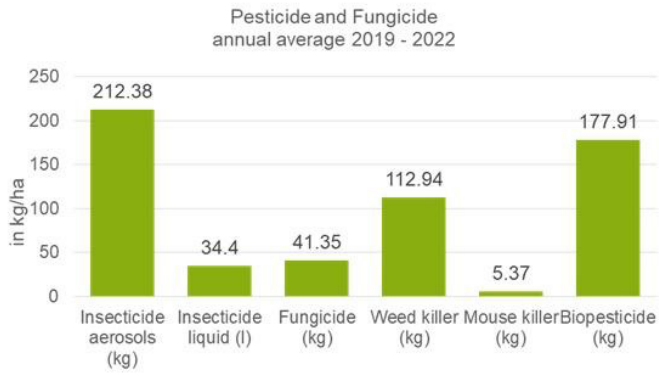


Figure 50: Pesticides and Fungicide consumption data for Shahjahanpur district

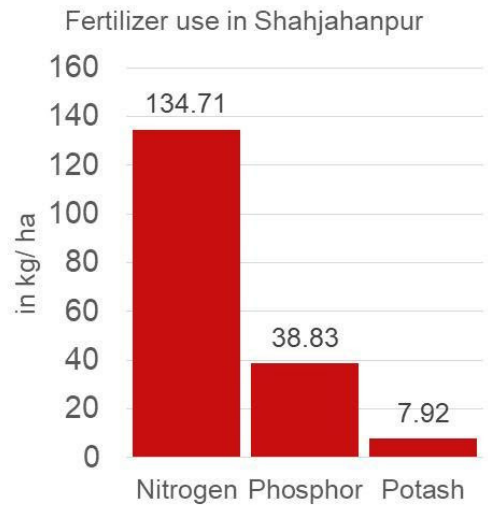


Figure 51: Fertilizer consumption data for Shahjahanpur District

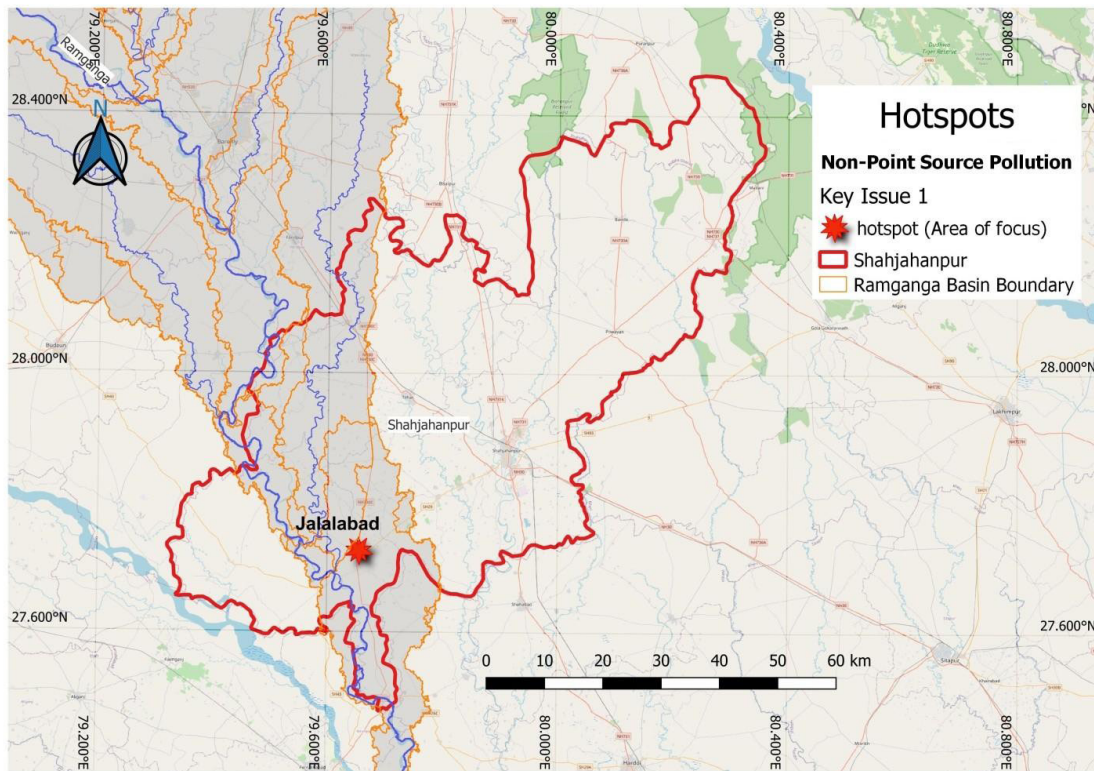


Figure 52: Rural areas with a focus on interventions for non-point source pollution

## **Key issue 2: Liquid waste management (domestic sewage) in urban areas and household sanitation in rural areas**

### **Assessed gap:**

Domestic wastewater contains high levels of organic matter, nutrients and coliforms which contaminate water bodies. In Shahjahanpur the volume of domestic wastewater is increasing at a fast rate due to the rapidly growing urban population combined with general economic growth. While treatment plants are under construction, the gap between installed treatment capacity and wastewater generation is expected to grow further. Urban settlements are not yet connected to underground sewage systems and pollute ground and surface waters through open, untapped drains. E.g. untreated household sewage/sullage from Shahjahanpur city is discharged into River Garra and Khannaut. There are 17 nos. untreated drainage discharge point at Garra and Khannaut rivers. Drainage network within Shahjahanpur city is old and outdated and many portions of the drainage system are dilapidated which causes sewage/sullage stagnation and water pollution. The faecal sludge is discharged into open drains, fields, vacant lots, etc. in the absence of designated sludge disposal sites, contributing to environmental pollution. One private FSTP with 32 KLD capacity is operating at City Park Colony, Lodhipur. One STP with 40 MLD capacity is under construction at Keruganj, Shahjahanpur; 80% of civil construction work is completed; it will cater 70% area of the total Shahjahanpur city; STP is expected to operate from January to February 2023. 45 Km out of total planned 186 Km. long drainage network is already constructed. A 250 crore budget is allocated for STP and drainage network construction.

### **Potential interventions:**

- Augment co-treatment facility within 40 MLD STP which is under construction to cater to the remaining 30% area of the Shahjahanpur city area.
- Complete 186 Km. long underground drainage network construction and connections to STPs before discharge into the river.
- Monitor water quality for all the drains, nalas etc. discharging water into rivers
- Repair 55 km. long old and dilapidated drainage systems
- Develop Faecal Sludge and Septage Management Plan and provision FSTP in rural area
- Increase drainage network coverage and connection to STPs
- Augment bio-remediation in untapped drain
- Ensure individual sanitation facility in all household at urban as well as rural area

### Specific targets:

- Ensure 100% treatment of sewer generated from city household before discharge to river water
- Ensure individual sanitation facility at each household
- Implement storm water drainage system
- Ensure implementation of sludge and septage management in scientific way

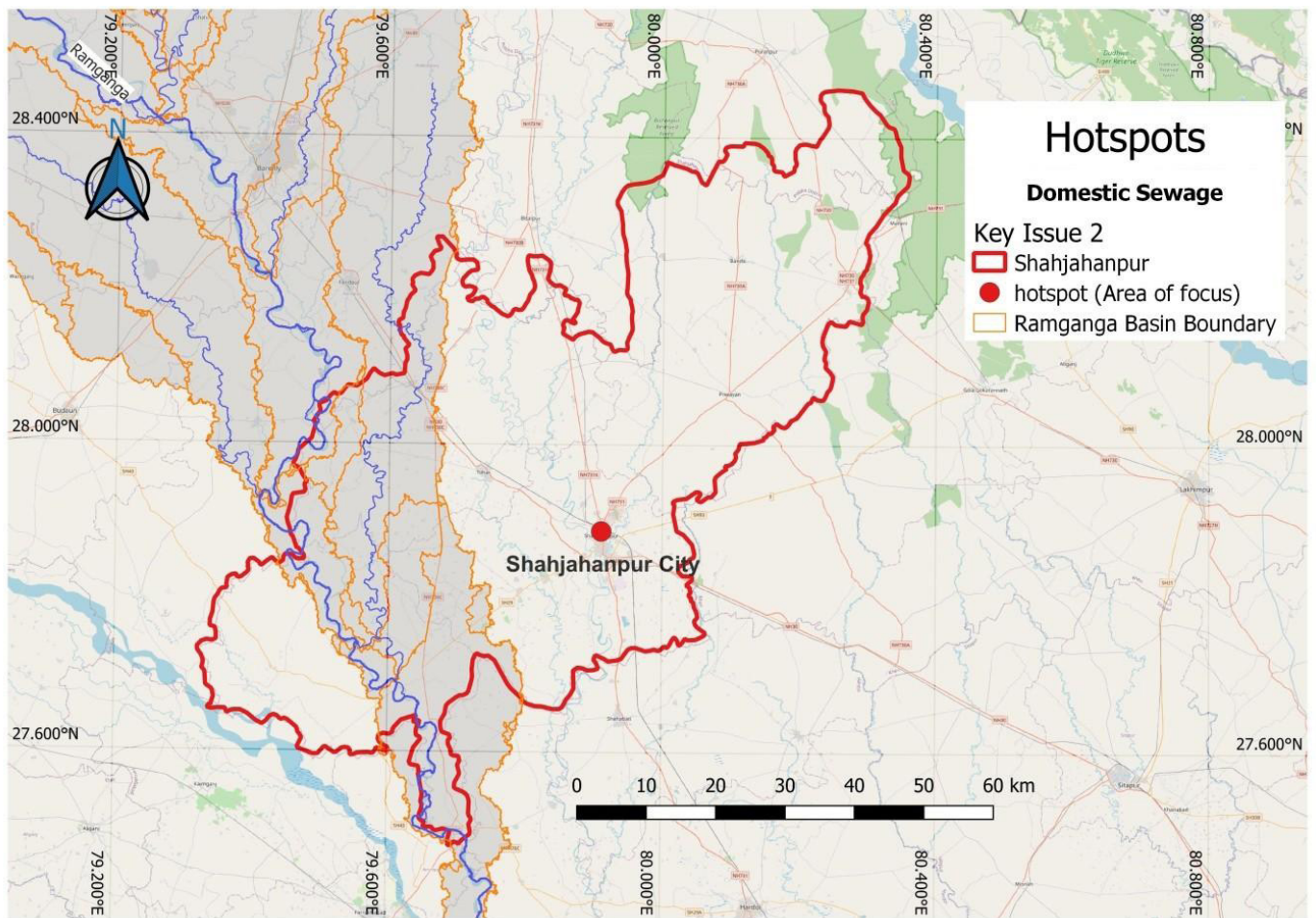


Figure 53: Location for installation of STPs

### **Key Issue 3: Wetland Management, declining groundwater tables and decreased baseflow in rivers**

#### **Assessed gap:**

Encroachment on wetlands, overexploitation of groundwater and insufficient surface water storage and management, is observed in Shahjahanpur. Encroachment was reported on river side setback zone (balm land) at Aziz Nagar and Lodhipur Bridge over Khannaut river. Demolition debris and foundation materials of old Lodhipur Bridge and Aziz Nagar bridge remained in the mainstream of Khannaut and Garra river respectively which is creating an obstruction to natural river flow hence reducing the environmental flow. Net groundwater availability is 40,974.03 ham whereas groundwater draft (all uses) is 83,111.52 ham, hence the level of development of groundwater is 58.96%. There is no water purification centre in Shahjahanpur district. Ground water is the only source for municipal supply. Shallow well irrigation pumps are the major source of irrigation during lean, dry period. Pre-monsoon GW table lies at 6.8 MBGL whereas it is 5.83- 6.79 MBGL during rainy reason and 5.47 – 6.45 at postmonsoon season. 19 nos. of ground water recharge pit each with 3X3 or 3X2 M dimension is constructed. Annual ground water recharge potential of the district from different recharge structure is 1.88 MCM. A total of 601 wetlands are present in the district. Biofilter is augmented in wetland.

#### **Potential interventions:**

- Ensure compliance to environmental regulations through appropriate administrative and legal measures, and reverse wetland encroachment
- Groundwater regulation laws enforcement, monitor illegal groundwater abstractions and ensure compliance to the permitting system
- Promote groundwater recharge by establishing, maintaining and protecting check dams, percolation tanks, subsurface dykes and recharge shafts
- Encourage rainwater harvesting in agricultural areas through diverse means (swales, pits, contour bunds, etc.) in order to substitute water abstraction from rivers and ensure more base flow
- Use alternate sources of water for irrigation purposes hence reducing the stress on groundwater specially during dry period
- Promote rainwater harvesting and ground water recharge

#### **Specific targets:**

- Conservation of wetland
- Floodplain recovery and improving natural flow of river
- Monitoring and better management of ground water resources
- Improving groundwater recharging



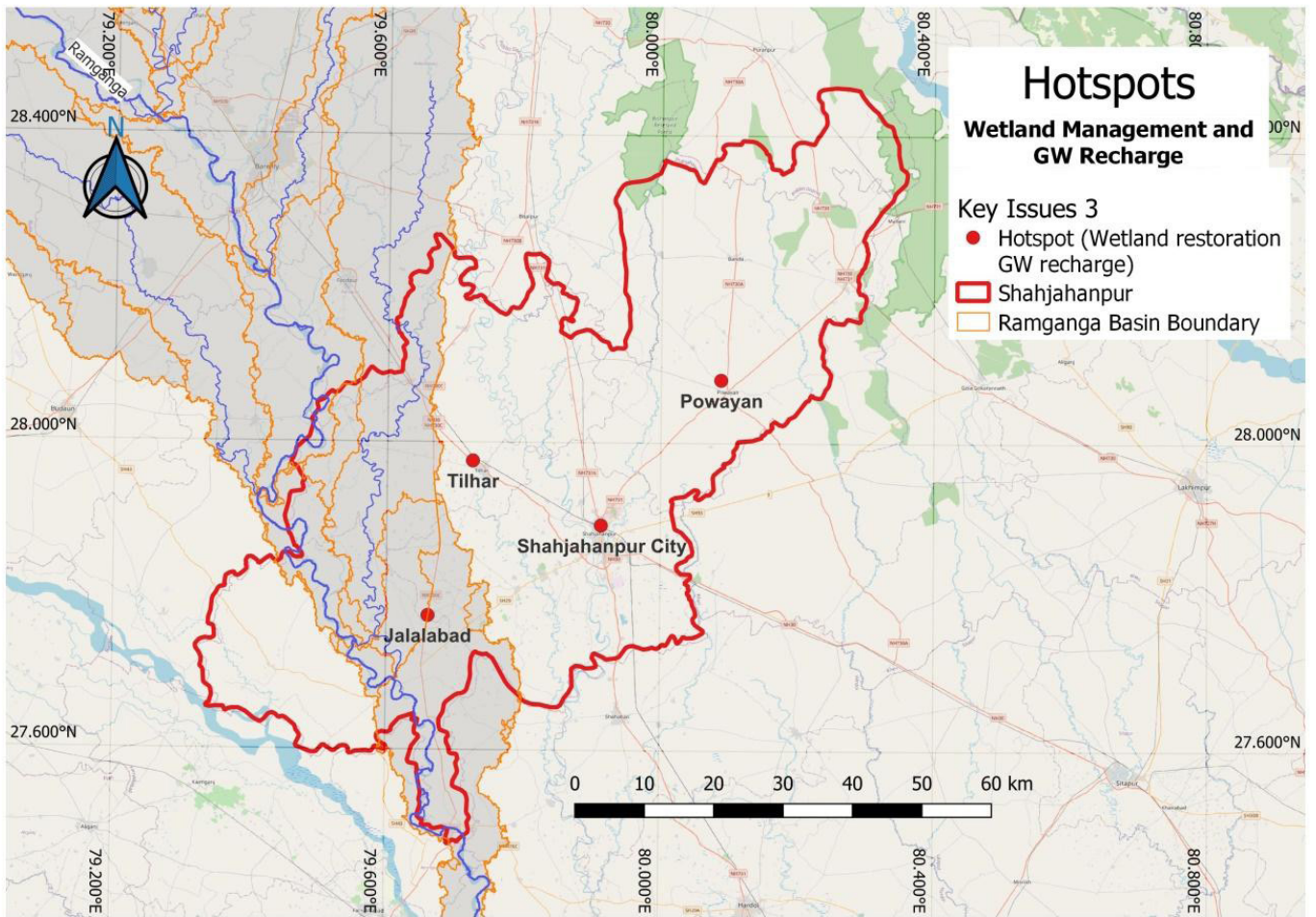


Figure 54: Location for conserving wetlands and GW recharge

## **Key Issue 4: Industrial Pollution**

### **Assessed gap:**

With rapid economic growth and urbanisation, industrial pollution is increasing. In many places untreated industrial wastewater is discharged in rivers and streams, contaminating surface and groundwater resources. Although all 9 GPs have ETPs with the official capacity of 25.34 MLD which covers the entire effluent load from these units the treated effluents are obviously not meeting the required quality standards and drains and rivers have anaerobic conditions. No CETPs exist in the district. One major source of industrial pollution found in Shahjahanpur district is from KR Pulp and Papers mill located at Rampura village, Sadar Tehsil, Shahjahanpur district connected with Ramganga at Hardoi District.

### **Potential interventions:**

- Construction of CETP with adequate capacity
- Connecting all industrial effluents from respective ETPs to CETP before discharging into the rivers
- Improving WQ monitoring network, with a specific focus on hotspots of water contamination
- Regular sampling and inspection of industrial wastewater to map all pollution sources and identify pollution hotspots
- Initiate the necessary action against industries that do not meet the standards

### **Specific targets:**

- Ensure proper treatment of effluent generated from GPs
- Regular monitoring of water/ effluent quality



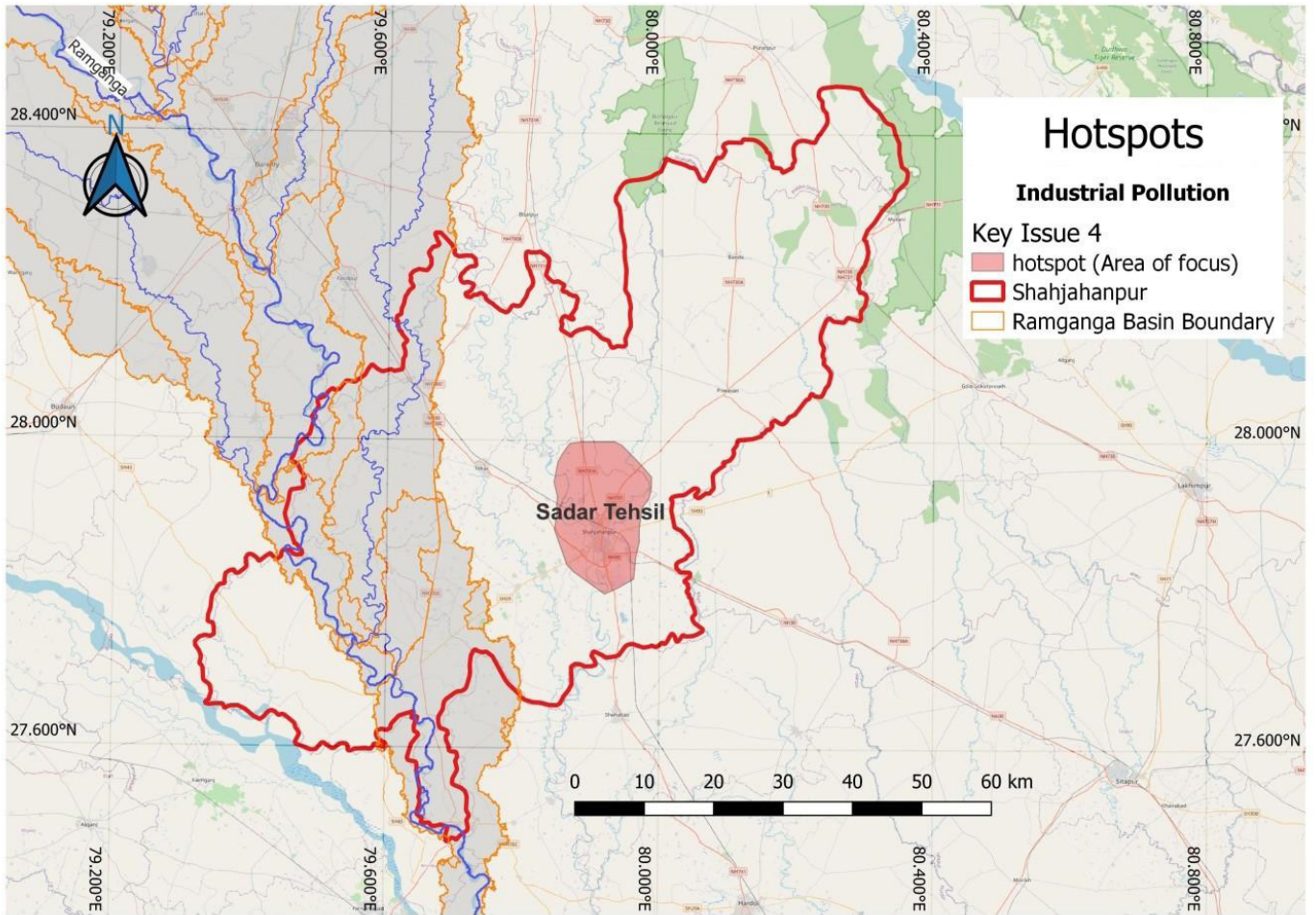


Figure 55: Area of focus for WQ monitoring and Installation of CETP

## **Key Issue 5: Solid waste management in rural and urban areas**

### **Assessed gap:**

Packaging materials, vegetable wastes dumped on both river banks and river water from Sabji mandi / vending unit operating on dilapidated bridge located at Raj Ghat on Garra River. Dumping of municipal waste on River Garra & Khannaut by local residents, shop owners from ROB at Lodhipur, Ajj ganj bridge; Subhas Nagar bridge; Keruganj bridge; 2 bridges in Bareilly – Lucknow highway, one bridge over Garra and another one on Khannaut. Two hazardous waste processing units (Ramapati Agro Chemicals, Rosa, Shahjahanpur; J.K. Chemicals Atsaliya, Shahjahanpur) available in the District are not functional. There are no e-waste processing units in the district. Shahjahanpur Municipal Corporation is operating one waste segregation unit at Jail road near Fire Station and One Material Recovery Facility (MRF) Centre at Kakra, Shahjahanpur. Few volunteers with motivational support from municipal authorities are organizing awareness programmes on river cleaning twice a month at Raj Ghat area.

### **Potential interventions:**

- Vending on River Over Bridge (ROB) should be prohibited by law and fencing may be provided on both sides in all ROB location.
- Mass scale awareness programme on ecological integrity of rivers viz. river beautification and cleaning, throwing of household waste at waste bin provided by municipality authorities.
- Adequate number of waste collection bins should be provided all over the city
- Waste collection and evacuation system by municipality shall be regularized and strengthened further.
- Waste Transfer Stations construction on priority basis
- Separate Hazardous Waste, E-waste, C&D waste management units processing facility set up.

### **Specific targets:**

- Improve waste management practice
- Awareness raising of local people
- Adopt comprehensive environmental management practice

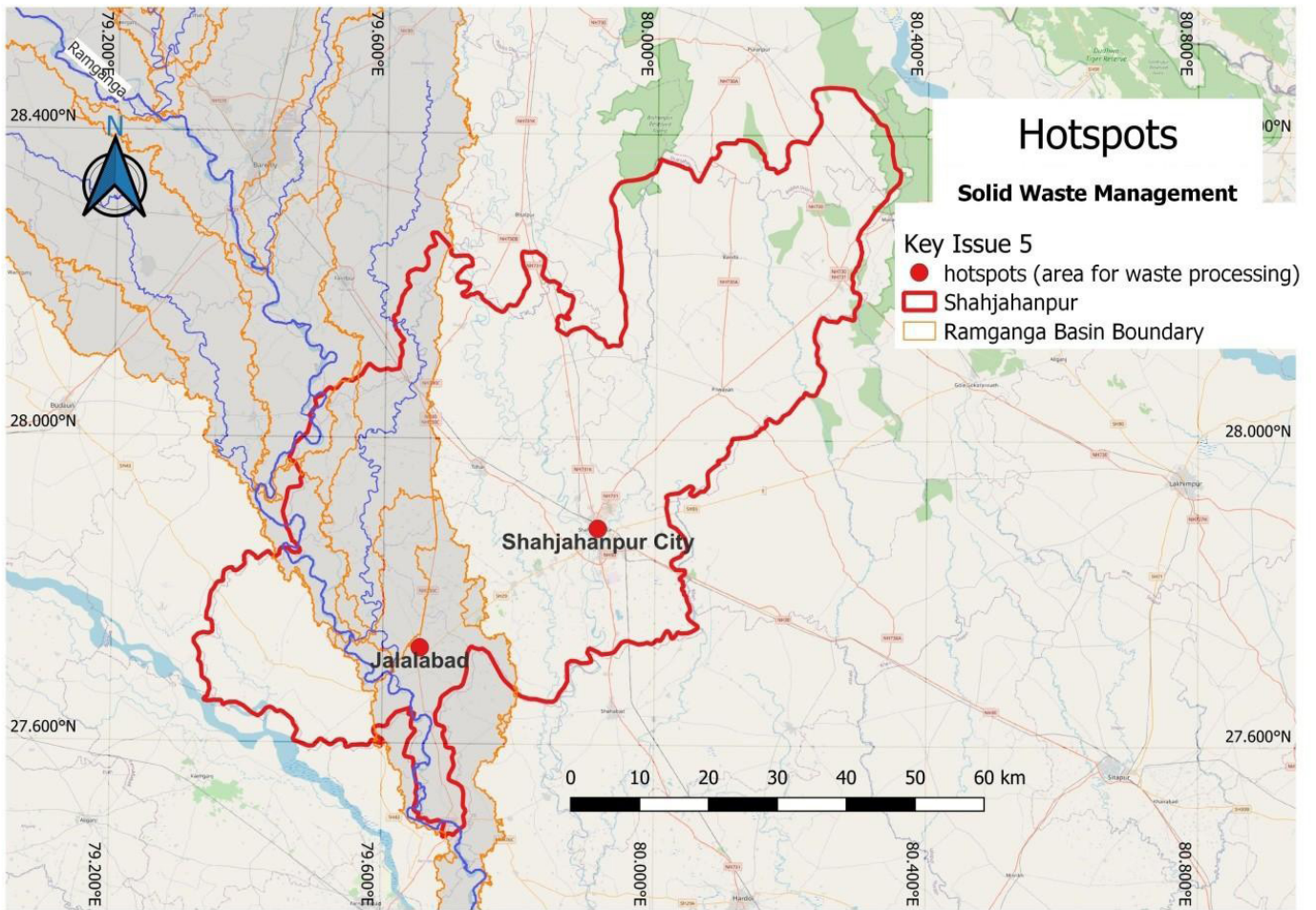


Figure 56: Locations where waste management practices and facilities is to be improved

## **Key Issue 6: Capacity building and public outreach (including Arth Ganga)**

### **Assessed gap:**

The DGCs are mandated with the rejuvenation of the river stretches and the catchment area but currently lack capacities and human resources to look into the required actions to initiate, prepare, implement, operate and maintain associated projects. Diverse funding sources for implementing Ganga rejuvenation projects exist at the district level but are not sourced by the district authorities. The topics of Eflow assessment and GIS based land use assignment are not included in the district level planning by DGC. Linkages and synergies with Arth Ganga with block development plan are still missing.

### **Potential interventions:**

- Make use of the existing funding sources for capacity building and human resource development in the area of river rejuvenation incl. RBM cycle, as well as various required environmental and civil engineering topics (STP, WWTP, ETP, CETP etc.)
- Establish additional dedicated capacity at the DGCs of the pilot districts by seconding 2 designated professionals in the form of a supporting cell
- Provide additional trained human resources to the executing agencies to technical topics for operation, maintenance and monitoring of STPs, Faecal Sludge Management (FSM) and CETPs, waste management facilities (MRF, Treatment, Storage, and Disposal Facilities, etc.)
- Identify and involve suitable research institutes for capacity building
- Conduct a gender sensitive outreach campaign for water related issues involving NGOs and self-help groups (especially women groups)
- Foster the setup and enhance the capacities of Water Users Organisations (incl. gender sensitive composition)
- Foster linkages and synergies with Arth Ganga during human resources development for other livelihood generation schemes.
- Pilot DGCs act as ToT for other follow up DGCs for developing DGPs

### **Specific targets:**

- Training and capacity building of DGC with specifically trained resource person (with knowledge on gender sensitivity) who has the sole task of implementing, monitoring and revising the DGP
- Training and capacity building of local community enhancing skills building and empowerment programme on women leadership skills, decision making skills
- Engage resource institute to carryout special study



- Capacity building programme on gender sensitisation for women on leadership and decision-making skills has been conducted for 5 NGOs

# D Action and Monitoring Plan and Implementation

Section

## 8 Detailed action plan

### 8.1 Selected issues

**Key Issue 1: Non-point source pollution (fertilizer and pesticides) in irrigated agriculture**

| Action description  | By                        | Start date | End date |
|---|---------------------------|------------|----------|
| <b>Specific target 1: Training and capacity building on implementation of IPNM strategy</b>   |                           |            |          |
| Carryout training need assessment on promotion of IPNM  | Department of Agriculture | Oct 2023   | Apr 2024 |
| Develop training modules and IEC materials in local language with visual display covering crop specific IPNM practices.   | Department of Agriculture | Oct 2023   | Apr 2024 |
| Organise training of trainers programme for at least ten (10) village resource persons/ individual service providers/ irrigation operators on crop wise IPNM strategy.  | Department of Agriculture | May 2024   | Oct 2024 |
| Orientation of farmers on IPNM through trained resource person (trainings of farmers shall be organized before the on-set of agricultural seasons, i.e., at least 30-45 days before sowing / planting)                          | Department of Agriculture | Dec 2024   | Oct 2026 |
| Hand holding support shall be rendered to the farmers through the trained resource person during different stages of crop growth.   | Department of Agriculture | Dec 2024   | Oct 2026 |
| Farmers including women farmer groups are sensitized and trained on crop specific IPNM strategy and managing livestock access to river in twelve (12) villages located within five (5) km. aerial distance from Ramganga river. | Department of Agriculture | Dec 2024   | Oct 2026 |



| Milestone  | Required resources  | Outcome   | Linkage  |
|--|---|---|--|
| Tender published, agency selected, agreement made, training need assessment done | Financial Allocation for survey                             | Capacity gap identified   | Agriculture Dept. Budget/ Rashtriya Krishi Vikas Yojana                            |
| Agreement with specialised agency  | Financial Allocation, List of ongoing initiatives           | IPNM strategy & training material developed                               | Agriculture Dept. Budget/ Rashtriya Krishi Vikas Yojana                            |
| Tender published, agency selected, agreement made, training of trainers done     | Financial Allocation, Training Material, Training Agency    | Local Trainers are capable of organizing orientation workshops to farmers | Agriculture Dept. Budget/ Rashtriya Krishi Vikas Yojana                            |
| Training scheduled, area selected, farmers identified, resource person involved  | Financial allocation, training material, resource person    | Farmers are more aware on appropriate uses of fertilizers and pesticides  | Agriculture Dept. Budget/ Rashtriya Krishi Vikas Yojana                            |
| Area selected, Farmers Identified, Resource person involved                      | Financial Allocation, Resource Person                       | Optimized uses of fertilizers and pesticides have achieved                | Agriculture Dept. Budget/ Rashtriya Krishi Vikas Yojana                            |
| Training scheduled, Area selected, Farmers Identified, Resource person involved  | Financial Allocation for Training Material, Resource Person | Women farmers are more sensitised towards IPNM strategy                   | Agriculture Dept. Budget/ Rashtriya Krishi Vikas Yojana/ Gender Sensitive measures |

| Action description   | By  | Start date | End date |  |
|--|---|------------|----------|--|
| <b>Specific target 1: Training and capacity building on implementation of IPNM strategy</b>  |   |            |          |  |
| Incentivise the process to promote the use of water soluble, organic fertilizer  | Department of Agriculture                               | Dec 2024   | Oct 2026 |  |
| Arrange series of behaviour change communication (BCC), awareness and education events/ campaigns; circulate messages; publish news and articles in cooperation with women water user groups | Department of Agriculture & Nehru Yuva Kendra Sangathan | Dec 2024   | Oct 2026 |  |
| <b>Specific target 2: Promotion of organic cultivation and welfare schemes</b>   |   |            |          |  |
| All villages located within three (3) km aerial distance from Ramganga river shall be made completely chemical-free by promoting organic farming   | Department of Agriculture                               | Dec 2024   | Oct 2026 |  |
| Various welfare schemes promoted under project should be replicated in the selected twelve (12) villages where IPNM strategy is promoted. This will also promote Arth Ganga concept.         | Department of Agriculture & Nehru Yuva Kendra Sangathan | Dec 2024   | Oct 2026 |  |
| <b>Specific target 3: Taking measures to reduce flow of pollutants from agriculture field to the River</b>   |   |            |          |  |
| Assessment/study of suitable areas/locations   | Department of Agriculture                               | Oct 2023   | Apr 2024 |  |
| Installation of pilot bio-filter created along identified stretch  | Department of Agriculture                               | Apr 2024   | Mar 2026 |  |
| Impact monitoring of pilot bio-filter  | Department of Agriculture                               | Apr 2026   | Apr 2027 |  |

| Milestone  | Required resources   | Outcome  | Linkage  |
|--|--|--|--|
| Reduction in synthetic fertilizer consumption, Quantity of organic fertilizer used                 |  | Increase in use of organic fertilizer  | A griculture Dept. Budget/ Rashtriya Krishi Vikas Yojana               |
| BCC Agency identified and involved; Communication material developed; awareness campaign organised | Financial allocation for trainings, programmes, trainers, publications       | Farmers are more aware on uses of optimized fertilizers and pesticides, water user groups are more aware and willing towards organic farming | Namami Gange Programme / Agriculture Dept. / Gender Sensitive measures |
| Area earmarked, Organic farming promoted   | Resources for organic farming materials e.g.- bio composting, bio-pesticides | Reduction in synthetic fertilizer consumption, Increase in use of organic fertilizer   | Namami Gange Programme / Agriculture Dept. Budget                      |
| Campaign organised   | Financial Allocation for scheme identification selection criteria            | Schemes are linked and benefits are assessed   | Namami Gange Programme   |
| survey initiated, map prepared   | Financial Allocation for survey, map preparation                             | Areas identified for bio filter zones;   | Namami Gange Programme   |
| Tender floated, bio-filter zone installed  | Financial allocation for construction of bio filter zone                     | Bio filer zone established, water quality of River have improved   | Namami Gange Programme   |
| Agency for monitoring appointed, operation guideline have prepared                                 | Financial allocation for operation and monitoring of bio-filter zones        | Sustainability of bio-filter zones have achieved   | Namami Gange Programme   |

**Key Issue 2: Liquid waste management (domestic sewage) in urban areas and household sanitation in rural areas**

| Action description  | By                 | Start date | End date   |
|---|--------------------|------------|------------|
| <b>Specific target 1: Training and capacity building on implementation of IPNM strategy</b>                 |                    |            |            |
| Completion of remaining work of 40 MLD STP and 186 Km. long drainage network construction                   | Jal Nigam          | Ongoing    | Feb 2024   |
| Augment co-treatment facility within 40 MLD STP to cover remaining 30% of the total Shahjahanpur city area. | Jal Nigam          | May 2024   | Apr 2026   |
| Detailed survey of drains, including location of I&D and STP  | Jal Nigam          | Sep 2023   | Dec 2023   |
| Connecting all 17 untapped drains with STP  | Jal Nigam          | ongoing    | Feb 2024   |
| Regular monitoring is done for the 17 drainage discharge points   | UP-PCB & Jal Nigam | Oct 2023   | continuous |
| Identification of five (5) drains and augmenting bioremediation in this RBM cycle.                          | Jal Nigam & ULBs   | Nov 2023   | Feb 2025   |
| Scientific processing of biodegradable waste  | ULBs               | ongoing    | Dec 2024   |

| Milestone   | Required resources  | Outcome   | Linkage   |
|---|---|---|---|
| Construction is completed, STP commissioned   |   | Treatment of waste water before discharge to River                          | Nagar Vikas Nigam / Jal Nigam/ AMRUT 2 / Namami Gange Programme |
| Tender Floated, Agency Involved, Co-treatment augmented   | Financial Allocation, Involving agency                        | Achievement of 100% treatment of sewerage discharge                         | Nagar Vikas Nigam / Jal Nigam/ AMRUT 2 / Namami Gange Programme |
| Tender Floated, Agency Involved, survey done, location identified   | Financial Allocation, Involving agency                        | Detailed mapping and information collection is done                         | Nagar Vikas Nigam / Jal Nigam/ AMRUT 2 / Namami Gange Programme |
| All drains are connected with STP   | Financial Allocation, Commissioning agency                    | Zero discharge without treatment is insured                                 | Nagar Vikas Nigam / Jal Nigam/ AMRUT 2 / Programme              |
| Selection of monitoring location, Prepare monitoring schedule   | Financial allocation  | WQ of discharging points monitored  | Namami Gange Programme  |
| Floating of tender, Identification of drain and location, Engaging construction agency, commissioning of bioremediation | Financial allocation, Engage construction agency              | Less untreated waste water discharged in the river                          | Nagar Vikas Nigam / Jal Nigam/ AMRUT 2                          |
| Floating of tender, Engaging construction agency, commissioning of the plant  | Financial allocation for construction, materials, supervision | Processing and reutilisation of wet waste, better waste management achieved | Nagar Vikas Nigam   |

| Action description   | By                               | Start date | End date   |  |
|--|----------------------------------|------------|------------|--|
| <b>Specific target 2: Ensure individual sanitation facility at each household</b>  |                                  |            |            |  |
| Provide integrated sanitation facility in each household at urban and rural area   | ULBs                             | Ongoing    | Mar 2027   |  |
| <b>Specific target 3: Implement storm water drainage system</b>  |                                  |            |            |  |
| Existing open drainage systems is repaired and used for stormwater drainage including bar screen installation  | ULBs                             | Nov 2023   | Apr 2025   |  |
| <b>Specific target 4: Ensure implementation of sludge and septage management in scientific way</b>   |                                  |            |            |  |
| Ensure collection, transportation and management of all sludge and septage on regular basis as per the State Septage policy which was promulgated on 31.10.2019. | ULBs                             | ongoing    | continuous |  |
| Conduct feasibility study on treatment and management of faecal sludge at block level and rural area   | ULBs                             | Nov 2023   | Sep 2024   |  |
| Formation of septage management committee  | ULBs                             | Nov 2023   | Dec 2023   |  |
| Ensure evacuation of septage on regular interval and proper treatment of faecal sludge   | ULBs                             | Ongoing    | continuous |  |
| Quantification and reutilisation of STP sludge as an alternative for chemical fertilizers  | ULBs & Department of Agriculture | Feb 2023   | Continuous |  |



| Milestone  | Required resources   | Outcome  | Linkage                       |
|--|--|--|-------------------------------|
| Household identified, tender floated, agency engaged, No. of sanitation facility installed | Financial allocation for construction, materials, supervision        | 100% household level sanitation achieved   | Swachh Bharat Mission         |
| DPR prepared, Tender Floated, Agency Engaged   | Financial allocation for materials, construction, supervision        | Storm water drainage network is in place, Removal of large and solid particle before discharge | Nagar Vikas Nigam / Jal Nigam |
| Frequency of collection, quantity generated vs collected, final disposal process           | Financial allocation for collection transportation of sludge, trucks | Better sludge management facility achieved   | Nagar Vikas Nigam / Jal Nigam |
| Questionnaires prepared, survey conducted, report prepared, Tender Floated, Agency Engaged | Financial allocation for survey, mapping                             | Actual situation and volume for treatment and management of sludge is identified               | Nagar Vikas Nigam / Jal Nigam |
| OM issued, Members identified  |  | Septage management committee formed  | Nagar Vikas Nigam / Jal Nigam |
| Maintain generation vs treated data record   | Financial allocation for sludge cleaning, transportation tanks       | 100 % treatment of faecal sludge achieved  | Nagar Vikas Nigam / Jal Nigam |
| Maintain logbook, STP sludge sold to farmers as compost                                    |  | Promotion of organic fertilizer, revenue generated   | Nagar Vikas Nigam / Jal Nigam |

**Key Issue 3: Wetland Management, declining groundwater tables and decreased base flow in rivers**

| Action description  | By   | Start date | End date   |  |
|---|--|------------|------------|--|
| <b>Specific target 1: Conservation of wetland</b>                                       |  |            |            |  |
| Demarcation/ mapping of all existing wetlands in the district                           | UP State Biodiversity Board                            | Feb 2024   | Nov 2024   |  |
| 50 hectares of wetlands are recovered   | UP State Biodiversity Board                            | Jan 2025   | Jun 2026   |  |
| <b>Specific target 2: Floodplain recovery and improving natural flow of river</b>       |  |            |            |  |
| Rehabilitation of Encroachers to other places   | ULBs   | Nov 2023   | Ju?? 2024  |  |
| Anti-encroachment drive on river side setback zones                                     | ULBs   | Feb 2024   | Mar 2025   |  |
| Removal of construction debris from active flow channel                                 | ULBs   | Sep 2023   | Mar 2025   |  |
| Removal of any establishment at river meandering point                                  | ULBs   | Feb 2024   | Mar 2025   |  |
| <b>Specific target 3: Monitoring and better management of ground water resources</b>    |  |            |            |  |
| Mapping of groundwater resources  | Irrigation and Water Resources Department, Govt. of UP | Feb 2024   | Jun 2024   |  |
| Quarterly monitor of water level at wells in overexploited zones (pockets)              | Minor Irrigation Department                            | Nov 2023   | Continuous |  |
| Abstraction permits are regulated for sustainable abstraction and compliance is ensured | Minor Irrigation Department                            | Feb 2024   | Continuous |  |

| Milestone  | Required resources   | Outcome   | Linkage   |
|--|--|---|---|
| OM issued, team deployed                                     | Financial allocation, Team Deployed                            | Inventory of Wetland, Wetland Map                   | Namami Gange Programme/ Mission Amrit Sarovar                 |
| Tender issued, contractor engaged                            | Financial allocation (for excavation, restoration, monitoring) | Wetland Restored                                    | Namami Gange Programme / Mission Amrit Sarovar                |
| No. of Household affected, compensation provided,            | Financial Allocation   | Rehabilitation of Encroacher                        | Nagar Vikas Nigam   |
| Area identified; List of encroacher; Notification issued     | Financial Allocation   | Floodplain recovered                                | Nagar Vikas Nigam   |
| Tender floated, agency deployed                              | Financial Allocation   | River flow improved                                 | Nagar Vikas Nigam   |
| Area identified; list of encroacher; notification issued     | Financial allocation   | Floodplain recovered and river flow improved        | Nagar Vikas Nigam   |
| Team deployed, study Carried out                             | Financial allocation   | Groundwater mapping done                            | Master Plan for artificial recharge to groundwater in India   |
| Resource allocated, well identified, quarterly plan prepared | Financial allocation   | Groundwater level measured                          | State Specific Action Plan (SSAPs) for Water Sector under NWM |
| Notification issued; Permit issued & renewed                 |  | Unaccounted extraction of groundwater is restricted | State Specific Action Plan (SSAPs) for Water Sector under NWM |

| Action description   | By  | Start date | End date   |
|--|---|------------|------------|
| <b>Specific target 4: Improving groundwater recharging</b>   |   |            |            |
| Augmenting roof-top rainwater harvesting in government building and installation of ground water recharge shaft  | Jal Nigam   | Ongoing    | Continuous |
| Construct new check dams, pond, nala bund and develop stream to augment ground water recharge and water conservation as per recommendation given by CGWB. (Block wise (Detail recommendations are given under section 6.3 and 7.1 to 7.15 at Page 53 to 168 of “Aquifer Mapping and Management of Ground Water Resources report of Shahjahanpur district by CGWB” (Shahjahan UP.pdf (cgwb.gov.in)) | Department of Agriculture                         | Nov 2023   | Oct 2025   |
| Construction of swales, pits, contour bunds, etc.  | Department of Agriculture & Irrigation Department | Nov 2023   | Oct 2024   |

#### Key Issue 4: Industrial Pollution

| Action description  | By     | Start date | End date |
|---|--------|------------|----------|
| <b>Specific target 1: Ensure proper treatment of effluent generated from GPIs</b> |        |            |          |
| Feasibility study to setup a CETP is conducted                                    | UP PCB | Oct 2023   | Jul 2024 |
| Construction of CETP’s to connect major polluters from insufficient working ETPs  | UP PCB | Nov 2024   | Nov 2025 |

| Milestone  | Required resources  | Outcome  | Linkage   |
|--|---|--|---|
| Structure identified, tender floated, agency deployed, construction started      | Financial allocation ( for construction, supervision, materials), engage specialised agency | Improvement in ground water level observed                               | Nagar Vikas Nigam                               |
| Tender floated, agency Involved, construction started                            | Financial allocation ( for construction, materials, supervision)                            | Improvement in irrigation facilities and ground water level has achieved | Jal Shakti Abhiyan/ MGNREGS                     |
| Tender floated, specialised agency involved, training and demonstration provided | Financial allocation  | Agri-runoff reduced and ground water table improved                      | Jal Shakti Abhiyan/ Agriculture Budget/ Mission |

| Milestone   | Required resources  | Outcome                               | Linkage                 |
|---|---|---------------------------------------|-------------------------|
| Questionnaires prepared, tender floated, agencyi involved, feasibility study carried out & report submitted | Financial allocation  | Area identified, feasibility assessed | Namami Gange programme  |
| Tender floated, agency involved, CETP constructed   | Financial allocation for construction, materials, supervision | Ensure 100% treatment of waste water  | Namami Gange programme, |

| Action description  | By          | Start date | End date   |
|---|-------------|------------|------------|
| <b>Specific target 2: Regular monitoring of water/ effluent quality</b>   |             |            |            |
| Strengthening of environmental monitoring laboratory of UPPCB.  | UPPCB       | Feb 2024   | Aug 2024   |
| WQ monitoring sample spots are identified at drains, nalas, streams and rivers before and after GPIs, online monitoring of indicator parameters are installed | UPPCB       | Nov 2025   | Continuous |
| Monthly samples are taken at the identified spots as well as directly at the ETP discharge point and pollution hotspots identified                            | DGC / UPPCB | Nov 2025   | Continuous |
| Ensure surprise environmental sample testing of at least one GPI industry in every month  | UPPCB       | Nov 2025   | Continuous |
| Take appropriate action on defaulter  | UPPCB       | Nov 2025   | Continuous |

#### Key Issue 5: Solid waste management in rural and urban areas

| Action description  | By                   | Start date | End date |
|---|----------------------|------------|----------|
| <b>Specific target 1: Improve waste management practice</b>                             |                      |            |          |
| Completion of construction work and commissioning of the two (2) waste to compost plant | ULBs in the district | Ongoing    | Sep 2023 |
| ROBs are free from vending units and have been fenced                                   | ULBs in the district | Oct 2023   | May 2024 |



| Milestone  | Required resources   | Outcome  | Linkage                |
|--|--|--|------------------------|
| Equipment purchased, HR deployed, training and capacity building done        | Financial allocation for upgrading of equipment and monitoring mechanisms, HR deployed | Strengthening of environmental monitoring                  | Namami Gange programme |
| Monitoring location identified; Online monitoring station established        | Financial allocation   | Better compliance system in place, WQ monitored            | Namami Gange programme |
| Location identified, Availability of portable testing kit, record maintained | HR allocation  | WQ of identified spots are monitored and noted             | Namami Gange programme |
| portable testing kit purchased, record maintained                            | HR allocation  | Unaccounted discharge of industrial wastewater has stopped | Namami Gange programme |
| Action record maintained   | HR allocation  | Better compliance system in place                          | Namami Gange programme |

| Milestone   | Required resources                              | Outcome  | Linkage                          |
|---|---|--|----------------------------------|
| Progress status, % Completed, revised date of commissioning | Financial allocation                            | 2 waste compost plant are installed, better waste management facility achieved | Projects under Nagar Vikas Nigam |
| List of ROD listed, Tender floated, Agency Involved         | Financial allocation for supervision, materials | Restrict indiscriminate throwing of waste into river water                     | Projects under Nagar Vikas Nigam |

| Action description   | By                   | Start date | End date   |  |
|--|----------------------|------------|------------|--|
| <b>Specific target 1: Improve waste management practice</b>  |                      |            |            |  |
| Estimate the actual requirement of waste bins to achieve 100% door to door collection and sets up waste bins accordingly | ULBs in the district | Dec 2023   | Aug 2024   |  |
| Door to door collection and processing of MSW  | ULBs in the district | Ongoing    | Continuous |  |
| Estimate the requirement of waste transfer stations and set up stations accordingly                                      | ULBs in the district | Dec 2023   | Aug 2024   |  |
| Set up separate Hazardous Waste, E-waste and C&D waste processing facility with adequate capacity                        | ULBs in the district | Aug 2024   | Jul 2028   |  |
| Establish and commission waste to energy plant on immediate basis for which lease agreement is already done              | ULBs in the district | Oct 2023   | Aug 2026   |  |
| Ensure valid registration of all health care facilities and compliance to bio-medical waste management                   | UP PCB               | Ongoing    | Continuous |  |
| Quantification of biomedical waste generation and scientific disposal of same  | ULBs in the district | Oct 2023   | Continuous |  |
| <b>Specific target 2: Awareness raising of local people on waste management</b>  |                      |            |            |  |
| At least one awareness raising programme is organised in every month in the municipalities                               | ULBs in the district | Ongoing    | Continuous |  |
| <b>Specific target 3: Adopt comprehensive environmental management- practice</b>   |                      |            |            |  |
| Carryout environmental assessment and prepare comprehensive city environmental management plan                           | ULBs in the district | Sep 2023   | May 2024   |  |

|  | Milestone  | Required resources   | Outcome  | Linkage                          |
|--|--|--|--|----------------------------------|
|  | Estimate done, Location Identified, tender placed, waste bin sets up                         | Financial allocation for household survey, Waste bin                     | Achieve 100% door to door collection                 | Projects under Nagar Vikas Nigam |
|  | Collection plan, frequency, quantity collected   | Financial allocation for waste trucks                                    | Improve the aesthetic value, better waste management | Projects under Nagar Vikas Nigam |
|  | Estimate done, location identified, tender placed, agency involved, stations are setup       | Financial allocation for equipment, construction, materials, supervision | Improvement in waste management achieved             | Projects under Nagar Vikas Nigam |
|  | Feasibility study done, Tender Floated, Agency Involved, Waste processing facility installed | Financial Allocation for survey, materials, construction, supervision    | Improvement in waste processing landscape            | Projects under Nagar Vikas Nigam |
|  | Construction plan prepared and construction initiated  | Financial allocation for construction, materials, supervision            | Resource utilisation, revenue generated              | Projects under Nagar Vikas Nigam |
|  | Listing of units, Registration status mapping, Validity of all Permit                        |  | Better management of bio-medical waste               |                                  |
|  | Record maintained, Monthly generated vs disposed, mode and place of disposal                 |  | Better management of bio-medical waste,              |                                  |
|  | Number of programmes organised, picture, record  |  | Local people are more aware on waste management      |                                  |
|  | Tender floated, Agency Involved, Plan prepared   | Financial allocation   | Comprehensive Environmental Management Plan prepared | SBM (Urban)                      |

### Key Issue 6: Capacity building and public outreach (including Arth Ganga)

| Action description   | By  | Start date | End date |
|--|-----|------------|----------|
| <b>Specific target 1: Training and capacity building of DGC with specifically trained resource person (with knowledge on gender sensitivity) having the sole task of implementing, monitoring and revising the DGP</b>   |     |            |          |
| Setting up dedicated supporting cell/ secretariat  | DGC | Jul 2023   | Dec 2023 |
| Recruitment of 3-4 resource person (with knowledge on gender sensitivity) at support cell/ secretariat having the sole task of implementing, monitoring, and revising the DGP  | DGC | Nov 2023   | Jan 2023 |
| Identification of trainers/ training institute for training and capacity building  | DGC | Jan 2024   | Mar 2024 |
| 4-5 executing agencies (members of the DGCs, e.g., Jal Nigam, Irrigation department, Jal Sansthan, ULB) have been trained on river rejuvenation, RBM cycle and operation, maintenance and monitoring of STPs, CETPs, FSM | DGC | Apr 2024   | Aug 2024 |
| Exchange workshops with at least 5 other DGCs are conducted on the development of DGPs   | DGC | Dec 2024   | Apr 2025 |
| <b>Specific target 2: Training and capacity building of local community enhancing skills building and empowerment programme on women leadership skills, decision making skills</b>                                       |     |            |          |
| Identification of trainers/ training institute for training and capacity building  | DGC | Jan 2024   | Mar 2024 |
| Strengthening and hand holding support of WUO  | DGC | Dec 2024   | Apr 2025 |
| 10 specific training on synergies with Arth Ganga are conducted  | DGC | Dec 2014   | Apr 2025 |

| Milestone   | Required resources  | Outcome  | Linkage                            |
|---|---|--|------------------------------------|
|   |   |  |                                    |
| List of nodal agencies and departments                              |   | Supporting centre/ secretariat established   | Namami Gange programme, Arth Ganga |
| Interviews are conducted, experts recruited                         |   | Resource person recruited  | Namami Gange programme, Arth Ganga |
| Institute mapped, Selected, Engaged                                 |   | Training Institute Identified  | Namami Gange programme, Arth Ganga |
| Training programme and events are organised                         | Financial allocation for training materials, programmes, trainers | DGC members are more aware on RBM Plan and RBM Cycle   | Namami Gange programme, Arth Ganga |
| District list, Workshop plan  | Financial allocation for organising workshop                      | Capacity development of other DGCs   | Namami Gange programme, Arth Ganga |
|   |   |  |                                    |
| Institute mapped, Selected, Engaged                                 |   | Training Institute Engaged   | Namami Gange programme, Arth Ganga |
| District list, Workshop plan shared                                 | Financial allocation  | Local WUO are more sensitized and able to prepare proposal for implementation of RBM programme | Namami Gange programme, Arth Ganga |
| Theme identified, Training scheduled, List of participants prepared | Financial Allocation for training materials, programmes, trainers | Capacity development of DGC/ CBOs  | Namami Gange programme, Arth Ganga |

| Action description  | By                 | Start date | End date |
|---|--------------------|------------|----------|
| <b>Specific target 3: Engage resource institute to carryout special study</b>   |                    |            |          |
| Two training institutes have taken up e-flow assessment, GIS based land use assignment and gender sensitive rural development planning in their curriculum for training of district authorities | DGC                | Apr 2024   | Aug 2024 |
| <b>Specific target 4: Capacity building programme on gender sensitisation for women on leadership and decision-making skills has been conducted for 5 NGOs</b>                                  |                    |            |          |
| Identification of research institute for capacity building based on women leadership and decision making  | DGC                | Jan 2024   | Mar 2024 |
| Involvement of NGOs in training and awareness programme   | DGC                | Apr 2024   | May 2025 |
| Organizing capacity building programme by NGOs  | Research institute | Jun 2024   | Mar 2026 |
| Establishment of Key resources centre in research institutes  | DGC                | Feb 2024   | Apr 2026 |



| Milestone   | Required resources  | Outcome  | Linkage   |
|---|---|--|---|
|   |   |  |   |
| Data collected for assessment, report prepared, Training programme and events are organised | Financial allocation for survey, data collection, mapping | Capacity building of DGC members, more information on RBM can assessed and planning prepared | Namami Gange programme, Arth Ganga, Gender sensitive measures |
|   |   |  |   |
| Selection criteria defined; Agreement made  |   | Agreement with research institute  | Namami Gange programme, Arth Ganga                            |
| List of NGOs and their area of expertise, Engaging NGO, Training schedule prepared          | Financial allocation for training materials, programmes   | Capacity development of local community  | Namami Gange programme, Arth Ganga                            |
| Trainings have been conducted   | Financial allocation                                      | 5 NGOs have been trained on women leadership and decision-making skills                      | Namami Gange programme, Arth Ganga, Gender sensitive measures |
| MoU prepared; KRC established   | Budget (resources materials)                              | Local organisations are able to capacitate more frequently                                   | Namami Gange programme, Arth Ganga                            |

## 8.2 Monitoring and evaluation mechanism

Monitoring and Evaluation (M&E) is a vital element of the DGPs. It provides a mechanism to evaluate the progress of implementation within the district and the success of its objectives.

A measurable indicator will be specified for each specific target. It serves to monitor progress, strengthen accountability, and assess if the proposed intervention is working as intended. The indicator should be simple and accurately describe the specific target. It is important that the indicator is not data intensive and does not require a complicated data acquisition effort. Examples are provided in 17.

### 8.2.1 M&E Plan for Key Issue 1: Non-point source pollution (fertilizer and pesticides) in irrigated agriculture

| No. | Action description  | Indicator  | Baseline            | Target     |
|-----|---|--|---------------------|------------|
| 1   | Specific target 1: Training and capacity building on implementation of IPNM strategy                | IPNM plan is available, number of farmers received training, training manual, record of participants | 0                   | 10 – ToT,  |
| 2   | Specific target 2: Promotion of organic cultivation and welfare schemes                             | Area covered, number of schemes introduced, number of beneficiary                                    | Village - 0         | 12 Village |
| 3   | Specific target 3: Taking measures to reduce flow of pollutants from agriculture field to the River | Study carried out, bio-filter zone identified and installed  | Bio-filter zone - 0 | 12 village |

|  | <b>Means of verification</b>        | <b>Frequency<br/>(how often will it be measured?)</b> | <b>Responsible<br/>(who will measure it)</b> | <b>Reporting<br/>(where will it be reported)</b> |
|--|-------------------------------------|---|--|--|
|  | Document Verification, Record Check | Fortnightly   | Dept. of Agriculture                         | Weekly Progress Report                           |
|  | Document Verification, Record Check | Fortnightly   | Dept. of Agriculture                         | Weekly Progress Report                           |
|  | Physical verification               | Fortnightly   | Dept. of Agriculture                         | Weekly Progress Report                           |

### 8.2.2 M&E Plan for Key Issue 2: Liquid waste management (domestic sewage) in urban areas and household sanitation in rural areas

| No. | Action description   | Indicator  | Baseline   |
|-----|--|--|--|
| 1   | Specific target 1: Ensure 100% treatment of sewage generated from city household before discharge to river water | STP commissioned, co-treatment augmented, drains connected with STP, bioremediation augmented, wet waste plant erected                     | STP-0<br>MLD, Co-treatment-0%<br>HH cover,<br>Untapped Drain – 17 nos.,<br>Bioremediation-0,<br>Wet waste plant- 0 |
| 2   | Specific target 2: Ensure integrated sanitation facility at each household                                       | No. of household receiving individual toilet   | HH with individual sanitation 69.2%  |
| 3   | Specific target 3: Implement storm water drainage system   | Length of drain renovated, bar screen attached at discharge point  | Drain repaired -0 km, Bar screen Attached - 1  |
| 4   | Specific target 4: Ensure implementation of sludge and septage management in scientific way                      | Feasibility report prepared, septage management committee formed, effectiveness of septage management, STP sludge generated and reutilised | Sludge and septage is not treated scientifically   |

### 8.2.3 M&E Plan for Key Issue 3: Wetland Management, declining groundwater tables and decreased baseflow in rivers

| No. | Action description   | Indicator  | Baseline                     |
|-----|--|--|------------------------------|
| 1   | Specific target 1: Conservation of wetland                                 | Inventory of wetland, wetland map, area recovered  | Recovered wetland-0          |
| 2   | Specific target 2: Floodplain recovery and improving natural flow of river | Location wise list of encroachers, number of encroachers rehabilitated, cleanliness of active flow channel | No encroachers rehabilitated |

| <b>Target</b>  | <b>Means of verification</b>                        | <b>Frequency (how often will it be measured?)</b> | <b>Responsible (who will measure it)</b> | <b>Reporting (where will it be reported)</b>                          |
|--|---|---|--|---|
| STP-40<br>MLD, Cotreatment-30%<br>HH cover,<br>Untapped Drain – 0 nos.,<br>Bioremediation-5, Wet<br>waste plant- 1 | Physical<br>verification,<br>Progress report        | Fortnightly                                       | Jal Nigam                                | Weekly Progress<br>Report, Monthly<br>Report,<br>Completion<br>Report |
| 100% house with<br>individual toilet   | Physical<br>Verification,<br>Progress report        | Fortnightly                                       | ULBs                                     | Weekly Progress<br>Report, Monthly<br>Report,                         |
| Storm water drain (re-<br>paired) – 55 Km.   | Physical<br>Verification,<br>Progress report        | Fortnightly                                       | ULBs                                     | Weekly Progress<br>Report, Monthly<br>Report                          |
| septage management<br>plan is in place; sludge<br>and septage is treated<br>scientifically                         | Report<br>verification,<br>Physical<br>verification | Fortnightly                                       | ULBs and Jal<br>Nigam                    | Daily generation of<br>STP sludge                                     |

| <b>Target</b>                              | <b>Means of verification</b>   | <b>Frequency (how often will it be measured?)</b> | <b>Responsible (who will measure it)</b> | <b>Reporting (where will it be reported)</b>  |
|--|--|---|--|---|
| Recovered wetland-50<br>hectares           | Monthly  | Fortnightly                                       | UP State<br>Biodiversity<br>Board        | Final Report,<br>Monthly Progress<br>Report   |
| All encroachers have been<br>rehabilitated | Physical<br>Verification,<br>Site visit, No.<br>of encroacher<br>rehabilitated | Fortnightly                                       | MC<br>Shahjahanpur                       | Weekly Progress<br>Report, Monthly<br>Report, |

### 8.2.3 M&E Plan for Key Issue 3: Wetland Management, declining groundwater tables and decreased baseflow in rivers

| No. | Action description  | Indicator  | Baseline                   |
|-----|---|--|----------------------------|
| 3   | Specific target 3: Monitoring and better management of ground water resources | Identified ground water trap zone, water level data, abstraction permit issued, renewed  | "Insufficient" management  |
| 4   | Specific target 4: Improving ground water resources                           | Area covered under roof top rainwater harvesting, number of recharge shaft installed, irrigation structure created, training provided on water conservation and water use efficiency | TBC in a feasibility study |

### 8.2.4 M&E Plan for Key Issue 4: Industrial Pollution

| No. | Action description   | Indicator  | Baseline  |
|-----|--|--|---|
| 1   | Specific target 1: Ensure proper treatment of effluent generated from GPIs | Area identified, Feasibility study conducted, capacity of CETP, commissioning of CETP        | CETP – 0 ns.  |
| 2   | Specific target 2: Regular monitoring of water/ effluent quality           | Equipment purchased, HR recruited, training provided, monitoring report, action taken report | Unreliable effluent WQ data, insufficient surprise visits |



| <b>Target</b>   | <b>Means of verification</b>   | <b>Frequency (how often will it be measured?)</b> | <b>Responsible (who will measure it)</b>               | <b>Reporting (where will it be reported)</b> |
|---|--|---|--|--|
| "sufficient" GW trap zone identified, water level data available and permits issued | Study report, monitoring report  | Monthly   | Irrigation and Water Resources Department, Govt. of UP | Study report, monitoring report              |
| TBC in a feasibility study  | Progress report, number of training provided, training theme wise list of participants | Monthly   | Department of Agriculture & Irrigation Department      | Progress report                              |

| <b>Target</b>  | <b>Means of verification</b>   | <b>Frequency (how often will it be measured?)</b> | <b>Responsible (who will measure it)</b> | <b>Reporting (where will it be reported)</b> |
|--|--|---|--|--|
| No-1 with required capacity  | Physical verification, study report, Progress report   | Feasibility report, Progress report               | UP PCB                                   | Feasibility report, Progress report          |
| Monthly surprise visits conducted; Reliable effluent WQ data is available and industrial units comply with reliably controlled effluent standards; | Purchase order, Appointment/ joining letter, training record, monitoring report, action taken report | Monthly   | UP PCB                                   | State of the Environmental Report            |

### 8.2.5 M&E Plan for Key Issue 5: Solid waste management in rural & urban areas

| No. | Action description  | Indicator   | Baseline    |
|-----|---|---|-------------|
| 1   | Specific target 1: Improve waste management practice                      | Status of compost plant, waste to energy plant, no. of ROB fenced, number of waste been provided, frequency of waste evacuation, quantity of waste generated vs disposed, no. of registered healthcare unit | No.- 0      |
| 2   | Specific target 2: Awareness raising of local people on waste management  | Number of programmes organised, picture, record   | Programme-0 |
| 3   | Specific target 3: Adopt comprehensive environmental management- practice | Agency Deployed, Study Report   |             |

### 8.2.6 M&E Plan for Key Issue 6: Capacity building and public outreach (including Arth Ganga)

| No. | Action description  | Indicator   | Baseline     |
|-----|---|---|--------------|
| 1   | Specific target 1: Improve waste management practice                      | Status of compost plant, waste to energy plant, no. of ROB fenced, number of waste been provided, frequency of waste evacuation, quantity of waste generated vs disposed, no. of registered healthcare unit | No.- 0       |
| 2   | Specific target 2: Awareness raising of local people on waste management  | Number of programmes organised, picture, record   | Programme -0 |
| 3   | Specific target 3: Adopt comprehensive environmental management- practice | Agency Deployed, Study Report   |              |

| Target            | Means of verification  | Frequency (how often will it be measured?) | Responsible (who will measure it) | Reporting (where will it be reported)            |
|-------------------|--|--|-----------------------------------|--|
| No.-2             | Progress report, List of ROB covered with fencing material, Purchase order, record on waste generated, collected & processed | Fortnightly                                | MC Shahjahanpur                   | Progress report, State of the Environment Report |
| Programme-1/month | Attendance Sheet / record/ Picture   | Monthly                                    | MC Shahjahanpur                   | Progress report, State of the Environment Report |
|                   | Contract agreement, Study Report   | Monthly                                    | MC Shahjahanpur                   | Study report                                     |

| Target             | Means of verification  | Frequency (how often will it be measured?) | Responsible (who will measure it) | Reporting (where will it be reported)            |
|--------------------|--|--|-----------------------------------|--|
| No.-2              | Progress report, List of ROB covered with fencing material, Purchase order, record on waste generated, collected & processed | Fortnightly                                | MC Shahjahanpur                   | Progress report, State of the Environment Report |
| Programme -1/month | Attendance Sheet / record/ Picture   | Monthly                                    | MC Shahjahanpur                   | Progress report, State of the Environment Report |
|                    | Contract agreement, Study Report   | Monthly                                    | MC Shahjahanpur                   | Study report                                     |

### 8.3 Gender sensitive plan for public outreach

Gender sensitive public outreach pertains to the involvement and active engagement of women (and other vulnerable groups) in the planning process by adopting enabling processes and mechanisms and removing barriers to Communication for Development (C4D). This has been used for several decades as a means to improve the involvement and active engagement of women and other vulnerable groups by promoting water & sanitation, health, nutrition education and numerous other human rights issues. There is abundant evidence demonstrating that communication strategies implemented through a mix of approaches, channels and aimed at a crosssection of the community members and stakeholders has a potential to inform, influence, motivate, engage and empower effectively.

Communication can also play a pivotal role in promoting gender equality through its ability to transform attitudes and break prevalent stereotypes that perpetuate genderbased discrimination and is also closely linked to empowerment as it contributes to building confidence and capacities of communities as a whole, including vulnerable groups to negotiate choices and have equal access to and control of resources.

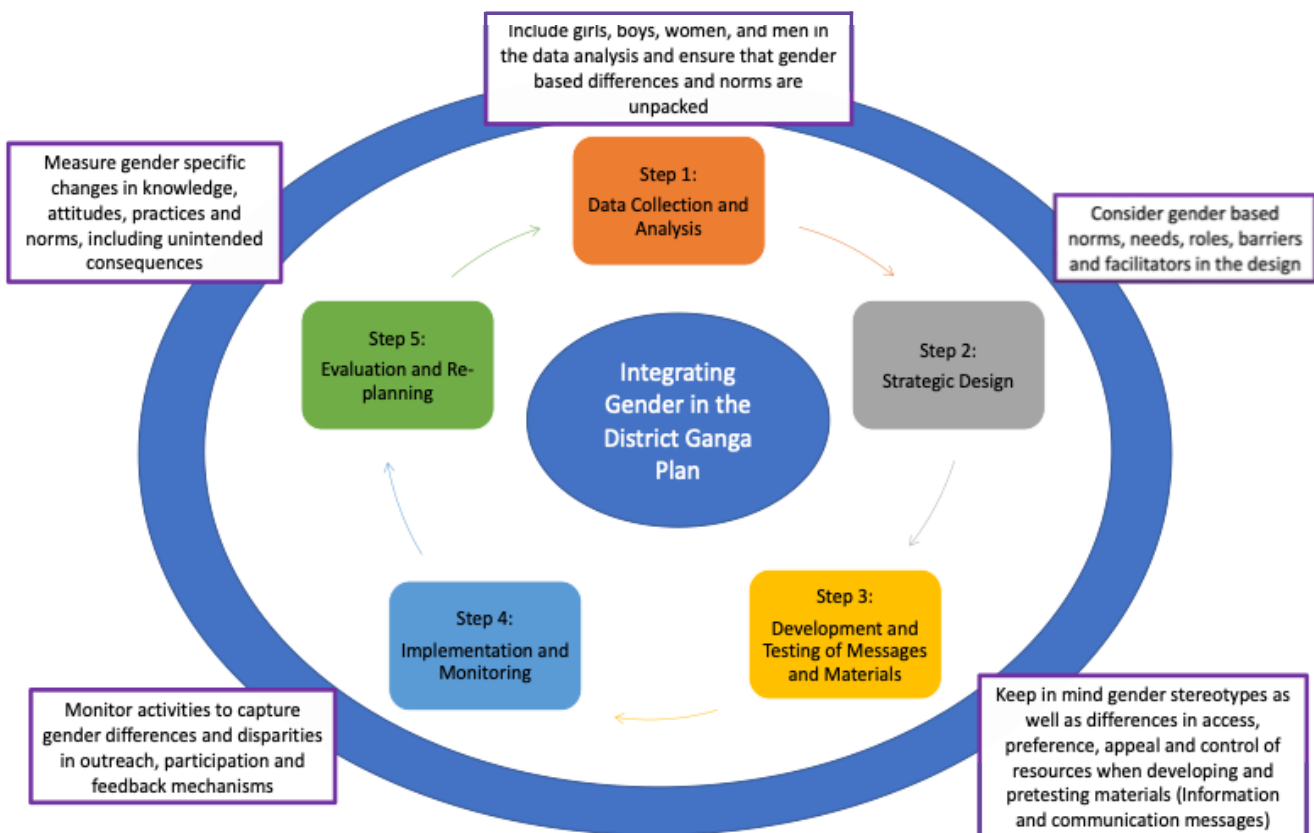


Figure 57 Five steps for gender outreach action

## **Data analysis**

The purpose of this step is to understand the nature and extent of the issue, to identify the most vulnerable group(s) and underline the need for transformative and inclusive approaches. In this step it is particularly important to understand why certain groups are excluded and the responsible prevalent practices and stereotypes. Applying a gender lens at this step demands gender disaggregated data and a deeper understanding of the barriers and motivators and how they may be different across genders.

Asking the right questions at this stage will help to get the answers to some of the questions that are needed to develop a gender responsive strategy.

## **Strategic Design**

This step focuses on the design and planning of the strategy. The proposed strategy should build on the evidence and insights garnered in Step 1 and the interventions should respond to the problem as well as the barriers and motivators. It is important to consult with both experts and participants to ensure that the proposed interventions and activities will be accepted in the local context.

Similarly, it is critical to validate the strategy and involve stakeholders and partners into the planning process. This becomes even more essential when dealing with sensitive issues or promoting non-traditional responses that government and policy makers may or may not accept. The plan should outline the expected change (i.e., the goals and objectives), how the change will be achieved (i.e., the channels, strategic approaches and activities) and how to measure success or progress on the key objectives of the strategy (i.e., the monitoring and evaluation framework). Applying a gender analysis in this stage will allow an understanding of how gender related factors may enable or hinder certain groups from accessing information.

## **Implementation and Monitoring**

This is the stage when the plan is put into action and the various components or building blocks of the strategy such as the media products, messages, partnerships and capacity building efforts are rolled out. The intervention needs to be monitored to ensure that it is producing the desired results and enables one to make mid-course adjustments where required. The key gender considerations at this stage are that gender norms and roles are not impeding any group from participating in the activities that are being rolled out.

## **Evaluation and re-planning**

This stage entails assessing whether the programme was effective and if yes, to what degree. This also helps assess whether or not the goals and objectives of the intervention were met. Evaluation provides an opportunity to assess the impact of an intervention or programme as well as to learn about what worked well and what did not. Applying a gender lens in this step will enable an understanding of how the intervention affected different genders and other vulnerable groups, if any. The evaluation should use appropriate gender-based measures to determine whether or not the intervention contributed to gender inclusivity.

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| SWM          | Department of Drinking Water and Sanitation, Ministry of Jal Shakti, Swachh Bharat Mission<br><a href="#">Thursday 20220908 15004343.pdf (uppcb.com)</a>   |
| GPI          | List of Grossly polluting industries (GPI) with respect to river Ganga in U.P.<br><a href="http://www.uppcb.com/pdf/rwq_180216.pdf">http://www.uppcb.com/pdf/rwq_180216.pdf</a>  |
| CPCB         | Ministry of Environment, Forest & Climate Change (2017-2018), Central Pollution Control Board Annual Report<br><a href="https://cpcb.nic.in/openpdffile.php?id=UmVwb3J0RmlsZXMvOTlyXzE1NjQwMzg5OTFfbWVkaWFwaG90bzE0Mig2LnBkZg==">https://cpcb.nic.in/openpdffile.php?id=UmVwb3J0RmlsZXMvOTlyXzE1NjQwMzg5OTFfbWVkaWFwaG90bzE0Mig2LnBkZg==</a> |
| STST         | Ministry of Environment, Forest & Climate Change, ENVIS Centre on Hygiene, Sanitation, Sewage Treatment Systems and Technology<br><a href="http://www.sulabhenvi.nic.in/Database/National_16254.aspx">http://www.sulabhenvi.nic.in/Database/National_16254.aspx</a>  |
| NWA          | Ministry of Environment, Forest & Climate Change, National Wetland Atlas: Uttar Pradesh<br><a href="#">Slide 1 (indianwetlands.in)</a>   |
| UPSERI       | Ministry of Environment, Forest & Climate Change, ENVIS Centre: Uttar Pradesh Status of Environment and Related Issues<br><a href="#">Ministry of Environment &amp; Forests, Government of India (upenvi.nic.in)</a>   |
| UPDF, Shp    | Indiastatpublications, Uttar Pradesh District Factbook: Shahjahanpur District<br><a href="https://www.indiastatpublications.com/District_Factbook/Uttar_Pradesh/Shahjahanpur">https://www.indiastatpublications.com/District_Factbook/Uttar_Pradesh/Shahjahanpur</a>   |
| KVK, Shp     | Krishi Vigyan Kendra, Shahjahanpur, District Profile<br><a href="#">Welcome Krishi Vigyan Kendra, Shahjahanpur (kvk4.in)</a>   |
| ACP, Shp     | Department of Agriculture, Agriculture Contingency Plan for District: Shahjahanpur<br><a href="https://agricoop.nic.in/sites/default/files/UP1-Shahjahanpur-26.7.2012_0.pdf">https://agricoop.nic.in/sites/default/files/UP1-Shahjahanpur-26.7.2012_0.pdf</a>  |
| CCP, Shp     | International Journal of Geography, Geology and Environment 2019; 1(1): 41-47, Changes in cropping pattern in Shahjahanpur district, Uttar Pradesh<br><a href="https://www.geojournal.net/uploads/archives/1-1-7-725.pdf">https://www.geojournal.net/uploads/archives/1-1-7-725.pdf</a>  |



| Abbreviation | Author/Title / Source  |
|--------------|--|
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| WRIS         | Ministry of Jal Shakti, India Water Resources Information System<br><a href="http://indiawris.gov.in">India-WRIS (indiawris.gov.in)</a>  |
| NGAP         | Department of WR RD & GR Ministry of Jal Shakti, Namami Gange Annual Report (2018-19)<br><a href="https://nmcg.nic.in/writereaddata/fileupload/56_AnnualReport18-19.pdf">https://nmcg.nic.in/writereaddata/fileupload/56_AnnualReport18-19.pdf</a>   |
| AMMP, Shp    | Department of Water Resources, River Development and Ganga Rejuvenation, Ministry of Jal Shakti, Aquifer Mapping and Management Plan, Shahjahanpur District Uttar Pradesh (2020), Pg 60<br><a href="http://cgwb.gov.in/AQM/NAQUIM_REPORT/UP/Shahjahan%20UP.pdf">http://cgwb.gov.in/AQM/NAQUIM_REPORT/UP/Shahjahan%20UP.pdf</a>         |
| DGWR         | Ground Water Department U.P And Central Ground Water Board Northern Region, Lucknow, Dynamic Ground Water Resources Of Uttar Pradesh (2020)<br><a href="http://cgwb.gov.in/Reports/State_Report_Resource_2020.pdf">Uttar Pradseh_State_Report_Resource_2020.pdf (cgwb.gov.in)</a>  |
| GWCBD        | Namami Gange & Rural Water Supply Department, (JJM-UP) Uttar Pradesh, Ground Water City & Block wise Dashboard,<br><a href="http://jjmup.org">Jal Jeevan Mission - Uttar Pradesh ( JJM - UP ) (jjmup.org)</a>  |
| DIP, Shp     | Department Of Agriculture Shahjahanpur, District Irrigation Plan Shahjahanpur, Pradhan Mantri Krishi Sinchayee Yojna (Pg 80, Table 3.4-Excisting type of irrigation, Section: 4.7, Pg 93)<br><a href="https://pmksy.gov.in/mis/Uploads/2016/20161124030340830-1.pdf">https://pmksy.gov.in/mis/Uploads/2016/20161124030340830-1.pdf</a> |
| NWA          | Ministry of Environment and Forests, National Wetland Atlas: Uttar Pradesh (Page – 110),<br><a href="https://vedas.sac.gov.in/vedas/downloads/atlas/Wetlands/National%20Wetland%20Atlas_Uttar%20Pradesh.pdf">https://vedas.sac.gov.in/vedas/downloads/atlas/Wetlands/National%20Wetland%20Atlas_Uttar%20Pradesh.pdf</a>                |
| WHCD         | Ministry of Environmental, Forest and Climate Change, Wetlands of India Portal, Wetland Health Cards Dashboard<br><a href="https://indianwetlands.in/resources-and-e-learning/health-card-dashboard/">https://indianwetlands.in/resources-and-e-learning/health-card-dashboard/</a>  |
| WOTM         | Ministry of Environmental, Forest and Climate Change, Wetlands of India Portal, Wetland overview threat and management<br><a href="https://indianwetlands.in/wetlands-overview/threats-and-management/">https://indianwetlands.in/wetlands-overview/threats-and-management/</a>  |
| EFHR         | WWF-India (2018), Environmental flows for a healthy Ramganga,<br><a href="https://wwfin.awsassets.panda.org/downloads/ramganga_e_flows_report_2018.pdf">https://wwfin.awsassets.panda.org/downloads/ramganga_e_flows_report_2018.pdf</a>   |
| CFE          | Directorate of Central Water Commission, Current Flood Forecast, Site, Hydrograph,<br><a href="http://india-water.gov.in">Flood Forecast - Central Water Commission, Govt. Of India (india-water.gov.in)</a>   |

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