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# Application of water resources management in Sahibganj District

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***Abstract - India places a high priority on the Ganga's economic, environmental, and cultural contributions. The river flows across the plains of north and eastern India for more than 2,500 kilometres before emptying into the Bay of Bengal after rising in the Himalayas. One of the holiest rivers in India, the Ganga has cultural and spiritual importance that extends beyond of the basin.***

***Despite its significance, the Ganga's biodiversity and environmental sustainability are seriously threatened by the tremendous pollution pressures caused by rising population and industrialisation, which have a negative impact on both the quantity and quality of its flows. The primary causes of pollution in the Ganga River include the discharge of untreated sewage and industrial wastewater, non-point pollution sources from religious activities near the river, agricultural runoff and livestock, as well as inadequate municipal solid waste management.***

***Keywords: Water Resource Management, Irrigation and projects***

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## INTRODUCTION

Jharkhand's Department of Drinking Water and Sanitation has issued an invitation for RFQs from qualified contractors for different works to be completed as part of the Mega Water Supply Scheme in Sahibganj in Jharkhand.

RFQs have been solicited for detailed survey, design, and drawing services, including the construction of an intake well and pump house in the Ganga and Gumani river, gangway, conventional water treatment plant, raw/clear water rising main, distribution main, RCC elevated service reservoirs, boundary wall, foot bridge, VT pump set, transformer, 11 kV HT overhead electric line, six phase servo controlled voltage stabiliser, three phase silent DG set, lighting arrangement, centrifugal The filing of requests for quotations must be completed by the 21st of December in 2011.

The plan called for a piped water supply that used surface water as its source, and it was designed to serve a constrained region. It included an intake well, a reservoir at the surface level, and an underground pipe network. 2014 will be the year that sees the completion of the Water Supply Scheme construction project. The following table outlines the anticipated requirements for water supply in Sahibganj.

| | 2027 (estimation) | 2042 (estimation) |
|---|---|---|
| Population | 105988 | 124908 |
| Total water demand (MLD) | 17.60 | 20.70 |

Source: Report of Environment and social plan sahib ganj.

**Current water supply in sahib ganj:**

At the moment, the city does not have a centralised system for supplying water, therefore the majority of the population must rely on decentralised sources such as wells and tube wells. The vast majority of homeowners have their own own bore wells installed on the grounds of their properties. Those homes that do not have their own private wells must rely entirely on the public tube wells for their water supply. Households who are in good financial shape have their own tube wells, which are often equipped with pumps that are powered by electricity. At the moment, the town of Sahibganj has a total of 475 hand pumps and tube wells that are operational. Piped water supply facility for a constrained region was operational until the end of the previous decade; however, the system ceased to function at the end of the previous decade as a result of a decrease in the yield of the tube wells. In light of this circumstance, the government took the initiative to enhance the

water supply condition in the town at some point between the years 1990–1992, most likely during this time period. Piped water supply using surface water as the source was prepared for the system, and it was designed to serve a confined region. A drinking water supply project that is based on surface sources has just been approved by the Government of Jharkhand. The project would cost Rs.5064.24 and was approved by the Government of Jharkhand in their letter no. (13th) -105 /10-112 Ranchi dated 26.03.2011. The work is currently being done, and it is anticipated that it will be finished in 2014. The plan is designed to provide water to the whole of the municipality. The Public Health Engineering Department (PHED), which is part of the Jharkhand government, is in charge of carrying out the plan. The following is a description of the scheme's most important characteristics:

- It is proposed to select the location of the intake facility nearer to the confluence point of the main stream of the river Ganga and the channel at Sakrigali Ghat to establish sustainability where there would be no dearth of water during dry period as well as stability of the river bank as there exists at this location a Floating jetty for the purpose of Sakrigali Pump Canal Project of Irrigation Department. This would ensure that there would be no dearth of water during dry period and that there would be no The water from the river is going to be pushed up to a height of 29 metres so that it may be supplied to the agricultural area via an open channel as part of this project.
- The projected population is assumed to be 1,05,988 for the year 2027 and 1,24,908 for the year 2042 accordingly.
- The demand for water at 135 lpcd in the year 2027 will be 17.60 mld, and the demand for water in the year 2042 will be 20.70 mld.
- The water treatment plant has a proposed capacity of 18.0 mld, while the raw water reservoir has a pumping capacity of 26.5 mld.Drainage system in the district:

The infrastructure for draining storm water is faulty across the whole of Sahibganj town. Jharna Nalla, Gopalpul Nalla, and Ghormara Nalla are the town's three storm water drains in order of their respective locations. The Ganga receives both the rainwater and the trash from homes as it makes its way via these drains and ultimately ends up in the river. The garbage from animals and humans that has collected on the surface is washed away by runoff and transferred to rivers through drains, which results in the water in rivers being polluted. When these drains go through residential neighbourhoods, they leave behind an offensive odour and unsanitary conditions. During the monsoon season, waterlogging occurs owing to the issue of storm drains being obstructed by polythene bags and other forms of solid debris.

**OBJECTIVE OF THE STUDY**

- To analyse the Various water resources and their management.
- To make an assessment of the proposed project to fill the water supply of sahib Ganj districts

**RESEARCH METHOD**

Qualitative approach is adopted to understand the project and their function. Further Literature survey is done to explore more factors about the study and its obejectives.

**REVIEW OF LITERATURE**

Handwerk (2021) revealed in his article that the availability of safe drinking water is critical for human survival, yet most people in the industrialised world don't give much thought to the water they use for drinking, food preparation, and sanitation. In impoverished countries, on the other hand, the hunt for clean drinking water may be a daily struggle. Every year, millions of people, the most of them children, die from illnesses that are generally avoidable if people had access to safe drinking water and adequate sanitation.

Bozorg et. al. (2021) satated that Water is an essential element that plays a critical function in the survival of all living things. This research evaluates the current situation of indicators based on the availability of water resources via the use of hydro-social analysis. During the five-year period 2005–2017, the study included nations with declining trends in renewable water use per capita. Climates vary greatly throughout the continents of Africa, America, Asia, Europe and Oceania. Africa has 48 nations, America has 43, Europe has 20, and Oceania has five countries. Using soft-computing methods [such as artificial neural networks, adaptive neuro-fuzzy inference system, and gene expression programming (GEP), four hydro-social indicators associated with rural society, urban society, technology and communication, and knowledge] were estimated for each continent of the world. Based on statistical criteria [correlation coefficient (R), root mean square error (RMSE), and mean absolute error], the GEP model outperformed all other computing approaches in terms of predicting hydro-social indicators for all seven continents of the globe. In Africa, America, Asia, Europe, and Oceania, respectively, the RMSE for GEP models for the ratio of rural to urban population (PRUP), population density, number of internet users, and education index parameters equaled (0.084, 0.029, 0.178, 0.135), (0.197, 0.056, 0.152, 0.163), (0.151, 0.036, 0.123, 0.210), (0.182, 0.039, 0.148, 0.210), and (0. The development of scalable equations for hydrosocial indicators with application at a variety of geographical and temporal scales around the globe. The findings of this article suggest that the patterns of correlation between social factors and water resources differ between continents, as shown in the paper. The findings of this research lead to better

water-resource planning and management by taking hydro-social factors into consideration.

Kumar (2020) has explained that water is the most valuable natural resource on the face of the planet. It is a necessary component of civilised contemporary life. It is utilised in a variety of applications including drinking, bathing, washing, irrigation, and industrial processes, among others. Water is readily available from both surface water and groundwater sources, depending on the location. Water shortage has become a serious concern for people living in both urban and rural regions as a result of the increased usage of water for various reasons in the contemporary period. Pakur District is located within the Santhal Pargana division of the state of Jharkhand. A portion of the Rajmahal Highlands is included in this area. The landscape is undulating and composed mostly of hard rocks, granitic and basaltic in composition; the quantity of surface water and groundwater available is limited. As a result of the widespread use and demand for water for a variety of reasons, planners, administrators, and scientists have been compelled to develop a strategy and plan for the conservation and management of this crucial resource, which is frequently referred to as the "Elixir of Life." The primary goal of this study paper is to determine the potential of ground water resources, their use and management in the district as a whole in a variety of ways, as well as to provide recommendations for their protection.

Korytny (2020) examined water resource mapping as an essential part of the geographical approach in land hydrology and the water sector, which can be used to aid in dealing with water issues and water resource management to a significant extent in both areas. We propose that seven types of water resource maps be distinguished: introductory maps, maps of the formation of surface and subsurface water regimes, maps of evaluations of water resource potential, maps of water management, maps of anthropogenic impacts on water, maps of hazardous hydrological phenomena, and maps of water protection measures. Introduction maps are those that provide a general overview of a water resource. The characteristics of water resource mapping for atlas products are determined via the use of a case study of the land around Lake Baikal, which is a location of international importance.. We developed an inventory of water resource issues covered by numerous atlases of the Baikal area and identified gaps in coverage of topics such as the economic implications of water and maps of water protection in the region. The classic isoline approach for global water resource mapping has certain limitations, as seen below. In areas where atmospheric precipitation turns into surface runoff, which then flows into streams, it is advised that the indicator localization approach be employed, which is based on the interrelations of components of the geosystem, particularly at hillslope level. Water runoff mapping at the regional scale in the hydrographic network is accomplished by the method of long-channel (epure) mapping, which is based on techniques such as structural hydrographic analysis and Horton-Strahler classification. Flood dangers, water protection, and recreation zoning of Baikal's coasts, as well as cartographic modelling of activities in the Selenga river delta, are all addressed using a regionalization approach presented in this study.

Lichtenberger (2020) handled the archaeological study which may provide new views on the evolution of water management systems in ancient cultures over different historical eras as well as the principles that underpin such management systems. Specifically, it focuses on the northern Jordanian city of Gerasa/Jerash, which was one of the middle-sized Decapolis cities that flourished from the Roman period (first century CE) until near the end of the Umayyad period, when a devastating earthquake struck the city in 749 CE and brought urban life to a virtual standstill. It was not until the mediaeval Islamic era (the 13th century CE) that the site was rebuilt. When it comes to water management in urban environments, the article focuses on how scattered archaeological evidence, which is typically not published by archaeological projects because of its feeble nature, can provide new insight into how water was managed in semiarid regions, such as the region in which Geras was located.

**RESULT ASSESSMENT**

**An assessment of the proposed project to fill the water supply of sahib Ganj districts:**

1- **Innovative approach of Water supply:** Innovative approaches for the establishment of a sustainable system for crop production, as well as the creation of farming models and the diversification of agricultural practises Initial survey for the purpose of gap analysis and identifying necessary actions, It is necessary to identify the crop as well as the varieties. The productivity of rice will rise from 1020 kg/ha to 1326 kg/ha during the next four years. The productivity of wheat will rise from 800 kg/ha to 1040 kg/ha in the near future. Increases in the production of cereals, vegetables, fruits, aquaculture, and organic farming will lead to a rise in the productivity of maize. Enhancing people's standard of living by the introduction of a secondary crop on previously monocropped land, the production of vegetables, aquaculture, organic farming, the growth of dairy, poultry, and pig operations, and the cultivation of medicinal plants. The use of contemporary methods in agricultural production Fostering the growth of vegetable crops Instruction for the village's assistant professionals. The establishment of upgraded goateries and piggieries Analysis of participatory agricultural systems, including crop, livestock, and so forth. Instruction as well as the supply of essential supplies for aquaculture and Aquaculture output improved from 1130 kg/ha to 1450 kg/ha

thanks to the introduction of a better production technique. The yield of vegetables is expected to rise from 825 kg/ha to a maximum of 1000 kg/ha. The annual revenue generated by one unit of goatery is Rs. 4,500. The annual revenue of Rs. 5,000 generated by a single piggery unit Earnings of Rs. 3,000 over the course of four months and Rs. 6,000 over the course of a year from a single chicken unit given two frequencies

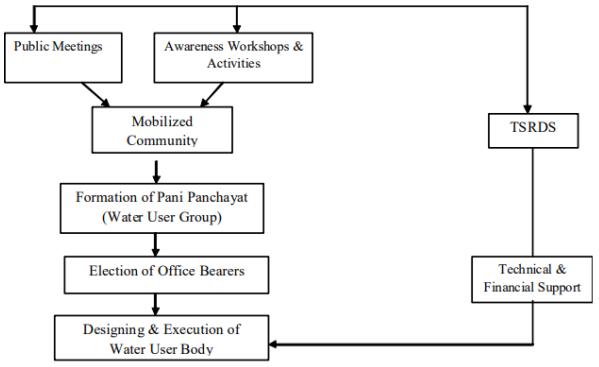
2- **For supportive approach:** The introduction of innovative modules for irrigation, such as flexidams, drip irrigation, and others. The formulation of an acceptable strategy for the utilisation of land and water Reconstruction of the water-collecting structures that are already in place New water collection systems are now being developed. The productivity of rice will rise from 1020 kg/ha to 1326 kg/ha during the next three years. Wheat productivity is expected to rise from 800 kg/ha to 1040 kg/ha in the near future. The productivity of maize will rise from 1130 kg/ha to 1450 kg/ha during the next three years. The yield of vegetables is expected to rise from 825 kg/ha to a maximum of 1000 kg/ha.

3- **Short term shortage planning:**The establishment of short-term storage facilities as well as processing units for the purpose of value addition and market improvement. The establishment of centres providing services to farmers Strengthening of capabilities via suitable training Elimination of drudgery upgraded forms of agricultural hand tools and equipment Encouragement of landless people to get involved in microbusinesses and IGA programmes. Organising market links by SHG. A remarkable decrease in migration, which equates to one thousand young people per season.

4- **Allocation of the resources:**The establishment of short-term storage facilities as well as processing units for the purpose of value addition and market improvement. The establishment of centres providing services to farmers Strengthening of capabilities via suitable training Elimination of drudgery upgraded forms of agricultural hand tools and equipment Encouragement of landless people to get involved in microbusinesses and IGA programmes. Organising market links by SHG. A remarkable decrease in migration, which equates to one thousand young people per season

**Access to Water Resource through Collective Action of Groups:**

Groups have often been created by the government, non-governmental organisations (NGOs), and farmers themselves in order to advance the development of ground water and surface water, and notably to increase the access of resource poor farmers (RPFs) (Chambers, Saxena and Shah, 1989:79). In this context, the Tata Steel Rural Development Society (TSRDS1) intervened in the Sahibganj District with a strategy that focused on sustainable development. The TSRDS made an effort to exert influence on village life from a number of perspectives, including economic, social, and cultural aspects; nevertheless, the primary focus was on economic activity. Collective effort was utilised by TSRDS in the Sahibganj District in order to engage residents in development endeavours such as the formation of Self-Help Groups (SHGs), the improvement of agricultural practises and irrigation systems by means of Pani Panchayat, the provision of medical assistance, and the improvement of sanitation facilities. The community mobilisation process for collective action may be seen in the following figure, which was taken in the Sahibganj District:




**Evaluation of the Project for the Management of Water Resources:**

In a nutshell, the TSRDS began focusing its efforts, beginning in the year 1998, primarily on the management of water resources. This was accomplished through the construction of a Lift Irrigation system known as Pani Panchayat and the development of Self Help Groups in. Farmers in the Sahibganj District were asked to form a samiti and donate a certain amount of money toward the plan in order to facilitate the construction of a lift irrigation system in that district. After hearing many explanations and gaining a better understanding of the situation, the villagers ultimately decided that they would make the donation that was requested of them. The villagers organised the organisation and gave it the name "Swarnrekha Pani Panchayat" (SPP). It now has the participation of 21 farmers as its substantial members. The total amount provided by the 21 members was 21,000 Indian Rupees (Rs.1000 each). In order to investigate the potential locations in Sahibganj District for the installation of pumping set machines, the secretary of the TSRDS, Mrs. Shakti Sharma, along by other officials, travelled there. Following a number of meetings, the TSRDS officials, with the assistance of the Pani Panchayat members, determined the area that would be located close to the river. This decision was made with the proximity to the water resource as well as the coverage area of the user group being taken into consideration. In addition to this, the

villagers contributed their labour to the building of a well, an irrigation shed, and a drainage system (furrows), all of which were designed to transport irrigation water to lower places. It was Mr. Middhya, Head of TSRDS, who officially opened the Pani Panchayat in Sahibganj District in July 1998. Irrigation work did not get underway until November 1998. The Pani Panchayat in Sahibganj District was finished because of the peace and unity that existed among the people. Since that time, the lift irrigation water has been put to use cultivating vegetables. Rainfall is an important component in the production of rice paddy.

Through the efforts of TSRDS, one Pani Panchayat, also known as a water user organisation, was established, and 21 people or beneficiaries were included in its membership. This Pani Panchayat, which translates to "water user group," serves as a forum for members to communicate with one another. The Swarnrekha Pani Panchayat in the hamlet of Idalbera is described in further depth below, including its construction and its functions.

**Panchayat in District: An explanation of its structure and functions**

**I) Establishment:** In 1997, a partnership with the L.D. Javeri Trust was established in order to get the Idalbera lift irrigation project off the ground. In the year 1998, the Swarnrekha Pani Panchayat came into existence.

**(ii) Objective:** The primary goals of the project were to I ensure that irrigational facilities are available throughout the whole year; (ii) encourage the cultivation of vegetables and other commodities that may be sold for a profit; and (iii) instil contemporary agricultural best practises.

**(iii) Conceptually, t**he Swarna Rekha River functions as a natural resource of perpetual water. The water is drawn up from the well that was erected on the riverbanks using a pumping system. The water is transported to the fields by a pipeline that is 2100 feet long (500 feet of subterranean pipe measuring 6 inches, and 1600 feet of pipe measuring 4 inches). There are three hydrants, and from those hydrants, water is delivered further either via furrows (for low-lying areas) or by portable pipes.

(iv) The Machine Has a Capacity of 8 HP (Kirloskar Engine)

**(v) Commanding Position:** Rabi: 25 acres, Zaid: 15 Acres

(vi) The arrangement for distribution is as follows: via furrows for low regions and through pipes (4 inch and 3 inch pipes) for higher fields.

**(vii) Composition:** There are now 21 members, including tribals and OBC, that make up the Pani Panchayat. There does not seem to be any excessive influence from any caste inside the group, despite the fact that the number of members who identify as tribal is much higher than the number of members who identify as OBC.

**(viii) Governing Body There are three posts:** President, Vice President, and Operator and Treasurer. The positions are of an elective character; nonetheless, from the time they were first established, the same individuals have held each office. During the interview, it was noted that the President and Vice-President did not play a significant role in the organisation. In point of fact, it was the Treasurer's job to keep the rest of the group apprised of the current balance of the group's funds in the bank, as well as the total amount spent and the locations at which it was spent, as well as the costs associated with the maintenance and repair of various machines. The matter is brought up in the meeting, when a decision is made, if the operator notices that the machine needs a significant amount of money to be spent on repairing it or that a component has to be replaced.

(ix) The method of governance and decision making is very democratic, and all of the members, regardless of the amount of land they own, have the same rights to share their minds and have an impact on the decisions that are made. During the meeting, the following topics were discussed: crops to be produced, challenges with marketing, repairing the pump set, and distribution of water, among other things. During the meeting, any participant may bring up a problem, and not only will those problems be addressed, but everyone will also be given a chance to voice their opinions. Consensus or voting are the two methods that may be used to make final judgments. The group works well together and everyone has a clear knowledge of the requirements of the other people in the group.

**(x) Meetings:** The Pani Panchayat holds sessions on a monthly basis, and the participation rate at these meetings is close to or exactly one hundred percent (in case of any member being absent another member of his family represents him). At each monthly meeting, a contribution of Rs. 10/- would be collected from each member, to be paid on a monthly basis.

**(xi) The pattern of distribution will be as follows:** via a rotating system, with priority given to those in need.

**(xii) Charges:** In the beginning, there was a price difference between members and non-members. In the year 2011, the fees for the delivery of irrigation water were set at Rs. 65/- per hour. This price included Rs. 20/- per hour as machine hiring charges (the cost of Mobil 6546 Kumar & Prasad and maintenance charges), Rs. 5/- per hour as operator charges, and Rs. 40 per litre per hour as diesel charges or Rs. 25/- per hour as machine hiring charges + Diesel charges for both members and non-members inclusive of operator's charges. Aside from this, it is the obligation of the farmers (the beneficiaries) to create the furrows, link the pipes, and other similar tasks in order to ensure that the

water reaches their land. In most cases, non-members will not have the opportunity to get water since the LI system is focused on meeting the demands of its members, who are given precedence in the distribution of water.

(xiii) Investment There was a total investment of Rs. 1,000,000, of which the recipients contributed around Rs. 40,000 (Rs. 20,000 in cash and Rs. 20,000 in the form of labour), bringing the total amount of their contributions to Rs.

(xiv) The operator will charge you Rs. 5 each hour for their services. In addition to operating the machine, it is the responsibility of the operator to maintain the machine. For this purpose, training has been provided by TSRDS to the operator. In the event that the machine suffers a significant failure, money is taken out of the bank and invested in its maintenance and repair.

(xv) Training to Farmers The TSRDS has created a number of training programmes in order to educate the farmers of Idalbera in agricultural practises via the provision of training. Issues such as proper agricultural practises, the use of fertilisers, HYV, and pesticides, crop display, social and agro forestry, and other related topics have been addressed by these initiatives. Following the training, TSRDS decided to pursue a particular approach for the promotion of Rabi Crops. The first year, 1999–2000, they gave seeds, fertilisers, pesticides, and spray machines at a subsidy of 75%. The next year, 2000–2001, the subsidy was decreased to 50%, and the following year, 2001–2002, the subsidy was cut to 25%. Upkeep as well as Business and Financial Dealings According to Debnath Singh, who serves as the Vice President of Idalbera Pani Panchayat, the annual revenue from Pani Panchayat used to vary anywhere from Rs. 10,000 to Rs. 40,000 in its early years, and this figure did not include the costs associated with its upkeep. Up to the year 2005, the money earned by the Pani Panchayat was traditionally split evenly among the members of the organisation. As a profit share, the members used to get anything from Rs. 500 to Rs. 2000 per person, every month. But over the last five years owing to wear and tear on the pumping machine, Managing Water Resources Through Collective Action 6547 it has not been able to carry much pressure, and as a consequence, it has been experiencing regular breakdowns. Managing Water Resources Through Collective Action 6547 As a consequence of this, the vast majority of the money is spent on the repair and maintenance of the machine, and on occasion, the members are required to make contributions out of their own personal funds for the same purpose. The revenue from the Panchayat these days is just around Rs. 1500 per year, and that doesn't include the expenses for upkeep. According to Taroni Singh, who serves as the operator cum treasurer, this sum is held by the society and, in times of need, it is used to pay for the repair and upkeep of the machine. He recalls the event quite clearly: "during the marigold cultivation time, the income of Pani Panchayat grows," but during the previous fiscal year, we did not make very much money. Because it had been used so much, the computer finally gave up and ceased working around 2004-2005. After then, Negi Singh and a number of other members once again reported to the administrators of TSRDS and demanded that they provide a new machine. After much persuading, TSRDS finally decided to offer a new machine, despite the fact that at initially it did not show any interest in the project. Once again, the members pooled their resources and contributed a total of Rs. 10,000; in 2009, TSRDS donated a brand new computer. Every year, the lift irrigation system is operational from December through June. The Influence of Lift Irrigation on the Community of the Village In order to assess in quantitative terms the nature and magnitude of the changes that have taken place among the members of the water user group as a result of the motivational activities of TSRDS for collective action, information was collected for the year ending 2010-2011. This information was used to assess the changes that have taken place as a result of the motivational activities of TSRDS for collective action. Even to the untrained eye, the changes that have taken place in the town throughout the last 18 years are readily apparent. As a result of the participation of Pani Panchayat via the initiative of TSRDS, the amount of land that is being cultivated on a consistent basis has grown across all of the beneficiaries, and there are now a greater number of green patches dotting the landscape even in the summer. In addition to rice and kurthi, the basic food crops of the people, which were the only crops that were farmed until the nineties, a range of other crops are being planted presently. Until the nineties, paddy and kurthi were the only crops that were cultivated. The Pani Panchayat irrigation system has been an essential component in the progression of this change.

**Evaluation of the PROPOSED Wastewater Treatment System:**

The planned network for the sewage system is broken up into two primary sections.

The lifespan of the sewage systems, rising mains, and sewage pumping stations is 30 years, starting from the base year of 2015. The Wastewater Treatment Plants are planned to last for a period of ten years using a modular approach in a stepwise way to accommodate the increasing population. According to the discussions that took place on the 4th of August 2012 and the 25th of October 2012 (during presentation) with officials from the Urban Development Department (UDD) in Ranchi, two sewage treatment plants based on Moving Bed Biofilm Reactor (MBBR) have been considered for the project area. These discussions took place in light of the discharge location and the quantity of sewage that will be treated.

The following is a list of the most important aspects of the proposed scheme: € The terrain of Sahibganj

town is undulating, and the whole of the town slopes in the direction of the Ganga river. The whole of the town has been subdivided into two zones, namely Sewerage Zone 1 and Sewerage Zone 2, according to the topography.

- The Sewerage Zone 1 network includes pipes with diameters ranging from 200 to 600 millimetres and a total length of approximately 15.78 kilometres. Additionally, there is one intermediate sewage pumping station located close to the Bharatia School that is responsible for pumping the entire sewage system. In the vicinity of Ghormara, there is talk of constructing a sewage treatment facility with a capacity of 6.0 million gallons per day.
- SPS1 is located in the east of Saksharata Chowk, SPS2 is located near the railway line in north Subhash Colony, SPS3 is located near St. Xavier School, SPS4 is located in ward 18 in west of Kamaltola and north of Sastri Nagar, and the Main Sewerage Pumping station is located in the north of Sastri Nagar. The total length of the sewer network is approximately 38.37 kilometres. Sewerage Zone It has been suggested that an 8.0 mld Sewage Treatment facility should be built close to Kabutar Khopi.

**Components of the Proposed Sewerage Work:**

A comprehensive sewerage network is proposed for Sahibganj in order to cover the entire area with a sewerage system. This will allow sewage flows to be collected in an integrated manner and then conveyed to STP for treatment prior to being discharged into the Ganga river via Nallah. The planned sewage system has been developed for a duration of 30 years, with 2015 serving as the base year and 2045 serving as the design year.

It is suggested that a sewage network that is roughly 54.15 kilometres in length be laid up throughout the town. The sewage will be conveyed from pumping stations to the other sewer manhole in case the invert level is greater than 6.0-7.0 metres deep / Sewage Treatment Plant sites using the suggested sewers, which are made of centrifugally spun CI pipes or ductile iron pipes with cement mortar lining inside.

Manholes: The conventional circular manholes of brick masonry, RCC are planned to be installed at all junctions, changes in diameter, and changes in pipe gradients, as well as on 30-meter-long stretches of straight sewage pipe. RCC manholes are being considered for sewer diameters up to 600 mm in order to enable the lowering of equipment for the purpose of cleaning.

House connection: Laterals are intended to be installed along the roadways in order to link the sewage from individual homes to the branch sewers. Given that Sahibganj currently lacks a sewage system, it has been recommended that each residence be connected to the system.

The planned sewage system in Sahibganj town underwent research on the following four potential configurations:

Option 1: Two zones, each having two STPs that have a capacity of six and eight million gallons and are equipped with MBBR technology; five SPS in Zone 1, four SPS in Zone 2, and two MPS.

Option 2: Two separate zones, each with two separate sewage treatment plants that use membrane bioreactor (MBBR) technology with capacities of six and eight million gallons per day (mgd), four separate secondary treatment plants (SPS), and two separate primary treatment plants (MPP).

Option 3: One zone with one STP that uses MBBR technology and has a capacity of fourteen million gmd.

Option 4: 1 Zone and 1 STP of 14 mld capacity of Waste Stabilization Pond technology is suggested. SPS1 of each zone 1 and 2 is deleted, and sewage is delivered to SPS2 via deep sewer. Option 1: SPS1 in each zone 1 and 2 is removed, and the deep sewer transports the sewage to SPS2 and 2 MPS.

Option 1 has been proposed for Sahibganj town after the DPR consultant carried out an analysis of the life cycle costs and weighed the benefits and drawbacks of each available choice.

* Option 4 was not pursued because there was a possibility that private property would be involved, tree cutting would be required, the depth of the sewage line would be more than 8 metres, and the cost would be much higher.

• Option 3 was eliminated because, despite the fact that it requires less land, the depth of the sewer line would have been greater than 8 metres. This would have resulted in the impinging of ground water at a number of locations, which would have increased the cost and made it more difficult to operate.

**CONCLUSION**

The results of the tests performed on the samples of ground water were compared to the standard (ISI - 1993) that was created for consumption. The quality of the ground water in the Phreatic aquifer is often suitable for drinking and irrigation, with the exception of a few specific samples. The presence of nitrate concentrations over the permitted level is the exception to this rule. The EC value may range from 193 to 1687 micro Siemens/cm at a temperature of 250 degrees Celsius.

In order to investigate the levels of arsenic in ground water, sixty acidified samples were obtained from the Gangetic alluvium of the district during the Ground Water Management Studies that took place between 2006 and 2007. According to the results of the assays done on these samples, 20% of the samples had an arsenic concentration more than 50 ppb, and

16.66% of the samples had an arsenic concentration between 10 and 50 ppb.

Additionally, building a dug cum bore well structure is excellent for raising dug well yields, which will save money. In order to establish ground water structures, knowledge of the local as well as regional hydrogeological condition of the area is essential. The development of the ground water varies from one site to another depending on the availability of appealing prospective zones or aquifers. Research is one method of gaining this information.

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