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Thirst Quencher of Pink City: A Bisalpur Hydro-Enterprise Monitoring Issue

Parikshit Srivastava and Sharadindu Pandey***

ABSTRACT

Effective water management is needed for a dry State such as Rajasthan due to shifts in land use patterns and catchment characteristics in conjunction with climate change. It has become a rigid barrier for water managers to learn and treat water for sustainability in the future. The degree of stakeholder satisfaction is studied in this research with both programs of the projects. The study, therefore, defines the variables letting the observer determine factors about a particular action, such as internal (strength, weaknesses) or external ones (opportunities, challenges). This study draws the implication that the Bisalpur Dam is substantially lower than the design's reliability. Anicut removal and building stoppages will avoid the death of the source with increased agriculture upstream. The decrease in the water purity and its movement from the reservoir in Bisalpur poses a significant risk to urban and irrigated areas.

Keywords: *Water for sustainability; Stakeholders expectations; BWSP; CWMI; Materiality aspect.*

1.0 Introduction

Rajasthan contains just 1.16 per cent of India's surface water, with annual precipitation of 531 mm, while the country's average is 1200 mm, respectively being India's driest state. Rajasthan comprises a territory of 10.4 per cent, covering 342,239 sq. kilometers (32,139 miles). With a geographic location stretching from 23.2 degrees

**Corresponding author; Ph.D Scholar, Indian Institute of Forest Management, Bhopal, Madhya Pradesh, India (E-mail: psrivastavfri19@iifm.ac.in)*
***Assistant Professor, Indian Institute of Forest Management, Bhopal, Madhya Pradesh, India (E-mail: spandey@iifm.ac.in)*

to 30.12 degrees on the North latitude and 69.30 degrees to 78.17 degrees longitude, the Tropic of Cancer passes through the state's southernmost point. However, the average rainfall in most of Rajasthan is just 380mm (Ramsey, 2017). Therefore, effective water management is needed for the dry state of Rajasthan. Rajasthan is taking modern steps to make certain cities satisfy expectations in the coming years. In line with the recommendations of the Planning Committee (GOI), the Government of Rajasthan agreed that the Bisalpur water supply project will be planned, built, and designed in India, such that it finally fits into the broader composite programmes to supply Jaipur, Ajmer, and Tonk with drinking water and also to construct irrigation facilities in the drought-prone region (RUIDP, 2017).

In the village of Bisalpur, approximately thirty kilometres south-east of Todaraisingh, 50 kilometres north of Tehesil Deoli in the Rajasthan district of Tonk, the irrigation-cum-drinking water project Bisalpur was constructed. This Dam sits in the Banas River, situated in the Yamuna Basin on the Chambal River. The Bisalpur Dam provides all the water for both projects and is located about 120 km from Jaipur. The river Banas is associated with a significant number of tributary rivers, with Berach, Gambhiri, Orai, Chandrabhaga, Kothari, Khari, Dai, Shohdra, Bandi, and Mashi being notable.

The Water Resources Department (WRD, Rajasthan) conducted the sub-project with two divisions: IGND (Indira Gandhi Nahar Department) and Water Resources Division. The Division of Water Resources is responsible for the project's implementation under Principal Secretary Sh. Naveen Mahajan (IAS). WRD Rajasthan has no in-house experience in environmental and social aspects. Currently, the SPMU chief engineer and dam administrator look after these aspects. There is no official mechanism for handling formal or Informal Grievance Reporting Mechanisms. The Bisalpur dam's storage capacity determination is based on the period's catchment and land use patterns. However, due to changes in land use and catchment characteristics, as well as climate change, it is presently not operating at total capacity. These characteristics have now become a tough hurdle for water managers to learn about and treat water better for future sustainability (Devi, 2018).

2.0 Literature Review

Agr (2009) reported that despite the presence of laws and policies, restricting improper water use seemed to be a limited success for the government. This was because complete and accurate regulations are mandatory to protect and conserve water resources and to set the responsibilities of water management organizations. Poor implementation capability and the broad existence of water discharge make it extremely difficult and expensive. Strategies for aligning the use of renewable and non-renewable water for a safe and sustainable future are much needed and it is reported that desalination can play a significant role by separating domestic and industrial consumers from groundwater, but drastic changes will be required in the country's water system.

Bharat & Dkhar (2018) reported the current coordination of the policies, programmes, and schemes of the Government of India with SDG 6 and its impact on other SDGs. This study proposed investigating and building these relationships between them so that the limits, inconsistencies, and lack of continuity between SDG 6 and other SDGs are realised. Assisting us to draw conscious choices, prioritizations, and enhancements at the ground level for the application of the programme. By describing the country's situation, the paper reports on the general relations between the various SDGs in the economic, social, and environmental aspects.

Kulkarnia (2015) reported that in management decisions and the creation of a governance system, participation at all levels is essential, knowing that the creation of groundwater in India has been 'atomistic' in nature. While managing groundwater resources in India and helping develop groundwater governance, an interdisciplinary perspective is significant. It is necessary to consider the complexities of developing a system for groundwater governance for regions of substantial groundwater development versus relatively less developed groundwater development areas. This report suggested that considerable concerns are required to move from a business-as-usual approach to groundwater resource management in India. The study also suggested moving away from 'infrastructure'-based, 'supply-side' solutions to more holistic solutions that combined hydrogeology and engineering with sociology and economics to establish a groundwater regulation system.

Llamas (2004) studied strategies for avoiding or correcting the undesirable effects of groundwater development in 'aquifers' stressed or used intensively. The study reported that concentrating on the ethical problems concerning the use of non-renewable groundwater should be initiated. It must be an iterative process where technology and knowledge enhancement for cohesion and involvement of stakeholders allow for increasingly efficient use of the resources. Trustworthy and fast information is crucial for facilitating cooperation between stakeholders involved in aquifers. Easily obtained good, reliable data on the concepts of water quality, and water levels should be available to all stakeholders. Current information technology makes information availability easy for an unlimited number of users.

Ayog (2019) reported the Composite Water Management Index which is significant for evaluating and improving the effectiveness of States / Union Territories, in the context of efficient water resource management. The CWMI is a summarized water data, that reports the path designed to raise awareness among people and governments of the actualities of the Nation's water crisis. To face this rising crisis, the CWMI focuses on allowing efficient water management in the states of India. The index includes the states and related central ministries and departments' useful data and supports the organizations to develop and implement an adequate approach for sustainable water resource management. NITI Aayog has rated all the states in the composite water management index, consisting of 9 large themes with 28 different indicators. These themes and indicators address multiple perspectives of groundwater, water resource conservation, irrigation, agricultural practices, drinking water, policy, and governance.

Kumar *et al.* (2010) attempted to harvest water potential and use it against drought. This research reported 9 action plans which can be applied to sustain life and face the water crisis in the coming decades. Other than that, many problems, strategies, and policies for developing water resources and their management were reported.

Worldbank (2010) report stated that an estimated 60 per cent of the groundwater blocks in India will be in a critical condition by 2025. Climate change would further strain groundwater supplies. A menu of realistic measures that can be applied in the current environment is presented in this study. In addition to sound policy, active regulation includes the administrative capacity to track and enforce rules for very large numbers of small users. This report stated that efficient conjunctive use by microzone development (e.g., sealing of banks and de-sedimentation of major canals) may increase crop intensity without sacrificing the sustainability of groundwater resources. Capacity development of state groundwater institutions will have to be established to ensure the collection of key information data and technically supporting activities for allowing community management, and enforcing regulatory measures.

Sharma & Bhatia, (1996) reported that after India's independence in 1947, there has been a rapid expansion of voluntary organizations. The sector of community health has been one of the key drivers of this expansion. The focus of this article is to trace the voluntary community health movement, examine the current state, and forecast potential developments in voluntary activities throughout the history of India. In this study, the review of the literature used was in conjunction with the Strengths, Weaknesses, Opportunities, and Threats (SWOT) survey. Improving linkages between health and development, building on collective forces, greater use of participatory training, establishing egalitarian and effective linkages for decision-making at the international level, and developing self-reliant community-based organizations were some of the key trends that emerged as priority areas for progress and strengthening voluntary organizations around the world.

Mohan (2004) investigated the factors that affect equal coverage of preventative health interventions in both the Universal Immunization Program (UIP) of Rajasthan, and the Rural Drinking Water Supply Program (RDWSP), India. A total of 2460 children were enrolled and categorised in economic quartiles based on the property possession at 12 primary health facilities in a district of Rajasthan. The major sources of drinking water were split into quartiles by coverage of vaccination. More access to the hand pumps was available to poor families, resulting in equal access to a secure supply. Wealthier households have higher access to piped water, which has more access to hand pumps for impoverished families. The vaccination distribution was uneven, with wealthy children receiving more vaccines. Although the RDWSP has become more egalitarian, the UIP remains highly unequal. He clarified that services would increase coverage by setting specific targets to ensure physical access to everyone, encouraging low demand for treatments, and strengthening front-line personnel supporting and supervising those interventions.

3.0 Objectives

- This study will allow the project to determine if the activities are structured to satisfy managers' expectations and desires.
- This study will analyse the materiality performance of the Bisalpur Jaipur Water Supply Project and conduct an in-depth analysis of the stakeholders' requirements and the institutional alignment of the Bisalpur Jaipur Water Supply Project.
- This study will find and recognise the risks and possibilities that help establish strategic choices by examining the elements that impact the BWSP's ability to achieve its goal so that the stakeholders' needs can be recognized and their suggestions can be adequately addressed. It also analyses the extent of the knowledge of the governing actors of the project's water source, which is the fundamental right of the parties concerned.

4.0 Research Methodology

4.1 Reckoning required for the study

An overview was prepared for selected locations to identify performance criteria and create indices based on those using academic literature, policy documents, project information, surveys and questionnaires, stakeholder interviews, and government data as a resource. For this research, secondary data was acquired from annual reports, various books and journals related to the study, and the website of the Bank and other institutions.

4.2 Primary data collection plan

Table 1: Data Collection Plan and Technique

S. No.	Methodology Item	Approach
1	Regions	Bisalpur, Jaipur, and Tonk
2	Questionnaire design	After a review of the existing stakeholders, primary data collection from beneficiaries, experts, and government officials in the area.
3	Questionnaire Administration	In-person visits at Jaipur and Bisalpur and phonic and virtual conversations.
4	Analysis Techniques	SWOT analysis

4.3 Swot analysis

To conduct a SWOT analysis for each goal, it is beneficial to provide a simple description of what is happening now, and the knowledge collected can be used later in this process for defining strategies and measures to achieve success. SWOT represents strength, weakness, opportunity, and threat.

- Strengths are capabilities that allow a well-performing BWSP to retain or improve performance.
- Weaknesses are features that hinder and must be addressed by BWSP performance.
- Opportunities are patterns, factors, incidents, and forces that can be used.
- Threats are factors or incidents that must be prepared, dealt with, or mitigated without BWSP’s control.

The usage indicators can be applied to a wide variety of stakeholders to understand the materiality evaluation of the BJWS project as per CWMI and other indexes to align the project with the materiality aspect of stakeholders in accordance with CWMI and other indexes. This strategic tactic, when included with SWOT would examine the rules in more depth, as well as the existing and anticipated requirements and supplies, along with various institutes, professional bodies, and individuals. This will explore the stakeholders’ needs and expectations for the future. However, the variables are identified through the analysis to distinguish factors in association with a specific action as internal (forces, weaknesses) or external (opportunities, challenges) and thereby equate opportunities and threats to strengths and weaknesses (Mainalia, 2011).

5.0 Findings

5.1 Strengths and associated opportunities of the BJWS project

The project is applied in three parts: transmission, transfer, and delivery. The RUIDP transmission segment's untreated water is obtained from the river, processed, and transported to a point close to Jaipur. In the RUIDP's Bisalpur Jaipur Water Supply Project, the transmission part was from Bisalpur to Balawala, and a 400 MLD Water Treatment Plant at Surajpura, with a raw water pipeline of length 8.4 Kilometres and a clear water pipeline of length 97.4 Kilometres from Surajpura to Balawala was executed (RUIDP, 2017). The Asian Development Bank (ADB) supported the financing. The transfer and distribution component involves the transfer and distribution of parts of the main and reservoirs with minimal alteration and access to the current network. The PHED funds this portion with JBIC and HUDCO financial support. BWSP is a two-principal multi-function project.

- The first is the implementation of drinking water for Jaipur, and the second is irrigating regions of Tonk. This Dam is 574 m in length and 38.5 m in height and can store up to 3.870 thousand million cubic metres (TMC). The Central Water Commission in New Delhi reported that 3.315 TMC water with a dependability of 75% is available. The net quantity of useable water reserved for drinking and agriculture is 24.2 TMC. When evaporation and other losses are taken into account, 11.1 TMC has been set aside to deliver potable water to Jaipur, Tonk, and within route regions. In the Ajmer, Beawar, Kishangarh, Kekri, and adjacent villages, a further 5.1 TMC is planned to provide drinking water. The other 8.0 TMCs are suitable for irrigation in Tonk, Toaraisingh, Uniyara, and Deoli Tehsil for 81,800 hectares (ha) (Stearns, 2009). Concrete Dam structures with a length of 574 meters, a height of 38.50 meters, a gross storage capacity of 1095.84 meters, and a 1040.95 Mcum storage capacity were formed under the project. A 338-meter long crest for masonry gates ogee type spillway was also developed with 18 radial gates of 15×14 meter designed to facilitate a discharge of 29046 cumecs at MWL. Both sides of the canal banks stretched to 51.64 km and 19 km with a discharge capacity of 18.34 cumec and 2.25 cumec, respectively, to irrigate 81,800 hectares (CCA) of the area in the Tonk district. The final irrigation potential of the project sums up to 55,224 hectares of area.

Additionally, the project provides 458.36 Mucm drinking water to regions of Jaipur, Ajmer, Beawar, Kishangarh, Nasirabad, and other cities, towns, and villages on the route (GOI, 2020). Fulfilling the purpose of farming and access to the clean water supply. The reservoir has been a lifeline to the city of Jaipur. The Bisalpur Dam Project is already supplying farmers and other inhabitants with water. With irrigation water mainly being supplied to Sawai, Madhopur, and Tonk regions, drinking water, apart from Jaipur, also benefits districts like Ajmer and Dausa. Moreover, a 15 wagon train with a holding capacity of 2.5 million liters from Nasirabad, Ajmer, supplies clean drinking water to the Bhilwara region. Earlier in 2016, around the annual Pushkar Fair, the Bisalpur reservoir was used to fill up the dried Pushkar lake.

Interestingly, today, the Bisalpur Dam supplies the lake's water for half of the regions under the Jaipur Municipal Corporation. Located on the Banas River bridge Deoli in the Tonk district, Rajasthan, the Bisalpur Dam, a gravity Dam is also the site for spotting more than 100 bird species and around 50 fish species, in addition to providing future chances for recreational activities like boating (Jaipur Stuff, 2020).

5.2 Weaknesses and associated threats or challenges

Dams belong to modern India. However, there are several issues and disagreements in distributing the Dam's water in the current situation. This case study includes the status of the project stakeholders for justifying the water distribution, controversy regarding over-sharing of water as well as the selection of the incorrect preferred water sources, the effect of Dam building on the population, the possible Bisalpur Dam's Capacity to satisfy the water needs, water conservation strategies, etc. Estimated drinking water needs in Jaipur in 2001 were 4.8 TMC, 7.6 TMC in 2011, and 11.1 TMC in 2021. Thus, until 2021, this water supply should be ample if there is a balance between supply and demand.

Following 2021, the requirement will be greater than the renewable supply alone from the Dam, and it will no more be a reliable water source (Stearns, 2009). According to the latest assessments, the Dam's water supply will have been severely depleted by 2027, and it will no longer be able to deliver the bulk water required by Jaipur. Interestingly, this time period is adequate considering that it will allow underground water levels to be refilled and other water choices to be explored. The capacity of the Bisalpur Dam has failed to reach its allotted capacity due to changes in land-use patterns and watershed features, as well as climate change, so this has become a big challenge for water managers to consider and develop water conservation strategies in the future for survival (Water Resources Department, 2020).

5.3 Outcome of the materiality aspects of stakeholders

Table 2: SWOT Analysis of the BWSP

SWOT analysis	**BWSP**
S (Strength)	• Public understanding of the issue of water shortage and the source's potential. • Special considerations to community concerns and attitudes and the planning according to that. • Clear and understandable description of water purification and quality • Established relationships and joint efforts between stakeholders effectively. • Support for the project by reputable organisations. • The project is technically and socioeconomically feasible. • This has social, environmental, and economic beneficial impacts. • The statistics needed for tracking threat factors using water management systems, decision support systems, and engineering skills.
O (Opportunity)	• Trying to highlight the alternative water supply. • Ensure that decisions are fair and sound. • Improve the economy and the environment. • Design and implementation of tanks for rainwater and water recycling systems that can result in a decline in summer water consumption. • Update stakeholder infrastructure by using sustainable technology to have a competitive advantage.
W (Weakness)	• Growing water demand than the Dam's potential. • Lagging study on costumers and their perceptions on recycled water use in particular. • The potential effect on irrigation with reclaimed water usage causes soil salinization and iodization. • Unprepared for solving summer drought and possible water reduction. • Changing the amount of annual rainfall can lead to distribution shortages – high irrigation water consumption.
T (Threat)	• Lagging in the usage of the water recycled. • In the long term, farm practices may seriously affect soil quality. • A lack of water causes summer water constraints. • Increased water price and decreased quality of service due to inadequate restocking of groundwater. • Significant phases of drought throughout the summertime via climate change-based processes.

- **Managerial Materiality**: Subodh Jain, Superintendent, engineer, PHED, states that "This system not only assures that water flow rate but the level of chlorine and alkaline are also maintained, it will be the cleanest water the city has ever seen, it will be as good as the bottled water sold on the market." Barring any significant problems, he said that in the next few months, the quality of their water would be enormously changed for many Jaipurites (Stearns, 2009). However, one of the most challenging difficulties of the best water management schemes is the storage solution and its actual estimation. Water scarcity and environmental degradation are caused mainly by the growing natural resource demand caused by fast population expansion. The Bisalpur Dam has supplied water to, Beawar, Ajmer, and Kishangarh since 1994. Still, the Government of Rajasthan's Water Resources Department expanded the Dam potential in December 2008 to the city of Jaipur and then it passes villages (JMC, 2006). In 2005, the GOR facilitated the Bisalpur-Jaipur Water Supply Project to supply water from existing Bisalpur Dam facilities south of the city of Jaipur. The BWSP Phase I provided 360 mld for the city of Jaipur, while 40 mld respectively for the village areas, Phase II extended to 540 mld and 60 mld, with access to potable water from the Bisalpur Dam to Jaipur from March 2009 (Water Resources Department, 2020).

Query: While this pattern of urbanisation contributes to the rising water demand, it also serves as a matter of the question of whether the Bisalpur Dam has the capacity to satisfy Jaipur's water demand in the future. Another problem in the domain of exploration is policy reversal and the purchase of land. In the 2000s, the state government provided techniques and financial incentives for the construction of minor anicuts by agriculturists and consequently prohibited 27,000 private anicuts in the basin of Banas. Therefore, the question is why the rising urban demands are justified by overlooking existing water requirements in remote areas. The problems to be resolved include the renovation of the current water supply system, calculation of output by bulk metering to improve management, and the practical evaluation of shared quantities through utilization measurements. Archenna Agarwal of Satya, an NGO, addresses the situation on the eastern outskirts of Jaipur in the Kunda Basti. Interestingly, she says that, even though they spend up to several hours collecting water, the women with whom she works do not want to pay for water separately. They believe their money is better spent on electricity or household goods to get water free of charge.

- **Beneficiaries Materiality:** Dam rising was not without a robust disagreement among the villagers and the government, with the shooting of ten protesting farmers in 2005, 5 of them died, as it was lifted to 38.7 tmcft by 2007. Around 167 Chaksu and Phagi villages of the block were battling and protesting at the Bisalpur Project to allocate drinking water despite making use of the water that was available for non-consumptive purposes, such as gardening, sanitation, and other recreational activities. According to PHED Engineer S. Bhakar in Tonk, the government prefers cash compensation because it is easier than land allocation (Rajasthan Urban

Infrastructure Development Project: Bisalpur Water Supply Project: Resettlement Plan, 2004). Unfortunately, there are not many resources available to aid people of the region to live comfortably. The demand region is continually decreasing the groundwater table, including high fluoride levels in soil water, that are unfit for consumption and causing health problems in Rajasthan. "This Kunda Basti is a case in point of the PHED's failure. They have no single pipelines, and now that the hand pumps are drying up, they need to rely on water tanks. Since the water pipeline is not in the region already, they are not preparing to receive Bisalpur water shortly."

Query: The project currently provides up to 458.36 Mucm of drinking water for Jaipur, Ajmer, Beawar, Kishangarh, Nasirabad, and other enroute towns-villages. The principal secretary for the PHED Division, Sandeep Verma, on August 29, 2019, said that the system of water supplies would balance in Jaipur and elsewhere in the coming few months from 330 million litres per day to 360 million litres per day, and the supply period from 45 to 60 minutes per day (Stearns, 2009). But the decline in equal water distribution goals is a big concern in this sector, raising disputes among beneficiaries. The reservoir was filled just nine times between 2002 and April 2017 and thoroughly dried out in 2006 before the rains of July (Dass, 2012). At these times, Jaipur's needs were met from the six tubes which tapped 100 feet into groundwater across the Dam area and by comparing the theorised rainfall results from 1981 to 2012. How do we tackle the declining tendency for water inflow to the Bisalpur reservoir in irrigation infrastructure and supply of water? (Gupta, 2014)

- **Environmental Materiality:** The river was not assigned the environmental flow criterion, given that it is seasonal and dries outside of the monsoon season. The Bisalpur Dam has no hydropower generation, primarily because it has water storage and urban and irrigation diversion as its primary objectives (Gupta, 2014). There is also no fish passage in the Dam. The Chambal River and Lower Banas that enter the Ranthambhore Tiger Reserve from the Bagara Dam and some upstream portion of the South Banas (Katar) Village Bawara during June are known for their migratory fish species, especially mahs (Tor spp.). The Machseer Tor species from Chambal is considered Near Threatened (N.T.) but is reported to be missing from the Dam and the adjacent river. The Mahseer species from Chambal are of conservation significance. Therefore, Mahseer and presumably other riverine fish tend to have been removed for skewing distributional benefits and maintenance costs across the catchment. The Central Pollution Control Board has designated the Banas River as one of the top priority rivers for pollution control, with an emphasis on the biochemical oxygen demand (BoD) range of 4.2-39.9 mg (Everard, 2018).

Query: According to the Central Water Commission of Jal Shakti's ministry, the government of India has developed a guiding database enabling Dam owners to keep on track of the social and environmental protection requirements and discussed in detail all the legislative requirements to assess and manage environmental impacts on existing Dam projects. Surprisingly, there is a decreasing trend in the inflow to the Bisalpur Dam, and the catchment characteristics are regularly degrading. River biodiversity and the many essential resources it delivers to the environment also become more fragile due to this decreasing inflow trend. How can the maintenance of a severely unsuccessful urban technological area-centered model contribute to the sustainable development of the social and environmental area?

6.0 Conclusion

The project Bisalpur had a significant impact on its commanding regions. The dam has played a considerable role in the region's social and economic development, supply of potable water to impoverished parts with economic opportunities, and irrigation facilities. However, the area faces a multitude of problems when it comes to water-sharing of dams, which includes drying of water and river patterns and resettlement of displaced people in the sector, along with inequities and unfairness in water allocation and distribution. All of this concludes that the dam is considerably lower than its design dependence (represented in how much the dam fills or spills in accordance with its predicted probability), placing the urban areas and the irrigated areas it provides, at considerable risk. Recognizing that this pattern towards growing rainfall and the declining Bisalpur dam filling is similar to the one in the Ramgarh dam that used to be the primary source but now is entirely dry, led by the creation of the BWSP. Removing anicut and stopping the construction with an increased agriculture upstream can prevent the dying source.

Greater reliance on the Bisalpur dam waters, which were originally created for local drinking water consumption in Jaipur and nearby towns, and irrigation, perpetuates the urban appropriation and rural disposition trend found in the history of Jaipur and, more generally, in the developing world. The quality of the water and free flow are deteriorating in the Bisalpur reservoir, as witnessed by observing the dam's operation, which is considerably of lower design efficiency, placing the urban areas and irrigated area supplied by the Banas Bisalpur scheme at considerable risk. It also increases civic insecurity, with a history of demonstrations by the impacted rural population, marginalised and deprived by alleged political asymmetries that benefit urban and industrial operations in remote areas (Devi, 2018). When a large volume of water (25 per cent) evaporates from the reservoir surface, the structure becomes vulnerable. If more water is retained across the catchment as an underground resource, the vulnerability can potentially be avoided instead of collecting on the surface of the Dam.

6.1 The Ethical dilemma of project managers and stakeholders

- By 2027, it is expected that this Dam will no longer be able to provide water. Is this time frame adequate for replenishing the groundwater?
- How can you compensate the farmers whose lands have been seized, when most have no idea how and where to spend their hard-earned money wisely and end up spending it all, making the condition even worse?
- Many farmers complained in 2005 because they lived near the dam and had very little water to cultivate their crops. Could this forced altercation be softened in any way?
- During the summer, the growth of disease-causing microbes grows fast if the water is clean and pure. But what were the necessary measures being made in this regard, given that the villagers rely on tap water and do not cleanse it in their homes?

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