“A Study on challenges faced in Jhansi(U.P) regarding sanitation practices’’

A

Seminar Programme

submitted in partial fulfilment

for the award of the Degree of

B.A.(Honours) Economics

To



Amity School of Economics

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**Candidate’s Declaration**

I hereby declare that the work, which is being presented in the Major Project/Seminar/Term Paper,

entitled “A Study on challenges faced in Jhansi regarding sanitation practices” in partial fulfilment

for the award of Degree of “B.A(Honours) Economics” submitted to the Amity School of Economics,

Amity University, Uttar Pradesh is a record of my own investigations carried under the Guidance of Ms Manisha Raj , of Amity School of Economics.

I have not submitted the matter presented in this report anywhere for the award of any other Degree.

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**CERTIFICATE**

This is to certify that Pradyman Bansal of, B.A.(Honours) Economics,2016-2019,3Semester , has presented an analysis on “A Study on challenges faced in Jhansi regarding sanitation practices” in partial fulfilment for the award of the degree of B.A.(Honours) Economics under Amity University, Uttar Pradesh

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**Abstract**

Sanitation is the means of promoting hygiene through the prevention of human contact with hazards of wastes especially faeces, by proper treatment and disposal of the waste, often mixed into wastewater. These hazards may be physical, microbiological, biological or chemical agents of disease. Wastes that can cause health problems include human and animal excreta, solid wastes, domestic wastewater (sewage or greywater), industrial wastes, and agricultural wastes. Hygienic means of prevention may involve engineering solutions (e.g., sanitary sewers, sewage treatment, surface runoff management, solid waste management, excreta management), simple technologies (e.g., pit latrines, dry toilets, urine-diverting dry toilets, septic tanks), or even simply by behavior changes in personal hygiene practices, such as hand washing with soap.

Providing sanitation to people requires a systems approach, rather than only focusing on the toilet or wastewater treatment plant itself. The experience of the user, excreta and wastewater collection methods, transportation or conveyance of waste, treatment, and reuse or disposal is called the Sanitation chain and all need to be thoroughly considered

The main objective of a sanitation system is to protect and promote human health by providing a clean environment and breaking the cycle of disease. Lack of improved sanitation access have serious health impact on human kind. In fact, by improving access to safe sanitation and changing hygiene behaviours, diarrhea health impacts - the first death cause of child death under 5 - can be reduced significantly.

**Introduction**

Jhansi is a major rail road junction of North central India and is rapidly growing to an industrial town. The National Highway Department project has sparked off the growth of Jhansi as it has to led to better accessibility and excellent connectivity to the rest of India. The region of Bundelkhand has most number of dams and canals hence making it one of the best water and energy efficient cities. The growth of infrastructure has led to the development of the economy of Jhansi and it’s nearby areas.

**Water Resources in Jhansi**

Jhansi Jal Sansthan has been instrumental in ensuring safe drinking water within the city. It has installed close to 10000 water pumps in the slums and villages near Jhansi and as many as 20000 families have been provided with individual hand pumps. Water tanks for schools and colleges have been installed too. Practical problems faced for the upkeep and maintenance of water pipes, tanks and pumps are a major area of concern.

**Sanitation and solid waste management**

Maintenance of sanitation is a big challenge to the authorities in Jhansi. The Jhansi Nagar Nigam has opened several community and public toilets un each circle. People in slums and villages are educated on the need to maintain proper hugine and thereby use toilets in their locality . However, it has been found that the upkeep of nearly 46% of these toilets are poor and unusable.

**Literature Review**

1. Although both Tikamgarh & Jhansi are contiguous districts, Jhansi is much better-off in terms of social and development indicators and infrastructural facilities.

2. Both the districts have experienced a rapid and mass scale degradation of natural resources, resulting in a very high proportion of wastelands and acute scarcity of water

3. On an average, the districts have a decent amount of rainfall (1000 mm and 850 mm for Tikamgarh and Jhansi districts respectively). However intermittent but successive years of droughts have resulted in water scarcity in the last 2-3 decades.

4. In Tikamgarh district, the water demand (1773 mcm) is for domestic purposes, (122 mcm / years) livestock (11.2 mcm/year) & agriculture (1740 mcm/year) purpose. Wells being the main source of water for irrigation (78% of total irrigated area), almost 86% of net groundwater availability (630mcm /year) has been utilized, placing the district under the semi-critical category.

5. In Jhansi district, out of the total demands for humans & livestock, 2% (35 mcm/year) is for domestic purposes, 97% is for irrigation (1507 mcm/year) and 1% is for livestock & industrial purposes. Recent years have witnessed a dramatic spurt of development activity in the Jhansi district leading to a massive increase in water demand for construction purposes also.

6. Unlike Tikamgarh district, only 48% of irrigation in Jhansi district is groundwater dependent (wells & tubewells) while almost 45% of land is irrigated by canals. This has meant that only 37.29% of the ground water potential of the district has been exploited.

7. In both districts, several water harvesting structures have been constructed in the past to ease the water situation. These water harvesting structures include the Bundela tanks, step wells, village ponds, haweli bundhies etc. Many of these structure, however, are currently in a state of neglect and are no longer able to harvest water for use during dry periods.

8. In the last few decades, several dams and reservoirs have been constructed over the Betwa and Jamni rivers and their tributaries. Canals have been taken out from most of these reservoirs for water supply to Tikamgarh and Jhansi towns and for irrigation purposes. The latest initiative is the Water for All and Always 3 Development Alternatives proposed inter linking of Ken & Betwa rivers where surplus water of Ken basin is envisaged to be diverted to the water deficit Betwa basin. Although only 4.20% and 1% of Tikamgarh and Jhansi districts respectively fall in the command area of the link project, it is expected to provide relief in terms of meeting drinking water & irrigation needs. The project has, however caused serious concern among environmentalists and civil society organizations over potential adverse impacts related to economic viability, environmental costs, social costs, resettlement and rehabilitation issues, conflicts etc.

**Status of water resources in Jhansi District**

**Water Demand**

• Domestic The Jhansi district has a burgeoning population over the last 50 years. This has resulted in a huge increase in the domestic demand for water. Jhansi District - Irrigation Water Requirement and urban population as applied earlier for Tikamgarh district, the domestic demand for water in Jhansi district is approximately 35 mcm / year. This demand has been increasing at a decadal growth rate of more than 20% as a result of the increase in population.

• Agricultural Jhansi has less than half of its area as agricultural, including both Kharif and Rabi crops. The hill topography of the district does not permit large-scale farming and cultivation of land under the so-called improved agricultural practices. The soil quality in the district has also been a major factor in the use of land for agriculture and the consequent demand for irrigation. In the regions of black soils in tehsil Moth, Garautha and Mauranipur, artificial irrigation has not been absolutely necessary because of the water retaining capacity of the soil. In the red soils, however, irrigation is necessary because the soils are incapable of retaining moisture. Similar to the Tikamgarh district, the main Kharif crops in the district are paddy, jowar, bajra, maize, pulses etc. while the main Rabi crops are wheat, gram, mustard, oilseeds etc. The maximum water requirement in the district is for irrigating the tilhan and the wheat crops mainly because they account for a bulk of the total sown area. As per the total sown area in year 2004-05, the total requirement of water for irrigation in the district is approximately 1504 mcm / year.

• Livestock As per the Jhansi District Statistical Handbook 2005, there are approximately 279,000 cows, 153, 000 buffaloes, 50,000 sheep, 201000 goat and 155,310 poultry in the Jhansi district. Taking all these into account, the total annual water requirement for livestock in the district is around 7.88 mcm /year.

• Other uses (Environment, Instream Flow Requirements – average and drought conditions) In this case also, while no estimates have been made for the ecosystem requirements, it is beyond the scope of this study to do in a rigorous and scientific manner. In the last few years, the Jhansi district has witnessed a dramatic spurt in its development due to the catalytic effect of the National Highways programme of the Government of India. The NorthSouth Corridor connecting Kashmir to Kanyakumari passes through Jhansi. The East-West corridor also goes through this city. So there is a sudden rush in infrastructure and real estate development in the city. A greenfield airport is also on the anvil. Although no estimates could be made, but all this also has significantly increased the demand for water in the district. Water Availability

• Rainfall The average rainfall of the Jhansi district, as reported in the District Water for All and Always 25 Development Alternatives Chart 8: Jhansi District – % of villages at different ground water levels 26% 58% 7% 5% 4% 25 Source: Data taken from Report on Census of Minor Iirigation Schemes 2000-01, Ministry of Water Resources, Govt. of India Gazetteer, is 880 mm. The rains are caused mainly by the south-west monsoon and July is the month for the heaviest rainfall. Between 1901 and 2001, on an average, there are approximately 41.6 rainy days per year in the district. Considering the total area of the district to be approximately 5024 square kilometers and 850 mm as the average rainfall, the total volume of water from the rainfall is approximately 4270 mcm/year.

**Water supply and accessibility**

People in the Jhansi district have also been traditionally using the masonry wells for meeting its major drinking water needs. The villages near the rivers use the river water, which is largely potable. A major need for drinking water arrangements was required when Jhansi became a major railway and cantonment centre. Thus the huge reservoirs of Matatila and Pahuj dam were developed to supply water to Jhansi. Urban Drinking Water Supply In the Jhansi town, raw water is brought from Matatila dam to Babeena based settling and purification system from where it is distributed to the Jhansi city. This water supply is further supplemented by supply from the Pahunj dam and several handpumps, open wells and tubewells. The water supply scheme for the town is designed and implemented by the Jal Sansthan. Once it is complete, it is handed over to the municipal authority which is responsible for its operation and maintenance. Since full cost of the supply system is not recovered, it becomes difficult to take comprehensive and annual maintenance of the supply pipelines. As a result, maintenance is mostly undertaken only when there is a burst or a leakage. As per the information provided by the Jal Sansthan, Jhansi Division, Major Lakes and Reservoirs Name Storage Capacity (mcm) Current Status Lakes Kachneo Lake 44.7 Old lake, in the past canals were taken out from this lake Arjar Lake 17.4 Highly silted; canals taken out Barwar Lake 33.4 Used for drinking water supply and irrigation Barwasag ar Lake ,Dammed by a 1.21 km long embankment; supplies water for irrigation through canals Magarpur Lake 2.44 Supplies water for irrigation through canals Siaori Lake 10 Opened for irrigation; receives water from Kamala Sagar that has increased its irrigation capacity Magarwar a Lake 1.65 Used for irrigation Pachwara Lake 5.88 Used for irrigation Dams Pahuj 18.27 Used to supply drinking water to Jhansi town Dongri 9.92 Supplements the Pahuj dam in drinking water supply to Jhansi town and for irrigation Paricha 78.22 Used for irrigation to Jhansi, Jalaun and Hamirpur districts Dhukuwa n 57.79 Used for irrigation through canals Pahari 47.76 Used for irrigation in Hamirpur district Saprar 76.20 Used for irrigation in Jhansi district through Ranipur canals and capacity enhancement of Siaori Lake Lahchura 10.57 Used for irrigation Khaprar 3.51 Used for irrigation Total Capacity 428.01 Water for All and Always 27 Development Alternatives currently the Jhansi town is being reconstituted into 16 zones by the U.P. Jal Nigam. At present, the town does not have adequate drinking water storage facilities and the pipelines system is also undersized. In addition, there are no pipelines in certain areas of the town where is supplied mainly through handpumps and water tankers. As can be seen from Table 6, the total requirement in the town is 77.55 million litres per day (m.l.d) whereas the supply system only caters to 58 mlpd . There is therefore a shortage of 20 million litres per day in the town itself. Rural Drinking Water Supply As per the District Statistical Handbook, 2005 of the Jhansi district, all the 760 inhabited villages are covered under the water supply schemes, through one source or the other. As a result of the continuous efforts by the State Government, the supply situation in the villages is improving, but at a very slow pace. One of the reasons for this is that a lot of the villages at the tail-end of the supply system do not get water at all on account of inadequate electricity supply. There is therefore, still a very high dependence on handpumps, which form the bulk of the means by which water is accessed by the rural population. The Irrigation Water Situation The low water table and the hilly topograph of the district have always been an obstacle to the expansion of irrigation. The district was abundant in masonry wells which were employed for irrigating the fields before canals were introduced in the same areas for revenue benefits. As already mentioned, Jhansi has many lakes, ponds and reservoirs from where canals have been taken out for irrigation. Embankment (Bandhan-system) was also popular here, as in other districts of Bundelkhand. The Rajghat canal project, mentioned earlier, is now a major source of irrigation water for the district. Besides providing 57.90 Water for All and Always 28 Development Alternatives Canal 45% Tubew ells 3% Wells 43% Ponds 7% Other 2% .

**Measures for water resource availability**

Traditionally, Bundelkhand region had valued its water resources the availability of which is heavily dependent upon rains. Though in current times many water reservoirs of the region are under serious threat due to a high water crisis in the third consecutive drought year, it would be of importance to have an overview the different kinds of water harvesting practices in region. Since the terrain is undulated and rocky, surface run off has been high with little recharge and thus every drop of water was considered precious and stored in tanks and village ponds. Some of the common water harvesting practices in the districts of Jhansi and Tikamgarh are,Tanks The era of Chandela and Bundela dynasties centuries ago saw a largescale construction of tanks in mainly Tikamgarh and some parts of Chhatarpur districts known by the names of the dynasties they were built under. Rulers, merchants, and other philanthropists constructed these around 1000 years ago. There are a few differences in technology of construction of these tanks. Chandeli tanks have huge embankments – often parts of cities/ towns are settled on top of these like around the tank in Jatara town. These tanks are interconnected through feeder canals in such a manner that a tank at lower level gets filled up with the overflowing water of another at a higher altitude. There is a stone pitching of the size 2’\*2’ on both the sides of the upstream (the submergence area) and the downstream (command area). According to various sources, the number of these tanks is around 942 of which 453 still serve irrigation purposes. Bundela tanks are fewer in number, and not as large in size as the Chandeli tanks. Mahendrasagar and Sudhasagar lakes in Tikamgarh city are examples of these. One main technical difference is that Bundela tanks have wall pitching and only towards the upstream side. Exact number of tanks in Jhansi district is not known. Water for All and Always 29 Development Alternatives Dams There are two minor dams on Jamni and Dhasan rivers that serve the Tikamgarh district of M.P. Though some rivers flow through this district for long distances, most of the dams on these largely benefit Jhansi and other districts of U.P, which is mainly due to a slightly higher altitude of Tikamgarh and other districts of M.P. as well as the political will. In Tikamgarh, a positive aspect is availability of many natural dam sites because of its undulated, rocky terrain. Thus, check dams can be made in lesser resources. As per the Geography Professor Dr. Tewari from Tikamgarh Degree College who has done extensive research on the water resources of the region, Jamni and Dhasan rivers before merging with the Betwa have a potential of around 10 check-dams in these natural sites. There could also be channels created between these two rivers at the same altitudes.Village Ponds Many villages in the region have overtime constructed a number of ponds. There are mainly two kinds of ponds in the villages – those in the farmlands meant for agriculture and those in the village common lands having the purpose of supporting all other water needs like for fishing, cattle, sanitation etc. Runoff harvesting in the form of embankment type ponds has been practiced for centuries in Bundelkhand where stream flow is of ephemeral nature.9 There are several ponds constructed in the region, but most of them have lost their utility after getting silted up due to lack of maintenance and poor management of their catchments. Most of the runoff harvesting ponds are shallow with large surface area. Step Wells There are around 1293 step wells in Tikamgarh (number of such wells in Jhansi is not known). Many of these still have water though at much lower depths now. These are, however, under serious need of conservation and management. Private wells are still maintained but not the public ones. Digora and Papora near Tikamgarh city have some famous step wells in the region. Haweli Bundhies Haweli system of cultivation is also traditional way of water harvesting practices in Bundelkhand and is practiced in areas having black soils. In this system the rain water is impounded in bunded fields during monsoon and direct sowing of rabi crops is generally done after removing the impounded water. In this way, only a single crop in a year, either rice in 9 Water Harvesting Practices In India, Dr. Katiyar, 2001 Water for All and Always 30 Development Alternatives Map 5: kharif or any rabi crop is taken in Haweli system, which results in very low yield and low cropping intensity of the region. Sometimes, haweli cultivation system is having the principle of graded terracing in stream beds. This involves construction of a series of low, small check dams or bund type structures across a certain wide bed of ephemeral streams to retain runoff and store it in the soil to raise crops. This traditional system has received less attention of scientific community, but even today these are socially acceptable and widely popular. This is not only common to Bundelkhand, but also in other semiarid and arid areas.

**CHALLENGES IN WATER AND SANITATION**

1.Wide variations in seasonal availability

From the average figures provided earlier, it may seem that the two districts have adequate water available for all purposes. However, the two districts, infact the entire Bundelkhand region, faces extreme water crises for almost four - five summer months of the year. The Participatory Rural Appraisal exercises conducted by Development Alternatives in 5 villages each in the two districts reveals that rural drinking water situation is extremely fragile from May to August with less than 40% of the drinking water need being met and hardly any agriculture activity being pursued. Villagers normally avoid washing animals during drought and summer seasons during normal years. Several reasons can be ascribed to this situation. Like most parts of India, this region also receives almost 80-85% of this rainfall in the period July – September. Typical hard rock terrain of the region ensures that this water does not percolate into the soil and leads to high levels of runoff and soil erosion. Also, vegetation and forests have disappeared at an alarming rate causing increasing ingress of desertification and reduced ground water recharging. This is further worsened by overexploitation of water for livelihood purposes. All this has meant that while the historical water sources used by the communities were perennial, they have become seasonal at present. The seasonality factor is also visible in the new sources of water viz. handpumps and tubewells, due to the same reason as that of the traditional sources. In recent years, the districts are also facing successive failures of monsoons over a large area. Thus, drying up of all natural water bodies, together with successive failures of monsoon, have been the root causes of the widespread drought witnessed currently.

2. Detoriating water availability

In recent years water quality has also emerged as a principal environmental concern in the region. In the two districts, the water supplied to habitations through the piped system is treated by respective Public Health Departments. Under the Community Led Environmental Action Network (CLEAN) programme of Development Alternatives, regular water quality monitoring in the Jhansi city has revealed that:

• Water samples collected from municipal water supplies in several of the places had a lower amount of residual chlorine than the prescribed norm of 0.2 miligram / litre.

• Iron is present in a large number of samples of drinking water extracted from groundwater sources such as wells. In the rural areas, water quality testing by the concerned authorities is done only if there are complaints about particular sites or when new infrastructure such as handpumps etc. is installed. The primary survey conducted by Development Alternatives in 5 villages each of Tikamgarh and Jhansi revealed that:

• In almost 59 out of 64 samples, the drinking water was contaminated with either coliform bacteria, nitrate, fluoride or iron which made the water unfit for drinking without treatment

• Coliform Bacteria and nitrate presence in the drinking water sources is primarily due to poor sanitation practices (water sources were seen to be surrounded by domestic sewage and cow-dung heaps nearby water sources) and agricultural operations (run-off from agricultural fields, use of fertilizers)

• Fluoride and Iron are mainly present naturally in the groundwater due to the rocks and minerals that form the geology of the region

• Due to poor quality of drinking water, there is high prevalence of diseases such diarhhoeal infections, cholera, typhoid, Hepatitis A, Gastro-enteritis, skin diseases and dental problems.

**Conclusion:**

All in all, it may be said that with increasing challenges in water accessibility, the communities have not yet started to make adaptations to their lifestyles. They have some knowledge of the core issues leading to the water shortages but are woefully short of any collective action to improve the situation. There is still a high degree of dependence on government for solutions that are more often than not temporary