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A Study of Water Resource Management in Urban and Rural Areas of Jabalpur District

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Abstract

India is rich in natural water resources, but because of the uneven distribution of resources and improper management, the major part of the country suffers from drought almost every year. The present study is based upon the inappropriate management of water resources in the urban and rural area of Jabalpur. The present paper intends to find out the actual condition of management of water resources by the municipal corporation of Jabalpur, whether the citizens of Jabalpur are benefitted through the policies made by the government for the equal distribution of water resources, are the policies adequately implemented and monitored once they are made? The data has been collected from secondary and primary sources, and simple percentage method has been used to analyze the collected data. The outcome of the study reveals that the government is trying to manage the water resource and is concentrated on the equal distribution of water in both urban and rural areas. Many policies have been prepared by the local government, but ineffective monitoring is the leading cause of improper management of water resources.

Keywords: Water Resource Management, Government Policies, municipal Corporation, natural water resources.

Introduction

Water has become the scarcest natural resource in the world. The world reports have continuously been warning us about water resources and global warming. Not only India but almost all the countries of the world are facing this difficulty in now and then. Over the past decade, sustainable entrance to water supply has emerged as one of the most critical development challenges facing the developing world. Scarcity of water resources coupled with inequitable distribution and inefficient use and distribution of water has led to a situation wherein a large percentage of the population in urban centers across the country have no access to safe drinking water, and at the same time, vast quantities of water are wasted through leakages and pilferages. Water Demand Management (WDM), which essentially encourages improvements in water distribution and use rather than augmentation of supplies has over the years emerged as an alternative approach to securing access to water supply for everyone on a sustainable basis. This is a micro-study based on problems related to water resource management in the urban and rural area of Jabalpur (Madhya Pradesh). Jabalpur district is located almost in the central part of Madhya Pradesh, and it is the third largest city in the State of Madhya Pradesh having 15% tribal population to the total population of the district. The deposits of the tale around Bheraghat near the Marble rocks on the Narmada River, about 13 miles west

of Jabalpur are the best known. The district lies between the North latitude 22° 49' and 23° 07' North and meridian of longitude 79° 21' and 80° 35' East. The area is bounded in the Southeast and east by Mandla & Dindori districts, in the south by Seoni and in the south West Narsingpur district and the west by Damoh district. The area falls in the survey of India Top sheet Nos. 55m, 64A- and 55 N on 1250,000 scales & occupies an over of 5655 sqkm.

The city is blessed with a perennial water source and good rainfall, and yet the water availability is unsatisfactory. Jabalpur supplies around 130 MLD of used water to an estimated population of around 1.2 million, besides utilization 20 MLD of ground water through tube wells and hand pumps. The actual situation is much less with estimated per capita availability of around 80 LPCD. Further, the city gets only 2 to 3 hours of water supply in a day with little reliability.

Irrigation

The total area under irrigation by various sources is 1100.42 sqkm & Net sown area is 2726.60 sqkm, which is 40.35% of net planted area in the district. The area irrigated by canals was 78.54 sqkm (2.88% of total area sown), by tube wells 739.11 sqkm (27.10%), by open wells 281.88 sqkm (8.92%) and by ponds (0.04%). There are 8832 tube wells, and 8010 dug wells in the district for irrigation.

Rainfall and Climate

The climate of Jabalpur District M.P. characterized by a hot summer and general dryness except during the southwest monsoon. The average annual rainfall of Jabalpur District is 1279.50mm. Jabalpur received maximum rain received during the southwest monsoon period, i.e., June to September. About 90% of the annual rainfall received during monsoon season. Only 10% of the yearly rainfall takes place between Octobers to May period. Thus surplus water for groundwater recharge is available only during the southwest monsoon period.

Ground Water Management Strategy

Resource Estimation As per Groundwater resource estimation of Jabalpur district for the year 2008/09, the available groundwater resources & gross groundwater drafts are 556.79 MCM & 251.40

MCM respectively, making the stage of groundwater development 51% as a whole for the district.

Water Conservation & Artificial Recharge

Considering the hydrogeology situation of the area, there is tremendous scope for artificial recharge work, especially, in depleting groundwater areas of Shahpura, Patan Shihora, Majholi & Bargi blocks. At the present stage of groundwater development in the district are only 32% in the command area and 55.71% in the non-command area. The scene of groundwater development of Jabalpur district as a whole is 51%, which reveals adequate scope for the future development of groundwater for irrigation.

Objectives of the Study

The objectives of the study are as follows:

1. To find out various resources of water in the urban and rural area of Jabalpur District.
2. To find out the differences between the management patterns of water resources in the urban and rural area of Jabalpur District.
3. To know the current schemes running by the government to reach the need for water.
4. To analyze the performance of various government schemes to fulfill the need for water resources in urban and rural areas of Jabalpur District.

Hypotheses of the Study

Hypotheses of the study are as follows:

1. There is proper management of water resource in urban and rural areas of Jabalpur.
2. The development of an area is based upon appropriate management of water resources.

Research Methodology

This Research article is based upon Primary and secondary data where primary data has been collected from stakeholders of urban and rural areas of Jabalpur through the well-prepared questionnaire, and secondary data has been collected from various Journals, Magazines and Municipal Corporation of Jabalpur and simple percentage method has been used to analyze the data collected. To analyze the collected data division method, charts and bar diagrams have been used.

Limitation of the Study

The present research is based only upon drinking water supply and management in urban and rural areas of Jabalpur District. It does not cover any other usable form of water like irrigation, agriculture or business, etc.

Research Gap

There is no previous studies have been found for water resource management in urban and rural areas of Jabalpur district of M.P. Now, after this study, the researches can be done on any field like management of water resources in Irrigation, agriculture, and business uses.

Water Resource

Water is finite in quantity, tangible in nature, and un-equally distributed throughout the world. Only 2.5% of 1386 million cubic kilometers of water available on earth is fresh water, and one-third of this smaller quantity is available for human use.

Jabalpur city has been divided into four Tehsils and seven development blocks. (Fig-1) there 1458 villages, 542 village Panchayats 07 Janpad Panchayats of regulatory divisions of the district are given in the following table no. 1.

Table 1 Administrative Division, Jabalpur District, (M.P.)

S. No.	Tahsil	Block	An area in Sq. Km.	No. of Villages	No. of Towns
1	Sihora	Sihora	440.05	151	2
		Majhoul	596.94	210	
2	Patan	Patan	568.49	220	2
		Shahpura	810.31	224	
3	Jabalpur	Panagar	421.43	208	2
		Jabalpur	751.00	242	
4	Kundam	Kundam	890.91	189	2
Total			5655.34	1458	

Source: Municipal Corporation Jabalpur (2011-12).

The city is blessed with a permanent water source and good rainfall, and yet the water availability is unsatisfactory. Jabalpur supplies around 130 MLD of treated water to an approximated population of around 1.2 million, besides utilization 20 MLD of ground water through

tube wells and hand pumps. The actual situation is much less with assessed per capita availability of around 80 LPCD. Further, the city gets only 2 to 3 hours of water groceries in a day with little reliability.

Table 2 Availability of Water from Different Sources

Average Annual Rainfall	-	1014-7 MM
Availability of water		
Tab water facility from water plants	-	1,90,918
rural	-	1,74,152
urban	-	16,766
Water from other sources	-	39,059
rural	-	27,027
urban	-	12,032
Number of closed wells	-	3903
rural	-	2516
urban	-	1387
Number of open wells	-	24053
rural	-	4241
urban	-	19812

Number of Hand-pumps	-	202052
rural	-	29084
urban	-	172968
Tube well/Borewells	-	48976
rural	-	38870
urban	-	10106
Spring	-	715
rural	-	179
urban	-	536
Rivers/ Canals	-	2047
rural	-	124
urban	-	1923
Tanks/Ponds/Lakes	-	923
rural	-	698
urban	-	225
Other Sources	-	2383
rural	-	2125
urban	-	268
Source: Census 2011, Date of compilation - 26 June 2012, Name of the compiler - Anshul Thurgau, District facilitator for Jabalpur Division.		

The above table indicates the availability of water resources from different sources in the Jabalpur area.

Scarce Water resources have become a global problem which is common in India. India with 2.4% of the world's total area, has 16% of the world's population but has only 4% of the full available fresh water. This indicates the need for water resource development, conservation, and optimum use. Sustainable development and efficient management of water is an frequently complex challenge in India. Increasing population, growing urbanization, and rapid industrialization combined with the need for raising agricultural production generate competing claims for water.

Table 3 Per Capita Availability of Water

Year	1951	1991	2010	2025	2050*
Population(106)	361	846.3	1157	1333	1581
Average Water Resources (m ³ /person/year)	3008	128.3	938	814	687

Source: ministry of water resources, annual report of the Govt. of India; *expected

The drinking water crisis in many Indian cities is reaching alarming proportions. Urban population is suffering from an irregular water supply, especially in Jabalpur. Jabalpur is a district situated in the bank of River Narmada because of which the water availability is sufficient in urban and rural areas of

Jabalpur. The average annual rainfall of Jabalpur District is 1279.50 mm which also indicates proper availability of water during Monsoon season. Even after all the positive signs, the district faces the problem of water distribution and management in an urban and rural area of Jabalpur. Water availability is sufficient, but water distribution is lacking and not up to the mark. The Municipal Corporation and gram panchayat of the urban and rural areas respectively supplied water and had prepared many schemes related to water supply, even after there is ill management has been sought in the water supply. The main source of water in rural and urban areas are wells, taps, tube wells, hand-pumps, ponds, and municipal corporation pipelines.

There is a growing perception of a sense of an impending water crisis in the country and Jabalpur. Some manifestations of this crisis are:

- there is hardly any area which receives the 24-hour supply of drinking water.
- Many rural habitations which had been covered under the drinking water program are now being reported as having slipped back with target dates for completion continuously pushed back. There are pockets where arsenic, nitrate, and fluoride in drinking water are posing a severe health hazard.
- In many parts, the groundwater table declines due to over-exploitation imposing an increasing financial trouble on farmers who need to deepen

their wells and replace their pump sets and on State and local Governments whose subsidy burden for electricity supplies rises.

- Many significant and medium irrigation (MMI) projects seem to remain under execution forever as they slip from one plan to the other with enormous cost and time overruns.
- Owing to lack of maintenance, the capacity of the older systems seems to be going down.

(Source: based upon primary data collection)

Availability of Fresh Water in Jabalpur District

There was a time when Jabalpur has 52 ponds and 84 wells but one after another they all went dry naturally or artificially or due to population growth. Poor water resource management is spread not only in small towns, but it can be seen worldwide. Almost all countries and urban and rural areas are suffering from lack of water due to improper management of the water resources.

Water Resources are managed by the Municipal Corporation Jabalpur. There are three primary resources from where water is made available to Jabalpur. Those three primary resources are:

1. River Narmada
2. Khandari Pond- Gaur River
3. Pariyat Pond- PhaguaNala

Other than these resources, Jabalpur gets water from the ground, bore wells and hand pumps.

Table 4: Statement of Water Supply in Jabalpur

(Source Supplied)	(Installed Capacity MLD)	(Actual Water)
Pariyat Pond-Phagua Nala	54 (26.341%)	35 (22.152%)
River Narmada	97(47.317%)	80 (50.633%)
Khandari Pond-Gaur River	27 (13.17%)	23 (14.557%)
Tube-well	27 (13.17%)	20 (12.658%)
Total	205	158

Source: Municipal Corporation Jabalpur

The above table indicates that the highest water supply is from the River Narmada, so it needs to be looked after by the government as well as citizens.

Policies for Water Conservation

To save and conserve water resources, the Government has formed various Projects and Policies which are helpful in many ways provided

they are well monitored and maintained.

To manage the available water resource, Municipal Corporation has brought Project UDAY, under which some policies of water conservation have been formed like:

1. Metering: It seems impossible to find out the actual consumption of water resource of the overall population of Jabalpur, to make this impossible act possible a management technique has been formed which is called water metering under which the actual supply and consumption of water will be known. These meters will be of three types: a) Turbine meter b) Electromagnetic Meter c) Ultrasonic Meter.
2. Water Auditing and Balance: to know the actual amount of demand and supply of water resources water auditing and balance technique has been formed, which will enable us the water loss per person per year. This is also started by big cities like Bangalore, Hyderabad, Jaipur, etc.
3. Rain Water Drainage Policy: To make the rainwater useful and to avoid drainage problems in many areas of the city like Adhartal and Cherital, a project was approved by JNNURM of rs. 375 Cr. (approx). Under which sewage and drainage pipelines are offered. This is also an example of water management.
4. Cleaning of Water Tanks: It was proposed that overhead water tanks must be clean to supply fresh water to the public.
5. Water Supply by tankers: the areas where lack of Water resource or where there is a critical problem in water availability, it was proposed that the supply of water in the same areas would be by tankers.
6. Maintenance of broad pipelines: the set up of water supply from Khandari pond to Bhongadwar is 130 years old so that it has been broken down in between and so many leakages are there. To evade this excess wastage of water, a new pipeline of 2250 meter has been set up under a management scheme of Municipal Corporation.
7. Establishment of Power Capacitor: Under the water management schemes, power capacitors have been discovered in various primary water resources, these 20 power capacitors are of 10 or more horsepower.
8. Regulation of invalid tabs: there are many

tabs or tube-wells which are not registered or regulated, so it's difficult to know about the exact requirement and consumption of water. Regulation of such invalid tags will let us know the original situation of availability of water and waste of water.

In the rural area of Jabalpur, the water management of Municipal Corporation is quite different because of availability and pattern of consumption. In the rural area, there are only two types of resources available:

1. Surface Water Resources
2. Ground Water Resources

Under Surface Water resources, Ponds and Canals are the primary source of water, which provide water for household and agricultural use. There are around 93 surface water resources available in the rural area of Jabalpur.

Groundwater resources mainly include Hand pumps and wells. The total number of the hand pump is 9696, and complete wells are 7802 in the rural area of Jabalpur.

To ensure optimum utilization of the available water resource, there are specific programs that have been started by the government, which includes:

1. **Kapildhara Yojna:** under this program, digging of new wells for irrigation in private lands, refilling of groundwater, check dam, stop dam and establishment of small ponds have been proposed and started.
2. **Nirmal Vatika Yojna:** to ensure samagra swachhta Abhiyan in villages, this program has been started.
3. **Khet-Talab yojna:** the main object of this scheme is to provide bank loans to build ponds in agricultural land where 50% grant will be sanctioned by the Government.
4. **Balram Tal Yojna:** Maximum rain water is wasted because of poor maintenance. This program has been proposed to conserve rainwater for which 25% grant will be allowed to stakeholders.
5. **Micro Irrigation Scheme:** this scheme aims to cover more fields in less water and improve the quality of the crop.

Other than these above programs, JalAbhishek program and Integrated Water Management program have also have been started to resolve water-related

issues.

Analysis of Primary Data: To analyze the whole issue, a questionnaire was prepared, and a survey of 500 people was conducted from which only 448 forms were found authentic. In the questionnaire total, 16 questions were asked and got the response as follows:

Out of 448 ways, 306 types were received from an urban area (189 M, 117 F) and 142 forms (83 M, 59F) were collected from the rural area. All the respondents are above 18 years.

The primary source of water in urban area are Groundwater and Municipal pipelines and tabs, whereas in the rural area mainly there are surface water and bore-wells.

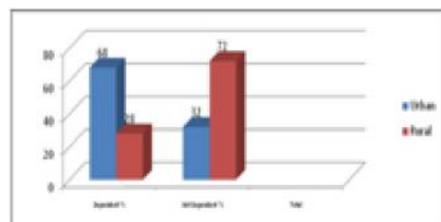
In the urban area, the water sufficiency level is satisfactory as compared to a rural area because in a rural area there is a problem of drought in summer because of lack of pipelines so that water supply is affected.

Table 5 Total Percentage of the Population Which is Dependent on Government Water Supply

Area / Govt. Dependency	Dependent %	Not Dependent %	Total
Urban	68	32	100
Rural	28	72	100

Source: Primary Data

Graph 1



According to the above graph, the dependency on government water supply in an urban area is 68%, and in Rural area, it is only 32% whereas nondependency on government water supply is more in the rural area as compared to an urban area.

Water Metering Will be Helpful in Water Management

Table 6

Yes	87%
No	13%

Source: Primary Data

The above table and graph represent the percentage population, which is in favor of and in against of water metering. Total 87% of urban population is saying yes to water metering like electricity metering so that public will also have awareness towards water saving and continuous monitoring will also take place whereas 13% population is not in favor of having water meters at home because they are afraid of having unexpected bills like electricity.

Suggestion & Conclusion

Following can be the suggestions to save water and to have appropriate water management:

1. As per the collected primary data, it was found that water Metering is the most crucial step to be taken for better management of water,
2. Efficient Monitoring of schemes is required to prevent the wastage of water.
3. Awareness towards saving water among the public will be beneficial to conserve water resources.
4. Rainwater harvesting system needs to be full proof to uplift groundwater level.
5. Purification and recycling of drained water are required so that it can be used for various agricultural and productive activities.

After going through all the above schemes of rural and urban areas, it can be said that the government is working hard on sustaining available water resources. The policies and programs are imposing and fair towards society, but even after this much of efforts, Jabalpur district is still not able to use the water resource at the fullest. Water-related problems are always arising. Now and then there is the unequal or nonsupply of water. Jabalpur is having the most significant source of water "River Narmada," but People are crying for water in all seasons, especially in summer, which shows that there is still poor water management. The alternative hypothesis

"Development of an area is based upon appropriate management of water resources" is approved, as per the collected data from urban and rural area because the water supply continues in metropolitan area from the government so that development can also be seen whereas due to non amount of government water in rural area they are still fighting for development.

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Abbreviations

- MLD - Million of Litter per day
LPCD - Liters Per Capita Daily
MCM - Million Cubic Meter

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