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A Comparative Study on Rural- Urban Disparity in Availability of Safe Drinking Water in India with Special Reference to Uttar Pradesh and Odisha

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ABSTRACT

"Rahiman Pani Rakhiye , Bin Pani Sab Soon |
Pani Gaye Na Oobare, Moti, Manush, Chun ||"

There are a number of rhymes, poems, phrases which depict the importance of water for our body and even for our life. Water is one of the main elements of *"Panchtatva"*, by which our body is made. " *Kshiti jal pawak gagan samira | Panch rachit ati adham sarira ||"* (Ram Charit Manas _ Tulsidas). Many ancient civilizations grew at river banks and became extinct due to lack of water. Life on earth begins from water, water is life and no one can even imagine life without water. At present time when we all are celebrating Amrit Kaal *i.e.*75th year of our independence, it becomes imperative for the government to ensure availability of safe drinking water to each and everyone. The problem is not only the availability of water, but the *availability of safe drinking water*. The availability of safe drinking water raises the question of quality of water. Various factors affect the quality of drinking water such as lack of awareness, illiteracy, poverty, excess population etc., and these are now posing the biggest challenges for us. Uttar Pradesh is posing the problem of large population while Odisha is more poverty - stricken state. In this perspective, the present study not only discusses the availability of safe drinking water but also tries to compare the disparities in the rural and urban regions of these two States. The present paper has the following objectives: 1. To present the status of availability of safe drinking water in India with special reference to Uttar Pradesh and Odisha, 2. To compare the water availability in rural and urban areas of India and above two states (Uttar Pradesh and Odisha) and 3. To draw inferences about the water availability in these states with India. The study is based on the secondary data. The data have been taken from NFHS 3 and NFHS 4, DLHS 3 and DLHS 4, NSS 69 and 79 rounds and Census 2011.The paper is divided in four parts. The first part is introductory, highlights the importance of water, and its availability. In the second part, the methodology is described wherein the third part, the data related to both the states are analyzed and interpreted. The graphs and charts are also used. In the fourth and the last part, the conclusions of the study along with the outcome for policy makers are presented. The paper, thus, provides a glimpse of availability of safe drinking water in these states, and its importance for living a decent life with measures to improve the situation.

Keywords: Availability, Safe Drinking Water, Rural-Urban Disparity

INTRODUCTION

Ancient Indians knew the indispensability of water for life on earth. According to ancient beliefs, the universe comprised of five basic elements: kshiti (earth), apah (water), teja (light/heat), marut (air) and vyoma (ether/ space). As per the Rig Veda, all life evolved from water (apah). Pure water was called divyajal due to its properties of sheetlam (cold to touch), suchihi (clean), shivam (replete with useful minerals and elements), Istham (transperant) and vimalamlahushadgunam (acidic balance should not exceed normal limits). Besides, there are copious references to medicinal properties of water.

Water is used to fulfill many different functions.

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These uses can be divided into three broad categories: water for life, water for citizens, and water for development. Water for life is usually given the highest priority as it concerns the provision of water for the survival of human beings and other living beings as well. Human adult body consists of about 70% of water. Therefore, to survive, humans must consume certain amount of water. The amount of water in all living things, in some organisms, varies among males, females, babies, young persons and adults. How much water is to be consumed varies according to age and gender, and also by where someone lives. Generally, adult male needs about 3 liters per day and adult female needs about 2.2 liters per day. It is not necessary that the water requirement be filled from drinking liquids as some of this water is contained in the food we eat[1]. To function properly, all the cells and organs of the body need water.

The water is most precious thing for human beings. It has been many uses like cooking, bathing, washing, etc too. It's also considered as a resource for the universe because it is not only a vital component for major sectors of economy *i.e.* agriculture, industry, service sectors but also a part of environment and ecology such that biosphere and lithosphere in the form of primary requirement, entertainment, forestry, absorb wastage etc. Often this has meant the diversion of Water from "water for life" and "water for citizen" to "water for development" *i.e.* away from uses related to the fulfillment of subsistence needs such as drinking and domestic use, and those related to public health. It is therefore hoped that the recognition of the human right to water will help to maintain the highest priority for 'water for life'.

Water for all categories especially water for life consumes the largest quantity of water from all surface and groundwater resources and consequently is largely responsible for creating problems of local scarcity and also of pollution. "The human right to water entitles everyone to sufficient, safe, acceptable, physically accessible and domestic uses. An adequate amount of safe water is necessary to prevent death from dehydration, reduce the risk of water related disease and provide for consumption, cooking, personal and domestic hygiene requirements".

In India, the right to safe drinking water is part of the right to life which is contained in Article 21 under Fundamental Rights in the Constitution of India. The primary allocation of water for human consumption has also been established through the national water policies, and large investments have been made in infrastructure to provide water for drinking, and for domestic use. The Tenth Five Year Plan (2002-2007) envisages 100% coverage of rural and urban areas through institutional reforms, efficient operation and management, and equitable distribution.

There is a true proverb in Hindi "Jal hai to Kal hai" which means if there is water then only our future is safe. However man has been mercilessly misusing this precious resource given by nature. It is time that the bugle call is sounded to make everyone realize that water cycle and the life cycle are one. Therefore, from today let all of us start saving each and every drop of water and conserve this priceless resource.

Review of Literature:

Saunders and War, Ford. (1976)[2] identified and enlisted potential economic effects and health effects of rural water supply systems. Macro-economic effects, such as effects on development and output, improved health, increased time for productive work, increase in income, increase in population and effects related to exerted costs to the economy are systematically examined in the book. Abraham, A. (1980)[3] has discussed that villages face the most acute water problems either because they are located in difficult terrain and the nearest water sources are 1.6 kilometers away or because the water is contaminated by organic or inorganic substances. The research paper calculates that on average poor localities do not have even one safe water supply, while on the other hand there is two or more safe water supply point in rich localities. Pant, S.K. (1996)[4] in this research paper, the evaluation of Rural Drinking Water Supply Programme in 8 districts of eastern Uttar Pradesh

1. De water in you! Water and the Human Body.www.usgs.gov>science>water.gn.
2. Saunders, Robert J. and Warford, Jeremy J. (1976), "*Village Water Supply, The Johns Hopkins University Press",* Copyright by the World Bank [The book contains detailed research and policy making on how to build and operate water supplies in the rural areas of developing countries].
3. Abraham, Amrita (1980, August). "Drinking Water for the Poor". *Economic & Political Weekly*, **LI** (53) : 1468-1469.
4. Pant, S.K. (1996, Dec.)."How Relevant Are Rural Water Supply Programmes?", *Economic & Political Weekly*, pp. 3163-3164.

has been done on the primary data. In addition to other aspects of study, community involvement and participation of women has also been studied. In which it is found that, only three present women have been involved. So if this programme has to be implemented effectively then more local people, especially women will have to increase. Uttar Pradesh Annual Plan, (2010)[5] according to this report thatUttar Pradesh is the most populous State having the largest urban system in the country with 628 municipalities. However, it ranks 18th in the level of urbanization. The process of urbanization in the State has been favorable towards larger cities. The emerging trends of urbanization in the State necessitate two-pronged strategy for balanced regional urban development, *i.e.*, better management of large cities and inducing planned growth of small and medium towns. Nayak, L. *et al.* (2012)[6] Present study examined the drinking water quality of Berhampur city of odisha in 2010, the study was based upon various standards such as total suspended solid, total dissolved solid, pH, BOD, COD, DO and other (physical-chemical) elements as calcium, magnesium, iron and nitrate. The results and facts were also tested on the standards of USPH (United States Public Health), WHO (World Health Organization), BIS (Beouroue of Indian Standards) ICMR (Indian Council of Medical Research), and found that maximum water supply in the city is up to the standards and contaminants are with in limit, only BOD was not according to the standard and government should take measures to correct the BOD level in water supply. Panda, S.P. and Sethy, K.M.(2016)[7] Present study evaluates the quality of water of Baitarni River, which is a main river for not only irrigation but also for drinking purpose for peninsular India. The study of water quality is the data collected for the period of 1990-2014 for which APHA (American Public health Association) assistance has been taken. For DO and BOD, Winklers's alkali iodide-azide method has been used.The WQI of river water is found 74.46 which is between (71-90), which indicates good water quality.(WQI is measured upon the weight of pH, BOD, DO, Turbidity etc). That means river water is good for drinking as well as other uses.Biswal *et al.* (2018)[8] Present study evaluates the quality of surface water and ground water of steel city Rourkela. In this study the quality of drinking water has been cheeked on the basis of metrology, hydrology, demography and physico-chemical parameters. Except the water for agricultural uses, the quality of water available for drinking is very poor, except some parameters the quality is not upto the parameters of safe drinking water. The water of Brahamani River is not up to the physical parameters and very polluted. There are two main sources of water pollution which are Industrial waste and domestic sewage, which is not only polluting the surface water as well as ground water, because of that, the present study focuses on the downstream flow of the river. Except the pH value, which is almost *remain some*, BOD, COD, and nitrogen levels the very high in the downstream. Many suggestions are also given in the study such as effective pollution control.

Objectives:

Based on the above background of availability of drinking, the paper studies the following aspects:

1. To present the status of availability of safe drinking water in India with special reference to Uttar Pradesh and Odisha.
2. To compare the water availability in rural and urban areas of India and above two States (Uttar Pradesh and Odisha)
3. To draw inferences about the water availability in these states with India.

Hypothesis:

1. **H_0:** There isno difference between the total availability of drinking water of India, U.P. and Odisha.
   H_1: There isdifference between the total availability of drinking water of India, U.P. and Odisha.
2. **H_0:** There isno difference between the rural availability of drinking water of India, U.P. and Odisha.
   H_1: There isdifference between the rural

5. Government of Uttar Pradesh (2010), Annual Plan 2010-11, Department of Planning, Vol.1, Part.2, Lucknow
6. https://www.researchgate.net
7. www.iosrjournals.org
8. DOI:10.12691/ajwr-6-2-4

Table 1 : Availability of Drinking Water in India Uttar Pradesh and Odisha

Year	India			Uttar Pradseh			Odisha		
	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban
1981	38.2	26.5	75.1	33.8	25.3	73.2	14.6	9.5	51.3
1991	62.3	55.5	81.4	62.2	56.6	85.8	39.1	35.3	62.8
2001	77.9	73.2	90	87.8	85.5	97.2	64.2	62.9	72.3
2011	85.5	82.7	91.4	95.1	94.3	97.9	75.3	74.4	79.8

Source: Census 1981, 1991, 2001, 2011

availability of drinking water of India, U.P. and Odisha.

3. H_0: There is no difference between the urban availability of drinking water of India, U.P. and Odisha.

H_1: There isdifference between the a urban availability of drinking water of India, U.P. and Odisha.

METHODOLOGY

The study attempts to unravel the rural-urban disparity in national and state level (especially Uttar Pradesh and Odisha) in terms of availability of safe drinking water and in this study the availability of safe drinking water has been measured from the sources of drinking water (Tap, Handpump and Tubewel, Well). The study is based on the analysis of secondary data. The data from surveys conducted by the National Family and Health Survey (NFHS-3), District Level Health Survey, Uttar Pradesh HDR Report (2003 and 06), and Census (2011) are used for analysis.

RESULTS AND DISCUSSION

Comparative Studies between India, Uttar Pradesh and Odisha:

If we evaluate the availability and accessibility of safe drinking water for last four decades (1981-2011), than in 1981, the availability of safe drinking water was almost at the same level for India and U.P., on the other hand accept some of the urban areas, the condition of availability of water was very poor in rural areas and in total in Odisha**.** While with time, the condition of water availability changed in next decade (1991) and a three time increase been measured from 1981 in Odisha state but still Odisha is far behind in water availability than India and U.P., In 2001 surprisingly the availability of safe drinking water in U.P. is above the national level and it continues also in 2011, and reached up to 95%. Meanwhile between these two decades a lot of work has been done on water availability in Odisha and it reached up to 75%, but it is still very low in comparison to National level or state of Uttar Pradesh (Table 1).

It is clear from the above table, that the water availability has increased in India, Uttar Pradesh and Odisha, weather this rise is equal in availability of water in all these regional areas or not, we are testing three hypothesis related to this on the basis of Anova test.

Hypothesis Testing:

1. H_0: There isno difference between the total availability of drinking water of India, U.P. and Odisha.

H_1: There isdifference between the total availability of drinking water of India, U.P. and Odisha.

Table 2 shows that, the computed values like the value of F-statistic at degree of freedom (2, 9) and 5% level of significance is found .809 and its probability is 0.475. In calculation the value of probability 0.475 is more than the significant value of 0.05. So Alternative Hypothesis is rejected and Null Hypothesis will be accepted. Then it means "There isno difference between the total availability of drinking water of India, U.P. and Odisha".

Table 2 : Value of F- Statistic for Total Availability of Drinking Water

Variable	F-Statistic	P value	Dof	lof
Total Availability of Drinking Water	.809	0.475	(2,9)	5%

The results shows that the increase in all three areas, India, U.P. and Odisha in water availability is same, because variation found in each series does not have any relevant difference among them.

1. H_0: There isno difference between the rural availability of drinking water of India, U.P.

and Odisha.

H_1: There isdifference between the rural availability of drinking water of India, U.P. and Odisha.

Table 3 shows that, the computed values like the value of F-statistic at degree of freedom (2, 9) and 5% level of significance is found .515 and its probability is 0.614. In calculation the value of probability 0.614 is more than the significant value of 0.05. So Alternative Hypothesis is rejected and Null Hypothesis will be accepted. Then it means "There is no difference between the rural availability of drinking water of India, U.P. and Odisha".

Table 3 : Value of F-Statistic for Rural Availability of Drinking Water

Variable	F-Statistic	P value	dof	los
Rural Availability of Drinking Water	.515	0.614	(2,9)	5%

The results shows that the increase in all three areas, India, U.P. and Odisha in water availability is same, because variation found in each series does not have any relevant difference among them.

1. **H_0:** There isno difference between the urban availability of drinking water of India, U.P. and Odisha.

H_1: There isdifference between the urban availability of drinking water of India, U.P. and Odisha.

Table 4 shows that, the computed values like the value of F-statistic at degree of freedom (2, 9) and 5% level of significance is found 4.750 and its probability is 0.39. In calculation the value of probability 0.39 is more than the significant value of 0.05. So Null Hypothesis is rejected and Alternative Hypothesis will be accepted. Then it means "There is difference between the urban availability of drinking water of India, U.P. and Odisha".

Table 4 : Value of F- Statistic for Urban Availability of Drinking Water

Variable	F-Statistic	P value	dof	los
Urban Availability of Drinking Water	4.750	0.39	(2,9)	5%

The results shows that the increase in all three areas, India, U.P. and Odisha in water availability is not same, because variation found in each series does have relevant difference among them

Conclusion

Present status of availability of drinking water in Odisha is even worse compared to India and Uttar Pradesh because first reason; there is not much awareness about sanitation and hygiene among the people of Odisha. Second reason is that due to low income of people in this region, they are not capable of affording tap water sources within their premises. Third, some areas are facing difficulty in setting up piped water supply and handpumps because $3/4^{th}$ part of hard rocky area is found in Odisha this is why rocky soil makes it difficult to install handpump and other drilling based facilities for assuring drinking water in this area.

According to census datathe disparities are pervasive in the availability of drinking water facilities both in the rural and urban areas of the national level and state level because socio-economic condition is very poor in rural areas this why they can not afford sources of drinking water within their premises as well as the awareness about safe drinking and it's health benefits is negligible in rural areas of people, people are not getting benefits of programmes related to drinking water supply.

The secondary data shows that the drinking water availability has increased in India, Uttar Pradesh and Odisha, weather this rise is equal in availability of drinking water in all these regional areas or not, to cheek this Anova test is used and according to this test, the increase in total water availability and water availability in rural areas is similar in all three regions, India, U. P. and Odisha, but the increase in water availability in urban areas is not the same, because variation found in each series does have relevant difference among them.

The result shows that the increase in the growth rate of the urban ares availability of drinking water in India, U. P. and Odisha are 21.70%, 55. 55% and 33.74% it means odisha, has the highest increase in the growth rate of the availability of drinking water because the availability of drinking water depends on geographical factors, secondly per capita water supply expenditure in Odhisa (0.025 lakh) is higher than Uttar Pradesh (0.008 lakh) as well as urban people invest on superior water purification methods, they are aware of the health benefits and availability of safe drinking water.

Water means to life and safe water means to health. Until and unless we do not have healthy life, development and progress are not possible because safe drinking water is must for healthy life and healthy people can positively contribute in the development and progress of the nation.

We all know that in present time, the demand for water is high on account of world epidemic as the WHO specifies that sanitation and cleanliness is necessary to be adopted regularly which requires washing hand with water and soap for 20 Seconds in order to reduce the risks of affecting from Corona Virus. Indeed, Corona Virus drew the attention of world towards the importance of clean water. So the availability of water is not only important for human consumption but also for health. Safe Water and Sanitation are among the most powerful drives for human development because "JAL HAI TO KAL HAI."

Limitations:

The paper is based on only secondary data. The paper will concluded the data of the total, rural and urban category of the year of 1981, 1991, 2001, and 2011.

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