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A Study of Awareness About Water Conservation in Rural Areas (With Special Reference to Sagar District in Madhya Pradesh)

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Abstract: This paper studies water supply systems, awareness about water use and conservation in 247 rural households selected from Sagar district using random sampling. Findings indicate that actual water consumption in these rural households significantly exceeds guideline estimates. Factors such as income level, education and family size significantly influence the implementation of water-saving behaviors. There is a positive relationship between water conservation behavior and socio-economic factors. In addition to addressing the psychological and socio-economic factors of rural households, more efforts are needed to address financial incentives, water conservation technology education and behavioral changes in water use.

Keywords: Rural Water Conservation, Domestic water, Water source, Water Uses, Awareness Water.

Introduction - Water is a fundamental resource for life, agriculture, and economic development. Rural communities depend on natural resources for their livelihoods. A combination of climatic, environmental, and anthropogenic factors is causing water stress.[1] the water crisis facing rural areas poses a serious challenge, profoundly impacting agriculture, health, socio-economic conditions, gender roles and social harmony. The blind pursuit of material development, consumerism and commercialism are destroying the entire environment.[2] the imbalance of modern material development has disrupted the interconnectedness of natural elements. Inadequate water resources and negligence in protecting and conserving available resources pose a threat to rural livelihoods, health, and well-being. Sustainable water management practices, climate change mitigation, and strengthening institutional capacity are essential to ensure the availability of adequate and clean water resources.[3] Groundwater levels are rapidly declining in most parts of the country. Traditional water sources such as hand pumps, wells, and step wells, essential sources of drinking water in rural areas are rapidly depleting. Tube wells and tube wells are drawing water from greater depths.[4] Negligence towards water conservation is pointing towards a dire water crisis. Government and administration level adaptive strategies and policy interventions for rural water conservation are coordinated and sustained efforts at various levels to address the water crisis. The impact of government schemes and programs for water conservation on rural communities and families has been examined.

Review of Literature:-

Bhala. P. (2007)[5]: According to the report, along with development, some of the relevant effects of the global industrial revolution are becoming increasingly severe in the form of pollution. Consequently, the scope of water pollution in wells, ponds, rivers, and even groundwater sources is increasing day by day. In these circumstances, widespread concern is being expressed about the contamination of large areas of water.

Yadav, D. (1987)[6]: According to the article by "Social and Voluntary Organizations in Water Conservation Social media is an effective medium to create awareness about water conservation and to increase public participation in soil and water conservation."

Ravish, S., Setia, B. and Deswal, S. (2018)[7]: Rural areas have low levels of sanitation and water services, as well as health outcomes. Analysis of the complexities of water, sanitation, and health has focused heavily on conflicts over water resources and the cost of basic sanitation and health. More initiatives are needed to ensure people's participation in all aspects of the water management cycle.

Gupta, A., Mishra, S., Bokde, N. and Kulat, K. (2016)[8]: Water availability in any region of India depends on its geographical conditions and the amount of rainfall. However, in this era of development, geographical structures are rapidly changing. The consumption/utilization and depletion of various water resources have altered the dimensions of water availability.

Ghosh, P. (2021)[9]: As with development, increasing

demand for water, like other resources, is a common phenomenon. Population growth, urbanization, and lifestyle changes are putting increasing pressure on groundwater, the effects of which are clearly visible in the form of declining groundwater levels and quality in many areas.

Objectives of the Study:

1. To study awareness about water conservation in rural areas of Sagar district.
2. To study general behavior towards water conservation in rural areas of Sagar district.

Hypothesis:

H1: There is a significant relationship between the economic statuses of rural Families and the amount of water used for household purposes.

H2: There is a significant relationship between social factors and behavior Towards water conservation.

Research Methodology: The present study used primary and secondary data to study awareness about water conservation in rural areas. For the primary data, a research survey was conducted considering Sagar district of Madhya Pradesh as a whole and a total of 247 respondents were selected using random sampling.

Data Analysis: The personal information of respondents selected through random sampling from Sagar district and included in the interviews is described in Table 1.

Table 1: Personal Information of Respondents (N= 247)

S.	Description	Classification	%
1	Gender	Male	31.98%
		Female	68.02%
2	Age	18 to 45 years	46.15%
		Over 46 years	53.85%
3	Educational Level	Illiterate	14.98%
		Secondary or less	55.06%
		Graduate or more	29.96%
4	Nature of Family	Nuclear	35.22%
		Joint	64.78%
5	Number of Family Members	1 to 4	16.60%
		5 to 8	62.75%
		More than 9	20.65%
6	Type of Occupation	Agriculture	76.52%
		Business	8.50%
		Employment	14.98%
7	Source of Water Supply	Well/Hand Pump	23.89%
		Public Water Supply	65.18%
		Other	10.93%

Source: Based on primary data.

For the study of awareness towards water conservation in rural areas, 78.54 percent of the respondents selected through random sampling method are men and 21.46 percent are women. Under classification according to age, 59.51 percent of the respondents are in the age group of 18 to 45 years. 40.49 percent of the respondents are in the age group of more than 46 years. Under educational qualification, 16.19 percent of the respondents are illiterate. 63.17 percent are educated up to secondary level or below. 20.64 percent of the respondents are graduates or above. Under classification under the nature of family, 34.82 percent are nuclear families and 65.18 percent are joint families. Under the type of occupation of the respondent, maximum 66.80 percent are engaged in agriculture, 25.51 percent in business, and 7.69 percent in government or non-government job. Under the source available for water supply in the surveyed families, maximum 49.80 percent get water from tap facility under public water distribution system. 8.50 percent families get water from well, 18.22 percent from public hand pump available in the locality, 10.93 percent families get water from bore well available in their own house or neighborhood and 12.55 percent use water from other sources which include private or public tankers, river, pond or other sources.

Amount of water used for household purposes: Respondents' water use for various household needs and purposes is shown in Table 2.

Table 2 (see in last page)

The amount of water a family requires for domestic needs depends on several factors. Rural households typically use 30-70 liters of water per day, depending on all household needs, including agriculture and production. In urban areas, a typical household uses 100 to 450 liters for drinking, cooking, toileting, bathing, laundry, and cleaning. According to Table 2, the highest water consumption among surveyed households is for laundry, bathing, and toileting. The minimum and maximum daily water usage for laundry among surveyed households is 125 liters and a maximum of 950 liters. The mean is 658.84 liters and the standard deviation is 367.05 liters. Bathing uses a minimum of 90 liters and a maximum of 870 liters per day. The mean is 480.68 liters and the standard deviation is 504.51 liters. The minimum and maximum water usage for toilets per day is 120 liters and maximum is 690 liters. The mean is 287.09 liters and standard deviation is 302.86 liters. The minimum and maximum water usage for drinking per day is 20 liters and maximum is 70 liters. The mean is 35.99 liters and standard deviation is 51.31 liters. The analysis reveals that the magnitude and variability of actual water consumption for domestic purposes in the sampled rural households is much higher than the values given in the guidelines. The maximum water usage in households is for washing clothes because apart from the clothes worn, families also have curtains, sheets, blankets, covers, etc. which are washed regularly in the households.

Common water conservation practices: There is considerable variation in the total water usage and consumption patterns among the households surveyed in the study. Table 3 presents information on common water conservation practices across different households.

Table 3: Analysis of awareness about water conservation among domestic consumers (N = 247)

S.	Description	Yes	No	Total
1	Do you use a shower instead of a bucket for bathing?	12.55%	87.45%	100%
2	Do you turn off the tap while applying soap?	27.13%	72.87%	100%
3	Do baths take more than five minutes?	88.66%	11.34%	100%
4	Do you turn off the tap while brushing your teeth, shaving, or applying soap to your hands?	18.62%	81.38%	100%
5	Do you use more water to cool hot water?	78.54%	21.46%	100%
6	Do you consider daily usage and the amount of water that is wasted?	32.79%	67.21%	100%
7	Are there devices to control water leaks from taps?	7.69%	92.31%	100%
8	Do you use once-used water to water plants, wash floors, or flush the toilet?	21.46%	78.54%	100%
9	Do you wait for the bucket to fill before bathing, washing clothes, or dishes?	10.93%	89.07%	100%
10	Do you ensure the tap is properly closed after use?	77.33%	22.67%	100%
11	If you notice water dripping from a tap, do you inform your parents or someone else who can fix it?	66.40%	33.60%	100%
12	Do you run the tap for extended periods to keep the toilet clean?	61.54%	38.46%	100%
13	Do you repeatedly wash vegetables or other items with the tap running?	85.43%	14.57%	100%
14	Does a family member wash their motorcycle/car, etc., with the tap running for a long time?	86.23%	13.77%	100%
15	When cleaning the house (bathroom, kitchen, floor, dusting, etc.), do you use chemical and synthetic products and then throw them down the drain?	78.54%	21.46%	100%
16	Do you think water is wasted at home?	87.45%	12.55%	100%

Source: Primary Data Analysis.

According to Table 3 above, a maximum of 87.45 percent of the surveyed families do not use showers instead of buckets for bathing, while only 12.55 percent use showers instead of buckets. 72.87 percent do not turn off the tap while applying soap while bathing, while only 27.13 percent do. 11.34 percent do not take more than five minutes to bathe. 88.66 percent turn off the tap while brushing teeth, shaving, or applying soap to hands. 88.66 percent do not turn off the tap while brushing teeth, shaving, or applying soap to hands. 21.46 percent use more water to cool hot water. 78.54 percent do not use more water to cool hot water. 32.79 percent think about the amount of water used daily and wasted, while 67.21 percent do not think about the amount of water used daily and wasted. 92.31 percent have devices to control water leakage from taps, while 7.69 percent do not have devices to control water leakage from taps. 21.54 percent use water once used for irrigating plants or washing floors or toilets, while 78.54 percent do not. 89.07 percent wait for the bucket to fill before bathing, washing clothes and utensils, while 10.93 percent do not. 77.33 percent ensure that the tap is closed properly after use, while 22.67 percent do not. 66.40 percent report for repairs, while 33.60 percent do not. 61.54 percent run the tap for a long time to keep the toilet clean, while 38.46 percent do not. 85.54 percent repeatedly wash vegetables or other items with the tap running, while 14.57 percent do not. 86.23 percent family members wash their motorcycle/car etc. vehicles/machines by keeping the tap on for a long time whereas 13.77 percent do not do it. 78.54 percent do cleaning, so do you use chemical and artificial products and then throw them in the drains whereas 21.46 percent do not do it. 87.54 percent of you feel that water is wasted in the house whereas 12.55 percent do not do it. Families which have adequate water facility waste more water whereas families where water facility is not available or supply is insufficient, such families use water economically.

Hypothesis Test:-

H_{a1}: There is a significant relationship between the economic status of rural families and the amount of water used for household purposes.

H_{a2}: There is a significant relationship between social factors and behavior towards water conservation.

Chi-Square Tests (see in next page)

The calculated chi-square value for Hypothesis 1 is 147.404($p<0.05$), and the calculated chi-square value for Hypothesis 2 is 132.112 ($p<0.05$), which is greater than the tabulated value of 3.841. Therefore, the Null hypothesis is rejected at the 5 percent significance level. It is concluded that there is a significant relationship between the economic status of rural families and the amount of water used for household purposes. People in the higher income group use more water than those in the lower income group. There is a significant relationship between water conservation behavior and social factors. Social factors play an important role in developing the behavior of economical use of water used in the family.

Suggestions:

1. Social media platforms like Face book, Integra and YouTube can be used to create awareness about water conservation.
2. Apart from the psychological and socio-economic

factors of the users, financial incentives, water conservation technical education, water conservation related text material, videos and motivational stories can be used to create awareness regarding water conservation.

3. The policy makers and water management related government and non-government organizations to change the behavioral attitude towards water conservation.

Conclusion: The paper highlights the important role of behavioral attitudes toward household water conservation. However, factors such as family income, education, and family size significantly influence the implementation of water-saving behaviors. Despite their environmental awareness, high-income households use more water due to larger assets and luxury appliances. Whereas, low-income households use less water for personal needs. Households in geographically water-poor areas are more aware of water conservation than those in water-abundant areas.

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Table 2: Amount of water used daily for various purposes in surveyed households (in liters)

S.	Water Uses	N	Minimum	Maximum	Mean	Std. Deviation	Rank
1	Bathing	247	90.00	870.00	480.68	304.51	2
2	Drinking water	247	20.00	70.00	35.99	51.31	9
3	Laundry	247	125.00	950.00	658.84	367.05	1
4	Cleaning dishes	247	115.00	230.00	145.72	147.21	7
5	Cooking food	247	20.00	164.00	88.62	45.17	8
6	Watering plants	247	130.00	260.00	208.93	128.85	5
7	Cleaning the house	247	70.00	227.00	177.13	199.47	6
8	Using the toilet	163	120.00	690.00	287.09	302.86	3
9	Other	247	20.00	380.00	213.38	154.81	4

Source: Primary Data Analysis.

Chi-Square Tests

No.	Pearson Chi-Square	Value	df	Asymp. Sig. (2-sided)	Correlation
1	H_{a1}	147.404	1	0.000	+0.81
2	H_{a2}	132.112	1	0.000	+0.79
	No. of Valid Cases	**247.00**			

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