IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Reginal Disparities In Drinking Water Availability And Accessibility Among The Rural Households In Karnataka

Dr. Anilkumar S.H[1]

[1] Research Assistant, Centre for Multi-Disciplinary Development Research (CMDR) Dharwad.

Abstract:

The provision of adequate drinking water has been the primary policy goal for many governments worldwide and has been one of the main policy agendas for a few decades (Adams,2018). However, the world's situation in providing safe and adequate water is sub-optimal, as recorded by numerous agencies. Nearly 771 million people do not have clean drinking water access and nearly a quarter do not have access to sufficient drinking water (WHO/UNICEF JMP, 2021). **(Dharmapuri et.al-2022).** The Government is committed to providing safe and adequate drinking water to all habitations by 2022. The National Rural Drinking Water Programme (NRDWP) has already provided 81.07 per cent rural habitations with access to 40 litres of drinking water per capita per day (LPCD) and another 15.58 per cent with partial access. The target is to provide piped water connection by 2024 under the recently launched Jal Jeevan Mission. The main objectives of this paper are to study the overall trends and patterns of drinking water facilities and analyse the household's accessibility and source of drinking water facilities among the social groups in rural Karnataka. To analyse the district-wise drinking water disparities in rural Karnataka. The study area covers the Karnataka region. This study primarily uses secondary data obtained from various sources, including Census 2001 and 2011 data, NFHS-4 and NFHS-5 data, and Karnataka Economic Survey reports. Statistical tools such as percentages, coefficients of variation (CV), and growth rates, as well as bar diagrams and charts, are utilised where necessary in the analysis.

Key Words: Water Accessibility, Rural Households, Karnataka and Regional Disparity.

I. Introduction

Drinking water being the basic requirements of life plays an integral role in maintaining and promoting public health. Sustainable Development Goal target 6.1 calls for universal and equitable access to safe and affordable drinking water. In 2022, 6 billion people used safely managed drinking-water services – that is, they used improved water sources located on premises, available when needed, and free from contamination. The remaining 2.2 billion people without safely managed services in 2022 included: 1). 1.5 billion people with basic services, meaning an improved water source located within a round trip of 30 minutes; 2). 292 million people with limited services, or an improved water source requiring more than 30 minutes to collect water; 3). 296 million people taking water from unprotected wells and springs; and 4). 115 million people collecting untreated surface water from lakes, ponds, rivers and streams. The JMP 2023 progress update on WASH in households highlights inequalities in service levels between and within countries.

Drinking water or potable water is a very valuable natural resource. Providing access to safe drinking water for all is one of the most complex contemporary issues to solve, especially in a country like "Drinking water is the water intended India. Rural Development is the process of improving the quality of life and economic well-being of people living in rural areas. An emphasis on Rural Development is essential given that the majority of the population (61% of Karnataka's population) continue to live in rural area. The proportion of rural population to total population is declining over the time. The decline is faster in Karnataka as compared to India. With economic development, the shift of labour from agriculture to other sectors has gathered momentum in last two decades. Therefore, India and Karnataka are still largely rural agrarian economies. Therefore, the focused approach to promote rural development is the real path to achieve the desired goals in economic as well as human development.

Government of India has launched "Jal Jeevan Mission" during 2019 in order to provide safe and adequate drinking water to all rural households. The main objective of this mission is to provide functional household tap connection (FHTC) to all the rural households on regular and long-term basis at affordable service delivery charges leading to improvement in living standards of rural communities by 2024. Under centrally sponsored Jal Jeevan Mission, Government of Karnataka has launched the pragramme Called "Mane Manege Gange" and intended to provide Functional Household Tap Connections (FHTC) to all rural households at the rate of 55 LPCD in the State. For 2022-23, it is targeted to provide 31.99 lakh FHTCs, 12.33 lakh FHTCs are provided by incurring an expenditure of Rs. 2203.52 crore up to the end of November 2022 under Jal Jeevan Mission. (**Karnataka Economic Survey 2022-23).**

When water comes from improved and more accessible sources, people spend less time and effort physically collecting it, meaning they can be productive in other ways. This can also result in greater personal safety and reducing musculoskeletal disorders by reducing the need to make long or risky journeys to collect and carry water. Better water sources also mean less expenditure on health, as people are less likely to fall ill and incur medical costs and are better able to remain economically productive. With children particularly at risk

from water-related diseases, access to improved sources of water can result in better health, and therefore better school attendance, with positive longer-term consequences for their lives. **(WHO-Report Progress on Household Drinking Water, Sanitation and Hygiene, 2000-2022).**

In rural India, the knowledge system for managing drinking water is deeply ingrained in traditional practices that emphasize sustainable and context-specific solutions. Communities employ traditional water harvesting techniques, such as building ponds and step wells, to capture and store rainwater for use during drier periods.

II. Review of literature

Nisha's (2006) study in north Kerala investigates the factors influencing users' participation in community-based rural water supply schemes. Constructing indices for meeting attendance and decision influence, the research highlights active male participation, with education levels and involvement in local organizations significantly shaping engagement. **Sangameswaran's (2010)** examination of neoliberalism's role in Maharashtra's rural drinking water reforms underscores its nuanced influence, urging a careful consideration of its impact on reform dynamics. **Singh's (2016)** exploration in Rajasthan emphasizes the effectiveness of traditional water management systems, particularly the revival of Johads by Tarun Bharat Sangh. This effort not only revitalizes the Arvari river but also yields positive environmental and socio-economic outcomes, affirming the ongoing relevance of eco-friendly traditional practices in water management. Collectively, these studies offer valuable insights into rural water supply dynamics, influencing policies to ensure sustainable and equitable access to clean water in rural areas.

III. Objectives of the study

The main objectives of this paper are as follows,

1. To study the overall trends and patterns of drinking water facilities in both India and Karnataka.
2. To analyse the household’s accessibility and source of drinking water facilities among the social groups in rural Karnataka.
3. To examine how rural households, assess drinking water for their daily needs, considering factors such as proximity (within premises, near premises, away from households) and distance to water sources.
4. To analyse the district-wise drinking water disparities in rural Karnataka

IV. Methodology of the study

The study area covers the Karnataka region. This study mainly uses secondary data only. Data obtained from various sources, including Census 2001 and 2011 data, NFHS-4, NFHS-5 data, and Karnataka Economic Survey reports. Statistical tools such as percentages, coefficients of variation (CV), and growth rates, as well as bar diagrams and charts, are utilised where necessary in the analysis.

Service Level	Definition
Safely Managed	Drinking water from an improved source that is accessible on premises, available when needed and free from faecal and priority chemical contamination
Basic	Drinking water from an improved source, provided collection time is not more than 30 minutes for a round trip, including queuing
Limited	Drinking water from an improved source, for which collection time exceeds 30 minutes for a round trip, including queuing
Unimproved	Drinking water from an unprotected dug well or unprotected spring
Surface Water	Drinking water directly from a river, dam, lake, pond, stream, canal or irrigation canal

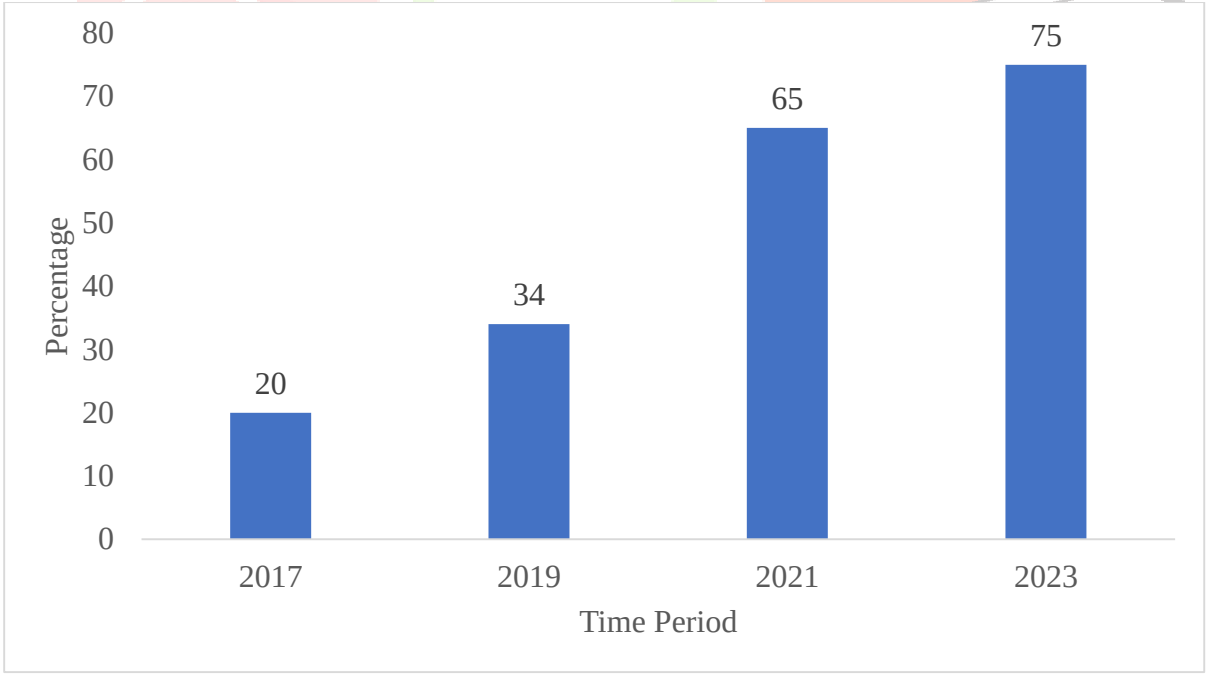
Source: JMP

V. Result and discussion

The results and discussion of the study illuminate key facets of the rural water landscape in Karnataka, offering insights into the prevailing patterns, disparities, and challenges. The dominance of hand pumps in rural India and the distinct reliance on untreated tap water and tube wells/boreholes in rural Karnataka reveal the multifaceted nature of groundwater sources in the region.

Chart 1:

Trends in Percentage of population Global Safely Managed Drinking Water in rural



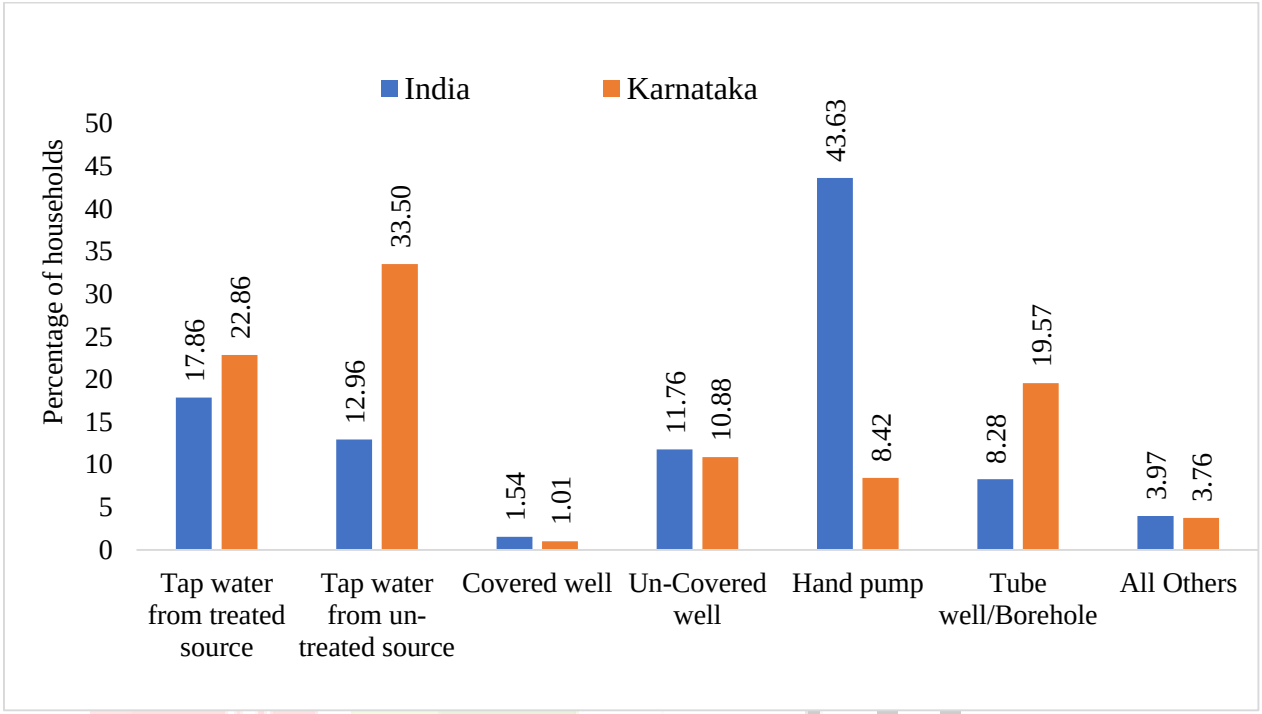
Source: JMP (Joint Monitoring Programme) progress updates, 2017–2023

Chart 1 shows that, Over the past six years, there has been a notable and progressive improvement in the provision of safely managed drinking water facilities in rural areas globally. The data reveals a substantial increase from 20% in 2017 to 34% in 2019, demonstrating a significant leap within this short timeframe.

This positive trajectory continued, reaching 65% in 2021 and further advancing to 75% by 2023. These figures indicate a commendable global effort in enhancing access to safe drinking water in rural households. The consistent upward trend suggests successful initiatives, policies, and investments aimed at ensuring the well-being of rural communities. Such improvements not only signify progress in meeting basic human needs but also contribute to advancing the United Nations Sustainable Development Goal 6, emphasizing the universal access to clean water and sanitation. As we assess these achievements, it becomes imperative to sustain these positive trends and address any existing disparities to ensure equitable access to safe drinking water for all

Chart-2

Distribution of Rural household's Main source of drinking water in India and Karnataka as 2011 census

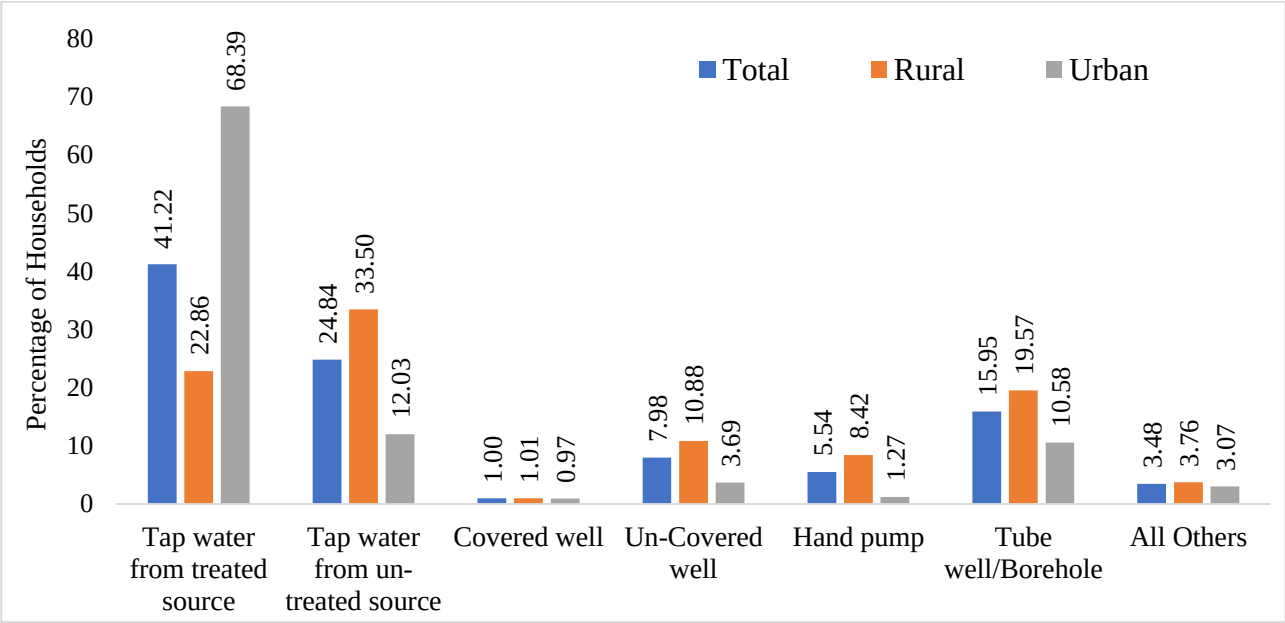


Source: Census 2011

As of the 2011 census, the rural areas of India and Karnataka exhibit a diverse array of sources for drinking water. In India, the predominant sources include tap water from treated sources (17.86%), tap water from untreated sources (12.96%), and hand pumps (43.63%). Conversely, in Karnataka, the primary sources are tap water from untreated sources (33.50%), tube well/borehole (19.57%), and tap water from treated sources (22.86%). While hand pumps dominate in rural India, tap water from untreated sources holds prominence in rural Karnataka. These figures underline regional disparities, reflecting the distinct water supply infrastructure and geographical conditions in each area. While hand pumps are the dominant source in rural India, tap water from untreated sources takes precedence in rural Karnataka. The prevalence of tube wells and boreholes in Karnataka suggests a reliance on groundwater sources.

Chart-3

Area wise Distribution of household's Main source of drinking water in Karnataka as 2011 census

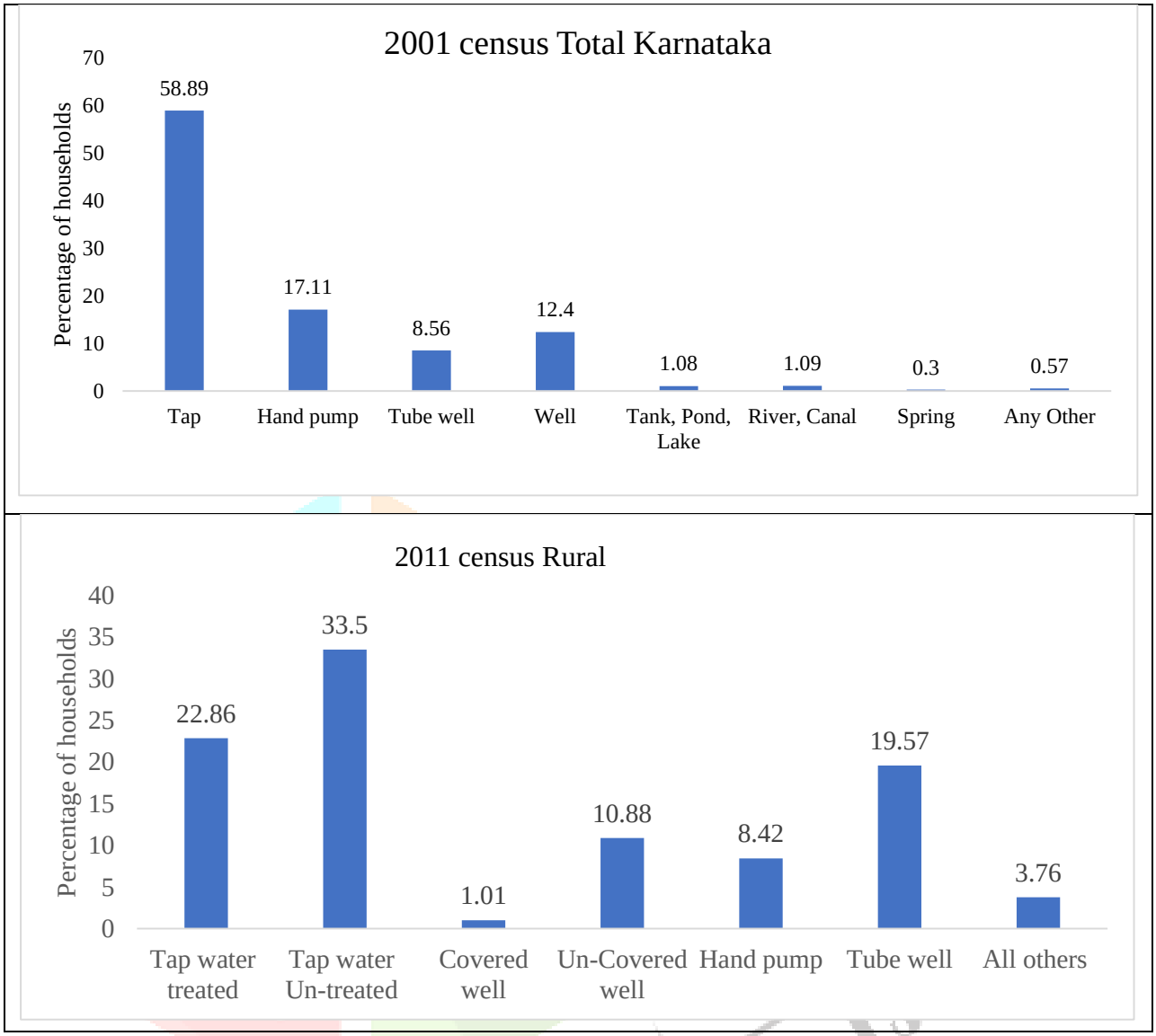


Source: Census 2011

The 2011 census data on the main sources of drinking water in Karnataka in chart-3 provides valuable insights into the distribution of water sources across rural and urban households. In total, tap water from treated sources constitutes the primary drinking water source for 22.86% of rural households and 68.39% of urban households, reflecting a significant urban-rural disparity in access to treated tap water. Conversely, tap water from untreated sources is the primary source for 33.50% of rural households compared to 12.03% in urban areas, indicating higher reliance on untreated water sources in rural settings. Covered and uncovered wells, along with hand pumps, play a more substantial role in rural Karnataka, collectively representing a considerable proportion of rural households' primary water sources. Notably, tube wells and boreholes contribute significantly to the drinking water supply in both rural (19.57%) and urban (10.58%) areas. This data underscores the need for region-specific water management strategies, acknowledging the diverse sources and challenges faced by households in both rural and urban contexts within Karnataka.

Chart-4

Trends in percentage of household's Main source of drinking water in Rural Karnataka as per 2001 & 2011 census



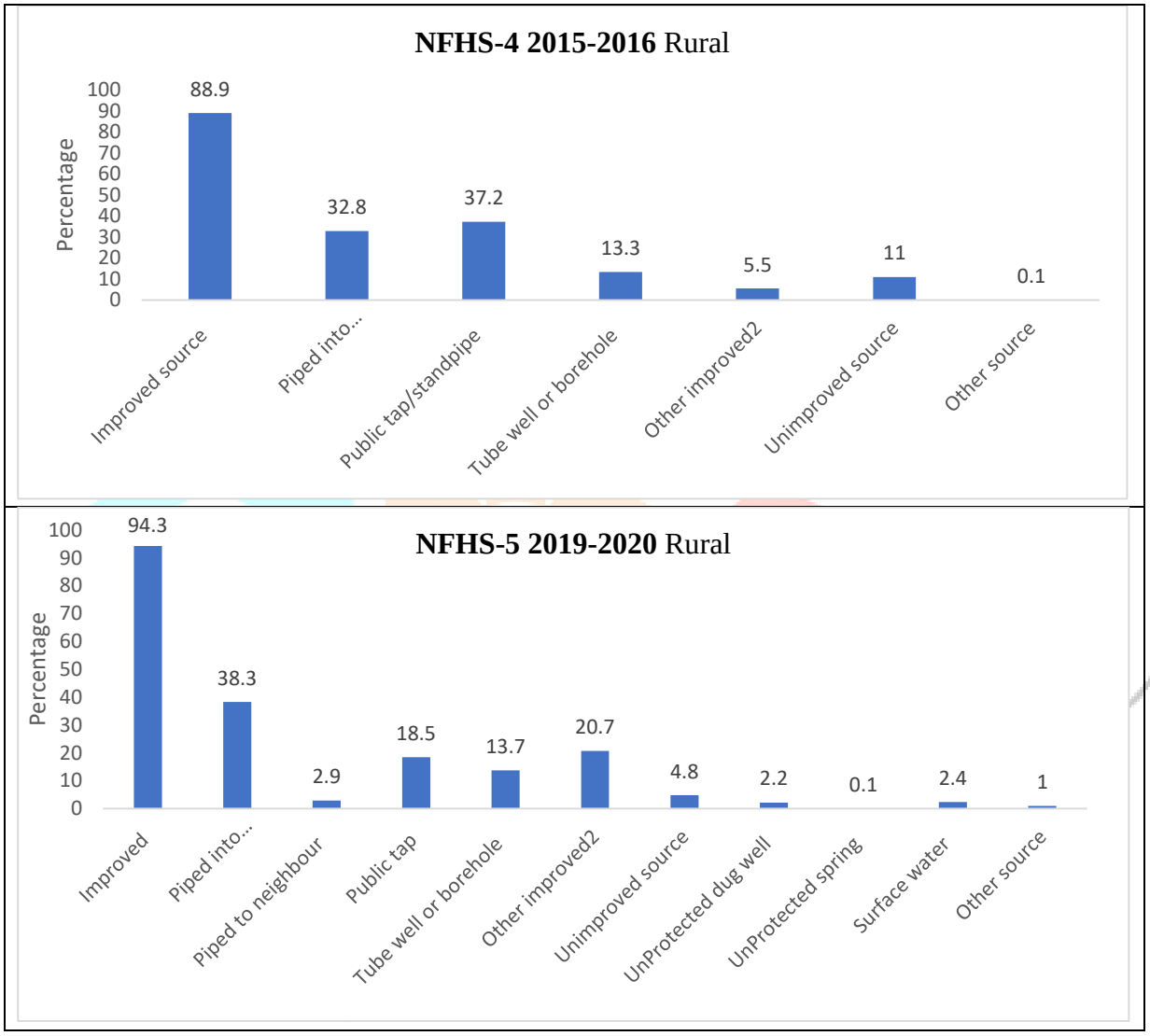
Source: Census 2001 & 2011

According to the 2001 census data for Karnataka, various sources of drinking water were reported across households. The majority of households, approximately 58.89%, relied on tap water, indicating a significant portion of the population had access to piped water supply systems. Hand pumps were utilized by 17.11% of households, showcasing the prevalence of groundwater extraction through manual pumps. Tube wells and wells constituted 8.56% and 12.4%, respectively, reflecting the reliance on groundwater sources. Tank, pond, and lake water accounted for 1.08%, while river, canal, and spring water collectively constituted 2.46% of the sources. A minor fraction, 0.57%, accessed water from other unspecified sources. As per the 2011 census data for rural Karnataka, approximately 22.86%, had access to treated tap water, reflecting a positive trend towards improved water quality through piped supply systems. In contrast, 33.5% of households relied on untreated tap water, indicating the need for further investments in water treatment infrastructure to ensure safe drinking water. Covered wells constituted 1.01%, suggesting a lesser dependence on traditional well sources, while 10.88% of households accessed water from uncovered wells. Hand pumps, tube wells, and other sources collectively made up 8.42%, 19.57%, and 3.76%, respectively. This distribution highlights the

diverse range of water sources in Karnataka, emphasizing the importance of understanding regional variations and adopting targeted strategies for water resource management and accessibility.

Chart-5

Trends in percentage of household's Main source of drinking water in Rural Karnataka as per NFHS-4 2015-2016 and NFHS-5 2019-20



Source: NFHS 4 & 5

Chart 5 shows the Karnataka NFHS-4 data from 2015-2016 provides insights into the sources of drinking water in rural areas. The majority of the rural population, accounting for 88.9%, has access to improved water sources, indicating a positive trend in water infrastructure. Among these, 32.8% have piped water into their dwelling/yard/plot, while 37.2% rely on public tap/standpipe. Tube wells or boreholes contribute to 13.3% of improved water sources, and 5.5% fall under the category of other improved sources. However, 11% of the rural population still depends on unimproved water sources, suggesting challenges in ensuring universal access to safe and reliable water. The presence of just 0.1% relying on other sources underscores the overall progress in providing improved drinking water sources. To gauge the effectiveness of interventions and policy measures, it would be insightful to compare these findings with the NFHS-5 2019-2020 data when

available, allowing for a comprehensive assessment of the evolution of water access in rural Karnataka over time.

The Karnataka National Family Health Survey (NFHS-5) for 2019-2020 sheds light on Chart-5 the sources of drinking water in rural areas, providing crucial insights into water accessibility and quality. A significant majority of rural households, accounting for 94.3%, access improved sources of drinking water. Within this category, 38.3% of households have piped water directly into their dwelling/yard/plot, reflecting a relatively high level of convenience. Public taps contribute to 18.5% of the improved water sources, offering a communal water access point. Tube wells or boreholes, representing 13.7%, contribute substantially to the rural water supply infrastructure.

The survey also identifies unimproved sources, which make up 4.8% of the total. Among these, unprotected dug wells and springs constitute 2.2% and 0.1%, respectively, highlighting potential concerns regarding water safety. Surface water and other sources collectively contribute 3.4% to the overall rural water supply. These findings underscore the progress made in providing improved water sources in rural Karnataka, while also emphasizing the importance of addressing challenges associated with unimproved sources to ensure safe and reliable drinking water for all rural households.

Chart-6

Social Group wise percentage of household's location of drinking water source in Rural Karnataka 2011 census

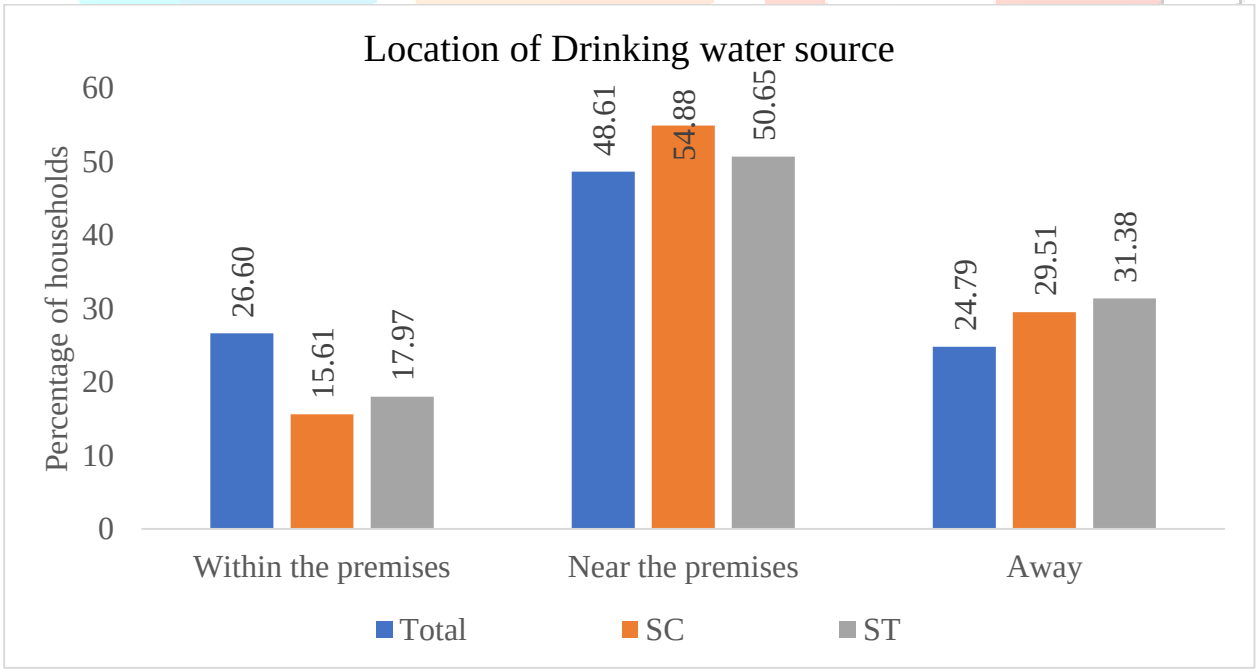
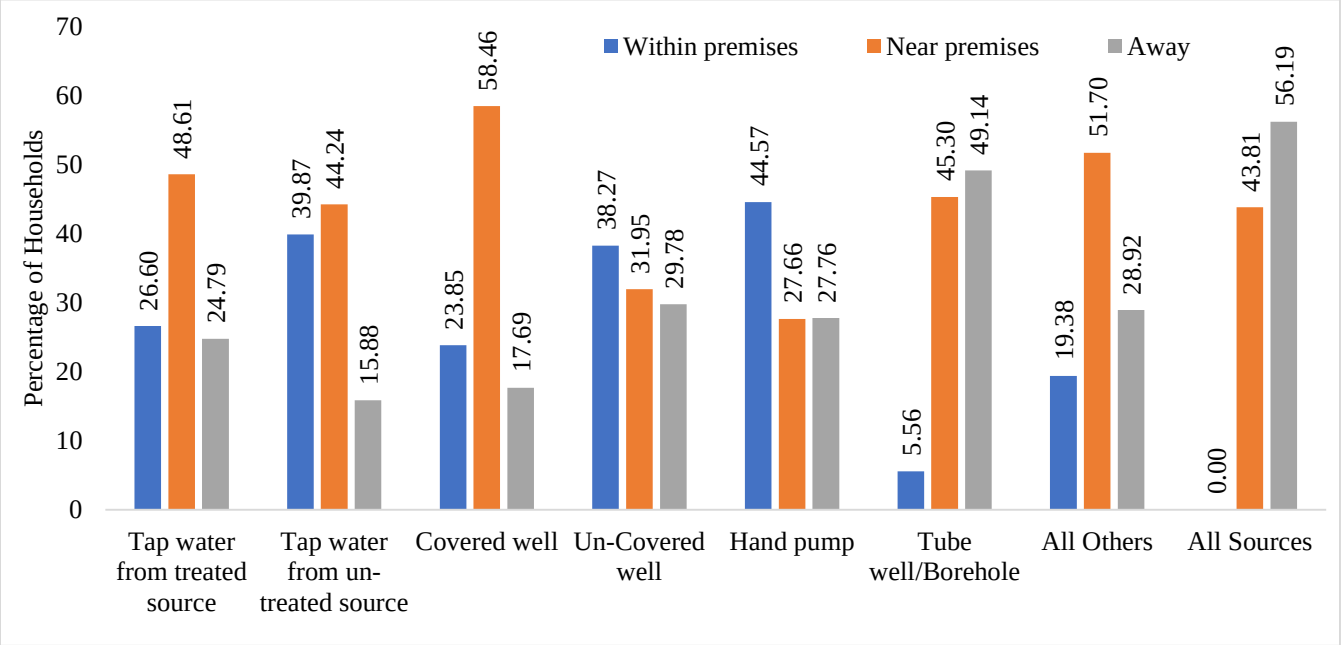


Chart 6 shows the 2011 census data that, the location of drinking water sources in rural Karnataka offers a detailed perspective on the distribution of these sources among different social groups. Across all social groups, a substantial portion of household's accesses drinking water from sources located near the premises, constituting 48.61% of the total. Notably, 26.60% of households have the convenience of having water sources within their premises. However, a significant proportion, 24.79%, still relies on water sources situated away from their households. When examining social groups, the Scheduled Caste (SC) households exhibit a noteworthy pattern, with 54.88% accessing water sources near their premises, indicating relatively

better proximity compared to other groups. Scheduled Tribe (ST) households, on the other hand, display a more dispersed pattern, with 31.38% relying on water sources located away from their premises. These findings underscore the importance of understanding the spatial distribution of water sources concerning social groups, emphasizing the need for targeted interventions to ensure equitable access, particularly for those situated farther from their households in rural Karnataka.

Chart-7

Location and source of drinking water in Rural Karnataka (Census-2011)

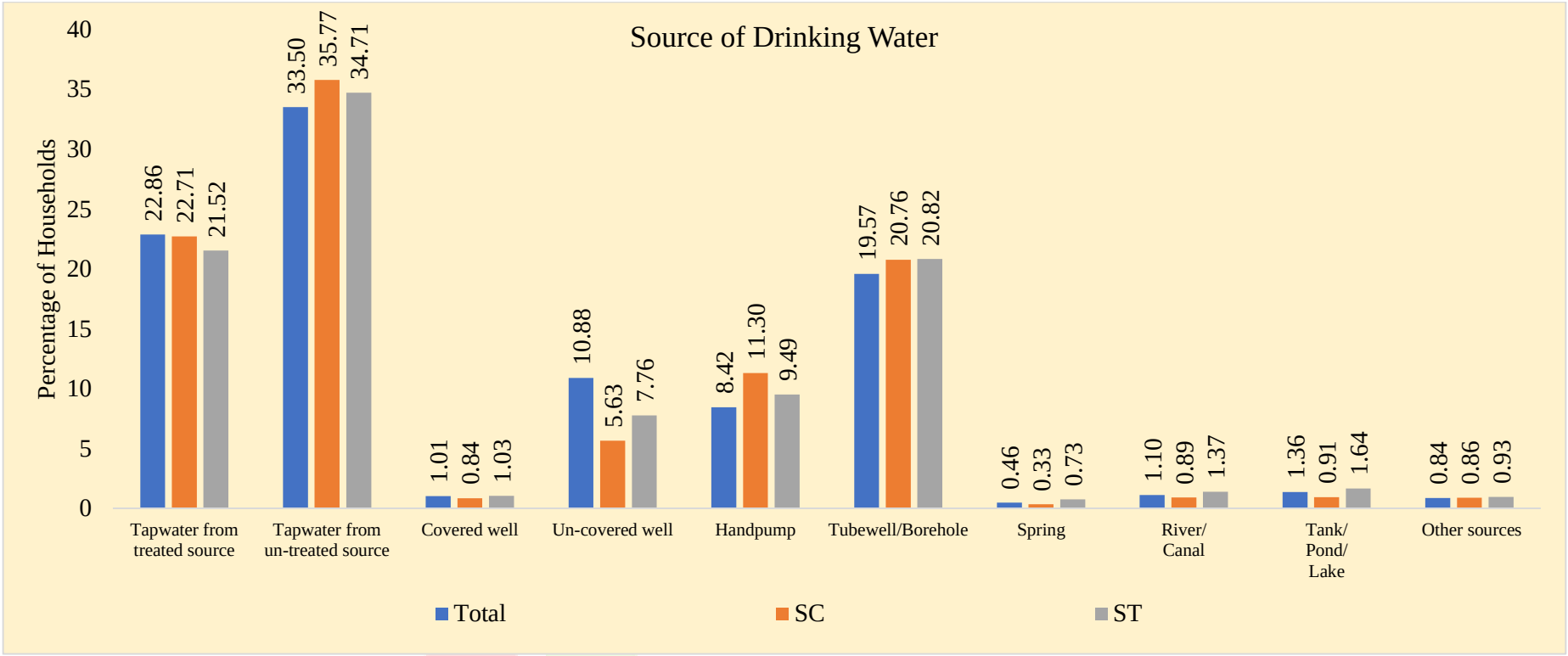


Source: Census 2011

The data from the 2011 census shows in **chart 7** regarding the location of drinking water sources in Rural Karnataka reveals interesting patterns in access to treated and untreated water across different types of water sources. Within premises, tap water from treated sources is the most prevalent at 26.60%, followed closely by covered wells at 23.85%, and hand pumps at 44.57%. Interestingly, tube wells/boreholes, despite being a treated source, have the lowest representation within premises at 5.56%. In contrast, away from premises, the majority of tube wells/boreholes are found at 49.14%, indicating a reliance on these sources at a distance from households. Additionally, uncovered wells show a significant presence away from premises at 29.78%, and tap water from untreated sources is relatively higher near premises at 44.24%. Overall, the data underscores the diverse distribution of water sources in Rural Karnataka, emphasizing the need for targeted interventions to enhance access to treated water sources, especially within households, for improved public health outcomes.

Chart-8

Social Group wise percentage of households access the source of drinking water in Rural Karnataka (2011 census)



Source: Census 2011

The Census-2011 data on the source of drinking water in rural Karnataka provides Chart 8 a comprehensive overview, delineating the varied water supply patterns among different social groups. Tap water from untreated sources emerges as the predominant source overall, representing 33.50% of rural households, followed closely by tap water from treated sources at 22.86%. Notable distinctions arise when considering social groups. Scheduled Caste (SC) households rely significantly on tap water from untreated sources (35.77%), while Scheduled Tribe (ST) households exhibit a preference for tap water from treated sources (21.52%). Handpumps and tube wells/boreholes play a significant role across all social groups, with variations in usage patterns. Additionally, the prevalence of tap water from untreated sources warrants attention, emphasizing the importance of ensuring water quality and safety in rural Karnataka.

The table-1 presents a comprehensive overview of the district and region-wide distribution of households based on their main sources of drinking water, various water sources, including tap water from treated and untreated sources, covered and uncovered wells, handpumps, tube wells/boreholes, springs, rivers/canals, and tanks/ponds/lakes. as per the 2011 Census in Karnataka. Notable variations exist across regions and districts, with the coefficient of variation (CV) indicating the degree of dispersion. In the Kalyana Karnataka (K. K.) region, Gulbarga stands out with a relatively high reliance on uncovered wells, while Koppala relies significantly on tube wells/boreholes. The Mumbai region displays considerable diversity, with Uttar Kannada heavily dependent on uncovered wells and Bijapur relying significantly on tube wells. The South region exhibits distinct patterns, with Udapi and Dakshina-Kan primarily depending on unprotected springs and uncovered wells, respectively.

The overall scenario for Karnataka reflects a diverse water source distribution, with a considerable reliance on tube wells/boreholes and notable regional disparities, emphasizing the need for region-specific water resource management strategies. The coefficient of variation highlights the variability in water source distribution, underscoring the importance of tailored interventions to address the unique challenges faced by different regions and districts in ensuring access to clean and sustainable drinking water.

Table-1 District and Regions-wise Percentage of Households to Total Households by Main Source of Drinking Water as for the 2011 Census

Regions	Districts	Main Source of Drinking Water (in Percentage)									
		Tap water from treated source	Tap water from un-treated source	Covered well	Un-covered well	Handpump	Tube well/ Borehole	Spring	River/ Canal	Tank/ Pond/ Lake	Other
K. K. Region	Gulbarga	22.5	24	0.8	14.4	20.1	15.2	0.4	1.9	0.1	0.7
	Yadgir	18.2	23.3	0.9	12.9	28.3	12.1	0.5	2	0.8	1.1
	Bidar	20.5	28.6	1.3	12.1	15.9	19.5	0.4	0.2	0.3	1.2
	Raichur	24.4	26.2	0.9	5.9	12	14.8	2.5	4.1	8	1.2
	Koppala	27.7	41	0.6	2.4	7.5	17	0.1	0.9	2.1	0.6
	Bellary	24.1	47.5	0.4	1.5	5.2	16.5	0.8	1.9	1.5	0.5
	Coefficient of variation **(C.V)**	**14.4**	**31.7**	**37.5**	**68.9**	**57.6**	**15.6**	**111.1**	**72.0**	**139.2**	**36.1**
Mumbai Region	Belgaum	23.9	21.1	1.1	15.3	9.9	23.6	0.4	3	0.5	1
	Bagakoti	22.6	36.4	0.7	4.9	8	22.8	0.2	3.2	0.2	0.9
	Bijapur	18.6	19.5	0.9	15.5	28.5	14	0.3	1.5	0.2	0.9
	Gadag	30.1	32.9	0.5	2.8	6.9	10.9	0.2	0.8	14	0.9
	Dharwad	26.4	41.7	0.3	1.2	2.9	13.1	0	0.1	13.9	0.5
	Uttar kannada	9.5	11.9	2.2	62.3	3.4	4.7	2	0.9	2	1.1
	Haveri	22.7	50.1	0.8	0.2	2.7	22	0	0.7	0.1	0.7
	C.V	**29.80**	**44.48**	**66.59**	**150.50**	**102.02**	**45.00**	**158.52**	**82.05**	**148.31**	**23.19**
South Region	Chitradurga	20.9	39.5	1.3	0.5	7.8	29	0.1	0.1	0.1	0.7
	Davanagere	20.8	41.5	0.9	1.1	5.9	28.5	0.1	0.5	0.1	0.6
	Shimoga	21.3	30.4	0.7	28.3	2.4	12.7	1.2	0.7	1.4	0.9
	Kolar	24.7	36.1	0.5	1.1	1	35.6	0	0	0.1	0.8
	Chikkaballapura	23.2	46.3	0.5	1.1	1.3	26.8	0.2	0	0.2	0.5
	Bangalore	29.7	38.4	0.4	0.4	0.9	27.9	0.1	0	0.1	2.1
	Bangalore Rural	19.3	42.6	0.3	0.4	1.3	35.1	0	0	0	0.9
	Tumakur	13.7	47.6	0.9	0.9	7.8	28.4	0.1	0.1	0.1	0.5
	Udapi	6.7	7.6	5	72.4	1	4	0.3	0.6	1.1	1.3
	Chikmagalur	22.8	40	1	9.9	4.6	14.8	2	2.3	1.7	0.7
	Mandya	33	42.3	0.7	1.5	7.1	14.8	0.1	0.1	0	0.4
	Hasana	19.3	37.5	0.8	2.8	10.7	27.8	0.2	0.3	0.3	0.5
	Dakshina -Kan	12.6	13.1	1.9	53.7	0.8	10.5	0.9	0.8	3.7	2
	Kodagu	26.2	16.8	5.5	31.1	2.7	10.6	1.8	2.4	2	0.8
	Mysore	41.9	31.9	0.3	1.9	10.8	11.7	0.1	0.6	0.1	0.7
	Chamarajanagar	24.1	34.6	1.5	3.4	14.6	20.3	0.2	0.5	0.1	0.9
	Ramanagara	27	50.6	0.3	0.4	2	19	0	0	0	0.6
	C.V	**35.25**	**34.45**	**116.73**	**173.42**	**88.10**	**45.40**	**146.86**	**139.73**	**156.48**	**55.97**
Karnataka	**Karnataka**	**22.9**	**33.5**	**1**	**10.9**	**8.4**	**19.6**	**0.5**	**1.1**	**1.4**	**0.8**
	Overall CV	**30.1**	**35.5**	**107.1**	**158.3**	**95.4**	**44.1**	**136.4**	**109.8**	**200.4**	**45.6**

Source: **2011 Census**

VI. Findings and Conclusion

In conclusion, the analysis of rural water sources in Karnataka reveals a complex and varied landscape marked by disparities in both access and quality. Hand pumps dominate in rural India, emphasizing a reliance on groundwater, while rural Karnataka stands out for its dependence on tap water from untreated sources and tube wells/boreholes. Urban-rural disparities are stark, with a significant contrast in access to treated tap water, highlighting the urgent need for targeted interventions in rural areas. Furthermore, spatial variations in water accessibility among different social groups, particularly the advantageous pattern for Scheduled Caste households and the dispersed pattern for Scheduled Tribe households, emphasize the importance of understanding and addressing these disparities. The prevalence of tap water from untreated sources, particularly among Scheduled Caste households, underscores the necessity for targeted water quality interventions. Despite a high percentage of rural households accessing improved drinking water sources, the diversity in distribution and regional disparities, as indicated by the coefficient of variation, stress the need for region-specific water resource management strategies. Overall, addressing these multifaceted challenges is crucial not only for achieving equitable access to safe drinking water but also for promoting public health and well-being in rural Karnataka.

Reference:

1. **Nisha (2006)** Community Participation in Rural Water Supply: An Analysis Using Household Data from North Kerala Institute for Social and Economic Change working paper.
2. Priya Sangameswaran (2010) Rural Drinking Water reforms in Maharashtra: the role of Neoliberalism, vol xlv no 4, Economic & Political Weekly.
3. Rajendra Singh The Indigenous Knowledge Systems of Water Management in India Tarun Bharat Sangh, Rajasthan, India DOI: 10.17491/cgsi/2016/95943