Access to water and drinking water supply coverage: Understanding water security in Kerala

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Abstract

Background/Objectives: Water scarcity is the main problems that the world faces today. This study made an enquiry about the accessibility and coverage of drinking water and explores the water security aspect of kerala.
Methods/Statistical analysis: The study is based on secondary data. The data were collected from the website of kerala state planning board, department of water supply and sanitation, and Registrar General and Census Commissioner of India. Data are also been collected from other sources such as: journals, newspapers, magazines, thesis and electronic resources.
Findings: The state with a lot of rivers and lakes is converted to the drought prone area due to the wreck less sand mining and quarrying mushrooming over the years. As a result, Kerala has witnessed a decline in percapita water availability over the years. The availability of rain, surface and ground water exhibit a declining trend. All the habitations in kerala have achieved water availability of above 40 Litre Per Capita per Day. Access to improved water supply exists, that is at least 40 Litres/capita/day of safe drinking water are provided within a distance of 500 m or 1km of elevation difference. Therefore water scarcity is not a severe problem in kerala, but the declining the quantity of water indicating the forthcoming water crisis.
Improvements/Applications: An integrated institutional system for groundwater conservation and recharging measures needs to be promoted to conserve the major source of drinking water.

Key words: water supply coverage, access to water, habitation status, water percapita, water security.

1. Introduction

Life on land depends on rain. It fills the rivers and lakes, it lets seeds germinate and grow, and provide us with safe drinking water. India is the second largest populated country in the world. Providing basic requirements to growing population is very difficult task for ruling government, especially food and safe drinking water. To provide safe and stable water supply service to meet the growing demand through installing water supply facilities, thereby contributing to improving living conditions of the local residents is one of the objectives of nation's development policy. Among all states in India, Kerala possesses several peculiar characteristics such as higher standard of living, life expectancy, birth rates, infant mortality rates, sex ratio and literacy levels especially of the female population, where its performance is rated very high. Kerala has achieved this attracting development through facilitating basic infrastructure like safe drinking water and sanitation.

Kerala is a land abundant in water resources, which include rivers, lakes, big and small ponds and backwaters. Kerala has 44 rivers of which 41 are west flowing and 3 east flowing. The west flowing rivers flow down the land and join the Arabian Sea or the backwater lakes which open into the sea. Yet there is problem related to water throughout the State. The annual yield of water in Kerala in normal year is around 7030 crore CUM. The ground water resource available in Kerala is estimated at 7048 MCM. As per rough estimate of projected demand, 3000 crore CUM is required for agriculture, 750 crore CUM for domestic use, 1220 crore CUM for prevention of salt water intrusion. The total requirement is 4970 crore CUM [1]. Nearly 40 % of available water resources are lost as run off. The pattern of demand is also undergoing gradual but continuous changes towards increasing pressure for drinking and other domiciliary needs and decreasing demand for irrigation. There is a commitment to expand public investment in water supply facilities, and the supply of drinking water to all levels of society in both urban and rural areas, and increasing drinking water supplies is one of the top-priority issues. Kerala has huge water sources

potential, the natural water conservation receives less public attention [2]. This paper analyses the accessibility and coverage of water in kerala and made an enquiry about water security of the state.

2. Background of the study

Access to safe drinking water means meeting basic human needs. In India, demand for water usage is increasing with its population and economic growth, but, due to lack of infrastructure, the water supply shortage is becoming acute. Further, over reliance on groundwater is lowering the groundwater level and leading to higher content of fluorine, arsenic, and other toxic substances. Also, with a sudden population influx in the urban areas along with industrialization, sewage emission is exceeding treatment which threatens the public health and living environment of local residents. People are heavily relying on groundwater due to a lack of surface water supply, groundwater quality is rapidly deteriorating as sea water permeates the underground water, and therefore development of surface water resources is urgently required. Kerala is endowed with 44 rivers tanks and wells, backwaters, innumerable rivulets and streams, highest rainfall, yet there is problem related to water throughout the State. The annual yield of water in Kerala in normal year is around 7030 crore CUM. The ground water resource available in Kerala is estimated at 7048 MCM. The total requirement is 4970 crore CUM. Based on this figures, kerala is being a water surplus state. But at the same time Kerala exhibits a paradoxical situation. It has become the routine in the state that women and children queuing with multi colored buckets and ponds in front of water taps and water supply tankers and the govt. of Kerala declared 7 out of 14 districts in the state as drought prone in 2012. Nearly 40 % of available water resources are lost as run off. Rapid commercialization and when the water becomes paid good, there water become a precious commodity. The declining water availability has become a threat to sustainable development and this give policy maker as a major area of focus.

3. Drinking Water Supply Coverage in Kerala

In Kerala, 72.77 % of the total population has access to drinking water as at the end of March 2010. The total number of rural people having accessibility to drinking water is 161.60 lakhs, which constitutes 68.55 % of the total rural population. Similarly, 84.80 % of the urban population is covered by water supply schemes and the total number of urban citizens covered is 70.11 lakhs. The increase in the number of citizens covered by water supply schemes during 2009-2010 is 319096. Of this increase, 312695 are in the rural area and 6401 are in the urban area. Table 1 shows the district wise details of population covered by water supply schemes in Kerala.

In kerala, Ernakulam is the district which has a wide range of water supply network. 96.19 percent of population in Ernakulam has got safe water supply. Thrissur holds the second position which fecilitate drinking water to 89.47 percent of its population. The district which has least water supply coverage is Kozhikode. Only 52.94 percent of population receive safe water supply. Higher percentage of rural population covered with water supply scheme is in Ernakulam district (97.83) and lowest in Kozhikode (39.01). The district with widest urban water supply coverage is in Malappuram, which constitute 99.35 percent of total population and lowest in Wayanad (50.10). More than fifty percent of urban and rural part of kerala is covered by water supply schemes.

3.2 Status of Water Supply Coverage in Habitats

According to the survey conducted by the Rajiv Gandhi National Drinking Water Mission, there were 9776 identified habitats in Kerala. Of these habitats, 1994 habitats were fully covered, 6964 were partially covered, 805 were non-covered and 13 were in forest area during 2001. Through various policies and prosperous effort on the part of the government made this situation different. Table 2 gives the details about present status of the habitats in kerala.

Table 1. District Wise Population Covered by Water Supply Schemes

SL. NO	District	Rural Population	% of Total Rural Population	Urban Population	% of Total Urban Population	Total Population	% of Total Population
1	Thiruvananthapuram	1601803	74.76	958617	87.81	2560420	79.16
2	Kollam	135397	63.01	453781	97.38	1789178	69.12
3	Pathanamthitta	813091	73.24	107700	87.00	920721	74.62
4	Alappuzha	1182805	79.00	528255	85.00	1711060	81.13
5	Kottayam	964558	57.09	292663	97.62	1257221	64.35
6	Idukki	632423	59.12	55262	95.95	687685	60.90
7	Ernakulam	1593378	97.83	1393990	94.38	2987368	96.19
8	Thrissur	1832646	85.85	828354	98.68	2661000	89.47
9	Palakkad	1468977	64.97	340964	95.62	1809941	69.15
10	Malappuram	1790729	54.77	353860	99.35	2144589	59.15
11	Kozhikode	693578	39.01	830762	75.44	1524340	52.94
12	Wayanad	669798	89.19	14835	50.10	684633	87.70
13	Kannur	829761	69.37	708332	58.40	1538093	63.85
14	Kasargod	751235	77.42	143298	61.32	894533	74.29
	Total	16160179	68.55	7010673	84.80	23170852	72.77

Source: Economic Review, 2010

Table 2. Status of water supply coverage in habitats

Month & year	Fully covered	Partially covered	Non covered
March 2001	1994	6964	805
March 2002	2091	6889	783
March 2003	2091	7444	228
March 2004	2125	7638	0
March 2005	2365	7398	0
March 2006	3892	5871	0
March 2007	4745	5018	0
March 2008	5283	4480	0
March 2009	9763	0	0
March 2010	11883	0	0
Sep 2010	11883	0	0

Source: Economic Review, 2010

A fresh habitation survey was conducted based on 2001 census population in 2003 and the number of rural habitations/wards got increased to 12165. The total number of habitations became 13289. Out of this, 1406 habitations are Census Town (CT)/or Out Growth (OG). As per the directions from the government, these CTs and OGs were deleted from the list and the total rural habitations became 11883 only. All these 11883 habitations attained fully covered status as on 2008, considering private wells also.

3.3 Habitation Wise – Quantity of Water Supply

The quantity of water required by each individual is different. Therefore, providing minimum quantity is only be concerned. There are 11883 habitations in kerala. All the habitation in kerala has achieved above 40 Litre Per Capita per Day (LPCD). The water authority in kerala is more efficient in supplying water. That is why the state can achieve full coverage in water supply. Each and every person can get above 40 Litre of water in a day that ensures water security. But achieving the continuity of water supply throughout the day is a distant goal. Thiruvananthapuram is the only district in kerala has achieved continues water supply throughout the year. Thiruvananthapuram, with a population of 745,000 in 2001, is probably the largest Indian city that enjoys continuous water supply. Drinking water supply in kerala continues to be inadequate, despite longstanding efforts by the various levels of government and communities at improving coverage.

3.4 Habitation Wise- water accessibility

The World Health Organization (WHO) defines access to water supply services as the availability of at least 20 litres per person per day from an "improved" source within one kilometre of the user's dwelling [3]. Kerala has accomplished a success in providing access to basic water supply facilities for everyone; the challenge now is how to provide higher levels of service with sustainable sources and systems that provide good quality water to the population. Improved sources are those likely to provide safe water such as household connections, public standpipes, protected dug wells, rainwater collection, boreholes, and protected springs. Through various policies, Government provides water access to households, commonly it is in the form of piped water, hand pumps or bore wells. The following table 3 shows details of schemes covered in habitations.

Table 3. Scheme Details of Habitations

Sl. No	Particulars	Kerala		India	
		No.	%	No.	%
1	Habitations covered by PWSS	8867	74.62	330130	19.91
2	Habitations covered by hand pumps / Bore wells	209	1.76	579737	34.96
3	Habitations covered by Others	46	0.39	14545	1
4	Habitations Without any Scheme	2761	23.23	733911	44.26
	Total	11883	100	1658323	100

Source: DWSS Website 2010

In kerala, habitats covered with Piped Water Supply Scheme is 74.62 percent where as it is 19.91 percent in India. It was only 1.76 percent of habitats covered with hand pumps / Bore wells and 0.39 percent are covered by other sources of water supply schemes in kerala. But in India habitats covered with hand pumps / Bore wells is 34.96 percent. The habitation without any scheme coverage is 23.23 percent in kerala. In India, it is 44.26 percent. It is clear that 74.62 percent of habitations in kerala depend on tap water, provided by the government through various schemes. Piped water is considered more desirable than well water or surface water because it goes through at least secondary, and usually tertiary, treatment [4]. Irrespective of the number of households, all rural habitations should have access to a safe, adequate and sustainable source or sources of water to meet daily requirements. Access to safe drinking Water is not only for better survival but also a symbol of standard of living in kerala. Prior to the completion of house construction, people have been ensured the safe and continue availability of water, electricity and transportation facilities. Most of the households prefer piped water, because it is very easy to use and affordable. If it is not affordable, people may borrow money to setup this facility.

Despite achievements in improved access to safer sources of water to habitations over the years, the current system of household water provision in kerala is unable to provide proper and safe access to drinking water for a large section of the population. Urban water delivery is characterized by irregular delivery and pressure, provided by inefficient and heavily subsidized municipal boards, panchayats and corporations which are unable to maintain and expand the existing system. The situation is somewhat worse in rural areas with declining water availability, groundwater depletion and poor maintenance of existing infrastructure. Reliance on underground water is very high in kerala. As compared to many other states in the India, the ground water potential is very low in Kerala. Dug wells are the major ground water extraction structure in Kerala. The dug wells have a maximum depth of about 10 to 15 meters and have a diameter of about 1 to 2 meters in coastal region and 2 to 6 meters in the midland and high land. The open well density in Kerala is perhaps the highest in the country – 200 wells per sq.km in the coastal region, 150 wells per sq.km in the midland and 70 wells per sq.km in the high land. [5] During the summer months, the ground water level diminishing drastically and drying up of wells are common features of many parts of Kerala. At this time, people relay on tanker water or public stand pipes where water available only few hours in a day with no time schedule, people had to wait day or night. People are waiting for irregular water service which farfetched them from engaging productive activities. According to the 2011 census, 62 per cent of the households depend on wells for drinking water, 1.4 per cent of houses rely on springs, 0.2 per cent on rivers and canals and 0.7 per cent on tanks, ponds and lakes. While 0.7 per cent use hand pumps to draw water, 3.7 per cent are serviced by tube wells. The figures show that 77.7 per cent of households have drinking water sources within their premises, 14.1 per cent near the premises and 8.2 per cent away [6]. Percentage of water used for domestic purpose is higher than agriculture in kerala. The percentage of agriculture is being decreased and agriculture land is converted for non agriculture

purposes results in water scarcity. Agriculture lands functioning as water sheds and helps for recharging ground water. Therefore in is necessary to keep agriculture land sustainable neither for water security nor for food security.

3.5 Availability of Drinking Water Facility

In Kerala, people switched from traditional sources of water to piped water, but with the failure to deliver water continually, people have returned to traditional sources. Currently, a combination of traditional and modern methods is used to supply water in rural and urban areas.

Table 4. Distributions of Household by Availability of Drinking Water Facility.

Districts	Rural (Percentage)					Urban(Percentage)				
	Well Water	Tap Water	Hand pump/ Tube well/ Bore hole water	Other source	Total	Well Water	Tap Water	Hand pump/ Tube well/ Bore hole water	Other source	Total
Kasaragod	65.4	10.7	11.3	12.6	100	58	18.6	21.4	2	100
Kannur	75.7	11.5	3.2	9.5	100	84.5	11.9	2.1	1.6	100
Wayanad	66	22.3	3.3	8.5	100	63.1	30.2	2.3	4.4	100
Kozhikode	73.2	17.8	1.5	7.6	100	72.6	22.7	2.4	2.3	100
Malappuram	76.7	15.2	3.6	4.5	100	80.6	14.4	3	2	100
Palakkad	51.1	39.2	5.9	3.8	100	39.8	54.5	5	0.7	100
Thrissur	62	29.1	6.9	2	100	63.8	26.7	8.3	1.3	100
Ernakulam	58.2	38.4	0.6	2.8	100	32	66.3	1.1	0.7	100
Idukki	40	29.3	4.2	26.5	100	48	49.4	1.7	0.8	100
Kottayam	71	20.2	1.9	7	100	67.3	29.7	0.8	2.2	100
Alappuzha	46.6	35.3	11	7.1	100	45.1	34.7	17.2	3	100
Pathanamthitta	75.7	17.3	1.4	5.5	100	63.2	33.8	0.7	2.2	100
Kollam	72.6	22.4	0.8	4.3	100	64.2	33.2	0.8	1.8	100
Thiruvananthapuram	70.5	23	2.5	4	100	44.7	51.7	1.8	1.8	100
Kerala	64.8	24.5	3.9	6.9	100	58.9	34.9	4.6	1.7	100
India	13.3	30.8	51.9	4	100	6.2	70.6	20.8	2.5	100

Source: Census of India 2011.

From the table 4, we find that about 65 per cent of the households depend on wells for drinking water in rural areas. And in the urban areas 58.9 percent depend on well water, the rest of 34.9 percent on tap water, 4.6 percent on tube wells and 1.7 on other sources. Well water is the major source both in rural and urban areas. The second most important source is tap water. The highest dependence well water among households in kerala is due to the fact that most of these wells are located within the premises of household. It is thus, evident that people in kerala do not have to travel distance to fetch drinking water.

3.6 Trends in per capita water availability in Kerala

Kerala is one of the states in the country showing a declining trend in population growth. Inspite of the achievements in demographic and social indicators, the state has undergone severe exploitation of natural resources, especially water bodies which gradually cause a decline in the availability of drinking water. The state is experiencing rapid urbanization and social changes. The factors such as pollution, engulfing precious land for settlement, scarcity of land for ever increasing demand for food, development of industrial sector, urbanization, conversion of paddy lands for non- agricultural purposes and deforestation cause decline in availability of water in Kerala. However this shift still accelerates the problem of water insufficiency and involve as a threat to water security. Kerala has witnessed a decrease in percapita water availability over the years. The availability of rain and the lowering of surface and ground water resulting from various in human and unnatural activities [7] lead to severe water scarcity. The population is increasing at a declining rate, but the per capita water availability is always declining and exhibits possibility of water crisis in future. The attitude of the society towards environment is being changed. Large−scale encroachment of the forest lands, destruction of forests, reclamation of natural ecosystem buffers and changes in the cropping pattern paved the way for deterioration of environment and constitute scarcity of natural resources.

The people look the environment with a profit mind and accelerate pressure to adopt sustainable development policies. The table 5 shows trend in the per capita availability of water in kerala.

Table 5. Trends in per capita availability in Kerala

Year	Population (crores)	Per capita water availability (Litre/day			Total
		Rain	Surface water	Ground Water	
1901	0.64	49,609	6,556	3,095	59,260
1911	0.71	44,718	5,909	2,790	53,417
1921	0.78	40,705	5,379	2,539	48,623
1931	0.95	33,421	4,416	2,085	39,922
1941	1.10	28,863	3,814	1,801	34,478
1951	1.35	23,518	3,108	1,467	28,093
1961	1.69	18,786	2,482	1,172	22,440
1971	2.13	14,906	1,969	930	17,805
1981	2.45	12,500	1,672	780	14,952
1991	2.95	10,762	1,422	672	12,856
2001	3.36	9,450	1,022	590	11,062

Source: Devi, I. P. (2012)

It is clear that the per capita water availability is decreasing over the years [8]. In 1901, Per capita rain water availability is 49609 Litres. But in 2001, it is declined to 9450 Litres. 6556 Litres surface water is available per head in 1901. This was declined to 1022 Litres in 2001. Ground water availability per person in1901 is 3095 Litres, where as in 2001, it is declined to 590 litres. Total water availability in 1901 is 59260 litres and it is declined to 11062 litres in 2001. This declining trend raises the consciousness of water security in the state.

4. Conclusion

Water scarcity is a serious problem in India, but it is not as much as serious in kerala compared to other states. Accessibility of Water is not a problem in kerala, because most of the households use water from wells within the premises. Habitation wise coverage of water supply in kerala is fully achieved. All the habitation in kerala has achieved above 40 Litre Per Capita per Day. Access to improved water supply exists, that is at least 40 Litres/capita/day of safe drinking water are provided within a distance of 1.6 km or 100 meter of elevation difference in kerala. Therefore water security is not a burning issue but declining water quantity uplift the importance of water security. An integrated institutional system for groundwater conservation and recharging measures needs to be promoted to conserve the major source of drinking water.

5. References

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