



Apartment Boom and Groundwater Crisis in Kerala: The Case of Kozhikode City Corporation

KEYWORDS

urbanisation, housing, groundwater, wells.

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ABSTRACT *Apartment boom associated with urbanisation is not an odd phenomenon in Kerala. House construction activities in Kerala show an increasing trend since mid-seventies. Environmental impact of such disproportionate increase is an area which can be enquired into. Groundwater crisis is one among such environmental issues which emerge out of the bewildering number of flats and high rise buildings in Kerala. Groundwater is being used by such constructions through wells/bore wells and continues its dependency over the same groundwater aquifer, resulting into its deterioration. In this background, this paper attempts to highlight the groundwater crisis in Kozhikode City Corporation based on a case-study. The paper also looks into the legal nuances of groundwater appropriation in Kerala; the legislation and controlling mechanism.*

Housing boom associated with population growth and urbanisation usually results in inadequate community services, hike in house price, inequality in housing provision as well as access to land, resources and security, congested transportation and poor sanitation along with its advantages. The sheer growth of economy, rural-urban migration, expansion of secondary and tertiary sector, etc. contributes to the growth of urbanisation. The problems, if remains unattended may cause decrease in standard of living and mushrooming of slums. Rapid urbanisation and increasing number of domiciles also result in environmental degradation. The extensive exploitation of natural resources for house construction activities have resulted in the degradation of non-renewable resources and accumulation of waste. When the waste disposal mechanism is inefficient that leads to air, water and land pollution. In addition to this the disproportional urban water demand undermines the once serene and splendid water availability of the region. In the past the increased water demand in the urban areas could often be met by tapping the unclaimed water sources. But at present this is not a viable alternative as unclaimed water largely appears to be unavailable in many areas. Hence urban water capture and associated physical infrastructure remains contested.

Apartment boom and related environmental problems as part of urbanisation process is not an unusual phenomenon in Kerala as well. The population growth rate of Kerala shows a steady decline during the last three decades whereas the growth rate in urban population was on the rise indicating the very high pace of urbanisation.¹ The span of 20 years from 1971 to 1991 can be construed as the period of intense urbanisation in Kerala. During the last decade the urban population recorded a sharp growth from 25.96% to 47.72% (with a percentage increase of 83.82) of the total population according to provisional census figures of 2011 (Economic Review 2012). The recent decadal rate of urbanisation in Kerala is 82%. The urban sector in Kerala comprises of 5 Municipal Corporations and 60 Municipalities; 47.7 % (2011 census) of the population lives in urban areas whereas the national average is 31.2 %. However, unlike the other parts of the country urbanisation in Kerala is not limited to designated cities and towns. Barring a few Panchayats in the hilly tracts and a few iso-

lated areas, the entire State is an urban rural continuum. Thus the Kerala society by and large can be termed as urbanised (Ibid).

Once the unique feature of Kerala's urbanisation was the dominance of small towns. But the recent decline in the dominance of small towns and the peripheral expansion of large towns automatically translates into spatial expansion of built up areas. Here agricultural lands and urban land use had moved further outward making more and more agricultural area vulnerable to conversion for housing (Chattopadhyay & Franke 2006). The 2011 census data confirms this fact; as per the data total urban population of Kerala is 1,59,32,171. Out of the fourteen districts six districts are having urban content more than 50% showing high level of urbanisation. Regarding urban population density during a span of 40 years urban population density of Kerala increased by 15.4% whereas the general population density increased by 88.7%. The high value of urban population growth with low increase in population density shows that urban area grows because of urban spread i.e. more and more area becomes urban. The State is experiencing urban spread rather than its concentration which demands more investment in infrastructure development like housing, commercial establishments, public utilities, etc. (State Urbanisation Report 2012).

As parallel to the urban population growth and generally, house construction activities in Kerala shows a sudden boom since mid-seventies resulting in social and environmental consequences. Housing became a leading sector in Kerala, generating employment and income to a large number of workers. Each and every person desires to have a house of his own, in order to keep his living in a better way. House construction activity in Kerala took a sudden growth during mid-seventies. Different from the general trend high level of housing investment independent of general economic improvement in the economy as a whole seems to be the experience in Kerala. House construction activity in Kerala is confined primarily to the household sector, house is not used as an input in the production of any other commodity, rather it is a consumer good (Gopikuttan 1990).

As such the housing situation in Kerala became far better than in the rest of the country. As per 2001 Population Census the State's population was 3.18 % of the country's population, but the housing stock in Kerala was 66 lakh, which was 3.75 % of the total stock of housing in the country. The number of households at present is 83 lakh which is counted as not sufficient to the population. It is also estimated that housing needs for the additional requirement for new population during the 12th plan period is 6.5 lakh. In addition to this there is a need for reconstruction of 5.5 lakh units of dilapidated houses. The State has to undertake a task of completing 12 lakh housing units of which around 60% are the needs of the economically weaker sections of the society, as envisaged in the State Housing Policy 2011. Although the average area of households in Kerala is recorded as 0.234 ha. including the 4.8 %age of landless households. It is notable that half of the population possess less than 0.4 ha. of land. In Kerala percentage of households holding only homesteads in rural area is 68.3% while in urban area the statistics rise up to 80% (Economic Review 2012).

Apartment Boom in Kozhikode

Kozhikode is the fourth populated district in the state with a population of 28,79,131 which is 9.04% of the state population. The extent of Kozhikode district is 2344 sq.km which is 6.03% of the area of Kerala State. The process of urbanisation is at a faster rate than rest of the districts. The present urban growth rate of the district is marginally higher than the total growth rate of the state i.e. 9.34% (District Urbanisation Report, 2012). Regarding population concentration, 2/3rd of the total population of the District is concentrated in 35.7% of the area of the district. The present population density of the district is 1228 person per sq. km. The following table gives the percentage of urban population in India, Kerala state and Kozhikode district during 1971-2001 (Ibid).

Table 1. Percentage of Urban Population

| Geographical Unit | Percentage of Urban Population | | | |
|--------------------|--------------------------------|-------|-------|-------|
| | 1971 | 1981 | 1991 | 2001 |
| Kozhikode District | 30.83 | 27.18 | 38.34 | 38.25 |
| Kerala State | 16.24 | 18.74 | 26.39 | 25.97 |
| India | 20.1 | 23.71 | 25.7 | 27.78 |

Source: (District Urbanisation Report, 2012)

Kozhikode city is situated on the west coast of Kerala at Latitude 11° - 15°N and Longitude 75° - 47°E. The city is 434 km to the north of Thiruvananthapuram, the State capital, and 215 km North of Kochi. Geographically Kozhikode city area falls within the coastal and midland zones. The city has long seashore of 15 km. In the city nearly 321 hectares is waterlogged area (City Report, 2005). The City Report of Kozhikode submitted as part of Kerala Sustainable Urban Development Project, presents the facts regarding urbanisation in Kozhikode city. A major chunk of the land i.e. 52.27% is used for residential purpose while 5.95% is account for industrial as well as commercial activities. Table 2 will depicts these facts. The present high percentage of land use for residential area is due to the local preferences for low-rise/low density housing. Water sources are estimated merely as 2.21% of the total land (Ibid).

Table 2. Existing Land Use in Kozhikode City

| Land use | Area in sq. km | Land use (%) |
|---------------------------|----------------|--------------|
| Residential area | 44.03 | 52.27 |
| Commercial area | 1.22 | 1.45 |
| Industrial area | 3.79 | 4.50 |
| Public & semi public area | 14.28 | 16.95 |
| Transportation area | 0.64 | 0.76 |
| Agriculture | 1.87 | 2.21 |
| Water course | 11.17 | 13.26 |
| Parks & open spaces | 7.24 | 8.60 |
| Total | 100.00 | 100.00 |

Source: City Report, 2005.

Kozhikode city alone accounts for 40% of the urban population in the district. In the city's central area, the population density is as high as 5,280 persons per sq. km. while it is 2,486 persons per sq.km. in the outer fringes of the city. The family size of Kozhikode is calculated as five. More than 42% of all households in the city live in individual houses (Ibid). As per the recent census the population of Kozhikode City Corporation was increased from 4,36,556 to 4,52,782 in 2010 for 118.58 sq. km. The projected population for the year 2021 is 4,72, 000 and for the year 2031 is 4,90,000. Thus the rapid urbanisation trends in the city periphery have necessitated a larger Development Plan area (Ibid).

Groundwater Crisis in Kozhikode City Corporation

The main impact of urbanisation process in Kozhikode city has been expansion and constant change of urban land use. Poor management of water bodies/tanks is another problem affecting the people in Kozhikode district. Water quality in Connolly Canal and other water bodies deteriorated due to discharge of untreated domestic and industrial effluents. Water bodies and low-lying marshy areas are reclaimed for developmental and construction purposes without due regard to environmental regulations. The water distribution and sewage treatment systems are not functioning effectively in the corporation. As per the JBIC (Japan Bank for International Corporation)² projection, the corporation demand of water supply is estimated at 69.0 MLD (Million Liters per Day) but the present supply rate is 61 LPCD (Liters per Capita per Day). Water supply improvement schemes like JBIC project, expect to solve the water crisis are now under construction. Currently ground water is the primary source for domestic consumption in traditional as well as newly developed areas but over extraction has resulted in brackish water, especially along the coastal belt. Thus the report suggests that for any future use, ground water exploitation should be effectively monitored and controlled (Ibid).

But water conflicts related to ground water use still persists in the Kozhikode City Corporation. The case of ground water exploitation at Chevayoor is one of such instance in this regard. Chevayoor is a thickly populated residential area near to Medical College. As the area is covered by lateritic formation there is no need of any outside water connection to the residents here. They depend on the open wells in their property and don't have the water authority connection. They never experienced the problems of water scarcity and water conflicts were not reported from among the residents. The problem started when Horizon Properties constructed their 12-storied apartment in

the colony and extracted groundwater for its requirements. The controversial flat began its construction in 2007 in 64 cents at Ennamppalath, opposite to the Chevayoor telephone exchange and North side of Mavoor road belong to revenue ward 30 and 33 of Kozhikode Corporation. As the area is gifted with natural water the flat authorities applied to the groundwater department for construction of bore well and officials from the department examined the place.

When the nearby residents realised this fact they submitted a petition in February 2009 to the district collector and corporation mayor demanding prevention of bore well construction expecting a possible severe water scarcity in future. They informed the factor of water scarcity in this region during summer. The district collector issued an order to the Groundwater Department for conducting an enquiry on the allegation, but the result was unknown to the colony residents. Consequently the mayor visited the place and enquired the issue. On behalf of mayor the flat owners promised that they will take the water authority connection for the water requirements in the flat. They also ensured that a plant will construct for waste water treatment. Later a huge boundary wall was constructed covering all the building structures in the compound. Moreover contrary to the agreements the flat authorities started digging a huge open well instead of bore well and deepened the existing one. They didn't get sanction to dig open well as the plot already had one. During the construction the neighbors examined the open well and found number of pipes projecting outside from the water.

When the construction is over the flat is opened for occupation in 2011. Availability of natural water was one of the major attractions sited in the advertisement of the flat. The 12 storied flat named as V. H. Cosmic Apartments consists of 42 residential units. Out of the 42 units only 12 flats were occupied by the residents. Soon after its occupation water level in the nearby 12 wells dropped drastically and water was not available in 5 neighboring wells at the end of monsoon itself, during September-October. In some wells water dropped to the similar level during the summer season. Some of them deepened their wells but water was unavailable in the deep underground. The neighbors also observed colour change of water in some wells. It was clear to the residents in the colony that the water requirement of the flat is completely met by the well water. They understood that in the flat a huge water tank having 1 lakh liter capacity is built for the resident's usage. The tank is filled by water from both of the wells and not from any outside source. When the residents examined the open wells in the flat compound they found that the wells filled with water. It leads them to a suspicion that the flat authorities might have constructed bore well inside the open well.

Immediately the residents in the colony conducted a meeting in the nearby Anganwadi and formed an Action Committee with support from Youth Congress and DYFI, to take up the issue. Besides the residents association in this area namely, North Kovoor Resident's Association submitted petitions to the collector and mayor. Also they conducted a group picketing on 20th October 2011 in front of the flat to record their resistance. But no action was taken either by the district and local government authorities. As such they submitted a petition to chief minister on behalf of the Action Committee. At the same time many youth organisations like Youth Congress, DYFI and other associations started involving in the issue. On 27th October a hunger strike was conducted by the Youth Congress

representatives. Later the residents with action committee leaders obstructed the way of access on 29th November, staged a torch rally and burned the effigy of the flat inside its compound on 30th November. Further they obstructed the way on 5th December and not allowed the residents to go for the work. Later the flat authorities got legal sanction to prevent the neighbors from entering into the construction compound.

Shortly the flat owners submitted a petition in the Medical College Police Station and later filed a case in the High Court of Kerala against the encroachment of the apartment compound by local residents and obstruction of ingress and egress of the residents. The petitioners demanded police protection for life of the inmates of the apartment. In response to the order of the High Court, Sub Inspector of Police, Chevayoor Police Station took vigil over the apartment complex and affords adequate and proper protection to the lives and limbs of the petitioners. The flat authorities also argued that the apartment took about four years time to complete the construction and there were about 70 labourers on an average engaged for the construction. The entire water for the construction and also for the personal use of the workers (90% of them were from North India and were staying at the site) was taken from these two wells and the present consumption is much below the consumption level during the course of the construction work.

As per the complaint to the district collector an inspection of the wells was conducted and obtained reports from two different agencies i.e. Center for Water Resources Development and Management (CWRDM) and Ground Water Department. CWRDM report stated that the flat building does not have a KWA (Kerala Water Authority) water connection. At present they are fully depending on the two large open wells within the compound (one old well having 3 meter diameter with a total depth of 10 meter and one new well having 5 meter diameter with a total depth of 11 meter). Also no bore wells have observed and observed 6 rain water recharge pits and one rain water harvesting tank with a capacity of 1 lakh liters. It reported that about 40000 liters is the daily water requirement for the flat building once it is fully occupied. Thus the report stated that the influence of water level declining due to large scale pumping can be ascertained only through 'pumping test' during the summer (CWRDM, 2011).

Similarly Ground Water Department reported that as the nearby wells are moderately yielding ones, bore wells are not constructed in this area, and physical quality of the ground water is also found good at the time of inspection. It also reported that there are two open wells in the compound of Cosmic Apartments in which one well is fitted with 3 numbers of Submersible Motors of capacities 1HP, 1.5HP and 1.5HP. The other open well is fitted with 2 numbers of motors with capacities 1.5HP each. As per the statement of flat owners they are pumping water from these open wells to a sump of capacity 20,000 liters. Finally the report concluded that since the slope of the terrain is towards north east and the total depth of two open wells constructed in the Cosmic Apartment Complex is more than or equal to ten meters excessive pumping from these wells is likely to affect the domestic wells constructed mainly on the south western flank of the site and the open well constructed very close to the apartment complex. Therefore the apprehension of the local people seems to be genuine. But a final conclusion can only be arrived at after a detailed pumping test conducting during

summer (GWD, 2011). As per the Ground Water Department's report the residents increased their pressure upon the flat authorities for establishing outside water connection. Finally succumb to the pressure of the colony people the flat authorities took water authority connection. Since then water scarcity and related problems is hardly reported from the colony turning the issue to an end.

Legal Nuances of the Problem

As per Indian Easement Act 1882³ the landowner owns the water below his land and he has exclusive right to extract and use the ground water. It has been said that ground water is attached like a chattel to land property and that there is no limitation on how much ground water a land owner may draw. Though Easement Law prevails throughout India increased exploitation of ground water has resulted into the creation of state specific laws to regulate ground water extraction. In Kerala also ample laws are existing to prevent groundwater exploitation. In Kerala ground water is the main source of drinking water and about ninety percentage of the rural population depends on ground water sources. But the greater use and lower recharge in Kerala cause wide gap between the demand and supply of water in all sectors like drinking water, agriculture and industry. There has been a spurt in ground water extraction during the last decade and the state shows a heavy imbalance in the availability of ground water. The non-agricultural use of land affected the groundwater recharge and aquifer potential. The construction boom in Kerala severely affected the replenishable capacity of groundwater as it is one of the major ingredients in the construction of buildings. The individual houses, major and minor buildings and skyscrapers continue its dependency on the same aquifer results in its degradation. Ground water abstraction structures like wells have increased to five million in Kerala in accordance with the apartment and housing boom. The number of open wells in the state is estimated roughly as one well for every eight to ten person, means well density of Kerala is the highest in the world. Sand mining, brick industry and quarrying also caused groundwater depletion in Kerala.

In this context the groundwater in Kerala was estimated in 2004 and 2009⁴ based on the Ground Water Estimation Methodology - 1997. In 2004 all the 151 blocks of Kerala were considered for ground water computation and classified into over-exploited, critical and semi-critical⁵ category based on the availability of ground water. In this assessment fifty blocks have moved into the unsafe category; among the fifty, five blocks were classified as over-exploited, fifteen as critical and thirty as semi-critical. Athiyannoor in Thiruvananthapuram tops the list of blocks with over exploited resources, followed by Kozhikkode, Kasargod, Chittur and Kodungalloor. It is clear that Kozhikkode belongs to the over-exploited category where groundwater exploitation is recorded as highest. As such Kozhikkode is declared as 'notified area' as per the provisions in the Kerala Ground Water (Control and Regulation Act, 2002). Section 7 of the Act says that any person desiring to dig a well or to convert the existing well into pumping well, for his own or social purpose in the notified area, shall submit an application before the Ground Water Authority for the grant of a permit it for the purpose and shall not proceed with any activity connected with such digging or conversion unless a permit has been granted by the Authority. The authority should grant or reject the permission within 90 days of application considering environmental matters as well as human needs⁶. In the case of Cosmic Apartments the flat authorities didn't sought the permission of Ground Water

Authority to dig an additional well in the compound.

Similarly as per the Kerala Municipal Building Rules (KMBR) 1999, Chapter XVI (Wells) section 103-109 no new well shall be dug without the permission of the Secretary. It says that where any person intends to dig a well, he shall submit an application along with site plan showing the position and dimension of the well and all existing and proposed buildings and structures in the site and within 7.5 meters radius from that well. Also it requires that no leech pit, sock pit, refuse pit, earth closet or septic tank shall be allowed or made within a distance of 7.5 meters radius from any existing well used for supply of water for human consumption or domestic purpose or within 1.20 meters distance from the plot boundaries. The Secretary shall, if convinced of the boundaries and plan and bonafides of the ownership approve the plan with or without modification and issue permit. The permit once issued shall be valid for two years and may be renewed for a further period of one year by submitting an application.

As such the flat authorities submitted an application requesting building permit. The building permit was issued on 15th February 2007 without permission to construct a well. In the building permit it is conditioned that arrangements should be made to dispose waste water and solid waste from the proposed building inside the owner's site and it should not be disposed to the public place. Sewage treatment plant should be constructed and functioned before the occupancy. Water supply arrangements except for drinking water should be provided by the building owner at his own cost and risk. From these conditions it is clear that water from the existing well can be used for drinking purposes and for other purposes it was obliged to take the water authority connection. But the flat authorities neither took water authority connection nor constructed the waste treatment plant to dispose the waste water as well as solid waste. Thus it is evident that the flat authorities went against to the existing legal stipulations imposed as part of KMBR and not even bothered about the Kerala Groundwater Act.

Conclusion

An analysis of the existing legal framework related to groundwater reveals that the provisions are not comprehensive enough to capture various forms of groundwater exploitation. For instance the provisions in the KMBR do not address the possible groundwater exploitation through wells/bore wells by the flats and other high-rise buildings. Rather it mainly concentrates into the pollution of water bodies. Likewise the provisions in the Groundwater Act is also silent about the possible ground water exploitation occurs along with apartment boom and increase in high-rise buildings. The Act tries to regulate groundwater exploitation in the notified area leaving the other areas unattended. Moreover the efficacy of the provisions in this act and its implementation is questionable as Kozhikkode belonged to the notified area when the construction of building was on. Lack of awareness about the legal provisions and the illegal political-bureaucratic-business class nexus might have contributed to the weakness of the implementation of the existing laws in this case. The absence of clear cut legal mechanisms has left the regulation effectively toothless to act against the indiscriminate extraction of ground water by the apartment complexes. It is worthwhile to add here that, during this period of apartment boom, such an unsustainable intake of ground water took place mostly at the expense of the independent households.

The last twenty-five years have witnessed an impressive increase in the number of household units in Kerala, a development which exerts new pressures on the loosely organised and dispersed settlement pattern. A major hallmark of this transformation has been the emergence of high density housing forms like flats or apartments, particularly in the municipal towns and city corporations similar to other cities. In those Indian cities and metros the provision for household water was ensured through public/private water connection depending mainly on the surface water sources. But when Kerala started following such dense settlement pattern, it continued the traditional well-based water extracting mechanism on the premise that groundwater availability of Kerala is static. But the recent estimates of groundwater in Kerala shows that its recharge potential is heavily threatened and the state is on the verge of a groundwater crisis. Thus such an increase in the number of households especially apartments/flats brought forth new challenges as far as ground water management is concerned which is explained in the case of Kozhikode Corporation. It has also been proven that there are serious lacunae in the prevailing legal framework when it comes to addressing the issue of excessive ground water extraction.

References

1. Building Permit, Kozhikode Corporation, No. 129601/05 dt. 15/2/07.
2. Center for Water Resources Development and Management (2011), A Brief Report on the Status of Ground water declining around the new flat of Horizon Properties at Chevayoor (ISP/K/1359).
3. CGWB (2004), Report on the Dynamic Ground Water Resources of Kerala, As on March 2004, Central Ground Water Board, Thiruvananthapuram, Kerala.
4. CGWB & GWD (2011), Dynamic Ground Water Resources of Kerala (2008-09), Central Ground Water Board & Ground Water Department, Thiruvananthapuram, Kerala.
5. Chattopadhyay, S & Franke, R. W. (2006), *Striving for Sustainability: Environmental Stress and Democratic Initiatives in Kerala*, (Concept Publishing Company, New Delhi), pp. 160-165, 284-309.
6. City Report, Volume 2, Kerala Sustainable Urban Development Project, (PPTA 4106 – IND), Final Report, Government of Kerala, Local Self Government Department, Kozhikode, MAY 2005.
7. District Urbanisation Report – Kozhikode (2012), Department of Town & Country Planning, Kerala.
8. Economic Review, 2012, State Planning Board, Thiruvananthapuram, Kerala, India March 2013.
9. Gopikuttan, G. (1990), House Construction Boom in Kerala: Impact on Economy and Society, *Economic and Political Weekly*, September 15, pp. 2083-2088.
10. Ground Water Department (2011), Report on site inspection carried out at Ennampalathe Paramba near Chevayur, Kozhikode Corporation on 03/11/11.
11. Indian Easement Act 1882”
12. John, C.P. (2003), “Rain Water Collect and Consume”, Kerala Calling, April 2003, Volume 23, pp. 8-9.
13. Kerala Sustainable Urban Development Project, Final Report, Volume 2, City Report, Kozhikode, Local Self Government Department, Government of Kerala.
14. Kerala Municipal Building Rules (KMBR) 1999.
15. KGWCRA (2002), The Kerala Ground Water (Control and Regulation Act) 2002, The Law Department, Government of Kerala, Secretariat, Thiruvananthapuram.
16. KRPA (1994), The Kerala Panchayati Raj Act, 1994, The Law Department, Government of Kerala, Secretariat, Thiruvananthapuram.
17. Mitra, A & Murayama, M (2008), Rural to Urban Migration: A District Level Analysis for India, IDE (Institute of Developing Economies Discussion Paper no. 137)
18. Order (2011), The Honorable Justice Pius C. Kuriakose & The Honorable Justice K. Harilal, of The High Court of Kerala, W.P.C. No. 32751.
19. Residential Vital Rates 2010, Department of Economics and Statistics.
20. State Urbanisation Report, Department of Town & Country Planning, Kerala, 2012.
21. Statistics for Planning 2009, Department of Economics and Statistics.
22. The Kerala Conservation of Paddy Land and Wetland Act, 2008, Government of Kerala, Thiruvananthapuram.
23. The Kerala Minor Mineral Concession Rules, 1967, Government of Kerala, Thiruvananthapuram.
24. The Kerala Land Development Act, 1964, Government of Kerala, Thiruvananthapuram.
25. Urban Profile, Department of Town and Country Planning, Kerala.
26. Vani, M. S. (2009), *Groundwater Law in India: A New Approach*, *Water and Laws in India*, Iyer, R. Ramaswamy (ed), (Sage Publications, New Delhi), pp. 435-473.
27. www.kerala.gov.in, viewed on 15 May 2013.