Chapter 70
Characterization and Management Concerns of Water Resources Around Pallikaranai Marsh, South Chennai

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ABSTRACT

Pallikaranai is one of the last remaining natural wetlands of Chennai. This marsh collects floodwater and increases groundwater levels in the region. The present study characterizes the water sources available around Pallikaranai Marsh. Groundwater was found to be the main source of water in the study area, extracted through domestic wells as well as commercially through a large number of agricultural wells. Direct surface water extraction from wetlands by private tankers was also observed in some areas. Acute water shortage and inefficient water supply by the government has led to thriving of tanker market in this area. Shrinking of the marsh and surrounding water bodies owing to construction, dumping of waste and encroachment accompanied by over-extraction of groundwater is driving this area towards extreme water crisis especially in event of climate change. Conservation of wetlands and evolving norms for sustainable water extraction of groundwater especially by commercial entities is recommended.

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BACKGROUND

Hydrological cycle forms an essential part of climate system (Askew, 1987) and change in climate is associated with changes in a number of components of hydrological cycle like altered precipitation pattern, intensity, etc. (Trenberth, 2011). Wetlands perform essential hydrological functions and are known to act as a sponge- 'soaking up water during wet periods and releasing it during dry periods'- signifying their importance as buffers against extreme climate change events that affect water availability (Bullock & Acreman, 2003; Maltby & Acreman, 2011). Some of the most important ecosystem services provided by wetlands are water supply and regulation, groundwater recharge and maintaining high water table, surface water storage, and removal of sediments, nutrients and other contaminants to improve water quality (Juliano & Simonovic, 1999; Zedler & Kercher, 2005). Apart from hydrological services, wetlands regulate global climate change through sequestration and long term storage of carbon dioxide from the atmosphere (Mitsch et al., 2013). Wetlands, mangroves and reefs also protect the coastal and inland communities from tropical storms and cyclones in events of extreme climate change (Turner, Oppenheimer, & Wilcove, 2009).

India sustains 16% of the world population with only 4% of the world's water resources (UNICEF, FAO and SaciWATERs, 2013). It is predicted that in future, the relative proportion of water used for irrigation will drop, whereas domestic and industrial use will increase. According to the National Water Policy, highest priority has been given to drinking water followed by irrigation, hydropower, ecology, etc. (Michael, 2009). However, with the rapid growth and expansion of metro cities, providing safe drinking water is one of the biggest challenges that the country faces today (Srinivasan, 2008).

Chennai, located on the east coast, is a water scarce city that has the lowest per capita availability of water amongst the four metro cities in India (Ruet, Saravanan, & Zerah, 2002). Although Chennai receives an average annual rainfall of 1200-1300 mm, only 5% of this actually seeps into the ground in urban areas (Janakarajan, Butterworth, Moriarty, & Batchelor, 2007). Traditionally a network of tanks (traditional rainwater storage reservoirs), ponds, temple tanks and wells formed the primary source of water in Chennai (Agarwal & Narain, 1997). Later due to increased inward migration and population pressure, these surface water sources had to be supplemented by groundwater pumped from wells in peri-urban areas (Janakarajan et al., 2007).

Chennai Metropolitan has 4 distinct systems of water supply-

1. Metro Water Board supply,
2. Municipal supply in towns adjoining Chennai city,
3. Domestic shallow wells or tube-wells, and
4. Private market including tanker trucks and retail distribution of bottled water (Anand, 2001).

Chennai Metropolitan Water Supply and Sewerage Board (also called 'Metro Water Board' or CMWSSB) obtains water from three interconnected rain-fed reservoirs, well fields and two inter basin projects (Srinivasan, 2008).

Despite the new projects, Chennai's reservoir storage capacity, mostly controlled by external agencies, remains very low (Srinivasan, 2015). As the gap between supply and demand is increasing by the day, the city is facing problems of low water supply, waste water management; fall in water table, salt water intrusion and flooding (Narain, Anand, & Banerjee, 2013).