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RESEARCH ARTICLE

ACCESSIBILITY AND EFFICACY OF WATER

1, *Dr. Brilla Balsam J. and 2Dr. Lancelet T.S.

¹Research Scholar, Sree Sankaracharya University of Sanskrit, Kalady

²Professor, Department of Geography, Sree Sankaracharya University of Sanskrit, Kalady

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ABSTRACT

Water is an ultimate need of life and it supports wide variety of activities. But very often water does not get the conservation it deserves. The present paper has been analyzed the availability and efficient use of surface water in an emerging town named Kalady in Ernakulam district of Kerala. The area had been well known for paddy cultivation and now land use has changed and it is in the pressures of development. There are three objectives for the study. The first one is to know the availability of surface water. The second is the utility of water for various purposes. The third one is the issues related to the utility of surface water in the area. The Survey of India Toposheet is used as the base map and to prepare drainage map, land use map and other related maps in Arc GIS software. Water quality is tested to know the issues related to the utility of surface water. The result shows that water sources are available in the area but the utilization of water is in an unsustainable manner. The unscientific use of surface water is reflected in the water quality status.

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INTRODUCTION

Water is significant in the existence of life and a variety of activities. Even though our planet earth has 71 percent water, a little is available for usage. According to the U.S. Geological Survey, over 68 percent of the fresh water on earth is found in icecaps and glaciers, and just over 30 percent is found in ground water. Only about 0.3 percent of our fresh water is found in the form of surface water such as lakes, rivers, and swamps. So the availability of fresh water on the surface of the earth is in the forms of lakes, rivers, ponds, streams etc. The present study evaluates the availability of fresh water in the forms of river, streams and ponds and then utilization of this surface water into various purposes and the issues related to the utilization of water.

Study Area

The study area Kalady is a census town located east of Periyar River, in the Ernakulam district of Kerala, India (Census 2011). Kalady Panchayat lies in the major watershed Periyar and form parts of sub watersheds 14P24a, 14P24b and 14P25a. The area is between 10° 09' 10" N and 10° 11' 50" N latitudes and 76° 21' 05" E and 76° 27' 31" E longitudes. The area lies in the flood plain of Periyar and had been well known for paddy cultivation.

*Corresponding author: Dr. Brilla Balsam J.,
Research Scholar, Sree Sankaracharya University of Sanskrit, Kalady.

Now the land use has been changed and paddy cultivation has considerably reduced. The area is in a changing phase from rural to urban. Rainfall is heavy in Kalady due to the presence of eastern hills. Rain occurs 139 days a year. The average rate of rainfall is 343cm/year. The two monsoon showers give immense water to streams and ponds. Kalady is a marketing and collection centre of agricultural products such as nutmeg and rice. The close proximity of Cochin International airport increases the importance of Kalady as an emerging town.

Objectives

- To make out the availability of surface water
- To study the utility of water
- To analyse the issues related to the utility of available water.

MATERIALS AND METHODS

Primary data was collected for analyzing the availability and utility of water. Data regarding water quality was collected from samples of streams, ponds and Periyar River and analysis was done in the laboratory. Secondary data was collected from census report, panchayat reports and literature review. Drainage map was prepared for showing the availability of surface water. Surface water includes ponds, streams and Periyar River. Random sampling method was used to take samples from surface water to analyse the quality. Samples were collected in three seasons viz., pre-monsoon, monsoon and post-monsoon.

In the case of interval of sampling, systematic sampling method was used. 12 samples from ground water, 9 samples from streams, 2 samples from ponds and 2 samples from Periyar River were taken for laboratory analysis. For analyzing micro-biological aspects namely total coliforms, fecal coliforms and fecal *streptococci* standard plate count method was used. The collected data was transferred to ArcGIS software and maps were prepared. Landuse maps were prepared from SOI Toposheet and Google earth. Drainage maps were prepared from SOI Toposheet and field survey.

RESULTS AND DISCUSSION

The study has three parts viz. i) Accessibility of water, ii) Efficacy of water iii) Issues related to the utility of water.

Accessibility of water

Surface fresh water is accessible in the study area in the forms of streams, river, ponds and canals.

River: Periyar River drains south of the study area. It is the longest river and the life line of Kerala.

Streams: The major streams joining the river Periyar are Kottamomthodu, Oommenthodu, Udumpuzha. The sub streams are Panayalithodu, Kuzhiyampadamthodu, Ambombilichal, Mukkadaithodu etc. The streams are locally known as 'thodu'.

Pond: There were 23 ponds in the area as per panchayat records. Now it has been reduced as 14 ponds. Public ponds are identified as 7. Ponds are water bodies related to flood plain and wetlands. Some ponds in the area are as large as lake and locally called as 'chira'. Manickyamangalamchira is the largest one.

Canals: There are three canal systems in the area. The first one is a canal system from Periyar River. It is a lift irrigation project and started 55 years back. It drains southern, south western, central and south eastern parts of the area.

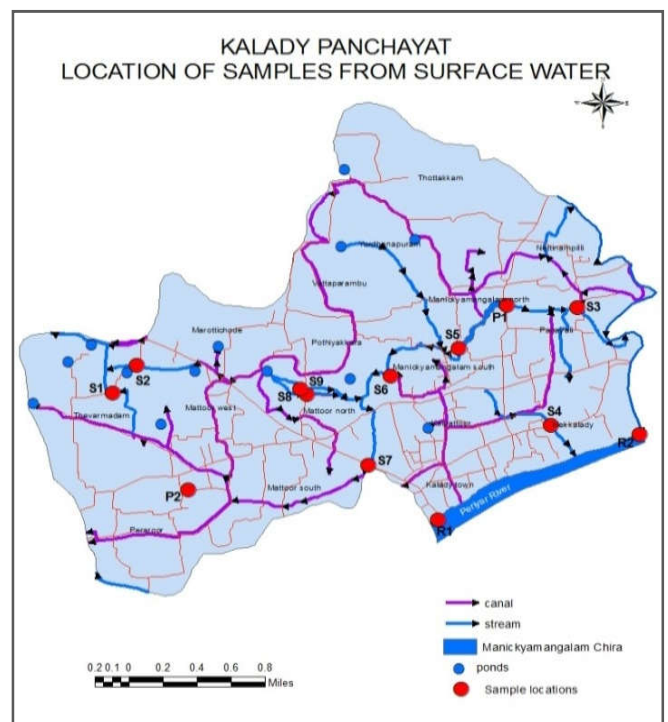
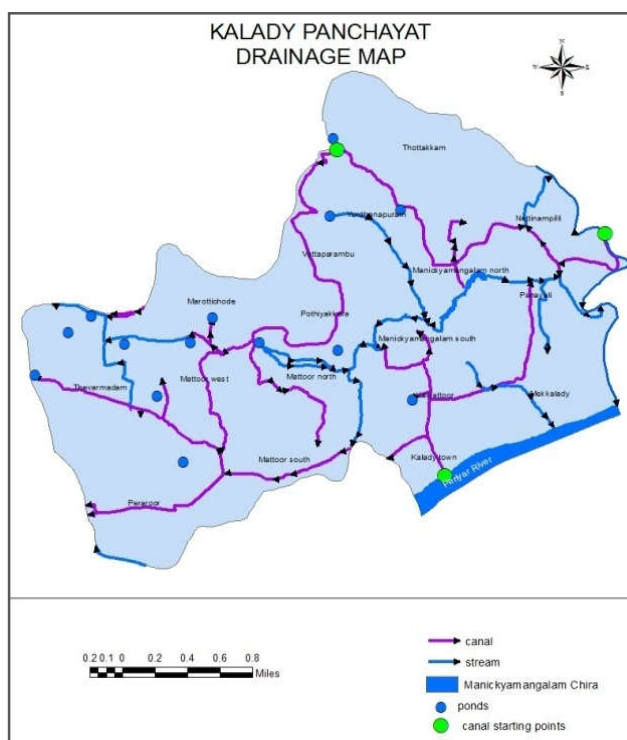
The second one is a canal system from Idamalayar Irrigation Development Project. It drains northern, eastern and western regions of the area. The third canal system is from Mukkadaithodu, a major stream to Periyar River. It drains eastern part of the area. All the canal systems are interconnected and drains entire study area. From the above details it is evident that Kalady has plenty of water. The area has high amount of annual average rainfall to supply water to streams, ponds and river. Therefore the sustainable utility of available water is significant.

Efficacy of water

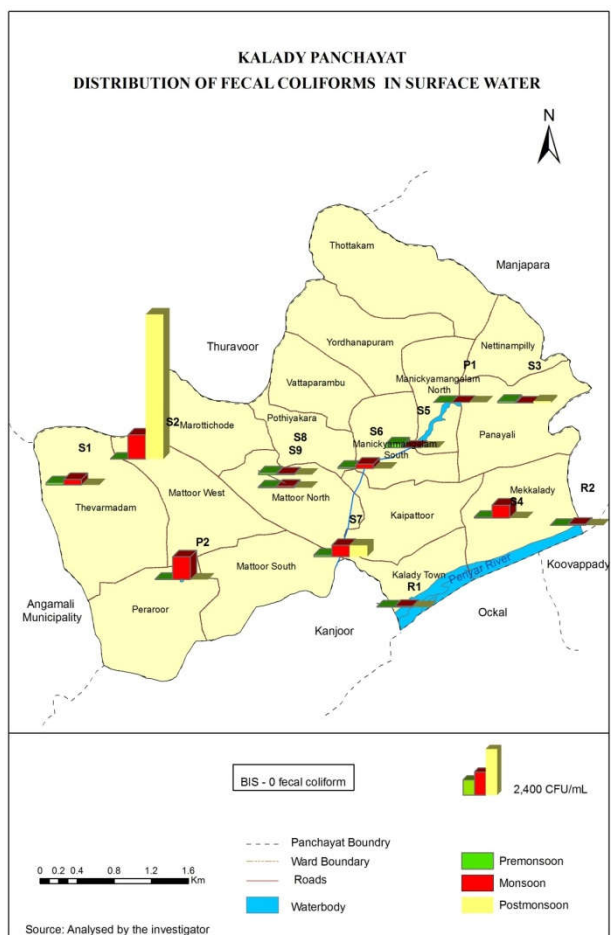
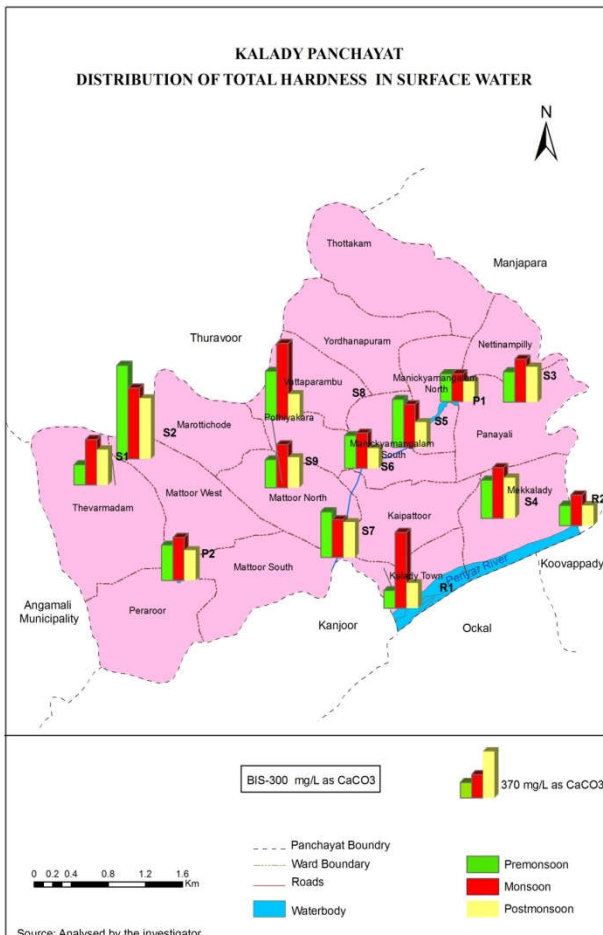
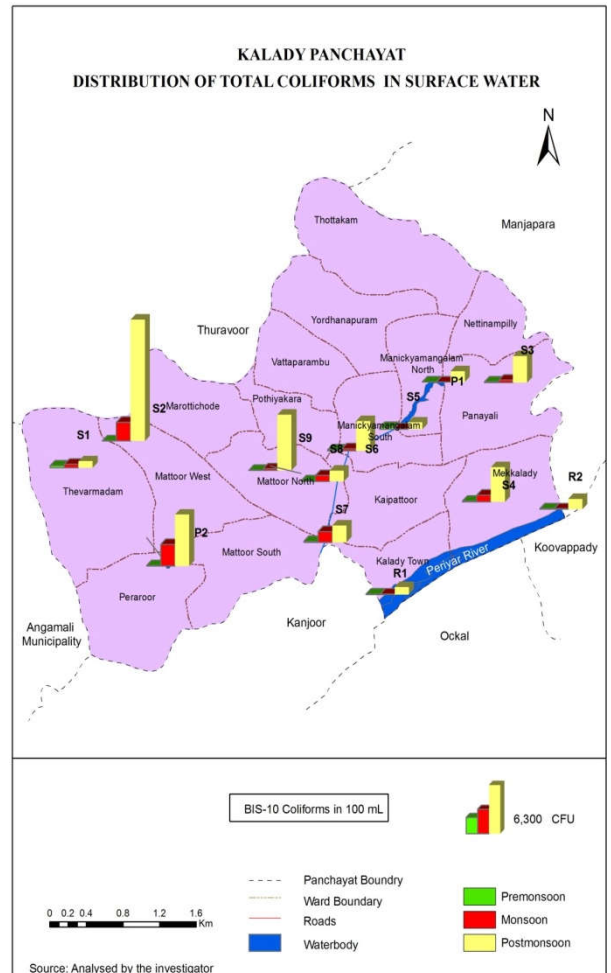
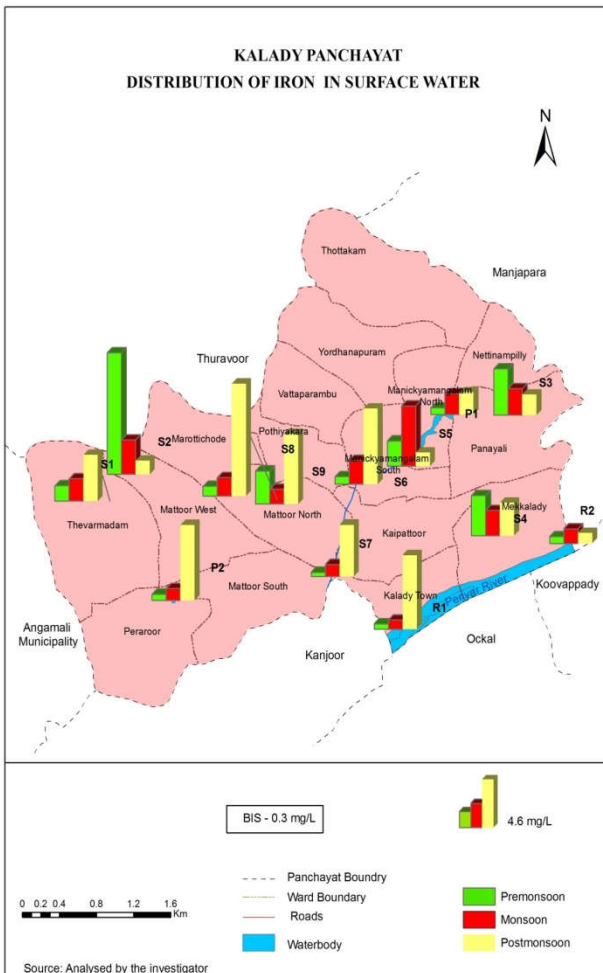
Streams and ponds were once used for domestic purposes and agriculture but now they are almost unused. The reason may be that agriculture has been decreased and changed as dumping yard for waste materials. Canals are using for domestic purposes like washing clothes, washing utensils, bathing etc. and for agricultural purposes. The dumping of waste materials into the streams is a serious issue because canals, streams and ponds are inter-connected and at last drains to Periyar River.

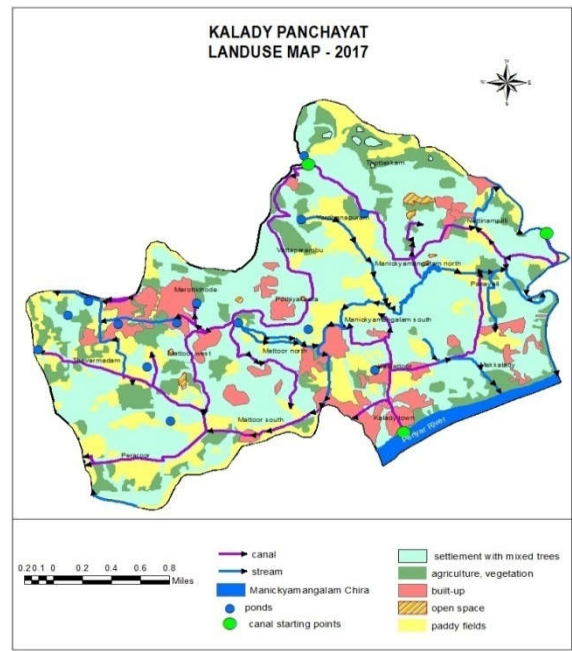
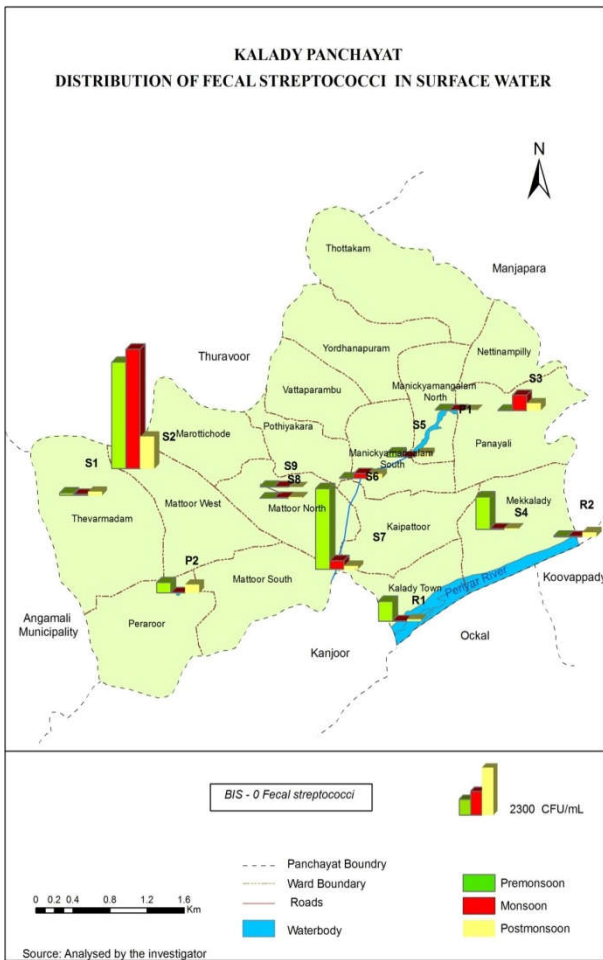
Issues related to the efficacy of water

To know the issues related to the utility of water, water quality was tested for physico-chemical and microbial properties. The sample points from surface water are given in the below map.



The result shows that iron content, hardness and microbes are high in surface water. High level of iron content is due to the change of landuse from paddy cultivation to unused or other agricultural practices. Carbonates and bicarbonates of calcium and magnesium cause temporary hardness. The presence of calcium and bicarbonates ions is due to the weathering of limestone in the rain catchments. Organisms that are considered as indicators for microbial contamination of water are total coliforms, fecal coliforms and fecal streptococci. Septic tank wastes are directly dumping into the streams results in high level of microbial contamination.





Source: prepared by the investigator from Toposheet and Google Earth

From the above information it is clear that water resources are available in the area but it is not properly utilized. A good network of canal irrigation is there and can be used for agricultural purposes. Pollution of streams would result in multiple troubles because canals are interconnected and last drains into the Periyar River. Since the water quality of Manickyamangalamchira (P1) is comparatively good it can be preserved from pollution.

The main reason for the degradation of water quality is the change of landuse. Many wetlands are reclaimed and drainage disappeared or course changed. Due to the decline of paddy cultivation, wetlands and streams became the dump yards of waste materials.

Conclusion

- The micro level studies of water resource are very useful for management and planned development. Maps acts as an important tool for planning as it gives visual representation. This type of study will be an eye opener for planners, students, social workers etc.
- Wetlands are degraded mostly by human activities, and they are in the rim of extinction in the process of unplanned development. Large amount of degradable and non-degradable waste reach the wetlands and thereby no chance for rejuvenation of water resources. This gives rise to the need for suitable conservation strategies in good water quality area. This type of studies helps to identify areas with good source of water through area location.

REFERENCES

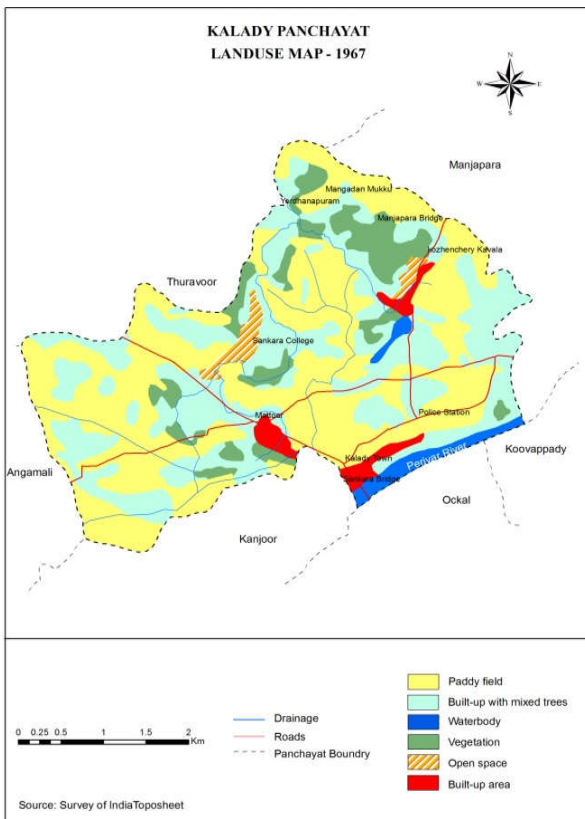
Kevin Hiscock, Victor Bense, 2012. Hydrogeology: Principles and Practice, Wiley-Blackwell publications.

Petri S. Juuti, Tapio S. Katko, and Heikki S. Vuorinen, 2007. Environmental History of Water: Global View of Community Water Supply and Sanitation published by IWA Publishing.

Robin Flowerdew and David Martin Methods in Human Geography (2005): A guide for students doing a Research project

Burk A. R. 2005. Water pollution: new research, Nova Science Publishers

Weiner Eugene R. 2000. Applications of environmental chemistry: a practical guide for environmental professionals. Lewis publications.



- Manivasakam, N. 1997. Industrial Effluents: origin, characteristics, effects, analysis and Treatment. Sakthi Publications, Coimbatore.
- Tripathi A. K. and Pandey, S. N. 1990. Water pollution: APH Publishing.
- Karnath, K.R 1989.Hydrogeology by Tata Mc.Graw Hill publishing company Ltd., NewDelhi.
- Trivedi R.K. and P.K. Goel1986.Chemical and Biological methods for water pollution studies.Environment Publications pp .215.
- Chelsea Core, 2012 Spatial Assessment and Analysis of pollution sources and water quality in the Bogue Falaya River and Abita River watersheds, st. Tammany parish, la
- Doug Gamble, Carolyn Roberts, Ahmad Atiyha, Waverly Ray, Kim Irvin, 2010. 'Conceptual Framework: How are water resources managed in different places?'Water in India: Situation and prospects, a report by UNICEF 2013.
- Consultation on the Development of a Strategy on Water Quality and Health (8–10 December 2010) World Health Organization organized in coordination with Ministry of Health, Labour and Welfare and National Institute of Public Health, Japan; Geneva, 2012.
- A report by Kerala state pollution control board: Action Plan for Greater Kochi area (2010). "DRWH Water Quality: A Literature Review" 2005.Prepared by prof. Padma Vasudevan and Dr. namrata Pathak. Centre for Rural Development & Technology, Indian Institute of Technology, Delhi, India.
- The Central Pollution Control Board monitoring results 2005.
- UN WWAP, 2003. United Nations World Water Assessment Programme. The World Water Development Report 1: Water for People, Water for Life. UNESCO: Paris, France.
