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IDENTIFICATION OF POTENTIAL WETLANDS IN TIRUCHIRAPPALLI DISTRICT, TAMIL NADU, INDIA

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Abstract

Wetland maps are prerequisites for wetland inventory, development, planning, management, protection, and restoration, for conservation of wetland-dependent flora, fauna and humans. It is estimated that 15.26 million hectares exists as wetlands in India according to Space Application Centre (SAC), pertaining to wetlands having more than 56 hectares area. Past research on wetland conservation in the country has shown that micro-wetlands (satellite wetlands) around a bigger wetland act as constellation of habitat mosaic for resident and migratory waterfowls. Often, the size of these micro-wetlands is much smaller than 50 hectares. Therefore, there is a great need to map such wetlands (smaller than 50 hectares). The Tiruchirappalli district, situated in the state of Tamil Nadu, India, is selected for the present investigation to identify the potential wetlands through geo-spatial technology (GIS & RS). All the wetlands within the Tiruchirappalli district have been demarcated from 1973 applying temporal remote sensing data. A total of 2399 wetlands of various size categories have been identified in the Tiruchirappalli District, Tamil Nadu, India.

Keywords: Wetland, Trichy, GIS, Geo-spatial technology, Toposheet

Introduction

Very little is known about the extent and condition of global wetland resources. According to Finlayson C.M et al., (1999), global wetland area was 12.8 million sq.km. Wetland ecosystem constitutes an integral part of cultural and biodiversity landscape of India.

In India wetlands are distributed in all the bio geographical regions occupying 58 million ha, including areas under wet paddy cultivation (Directory of Indian wetlands, 1990).

Wetlands are critical elements in the landscape in terms of habitat and biodiversity, regulation of watershed hydrology, and mediation of biogeochemical cycles (Detenbeck et al., 1999; Haag and Kaupenjohann, 2001; Bhatti and Preston, 2006). They can have ecological, cultural, historical, and economic value to society (Mitsch and Gosselink, 2000). If development is to be sustainable, it is important to manage the effects of human operations on wetlands in activities such as forestry, agriculture, recreation, and urban development (Christensen et al., 1996; Findlay and Bourdages, 2000 and Turner et al., 2000). Maps provide information on wetland type, location, and size. Wetland maps are used by local, state, and government agencies, as well as by private industry and organizations for many purposes, including the development of comprehensive resource management plans, environmental impact assessments, natural resource inventories, habitat surveys, and the analysis of trends in wetland status. The National Wetland Atlas, prepared by the Ahmedabad (Gujarat) Space Application Centre (SAC), Indian Space Research Organization (ISRO), has classified Puducherry and Tamil Nadu as wetland rich states as they occupy 12.88% and 6.92% of geographic area under wetlands, respectively.

In Tamil Nadu, Trichy district is one of the fast growing district in terms of urbanization. Though it is the Cauvery delta area with agriculture significance, nowadays agricultural lands and small wetlands are shrinking due to unchecked real estate exploitation (Jayaraj, 2011). A detailed wetland inventory is lacking for Trichy. For the conservation of wetlands, inventory is the basic requisite, knowing the urgent need the present investigation is undertaken.

Study Area

The Tiruchirappalli (Trichy) district in Tamil Nadu, India, was selected for the present investigation to identify the potential wetlands through geo-spatial technology (GIS & RS). It is one of the important districts in Tamil Nadu with a human population of 8,46,915(Census, 2011). In terms of urbanization, according to the composition of urban and rural population, Tiruchirappalli district ranks 10^{th} place among the other districts in Tamil Nadu. It lies between 10^0 10’ and 11^0 20’ N and $78^0$10’ and 79^0 0' E, in the centre part of the Tamil Nadu. Trichy is situated at an elevation of 88 meters (289 ft). The general slope of the district is towards east. It has a number of detached hills, among which Pachamalai Hill is an important one, with a peak up to 1015 m, located at Sengattupatti reserve forest. Temperature is low

during the month of January with an average mean temperature of 28^0C. The maximum daily temperature recorded during the hot season in the month of May (42^0C).

Methodology

The present study was initiated from reliable 1973 water body details using toposheets (SOI, 1973). They were demarcated (Index No. 58J, 58I, 58M) with a scale of 1:250,000 as a medium scale of topographic terrain for tank demarcation with reference of 1:50,000. Toposheets were used followed by SOI Topographical Index (STI: 58J, 58I, 58 M).

After verification of water bodies, the toposheet was imported into the ARC-GIS software environment (9.x). The collected data were scanned and saved as a tagged image file (TIF) format. After incorporating SOI toposheets, geometric corrections were made using GCS (Geographic Coordinate System) with respective geographic coordinates of Trichy district.

After geometric correction, the data management test was used for digital conversion of all tanks within the district. For the study purpose, the consolidated tanks were measured, and aerial extant were calculated through projected coordinate system(PCS). After finalization, repeated checks were carried out in the software environment. After corrections, all the tanks were counted in numbers (2399 tanks).Accordingly, all the tanks were classified into 5 groups with 0.5 sq aerial extent.

Results and Discussion

In the present study, a total of 2399 wetlands of various size categories have been identified for the entire Tiruchirappalli District, Tamil Nadu, India. However, majority of the wetlands were found under less than 0.5 ha category. So 2399 tanks were classified into 5 groups with 0.5 sq aerial extent (Fig 1 and 2).

Of the total 2399 tanks, the number of tanks below 0.5sq km were 2336, while 31 tanks fall under 0.5-0.75 sq km. Twenty tanks fall under 0.75-1 sq km, while 5 tanks fall under 1-1.25 sq.km. Only seven wetlands fall within greater than 1.25 sqkm (Table 1). Trichy district comprises 504 villages as per government website.

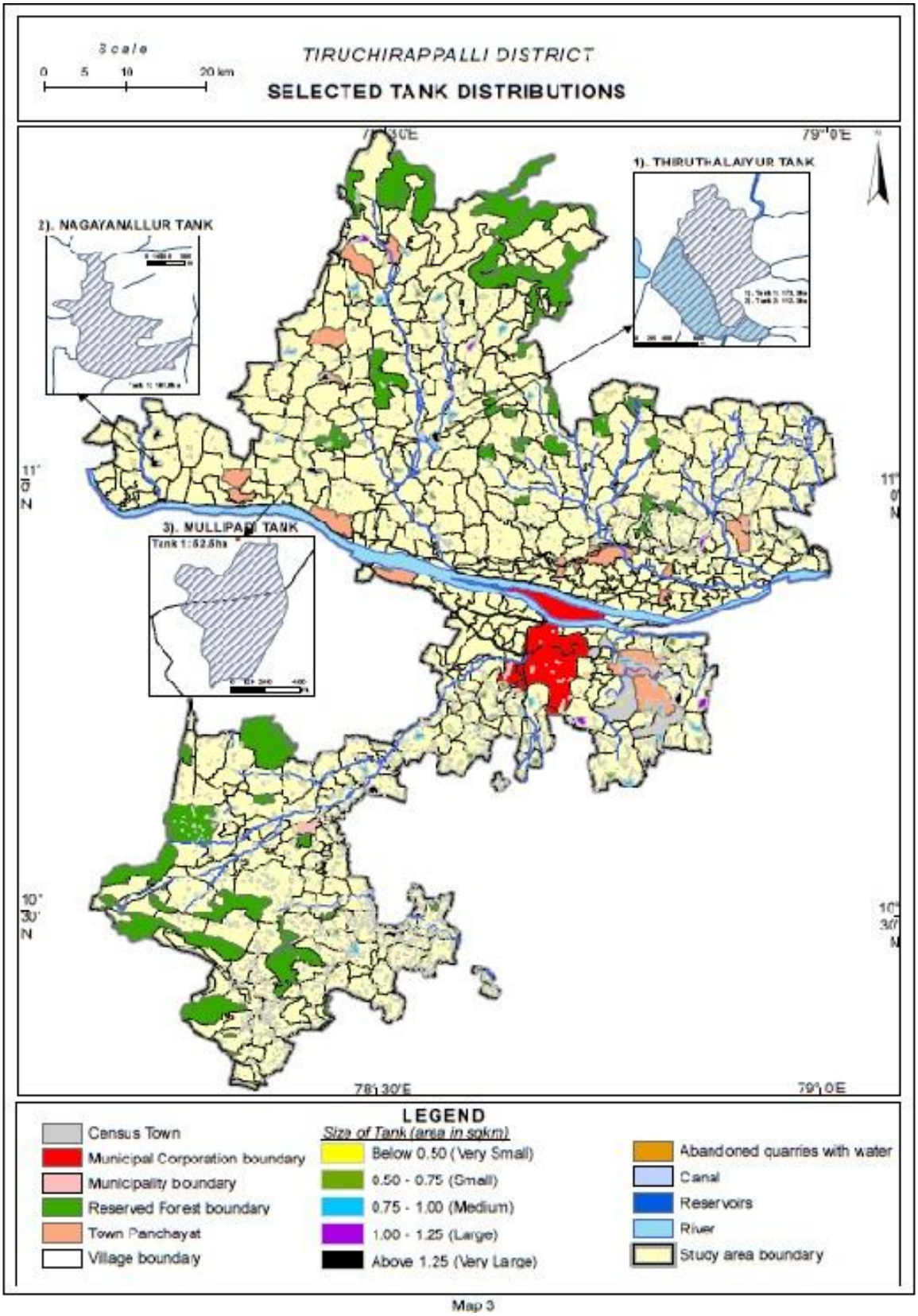

Fig. No.1 : Total Number of Wetlands in Trichy District, Tamil Nadu, India

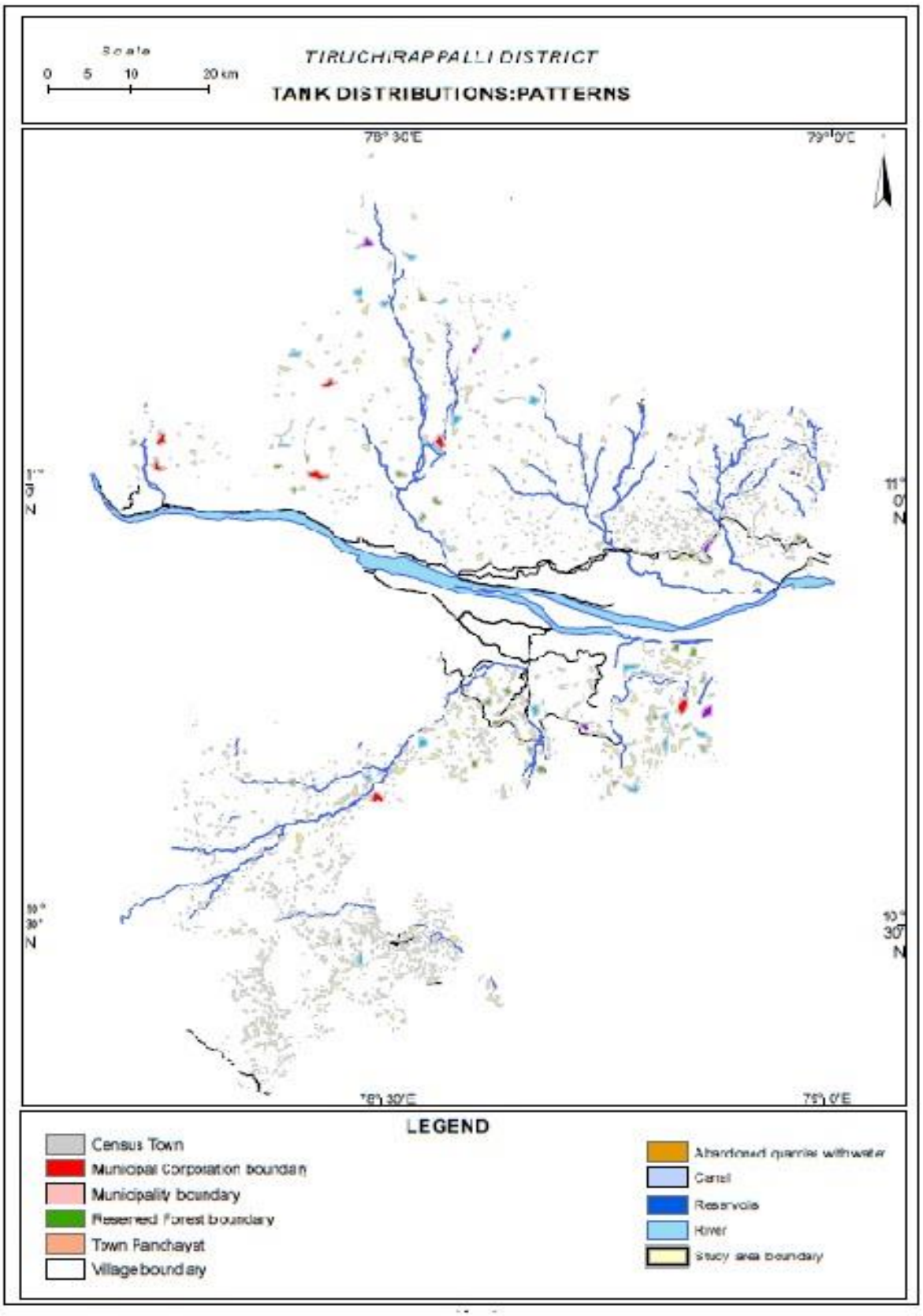

Fig. No.2 : Wetland Distribution Pattern in Trichy District, Tamilnadu, India

In South India village tanks are maintained by local government bodies because tank irrigation has a long history (Palanisamy, 2000).

Table 1. Size-class of wetlands in Trichirapalli district, Tamil Nadu, India

Sr.No.	Size Classes (sqkm)	Number of Wetlands
1	< 0.5	2366
2	0.5-0.75	31
3	0.75-1	20
4	1-1.25	5
5	>1.25	7
Total wetlands		2399

The northern part of Trichy distirict has wetlands larger in area than the southern part of Trichy district (Fig 2). This may be due to the fact that the northern area wetlands receive water from the main river Cauvery and the river Iyarru, which gets its source from Kollimalai. The southern part of the district has many micro- wetlands of size smaller than 0.5 sqkm, which may be due to the fact that they get their water from Koraiyar, which is a tributary of the Cauvery River.

The maximum aerial extent reaches to 1.73 sqkm (Thiruthalayur tank), followed by 1.6sq km in Mullipadi, and Nagayanallur with aerial extent of 0 .52 sqkm (Fig 1). Of the three tanks, Thiruthalayur and Mullipadi are maintained by PWD (Public Works Department) of Tamil Nadu.

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Conclusion

Lakes, ponds and tanks are the dominant inland wetland types found in all the districts of Tamil Nadu (Aravind, 2012). The present study gives the inventory for Trichy district. During the study period (2010-2013) failure of monsoon is witnessed which makes it so crucial to protect wetlands of Trichy district. Fourteen major irrigation tanks in Trichy district would be renovated by the central government sponsored scheme (Ganesan, 2013). Thiruthalayur tank which comes under the study area will be renovated at the cost of 57.05

lakh rupees. Without good inventory, it is difficult to promote the wise use of wetland habitats. Therefore, good inventory should be taken as the first step for good wetland conservation strategies.

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