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SHORT COMMUNICATION

IDENTIFICATION OF POLLUTION POTENTIAL ALONG CAUVERY BASIN BY SATELLITE IMAGES

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ABSTRACT

Ground water is being polluted due to sustained habitat practices including industrial activities and urbanization. The catastrophic sources of pollution decline the quality standards of both surface and ground waters. These destructive sources have been mapped with IRSP6MX image (NRSA courtesy) along with its attributes, thereof to serve as a comprehensive quality manual under GIS environment for the study area, a part of the Cauvery river basin.

Water, the most precious asset on earth, constitutes major portion of the earth. Ground water is available in permeable geological formation known as aquifers. Hydrologists unanimously agree that the most effective long-term strategies for dealing with water scarcity include conservation and efficient water use.

Rapid growth of urban areas has affected the groundwater quality due to overexploitation of the resource and improper waste management. There has been a tremendous increase in the demand for freshwater due to rapid growth of population. The emerging global freshwater crisis in terms of water quality and quantity lead to the ground water assessment studies. Hence, there is always a need and concern over the protection and management of groundwater quality. Mostly, the ground water assessment studies are presented in the form of Tables, maps, etc. and in this context, geographical information system (GIS) is used, which is a computer based system designed to accept large volume of spatial data, which efficiently manipulate and analyse various data according to user specifications (Krishnamurthy et al. 1996, Evans & Myers 1990, Halliday & Wolfe 1991).

The intended objectives of the present investigation include examination of water quality in comparison with quality standards, demarcations of aquifer boundary along the cauvery river basin, mapping the pollutant sources, developing thematic layers with attributes, to provide sufficient information about the pollutant source and characterisation of wastes.

The study area (1030 sq. km) chosen from Mettur reservoir to Erode town is a part of Cauvery basin at its upper region. It envisages boundary between latitude 11°20' to 11°50' and longitude 77°40' to 77°50'.

A rectangular grid with 60 km length in north-south direction and 6.5 km width in east-west direction was considered envisaging the above study area as shown in Fig 1. The area was divided into 16 rows and 19 columns with columns parallel to north-south direction. The grid size was selected as 2.6 sq. km.

Study Area – Satellite image **Study Area –Topo Extract**

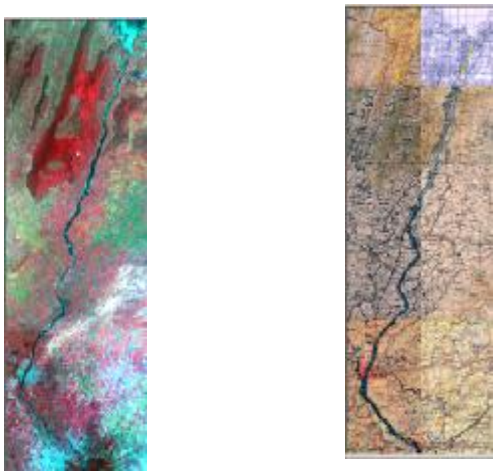

Fig. 1: Study area -satellite image and topo extract.

1. Erode
2. Karungalpalayam
3. Vairapalaya
4. Periya agraharam
5. Pudur
6. Bhavani
7. Mlapalayam
8. Chettipalaya
9. Urachchikotta
10. Selembekoundanpalaya
11. Kulikaran palayam
12. Kuppichipalaya
13. Manikampalayam
14. Kulakavundanu
15. Ammapattai
16. Nerunchipetai
17. Madaiyankuttai
18. Turkanampatti
19. Teppakulam pallam
20. Reddiyur
21. Kattur
22. Paraiyur
23. Kuppanur
24. Pulamapatti
25. Sarvareddiyur
26. Silumvampalayam
27. Perumachipalayam
28. Pulliyam patti
29. Kumarapalayam
30. Suryam palamyam
31. Pallipalayam

Fig. 2: Pollutant sources.

Table 1: Charecteristics of industrial effluent.

IND. No.	Category	Size	Type	colour	odour	Temp	pH	TSS	TDS	BOD	COD	Free CO_2	Salinity
IND 1	Red	Large	Textile Processing	Black	foul odour	40	6.7	340	2745	60	585	146	1.05
IND2	Red	Medium	Textile Process	Black	Foul odour	40	5.4	340	1340	7.8	583	146	1.05
IND 3	Red	Medium	Textile Process	Brown	foul odour	42	5.4	345	1340	7.8	580	148	1.07
26IND 26	Red	Small	Bleach liquor	brown	foul odour	42	5.5	356	1257	7.9	587	149	1.08
31IND 31	Red	Small liquor	Bleach	brown	foul odour	43	5.5	346	1240	7.5	583	149	1.98

IND. No.	Total alkalinity	Total hardness	Chlorides	Sulphides	Sulphate	Chro-mium	Calc-ium	Mg	Phosp-hate	Ni-trate	Sili-cate	Oil + grease	Tannin/ Lignin
1IND 1	50	1250	1020	24	1004	3.51	180	240	140	95	45	41	24
2IND2	50	1250	1020	24	1004	352	180	245	158	96	48	42	28
3IND 3	52	1350	1054	22	1025	324	195	246	159	96	48	43	29
26IND 26	53	1358	1058	25	1026	325	156	226	163		98	42	30
31IND 31	54	1450	1054	22	1045	325	196	249	160	98	42	43	29

The ground truth data were collected which supplement the experimental investigations. Ground truth data include 1. details of location of industries, 2. quantity of industrial effluent and 3. geomorphology maps. Experimental programme included the determination of quality of ground water and toxicology of industrial effluents and the abstract results are shown in Table 1.

The details of the industry and toxicity of pollutants were analysed and the major pollutants were identified along the river basin.

The inventories of water bodies viz., open well, pump, tube well, VES stations and pollutant source were made to prepare the aquifer boundary map. The aquifer boundary map was projected with the major industries along with their attributes.

The major 31 pollutant sources were identified as shown in the Fig. 2. The pollution potential along the banks of cauvery river basin (spread in the study area) due to influence of industrial effluents is attributed as the satellite images. As a prelude for quantification of the contaminant transport to arrive at diagnostic measures to model the transport and to appropriate the groundwater quality management taking conflicting in the part of the study area, this investigations are done.

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