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Research paper

Remote Sensing and GIS Applications in Natural Tank Management Studies of Salem District

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Abstract

Today the water shortage is one of the highlighted trouble persist in the global which causes several troubles in surroundings. Based on this in our attention we proposed to do research within the natural tank's development which performs the essential position in the garage of water and supply to all human wishes. To study the tank settlements and its utility we use GIS device for mapping and factors affecting. To develop the records on land use/land cover inside the shape of maps and statistical records is very crucial for spatial making plans, control, and utilization of land. Land use change can also influence many natural phenomena and ecological procedures, inclusive of runoff, soil erosion and sedimentation and soil situations. The goals of this examine are to locate land use modifications and different affecting parameter in Salem district purpose of water scarcity.

Keywords: *Remote sensing, GIS, Natural tank, Management and Salem.*

1. Introduction

The phenomenal populace explosion and the consequent wishes couldn't be happy with to be had floor water resources. Further, due to diverse anthropogenic activities, the floor water assets too significantly stand prone to pollution. Consequently, the man has started mining the groundwater massively; such big mining of groundwater has caused the drastic decline of water table internationally. Further, the contamination of the continental aquifers due to business and domestic pollution, depletion prompted quality deterioration, over pumping prompted saltwater intrusion alongside the coastal aquifers etc., has prompted extreme inadequacies in groundwater assets too.

The watershed provides a powerful examine and control unit, which integrates ecological, geographical, geological, and cultural factors of the land. The watershed is likewise a useful idea for integrating science with historical, cultural, financial, and political issues. Many human beings also revel in lakes and streams for his or her splendor and for boating, fishing, and swimming. Natural world additionally wishes healthy watersheds for meals and shelter. Powerful and efficient way to sustain the local economic system and environmental fitness. scientists and leaders now recognize the high-quality manner to guard the vital natural sources are to understand and manipulate them on a watershed basis. The whole thing this is achieved in a watershed impacts the watershed's device.

1.1. Management Planning

While faced with challenges and changes concerning water quality and quantity due to natural as well as human-caused risks, planning becomes essential so as to avoid their influences and confirm most beneficial utilization of the sources.

2. Methodology

Fig.1 shows the methodology of this study.

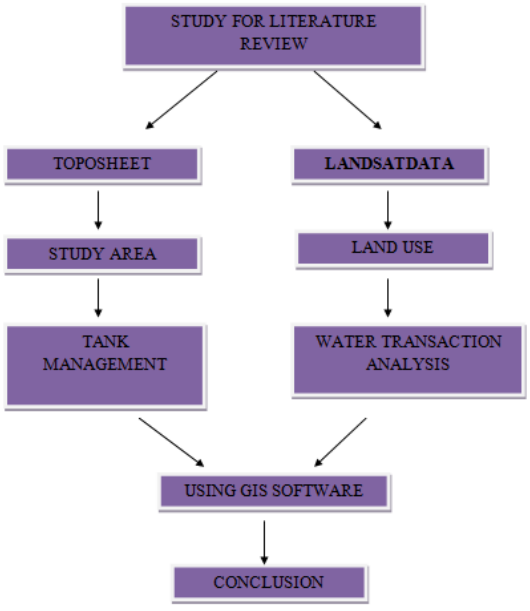

Fig.1: Methodology

3. The Study Area

Salem city is located in Tamil Nadu State of India having total area extended about 5205sq.Km. In terms of population and urbanization Salem city is the fifth largest city in TamilNadu.

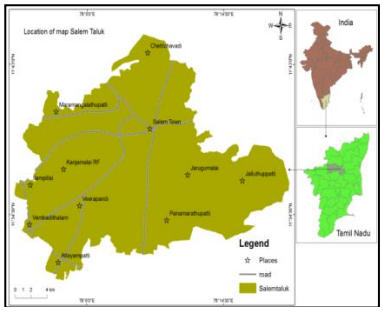

Fig.2: Location of study area

4. GIS Software

It is a efficient computer software that manages data. It analyse the different set of records system that offers especially with geographic, or spatial, information.

Remote sensing is the technological know-how and artwork of obtaining information approximately a phenomenon without being in contact with it. Far-flung sensing offers with the detection and size of phenomena with devices touchy to electromagnetic electricity along with:

- Light (cameras and scanners)
- Heat (thermal scanners)
- Radio Waves (radar)

5. Tank Details

5.1. Tank Inventory Study

Tank stock take a look at may be completed easily the use of the remote sensing era. To demonstrate that, a take a look at changed into executed in the usage of remote sensing imageries. The decadal adjustments in the number of tanks, discount/improved water unfold place and changes in application services are recognized.
Table 1 shows the landscape details.

Table 1: Landscape details

Landscape	Appllcable waterbodies	Non-applicable waterbodies	Reason why not applicable to this guideline
Urban	Artificial waterbodies Constructed urban lakes Modified existing waterbodies	Swimming pool Decorative water features Functioning stormwater treatment device	Not a wetland For information on stormwater treatment devices refer to Water by Design guidelines and resources
Perl-urban	Relic farm dams Fishing ponds Landscape features on 'lifestyle plots'	Treatment devices Aquaculture ponds Waterbodies for industry use	Outside scope of this guideline as these waterbodies usually have specific legislative requirements
Rural	Farm dams Irrigation ponds	Natural waterbodies	Outside scope of this guideline, refer to Queensland Wetlands Program tools and guidelines

The digital and updated command region map for the tank system normally will not be available. The village map and survey wide variety for cultivable and non-cultivable vicinity will best be to be had. contemporary strategies together with excessive resolution far flung sensing and gps monitoring are applied to pick out the cultivable and non-cultivable areas and through gis integration command region map may be generated which gives the up to date command region facts. Fig.3 shows the study area.

Fig.3: Study area

Fig.4 shows the study area.

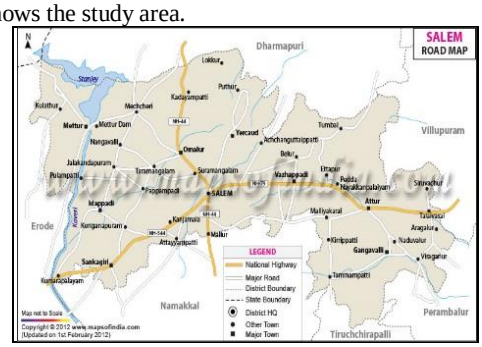

Fig 4: Study area

5.2. Preparation of Base Map

The base map of the look at is phase been prepared with the aid of using the topo sheet posted via the geological survey of India inside the year 1972. This map became used by the author to find the various villages, dam web site, river courses, hills, hillocks and to discover manner to reach the delocate areas.

6. Selection of Sites for Artificial RechargeStructures

As a way to improve the floor water situation, particularly the sustainability of each ingesting in addition to irrigation wells inside the hydro geomorphic unit, enough recharge is crucial. In case the herbal recharge isn't enough, it must be met through synthetic recharge. Many a times the web sites for constructing recharge structures are decided on based totally on administrative grounds. As a result right recharge doesn't take area leading to wastage of cash. To offer the consumer a scientifically appropriate place for constructing synthetic recharge systems, every hydro geomorphic unit is evaluated for its recharge capacity. For that reason, the types of recharge systems which might be appropriate in every hydro geomorphic unit are identified. The tentative places for their construction are recommended. The prioritization of the hydro geomorphic units with respect to taking over for creation activity on extraordinary priorities is made.

6.1. Types of Recharge Structures

The following types of recharge structures are considered for suggesting in each hydro geomorphic unit –

- Percolation Tank (PT)
- Check Dam (CD)
- Nala Bund (NB)
- Invert Well (i.e. Recharge Wells) (IW)
- Desilting of Tank (DT)
- Recharge Pit (RP)
- Subsurface Dyke (SD)

In hilly terrains, the following water harvesting/ recharge structures will also be included:

- Storage Tank (ST)
- Soil Conservation Measures (SCM)

7. Results

Fig.5 shows the FCC Image of IRS P6 LISS III.

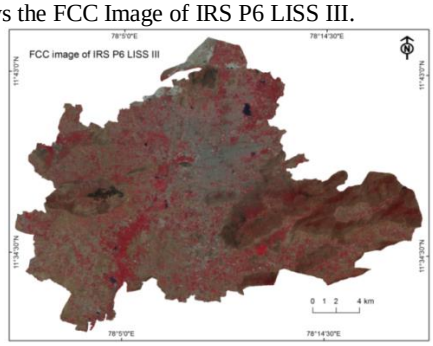

Fig.5: FCC Image of IRS P6 LISS III

7.1. Boolean Logic Method for Tank with Other Features

Fig.6 shows the tank with slope and stream order.

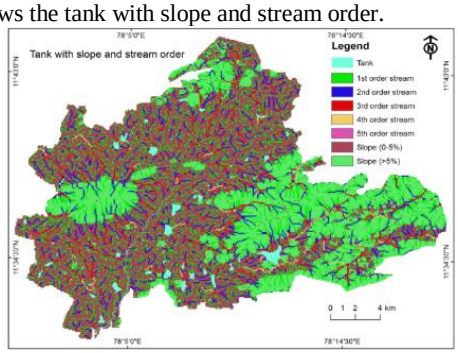

Fig 6: Tank with slope and stream order

7.2. Tank Hydrology

Tank yield is the volume and timing of runoff reaching the tank. Knowing the amount of water to be had inside the tank, farmers can take a decision about irrigation scheduling, alternate of cropping pattern and different irrigation control activities. In place of the use of mathematical fashions, surely drawing the size and monitoring the water degree of the tank enables in estimation of tank yield at the cease of each storm occasion. scale may be drawn near the sluice as in discern and at surplus weir if you want to gather the ranges of tank water at different intervals, which forms one of the number one statistics required inside the evaluation of tank yield. Fig.7 shows the tank geology.

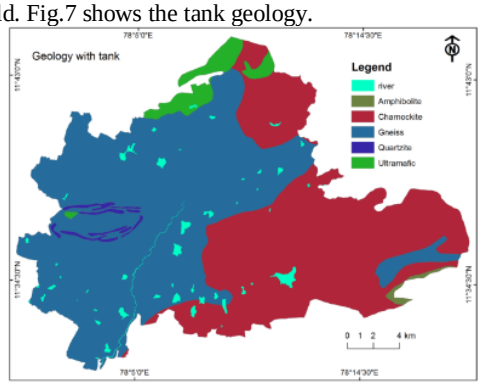

Fig.7: Tank geology

Fig.8 shows the tank geomorphology.

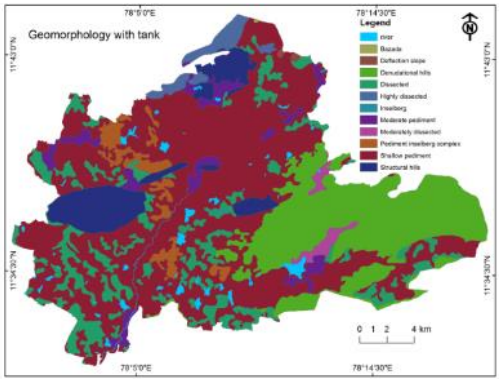

Fig.8: Tank Geomorphology

Fig.9 shows the land use / land cover

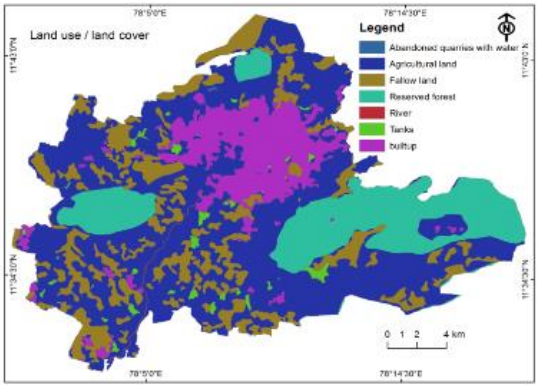

Fig.9: Land use /Land cover

Fig.10 shows the water level.

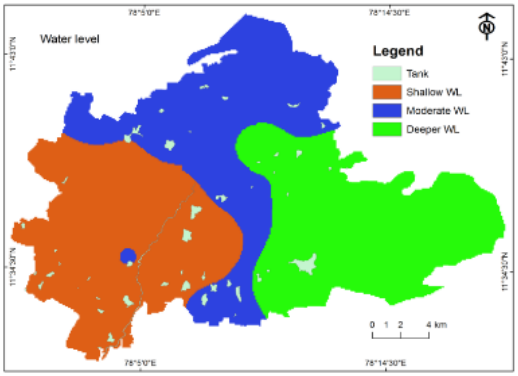

Fig.10: Water level

Table 2 shows the water level of tank.

Table 2: Water level of Tank

S.NO	WATER LEVEL	PRIORITIZATION
1	Deeper water level with tank	Very high to High Priority for management
2	Moderate water level with tank	Medium priority
3	Shallow water level with tank	Low priority

7.3. Recommendation

7.3.1. Adopt Integrated Watershed Management

Considering the huge growth and the stress on the area's, environmental indicators together with wetlands, rivers and forests cowl. The states placed watershed should adopt an ecosystem-primarily based integrated GIS and far off sensing watershed control approach with the intention to quicken the periodic

tracking of the delta's surroundings health and the interaction between human activities and the environment inside the place.

8. Conclusion

Our research project gives the knowledge about the combined use of remote sensing and GIS for development of a tanks and for development of its hydrologic response, to various land use and land changes. The total spatial analysis of the available information, which can be derived from remote sensing helps in the preparation of development plans before they are implemented. Sustainability of tank irrigated agriculture necessitates the proper maintenance of tank system. Here we conclude that the GIS software tool which plays important role in maintaining tank. This study explains the usage and total effectiveness of spatial technologies in setting of the various problems of tank irrigation methods and give the new idea with proposal for suitable corrective measures for its former condition.

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