

Map description and analysis

Introduction:

- Madurai District is in the South-Central Region of Tamilnadu lying between longitudes 77°2' and 78°2' and between latitudes 9°30' and 10°27'. The general slope of Madurai District is from West to East.
- There are 7 Taluks, 13 Blocks, 669 Villages consists of population 25,62,279(Rural Population= 1129028, Urban Population= 1433251).

Physiography and Drainage:

- It has geographical area of 3741.73 sq.km, consists of 7 Basins out of which two (Vaigai ,Gundar) is major.
- Central Part of Madurai district is drained by Vaigai River and Gundar river that forms parts of Vaigai. Northern Part of the district is drained by Pambar.
- Southeastern part of the district (part of Sedapatti and Kallupatti blocks) falls in Vaippar basin and the area is drained by Arjuna Nadi.

Major Contribution of Tanks:

- Madurai has 13 Sub Basins, possessing **1338** Tanks, contributing a Ayacut of **52197.21ha**, Water Spread Area of **28395.33ha**, Cumulative Capacity of **2143.48x10⁶m³**and Catchment Area of **9886.43km²**.

Application of Analysis:

- Tanks are becoming endangered at these recent days. To reduce the encroachments and siltation in the water spread areas/Tanks, supply channel and surplus courses, take preventions to mitigate major flood loss.



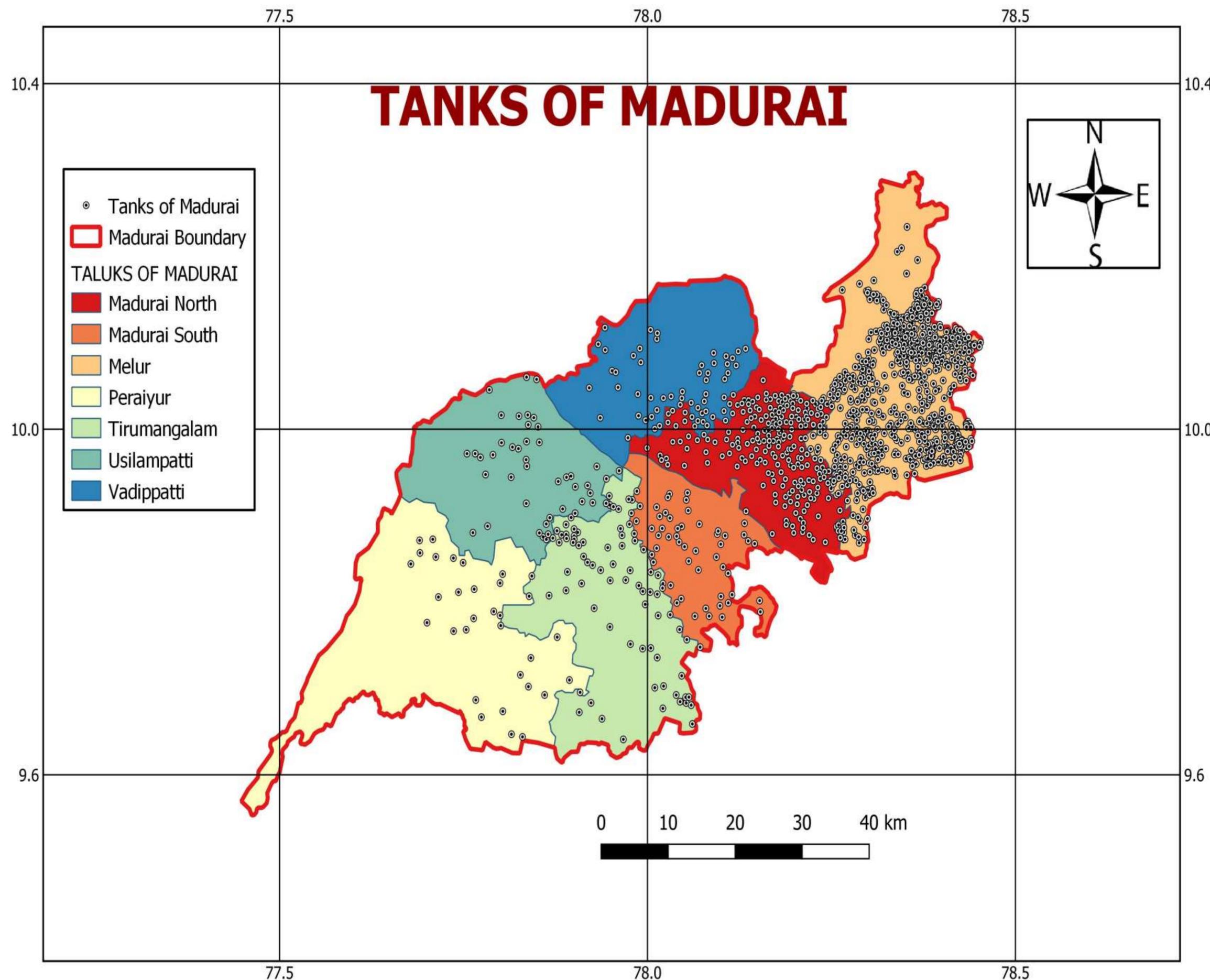
Team Name: HYDRO VECTOR

Topic: Tanks of Madurai.

Team lead: Akashkannan K

Organization: Thiagarajar college of Engineering

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Irrigational System:

- Madurai has a source of irrigation from PERIYAR – VAIGAI IRRIGATION SYSTEM (irrigating about 57,000ha, SATHYAR reservoir (irrigating about 200ha), Minor Irrigation tanks, Dug wells and Tube wells.
- Area under cultivation: 150704 ha(ha=hectare)

Capacity of Tank:

- Gross volume of water which can be stored in the Tank/storage structures.

Capacity specification of Madurai Tanks:

- Madakulam Tank**(Thirupparankundram Village, Madurai South Block) is the Largest Tank in this District, having Maximum Capacity of $166.90 \times 10^6 \text{m}^3$ serving Agricultural land of **1043.30ha.** (ha=hectare)
- Also there exists a many small tanks of magnitude less than 1MCM.
- Cumulative MCM of 1338 Tanks= $2143.48 \times 10^6 \text{m}^3$
- 1MCM=1Million Cubic Meter(10^6m^3)

Important crops:

- Paddy, Millets, Pulses, Seeds, Cotton, Sugarcane (in Madurai Sedapatti Block- Vaigai river Basin).

Application of analysis:

- With the cumulative capacities of Tank, current available water for the given population density and Irrigational lands can be evaluated.
- Proper rationing of water for both domestic purpose as well as agricultural utilities can be validated.
- Cost for Maintenance of Conduits and its new installation can be done in very effective manner.
- Seasonal opening of sluices may be decided by knowing the Capacity of Tank.



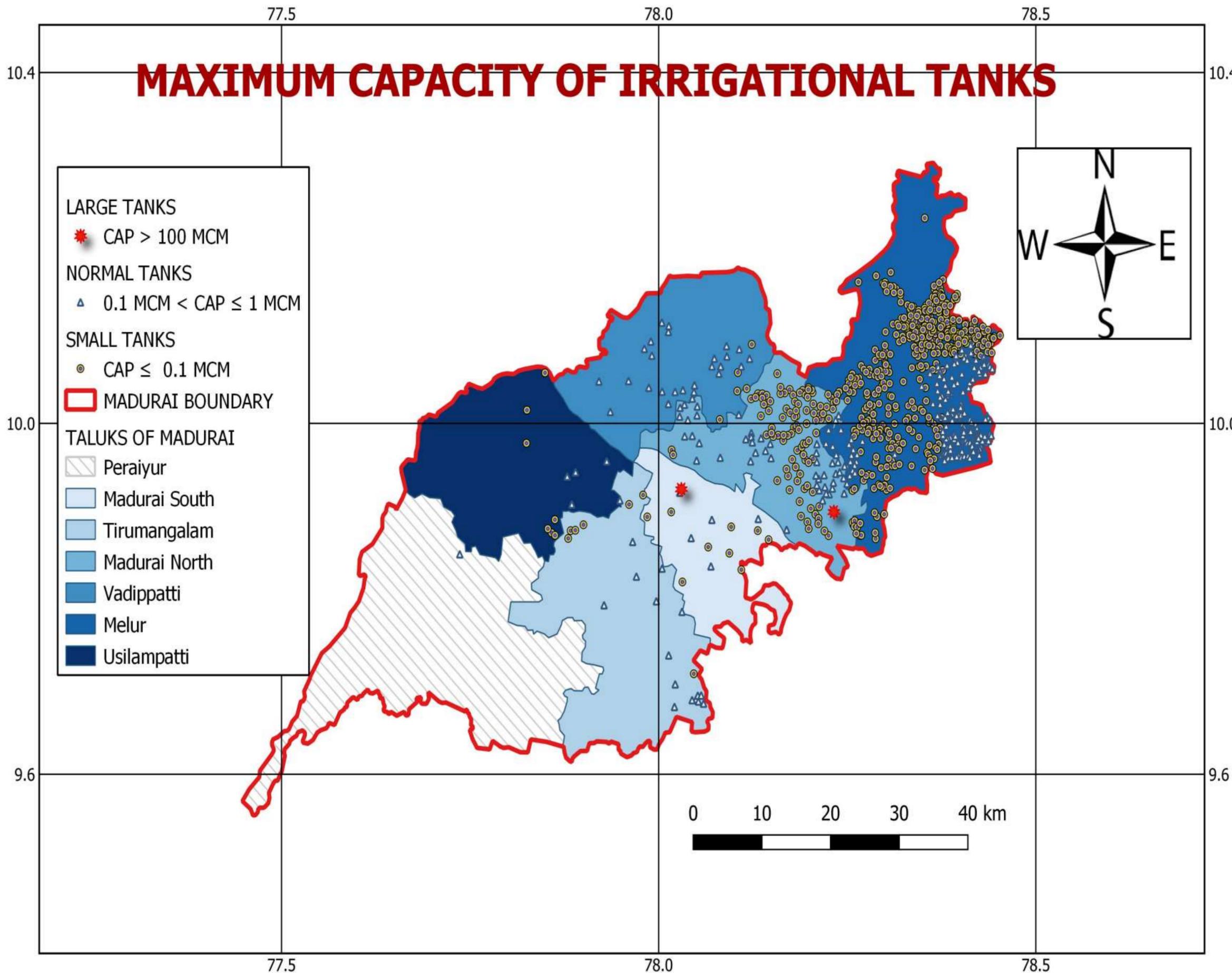
Team Name: HYDRO VECTOR

Topic: Maximum capacity of Irrigational Tanks.

Team lead: Akashkannan K

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77.5

78.0

78.5

10.4

10.4

10.0

10.0

9.6

9.6

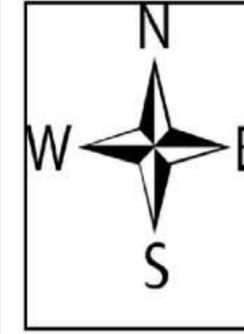
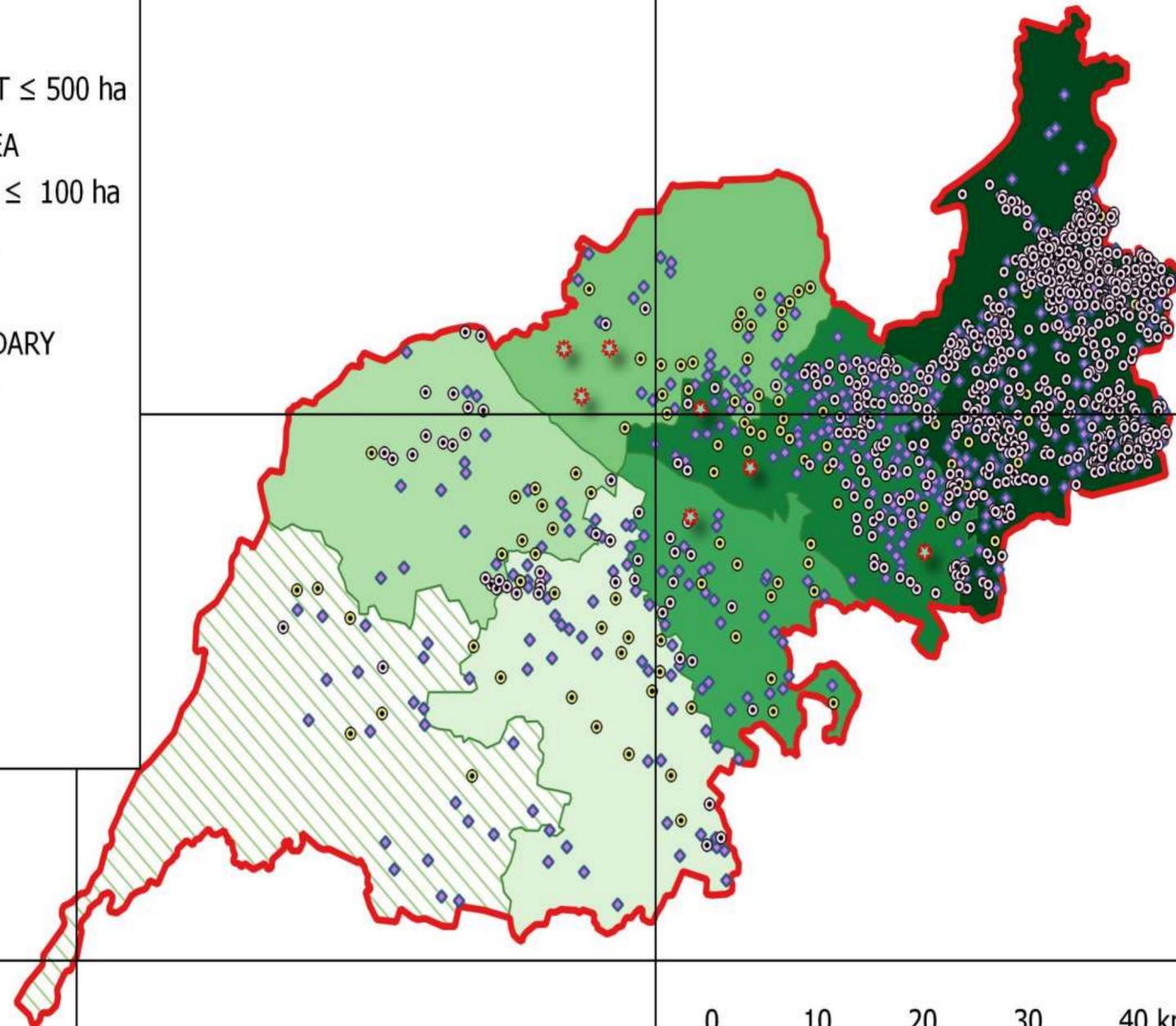
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AYACUT AREA OF MADURAI

- VERY LARGE**
 * AYACUT > 500 ha
- LARGE AYACUT AREA**
 ○ 100 ha < AYACUT ≤ 500 ha
- NORMAL AYACUT AREA**
 ◆ 25 ha < AYACUT ≤ 100 ha
- SMALL AYACUT AREA**
 ○ AYACUT < 25
- MADURAI BOUNDARY**
 □
- TALUKS OF MADURAI**
- ▨ Peraiyur
 - Tirumangalam
 - Usilampatti
 - Vadippatti
 - Madurai South
 - Madurai North
 - Melur



Map description and analysis

Ayacut:

•The area served by the Tanks for the irrigational purposes.

Ayacut specification of Madurai Tanks:

•Madurai Tanks has a cumulative ayacut of almost **52197.21ha**(ha=hectare), spreading over **669 villages** namely Elumalai, Mellapuram ,Perungamanallur, Kallappanpatty, Poosalapuram, Sembarani, Kuppalnatham, Sedapatti etc...,

•MADAKULAM TANK serving largest ayacut area of about **1043.30ha** to its neighbouring villages with a capacity of $166.90 \times 10^6 m^3$, comes under the Sub basin of GridhamaalNadhi,basin of Gundar.

•Also there exists a small ayacut served by tank of magnitude less than 1ha like CHINNAKULAM TANK.

Important crops:

Area under cultivation: 150704 ha
 Paddy, Cholan(Maize) Cumbu(Millet), Sugarcane, Groundnut, Banana, Cotton, Jasmine.

Application of Analysis:

•Using these data, Government can allocate relief fund for farmers whose who have lost their grown crops in their own field due to Natural calamities like **CYCLONES, FLOODS, HEAVY RAINS** etc...,

•These data directly contribute the region of Natural wellness meant for **potential & productive agricultural areas**.

•Gives a clear vision to **protecting** those particular areas with immense beneficiary data.



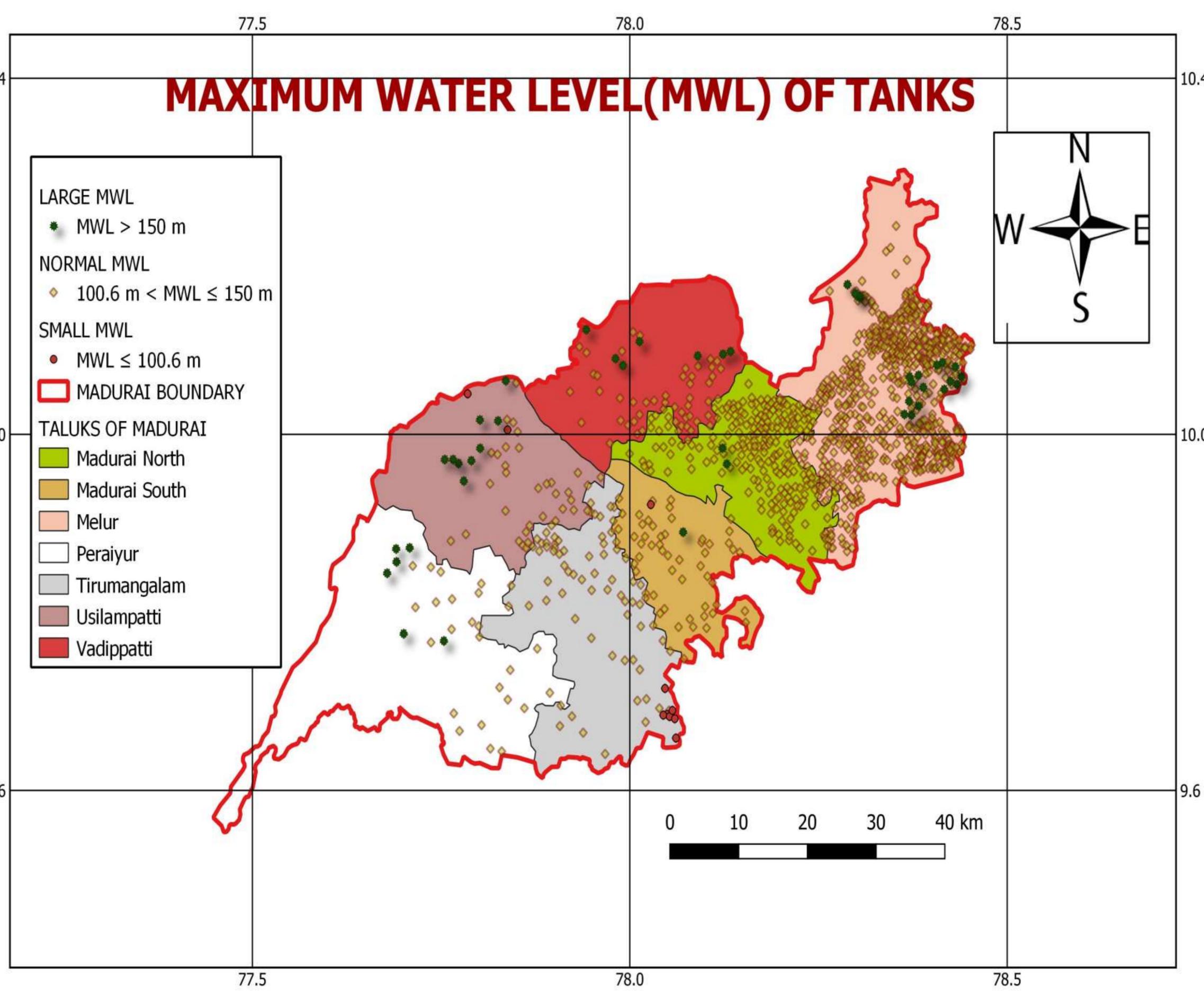
Team Name: HYDRO VECTOR

Topic: Ayacut area of Madurai.

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Maximum Water Level (MWL):

- Water level that is attained during the passage of the design flood.
- It depends upon the specified initial reservoir level and the spillway gate operation rule. (also called sometimes as the HIGHEST RESERVOIR LEVEL or the HIGHEST FLOOD LEVEL).
- Cumulative MWL of 1338 Tanks = 183307.57m (m-meter)

MWL specification of Madurai Tanks:

- **Veppankulam Tank** has the highest Maximum Water Level (MWL) of **497.41m**, located in the Madurai North Taluk- Kulamagalam Village comes under the Sub Basin of Sathaiyar, Basin - Vaigai
- Also there exists a Tank possessing smallest MWL **less than 1m** like **Chandrakulam Tank**, located in the Thirumangalam Taluk- Kallikudi Block comes under the Sub-Basin of Therkar, Basin- Gundar.

Application of Analysis:

- To increase the depth of Tank, to meet the future forecasted water requirements which would be found by **Mathematical modelling**.
- To mitigate the **Major flood loss** by monitoring the water level by taking these values as extreme values.
- Alarm for a time to **Desilting of Tank** (Desilting process)



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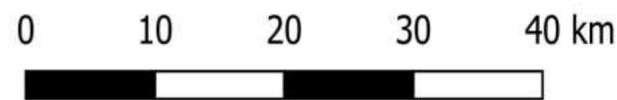
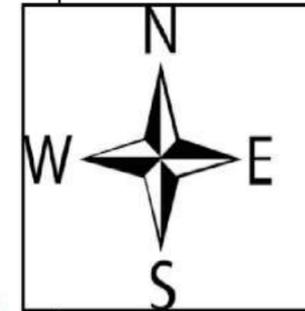
Topic: Maximum Water Level (MWL) of Tanks.

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WATER SPREAD AREA OF TANKS



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Water Spread Area:

- Water Spread Area (WSA) will have the meaning of area covered by water i.e., land of Tank occupied by water (submerged area)
- Cumulative WSA of 1338 Tanks= 28395.33ha (ha=hectare)

WSA specification of Madurai Tanks:

- Valandur Tank** having the largest value of Water Spread Area of **1014.0ha**, located in the Valandur Village-Usilampatti Taluk.
- Also there exists a Tanks having WSA **less than 1ha** like **Veeraputhukulam**(Katchirayanpatti Village- Melur Taluk), **Somakulam**(Maruthankudi Village- Thirumangalam Taluk) etc.,

Application of Analysis:

- These data enable us to directly measure the available surface water in the particular zone, which can be **index factor** for balancing the eco-systems.
- Using these data, Government can easily allocate fund for CPWD, SPWD for the **Civil repair Project**.
- To monitor/detect any **encroachment** in these areas.



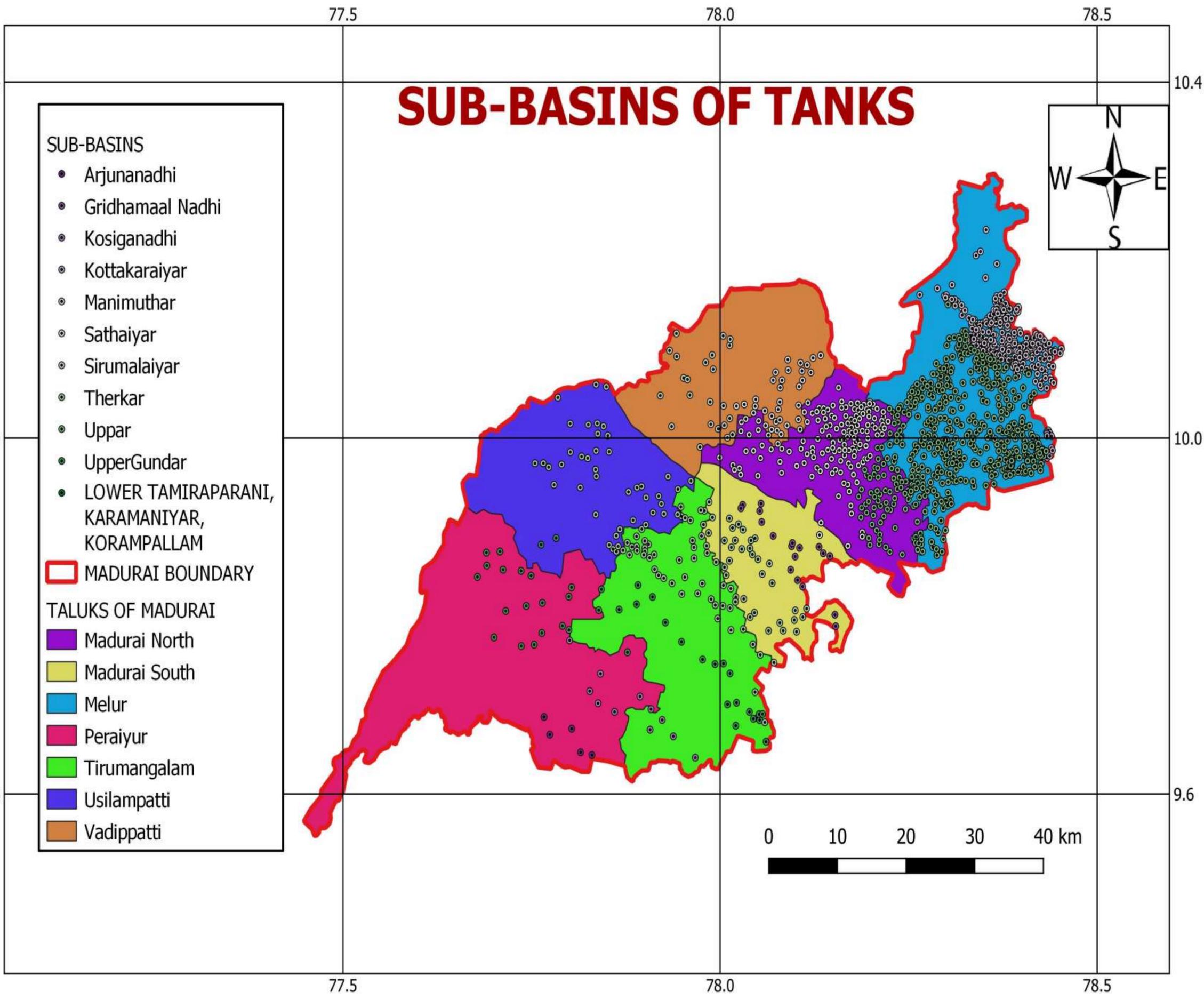
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Sub-Basin:

•**Sub-Basin** is a structural geologic feature where a larger basin is divided into a series of smaller basins with intervening intrabasinal highs.

Sub-Basins of Madurai Tank:

□ There are **13 Sub-Basins** in the Madurai district, namely, (With number of tanks under these Sub-Basins)

Arjunanadhi-5, Gridhamaal Nadhi-24, Kosiganadhi-11, Kottakaraiyar-31, Manimuthar-330, Sathaiyar-187, Therkar-137, Uppar-540, UpperGundar-44, Lower Tamiraparani-5, Karamaniyar-1, Korampallam-1, Sirumalaiyar-22

Basins of Madurai:

□ There are almost **7 Basins** in Madurai which in turn converted into Sub-Basins as above. They are mentioned below with number of tanks fall under this Basins too.

➤Pambar Kottakaraiyar-363, Vaippar-16, Vaigai-748, Nambiyar-1, Kallar-1, Gundar-204, Tamiraparani-5

Application of Analysis:

•Geological /Soil Analysis data combined with our obtained data, suitable agricultural crop may be suggested to cultivate in those regions, pertaining to uniform Sub-Basins.

•With the help of these data, Renovation/Repair work in any particular Sub-Basin can be made since repair work simultaneously affect the series of Tanks associated in the particular Sub-Basin.



Team Name: HYDRO VECTOR

Topic: Sub-basins of Tanks.

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