
Vassar Labs IT Solutions

5th Floor,
Building no 9,
Raheja Mindspace,
Hyderabad, 500081

Rural Water Stress

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OVERVIEW

This Project is aimed at providing insights into the drinking water availability in every habitation of Andhra Pradesh state and enabling the government to take actions accordingly.

GOALS

1. Providing a dashboard for administration where they can drill down through various geographical levels and see the critical habitation points.
2. Provide a form where users can report the water stress status of a village/habitation

SPECIFICATIONS

Stress_Threshold is the groundwater level value which indicates the point at which the Village/Habitation enters the stress status

Stress_buffer is the range below the *Stress_Threshold* which would be considered as stress vulnerable zone.

Stress Types :

System_Critical_Stress when groundwater level value of that Village is more than *Stress_Threshold* or Tankers started delivering water

System_Moderate_Stress when groundwater level is between *Stress_Threshold* and *Stress_Threshold - Stress_buffer*

System_Normal when groundwater level is lesser than (*Stress_Threshold - Stress_buffer*)

Water Stress Specification

- System has to change the stress indicators as soon as the *Stress_Threshold* is changed by user or we receive data of tankers from scraper as per the ranges and conditions defined above

- User_Critical and User_Moderate Stress

UI for user to easily report the stress from field data.

Update the *Stress_Threshold* (in case of User_Critical input) and *Stress_buffer* (in case of User_Moderate input) with present GW levels when they submit the status

System Stress can be overridden by Users

User_Critical or User_Moderate to No stress when the GW resumes back to within the new threshold.

Tankers data will be used to bring back the stress situation to No stress situation by giving deep blue or light blue colours.

Instead of tanker based stress or no-stress, we should use the amount of water supplied to identify light and dark blue

>10 is Dark Blue

>5, <10 is light blue

The Meta Data Creation

- Create village/habitation level *Stress_Threshold* value that indicates the stress

- Use shared files that have village wise when stress has started

- Village/Habitation level requirement of tankers

- Village/Habitation level population data

DB Design

water_stress_md, water_stress_md_history

Column name	Type	Description
location_type_md_id		
location_name		
location_code		
threshold_value		
impacted_population		
buffer_value		
source		Can be user input/historical/live tanker data
update_ts		
insert_ts		

Indexes

search_index(location_type_md_id, location_name)

unique_index(location_name)

water_supply_data

Column name	Type	Description
location_type_md_id		(select location_type_md_id from platform_data.location_type_ md where name = 'HABITATION')
location_name		
location_code		
event_gen_ts		
event_gen_day		yyyyMMdd
water_quantity		Quantity in kiloLitres
water_quantity_mu		18
supply_block_count		No. of trips
supply_block_capacity		Tanker capacity
supply_block_mu		18
source		user/tanker etc
insert_ts		(select unix_timestamp()*1000)
user_session_id		0

Developer Notes :

Scripts to include tanker data, UI driven user stress inputs

Data Availability/Requirement:

- 5 years of Historical groundwater Data - wont get, use currently available system data
- Habitation Shape files - won't get, use village level shape files
- Start of Tankers data for the entire state for 2-3 years
- Borewell GPS locations - won't get, use village level data
- Tanker Data source and format - current data to be scraped

Sprint:

db design

1 - harsh/kalai/kumar

existing data analysis and importing new data

2 - kumar

backend logic - kalai

- Find nearest R grid for each village and store it in *grid_entity_map* table. Only for each village but not for each grid. Cache the mapping - Nilesh

- Generate habitation to village mapping cache using DMV code from shape file and the corresponding code from the website. - Nilesh / Sravan / Kalai

- Historical tanker data upload - Sravan

- Service to interpolate gw data and cache it at grid level. Use nearest R grid interpolated data for village level data. - Kumar

- Based on historical tanker data and village level interpolated data, generate habitation level stress threshold metadata. GW levels should be picked for 8:30am for metadata as well as stress indicator cache updates. Assume habitation level gw is same as village - Kalai

- We'll scrape the data at habitation level and insert into *water_supply_data* table

- On incoming tanker data, raise an event to update the stress threshold metadata at the village level based on live tanker data in handler. WATER_SUPPLY_EVENT

- update *water_supply_data* db table

- raise THRESHOLD_UPDATE_EVENT - updates the stress threshold metadata, find the current gw level at the habitation and updated stress threshold and population metadata for the habitation if this gw depth is lesser than the existing threshold value.

- At the time of period stress indicator cache update :

- use the habitation to village mapping cache; village to rgrid mapping cache; assign gw level at village (this will be assumed to same at habitation) using interpolated data at rgrid; use stress threshold and population metadata to populate the stress indicator cache. This will determine CRITICAL_STRESS / MODERATE_STRESS / NORMAL status. Aggregate habitation level tanker data to village level and so on upto state level.

- After determining the stress level, use the last 24 hours tanker supply data to update stress indicator (SUFFICIENT_WATER_SUPPLY - blue if greater than 10 kL per person / MODERATE_WATER_SUPPLY - light blue if between 5 to 10 kL per person)

- On user input :

- Raise USER_INPUT_EVENT - updates the user input db table

- Raise THRESHOLD_UPDATE_EVENT - updates the stress threshold metadata

- User no stress stays active for n days. User stress input only updates the threshold, stress indicator will be subject to next cache update

-1.5

play changes - 2

Ui.html - 1 - praveen

input for current stress - 1.5 - eshwar/zubair

water stress heat maps and ui - 2 - eshwar/zubair/nilesh

Questions/Assumptions

1. How do we calculate the stress threshold buffer for each location (village) from history data?

Buffer is at habitation level and fixed at 1m for now.

2. Threshold will be generated at habitation level from history data. How do you map habitation threshold to village level (min/max/avg) ?

minimum

3. What is the source of current tanker data?

4. Is population affected to be assumed same as the static village level population ? Or does this come with live tanker data?

Population is dynamic, we'll get population

5. Since stress calculation is to be done at village level, we need to calculate gw level at village. This will be done by interpolating station data to R grids and using nearest R grid's interpolated value at the village.

6. Tanker data is available at habitation level. Mapping required from habitations to Villages

If we're showing no stress and user says stress, we'll update the stress threshold.

If we're showing normal and user says no stress, it has expiration of one week.

7. No. of habitations to be shown at village level