

**‘Guidelines for Preparation of GIS Based Water Conservation Plans and
Inventory of Water Bodies for Districts
Under “JAL SHAKTI ABHIYAN: CATCH THE RAIN” Campaign’**



National Water Mission
Ministry of Jal Shakti
New Delhi

Jal Shakti Abhiyan: Catch the Rain (JSA: CTR) campaign was launched by Hon'ble Prime Minister of India on the World Water Day, 22nd March 2021. The theme of this Abhiyan is *"Catch the Rain – where it falls – when it falls"*.

In order to catch the rain where it falls, we need to renovate/repair already existing water bodies/water harvesting structures and also construct new water bodies/water harvesting structures, so as to conserve rain water into the three forms that are surface water, soil moisture content and groundwater. Districts need to prepare the district/block/village level water conservation plans, incorporating plans for renovation of existing water bodies/water harvesting structures and construction of new water bodies/water harvesting structures. This is one of the most important activities of JSA: CTR campaign.

For preparing the District level Scientific Water Conservation Plans under the JSA: CTR, there are two main tasks as mentioned below are to be carried out by the districts using geo-spatial tools like Q-GIS/Arc GIS/ERDAS tools and satellite data.

Activities to be undertaken by the districts for preparation of Geographic Information System (GIS) based district water conservation plans, if not done already:

1. Identify and prepare an inventory of existing water bodies/WHS

All Collectors have been requested to enumerate all the water bodies in the district, w.r.t the revenue records, geo-tag it and make a detailed inventory of the water bodies. Once identified, plans for repair/renovation of these (where required) are to be prepared and then executed. Various steps involved in this task are given below:

- a) Identification of all existing water bodies/WHS with the help of GIS experts. A database of these structures needs to be created using the satellite images with sufficient resolution or manually through imagery from Google Earth. Wherever satellite images are not available, freely available imageries of 'Google Earth Pro' can be used.
- b) The functionality of the water body and its condition has to be tagged on Google along with approximate submergence of that water body and thus the capacity calculated as well. This process will save lot of time and all water bodies/Water Harvesting Structures will be covered.

- c) Shape file of all existing water bodies /WHS identified above is to be created by the GIS expert. KMZ Layer of these points has to be generated and should be provided to the DM/Collector of the district.
- d) The DM/Collector shall assign the field verification of the identified structures, Gram Panchayat (GP) wise, to the engineers of all water management related engineering departments of the district, that is Water Resources Department (WRD), Public Health Engineering Department (PHED), Watershed Department, Forest Department, MGNREGS Department, Panchayati Raj Department and Rural Development Department etc.
- e) DM/GIS expert will share the KML file of GP with the concerned engineer (field officer) who has been assigned with the corresponding work.
- f) Field officer will go to that GP locations and tag these points using the mobile app (given to the districts by NWM, M/o JS, GoI) and will fill all the particulars including the present functionality status of the structure and comments on whether renovation required or not. If renovation is required, then the amount required for renovation will also be recorded in the mobile app.
- g) All the contents of the mobile app would be transferred to central servers on a real time basis and /or daily basis.
- h) All the structures marked for renovation would be renovated using the MGNREGS funds.
- i) The identification of the structures by the GIS expert using Google imageries and the corresponding ground verification by the field officers has to be done.
- j) Funds from MNREGS have to be fully utilized to perform the repair/renovation of these structures.

It is observed that many efforts have been made to make the inventory of water bodies in districts. CWC, NWIC, NIC and state agencies have been involved. Also, as per the directions of Hon'ble *NGT* in its order dated **18.11.2020** in OA 325 of 2015, restoration of all water bodies are to be done. The last meeting on this subject was also done with Chief Secretaries/ department secretaries of states on **30.3.2021**.

Note: All these information need to be consolidated at the ground level by the DMs, cross checking with the revenue department land records and the factual position on the ground to avoid duplication of data and confusion caused by multiplicity of databases.

2. Identify locations for new water bodies/WHS locations

Various steps involved in this task are given below, if not done already:

- a) First is the identification of all the drains in the district and make a shape file. There are three options to do this and are given below:
 - i. **Option 1:** Most of the states have **watershed atlas**, prepared by respective state remote sensing agencies and these are available in the shape file. The *drainage thematic map* of watershed Atlas in shape file be used.
 - ii. **Option 2:** Indian Space Research Organization (ISRO) may be asked to share the **2.5 m CARTOSAT Digital Elevation Model (DEM)** with all the states. GIS experts may extract all the streams in a given district from this DEM.
 - iii. **Option 3:** If ISRO cannot share the DEM of some places due to strategically reasons, **freely available SRTM 30 meter** data may be used for extraction of streams but accuracy of plan will require lot of understanding by GIS expert.
- b) Second step is the **superimposition** of the existing structures which are identified in the first task above on top of the **shape file** containing all the streams.
- c) Third step is the **identification of untapped drains** from the above **superimposition**. With the existing structure marked on all the streams, untapped streams can be identified.
- d) Fourth step is to identify the locations of feasible structures. The engineers of respective departments have to help the GIS expert in specifying appropriate Water Harvesting Structures at these identified locations.
 - i. **Proposing Suitable structures to be proposed on untapped drains:**
 - For 1st order drains - Mini percolation tank (Cost – Rs. 1-2 lakh, capacity – 1000 m³, Catchment- 5 hectare)
 - For 2nd order drains – Percolation tank (Cost – Rs. 3-7 lakhs, capacity – 2000 m³, Catchment- 5 to 10 ha)

- For 3rd order drains – Pakka check dam (Cost – Rs. 10-15 lakhs, capacity – 4000 m³, Catchment- 10 to 20 ha)
 - For 4th order drains – Anicut (Cost – Rs. 15-45 lakhs, capacity – 6000 m³, Catchment- greater than 20 ha)
 - For 5th order drains – Micro Irrigation Tank (Cost Rs.50 lakhs, capacity – 9000 m³, Catchment- > 40 ha)
- ii. **For Catchment area works (in situ moisture conservation interventions):**
- Land use/land cover map can be used to find out the category of land like Scrub/Degraded forest lands/pasture lands. Depending on the feasibility, these lands may be fully or partially treated (say 25%).
- iii. **Works on cultivable lands (in situ moisture conservation interventions)**
- 40% of arable land in a particular block can be taken up for activities like Farm Pond, ECDs and field Bunds.
- e) Sixth step is to construct the structures so designed. Execution of these structures has to be planned department-wise. Funds for construction and maintenance of these new structures have to be arranged by converging both central and state government schemes and programs related to water conservation and management.

3. In every district opening of a “Jal Shakti Kendra”

- 1) To assist the DMs/Collectors to co-ordinate all activities related to Water conservation in the district. This will **NOT** be a fund providing center, but will function as a *support center* for the District Magistrates/Collectors on water related issues including the plan preparation.
- 2) To act as a *KNOWLEDGE CENTRE* for the public to get information related to water and water sources in the district and a technical guidance center to advice local people about the APPROPRIATE rain water harvesting structures, suitable to the *climatic conditions* and *soil strata* to be taken up to store rainwater.

Note: To facilitate the District Magistrates/District Collectors to do GIS mapping and make the inventory of all water bodies and water conservation plans and to setup the Jal Shakti Kendra's,

*Nation Water Mission will provide Rs 2 lakhs. (Rs 1 lakh initially and Rs 1 lakh based on the performance). DMs/DCs may use the services of NIC or hire a GIS expert for a period not more than 60 days to get the mapping/ planning done, if not done already. DM/DCs were asked to provide their official bank account number to transfer the amount vide ref **M-65022/13/2020-NWM/778** dated **15/3/2021** and **19/3/2021** sent as DO from AS and MD, NWM and in the official NIC email ids of the DMs/Collectors.*
