

# Smart Maps on Android Phones

Digimap



# Agenda

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- ① Who we are and What we do
- ① Limitations of Android PDF reader App
- ① About Digimap Android App
- ① Which geodata can be imported & created
- ① For whom Digimap is useful
- ① Digimap deployment Process
- ① Why it is needed and What we achieve
- ① Collaboration & Technology Transfer
- ① A few screen shots of Digimap in use
- ① Benefits to Jal Shakti Abhiyan

# Who we are

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- We are a GIS & Mapping Consulting & Training firm based in Pune
- We have a working experience of over 18 years in deployment of a wide range of Open Source Software in diversified sectors
  - 10 plus years experience in QGIS & developed our Digimap GIS App
- Worked with many Government agencies in different capacities
- Deliver maps as per IIT Bombay norms for assessment of Jal Yukt Shivar Abhiyan work sites, to validate scientific compliance

– Contact us –

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# What we do

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- We provide technical consultancy, training & services in
  - ✓ QGIS Desktop GIS Software with important Plug-ins
  - ✓ Vector & Raster data processing
  - ✓ Remote Sensing & Satellite Imagery data processing from open & freely available sources like SRTM, Landsat, Sentinel etc.
  - ✓ Delineating Micro-Watershed maps of 250 – 300 Ha for villages
  - ✓ Creating up to village level maps from any Third Party / Government sources
- We conduct 3 & 5 Days GIS Training Programmes for
  - ✓ GIS & Data Integration (eg. Census 2011 data, District Micro-Planning data, etc)
  - ✓ QGIS for Village level Micro-Watershed development
- Smart field mapping & assessments using Digimap & QGIS
  - ✓ Composing maps from all input data

# Limitations of Android PDF Reader App

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- PDF files generally are not geo-referenced and do not have any corresponding ground points associated with the geo features.
- Though many files can be opened at once, they are loaded in different tabs & not as stacked layers in a single view.
- Extra features can be drawn as annotations, but can not be made available across all the tabs simultaneously & accurately.
- These drawings can not be saved & exported, explicitly in GIS vector data format & can not be imported in any GIS software like QGIS.
- Facilities like getting GPS location of the user with marker on the map, distance & area measurements on the map, scale bar, North arrow are not available & possible.
- Satellite imagery can not be viewed & compared with map features.

# About Digimap Android App

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- Digimap is a mobile GIS (Geographic Information System) App for Android devices. It displays a map from a set of layers.
- Digimap facilitates following activities,
  - Performs map navigation, as, zoom in, zoom out, pan
  - Import already available vector & raster data
  - Add a layer of Google satellite image
  - Create and edit/modify vector geodata (with geometries & attributes)
  - Digitization with a tip of finger on the backdrop of satellite image / raster map
  - Browse and edit attributes of the selected geometric feature
  - Save the resultant vector data locally or share/export it in peer-to-peer fashion or upload in the cloud in a variety of ways
  - Display current GPS location of the user with a location marker on map
  - Measure distance/area on-the-fly, show coordinates, scale bar, North arrow

# Which geodata can be imported & created

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- Vector data, (*for example*)
  - Administrative/Watershed or any other boundaries, area polygons
  - Contours, streams, lineaments, drains, roads & other line features
  - GPS locations of past interventions, Water outlet points of micro-watershed, facility/utility centers in villages, any other point data
- Raster data, (*for example*)
  - Various soil maps like, soil texture, soil depth, soil drainage maps
  - DEM (Digital Elevation Model), Slope maps, Aspect maps etc
  - Drainage & water accumulation map, micro-watershed maps
  - Any pdf/jpeg/png map after accurate georeferencing
- Digimap facilitates to create any vector data in Point, Line & Polygon format on the backdrop of Google satellite image using Android Smart Phones.

# For whom Digimap is useful

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- Digimap is intended for a variety of stakeholders engaged in water conservation sector who want to work **Smartly & Efficiently** using advanced GIS Technology.
  - **Site Engineers** to identify & locate their work sites in the field from the maps, created using Desktop GIS software in the back office .
  - **Geologists** to identify proper sites or verify conformance of work sites using available soil maps on their Android smart phone & GPS location marker.
  - **Spacial Enumerators** to survey & collect work sites data by digitizing geo features (JSA sites in layers, depending on type) & submit it to back office.
  - **Scientists & Analysts** to import the submitted data in GIS software, compose maps from the data received & further decision making.
  - **Assessment Authorities** from government, village functionaries, etc for validations of site locations & ensuring correctness of work site selections.
  - **Rural Communities** to map all the (ground & surface) water sources, water drains, groundwater lifting, water recharge, water storage locations, etc.



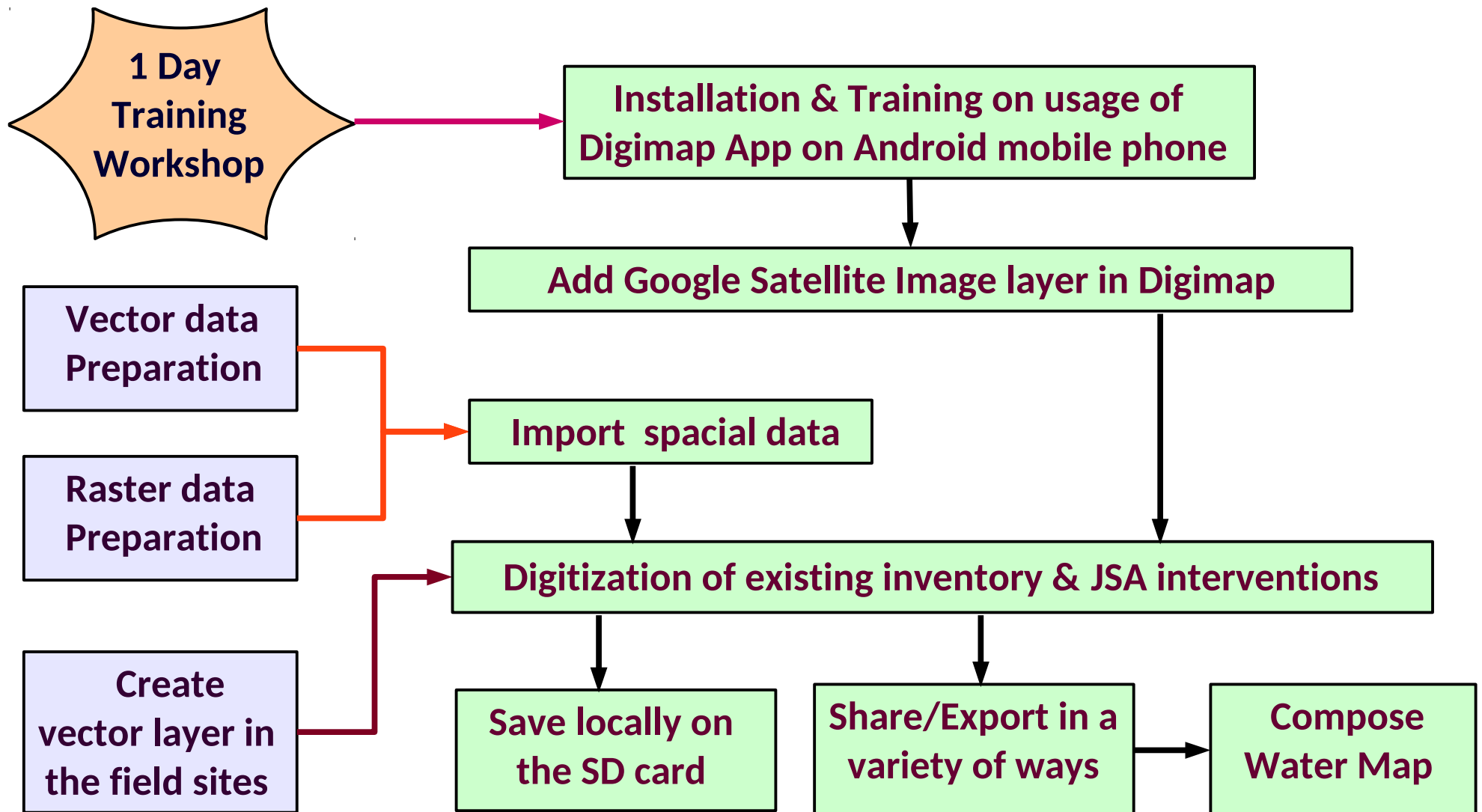
# Why it is needed

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- Governments have vested a lot in resources & efforts for generation, collection & dissipation of high quality spacial data.
- Most of these are accessible from Desktop PCs with Internet connection via Websites or as online services and occasionally, using GIS software.
- These Websites do not prove useful when they are accessed from the Android phone using its browsers like Chrome and can not take benefits of GPS facility.
- The maps available for download are in PDF format & their printouts. The derived data based on these, is difficult to work with, maintain & reproduce.
- Thus the immensely valuable information is very much under utilized, for the purpose it is produced & out of reach from the stakeholders.
- Digitization of existing water structures accurately & easily is also a challenge.

**Digimap makes this spacial information available on the Android phones & facilitates further digitization efficiently**

# Digimap Deployment Process



# Data Export & Next Steps..

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- The vector data digitized from Digimap can be exported in many ways, as,
  - Save to Google Drive storage or other such Web storage services
  - Email as attachment(s) to selected recipients
  - Share with other Android phones/Laptops using Bluetooth, SHAREit etc
  - Attach & send spacial data files using WhatsApp
- Download the data on PC so that it can be further imported, processed & analyzed using a GIS software like QGIS or ArcGIS.
- Use map composer of the GIS software so that the high resolution Water Map of the Village, with various raster basemaps, can be prepared.
- Planning, Development & Support for subsequent interventions.
- Year wise maps of interventions locally available to stakeholders.

# What we achieve

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- Geologists & Engineers are equipped with requisite digital maps on their smart phones, assisted by their current GPS location at work sites.
  - Increased efficiency with high precision; Decision making at work sites
- Site selection mistakes can be avoided & corrected well in advance.
- Quality Assurance in digitization & spacial data building, locally.
  - As the enumerator can actually see the well or any recharge structure on the Google satellite image, he digitizes that feature accurately & very easily
- Faster deployment of maps in the field with low Cost of Ownership.
- Digimap facilitates to collect spacial data in point, line & polygon format, unlike GPS based Apps, in which data is collected only in point format.
- A copy of submitted data is always available with the user for later use.
- **Digital India:** Digital Maps to the grass root levels at remote locations.

# QGIS Training module

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- We have developed a special QGIS Training Module for this, covering,
  - GIS basics & Introduction to QGIS
  - Vector & Raster data processing, data integration
  - Extracting contours from DEM, creating micro-watershed maps; slope, aspect, drainage, accumulation maps, water outlet/accumulation points
  - Creating up to village level, LULC, soil maps from online sources
  - Raster calculator to identify appropriate work sites for area treatments
  - Using Map composer
- Carefully selected & compiled training & reading material comprising of user manuals, online videos from reputed channels, blog posts, how-to articles etc.
- Post training support via email, user forums etc.
- Conducted trainings for government agencies, Engineering colleges.

# Collaboration & Technology Transfer

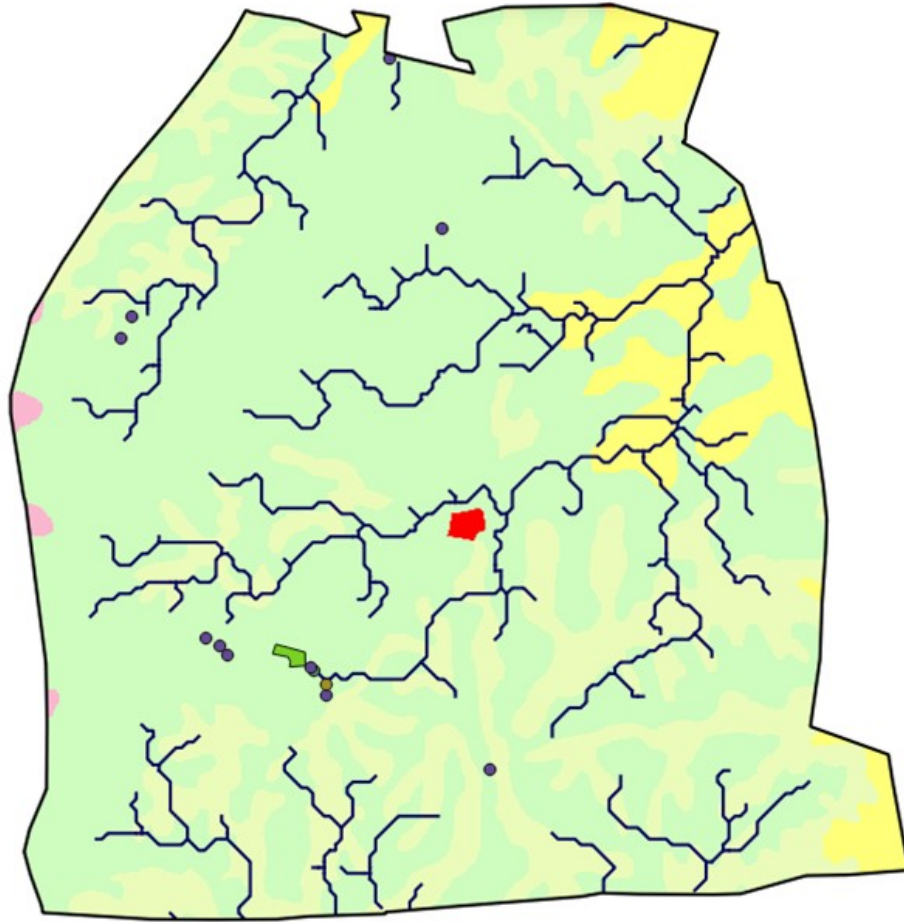
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- We believe that the technical institute, such as Engineering College, can play role of a catalyst for development of that region.
- Engineering Colleges are equipped with necessary IT infrastructure which is under utilized when not busy in academics.
- We propose to collaborate with Engineering Colleges with all the technology transfer for GIS & Mapping initiatives for JSA.
  - Low set up costs for GIS Labs, with less TCO & no licensing costs
  - Opportunity for students & faculty to learn & work on the technologies which their soil demands for uplifting of their very own region
  - ***Earn while Learn*** scheme for students apart from enhanced skills
  - Any support for stakeholders is available locally at affordable costs
  - An open database for government, planners, village functionaries & other stakeholders for future such interventions in that region

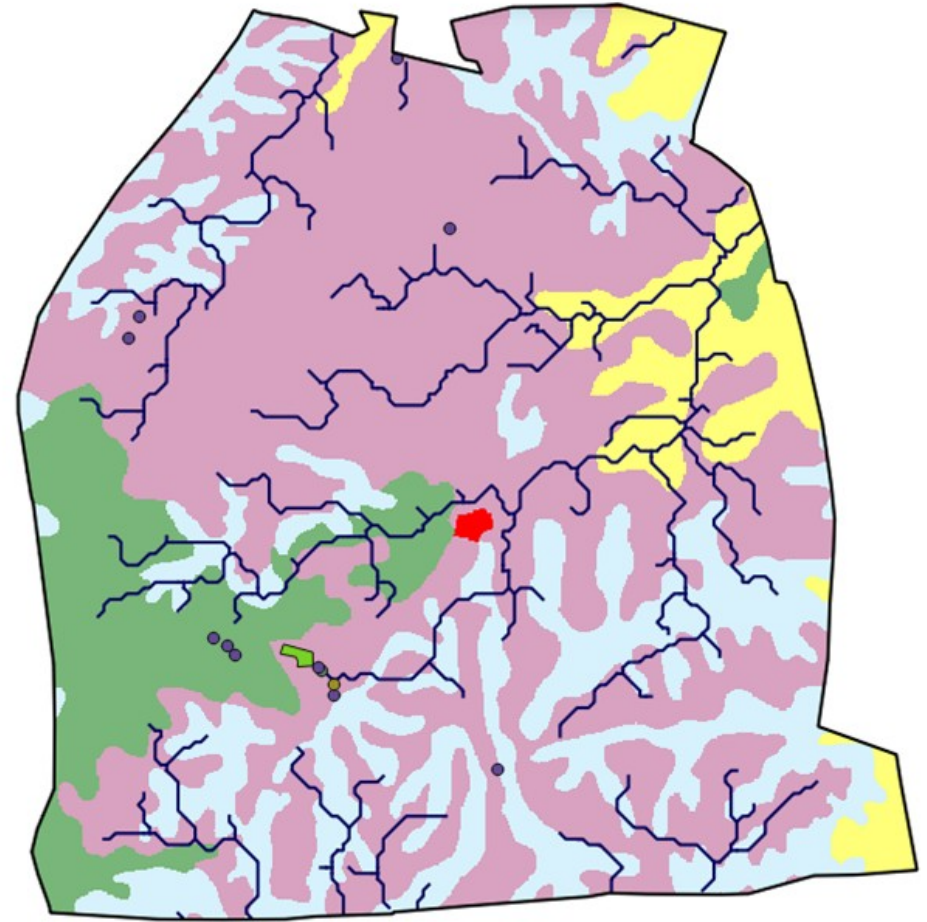
A few Screen shots...

# Soil Maps of a Village

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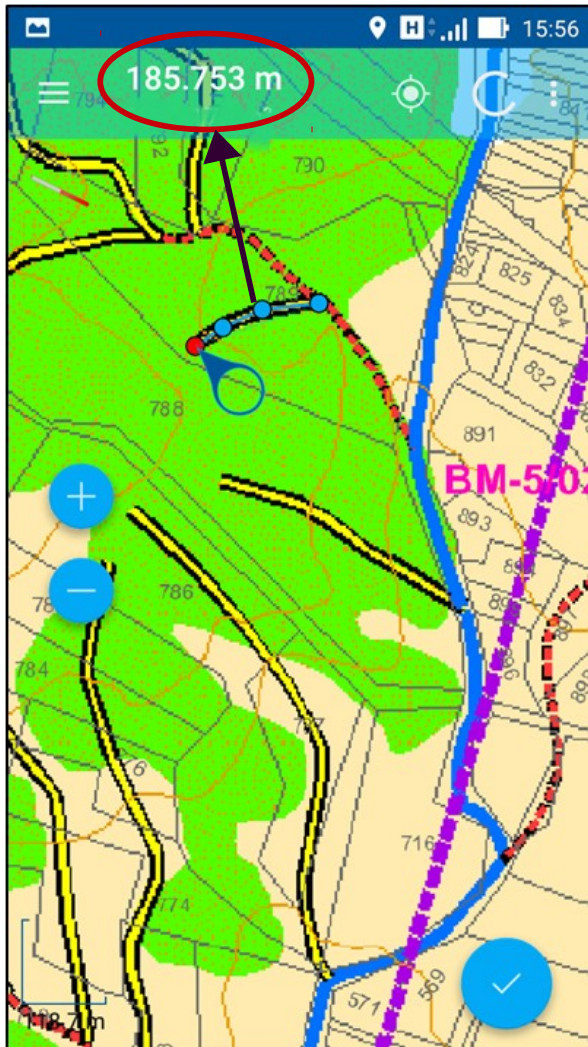
**Soil Texture Map**



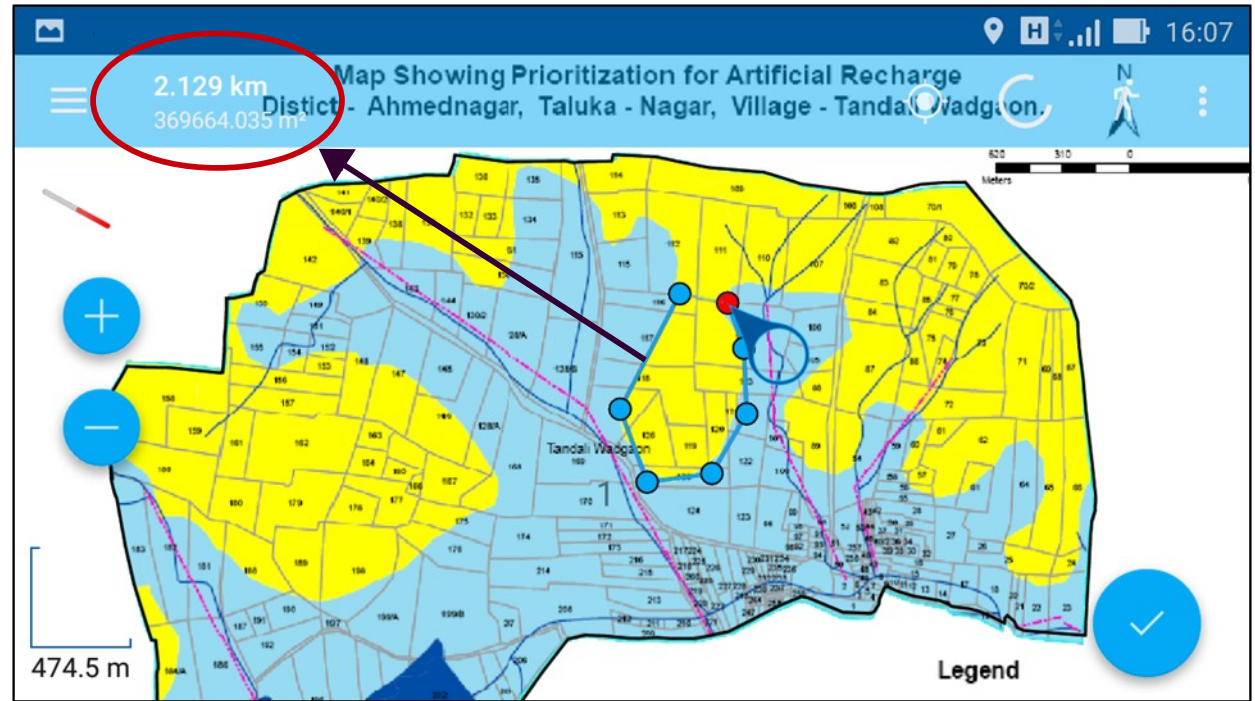
**Soil Depth Map**



# Measurements on the map



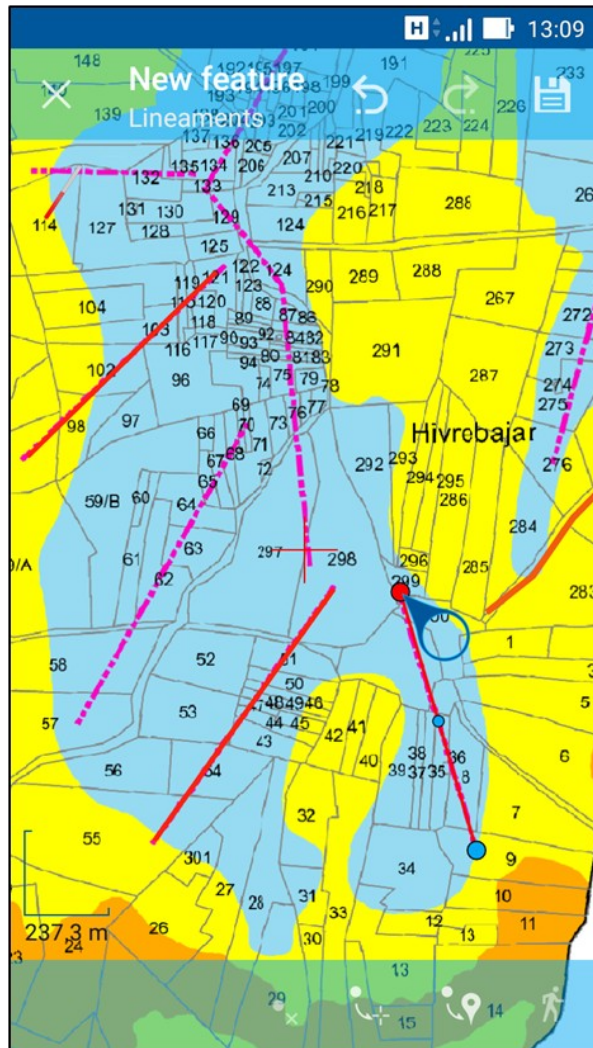
Measure Distances



Measure Perimeter & Area

On-the-Fly Measurements

# Smart Digitization – Draw Lines

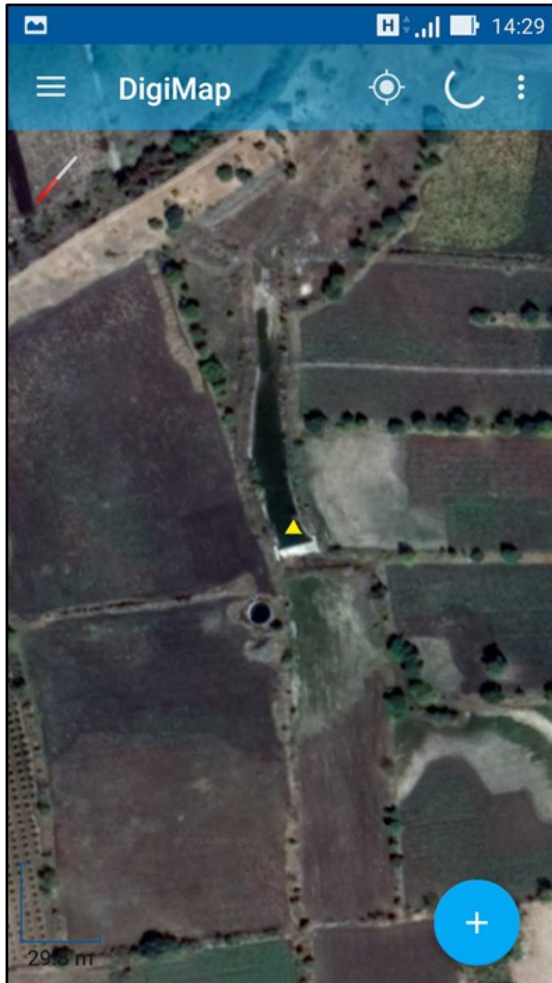


Draw lineaments on the Map



View them on the Satellite image

# Smart Digitization – Draw Polygons



**Exact location of CNB**

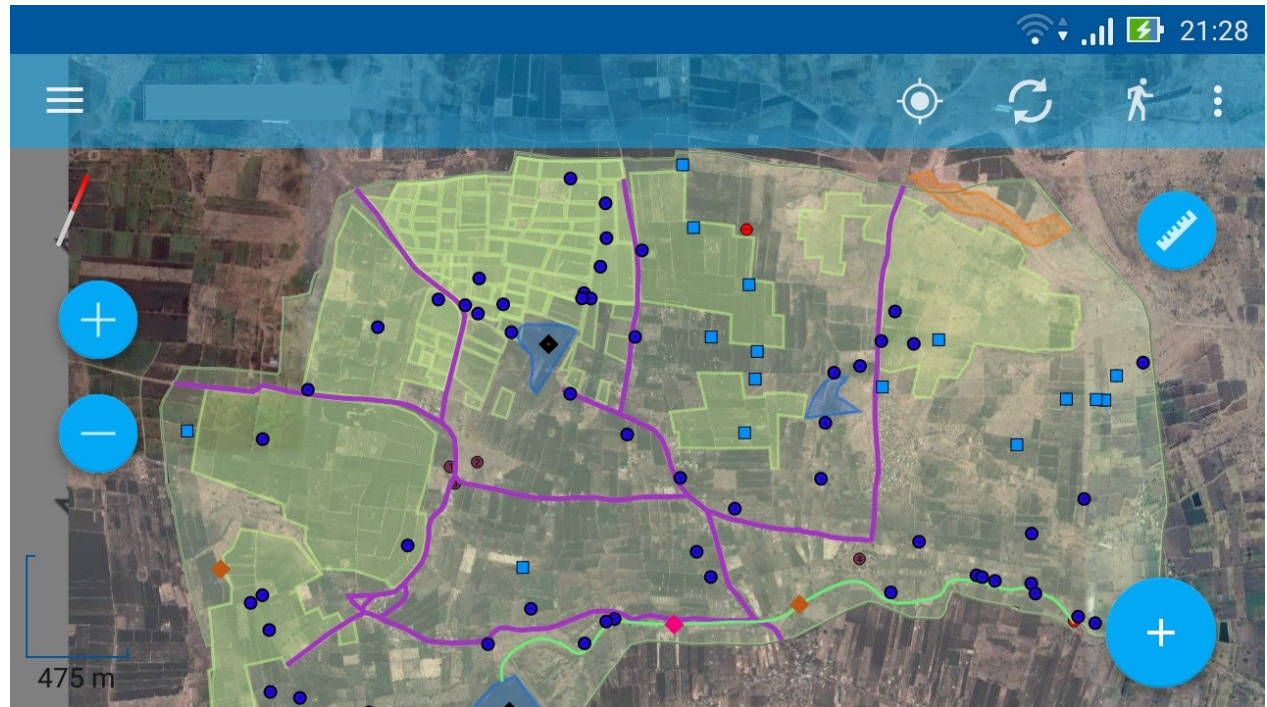
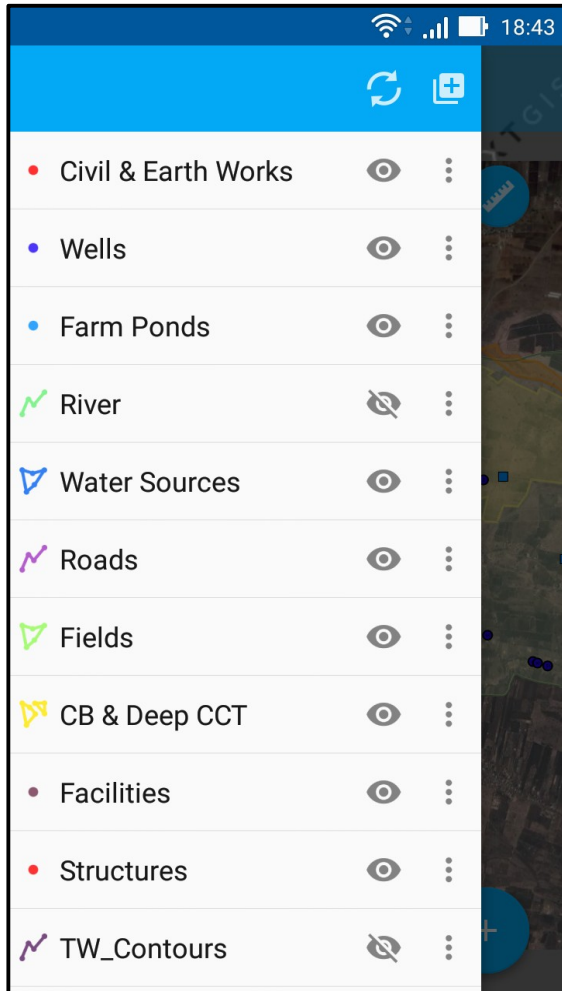


**Compartment Bunding**



**DeepCCT Area**

# Spatial data management

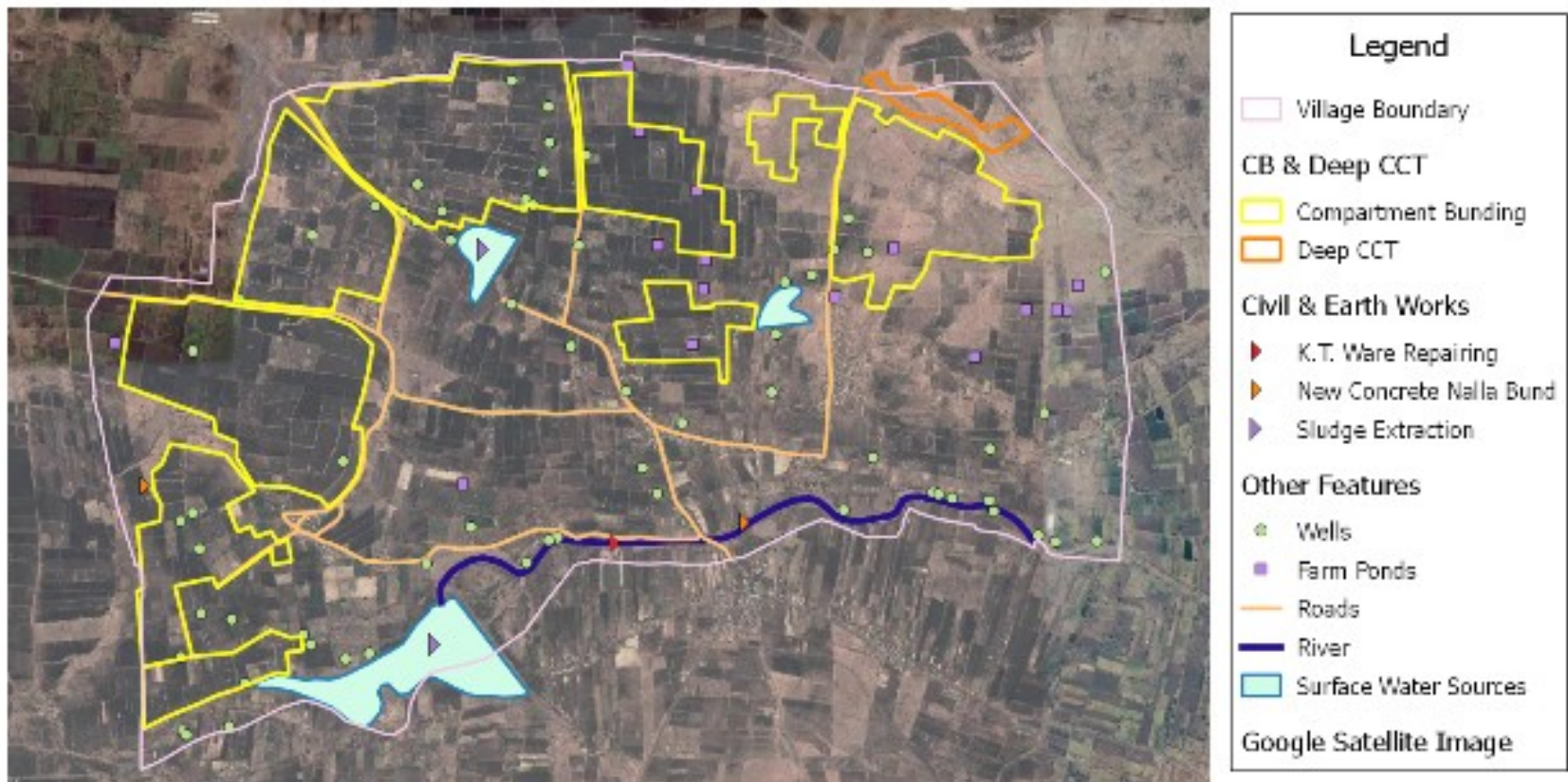


**Availability of all the digitized data, always..**

**Various Layers**

# The Water Map of the Village

Water Sources & Base Map of Tandali Wadgaon



502 0 502 1004 1506 2008 meters



# Our Role

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# What can be mapped..

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- Water Conservation work sites locations (point & areas)
  - Civil & earth works like CNBs, earthen bunds, check dams, etc
  - Compartment bundings, Deep CCTs etc
- Inventory of groundwater & surface water sources
  - Dug wells, boar well, hand pumps, electric pumps, etc
  - percolation tanks, lakes & ponds etc
  - Farm ponds, other places of water storage
- Existing water & recharging structures
- Rainwater harvesting locations like recharge wells, rainwater storage etc
- Micro watershed maps of village with 250 – 300 Ha areas to fully use its potential
- Afforestation areas from the village

# Benefits to Jal Shakti Abhiyan

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- Fast inventory of previous & current water conservation works by rapid field surveys with attribute data collection, with increased accuracy.
- Identify proper work site locations scientifically & rectify previous mistakes.
- Future construction losses can be prevented, those would have incurred due to wrong work site selections. Scientifically disciplined Plan of Action.
- Discovery of their own village to school & college students in a pure scientific manner; much useful & desirable for further sustainability.
- Copy of the data collected always remains with the village enumerators for further interventions in their village by any third party agencies.
- **Water Map** of the village is prepared in much less efforts & budget.
- Very low deployment costs & less Cost of Ownership & maintenance.
- Assured local support & data hand holding for future JSA interventions.



Thank  
You