Sustaining India's Hidden Water Resource

B. Maheshwari, Lewis Daly and the MARVI team

Partnership

- Nine organisations:
  - Western Sydney University
  - Development Support Centre
  - Arid Communities and Technologies
  - MP University of Agriculture and Technology
  - Vidhya Bhawan Krishi Vigyan Kendra
  - CSIRO Land & Water
  - International Water Management Institute
  - Mekong Region Futures Institute
  - Carnegie Melon University, South Australia Campus

>30 Researchers + 35 Farmer Researchers (BJs)

Running for the last five years

Project team during the visit to the Meghraj Watershed.

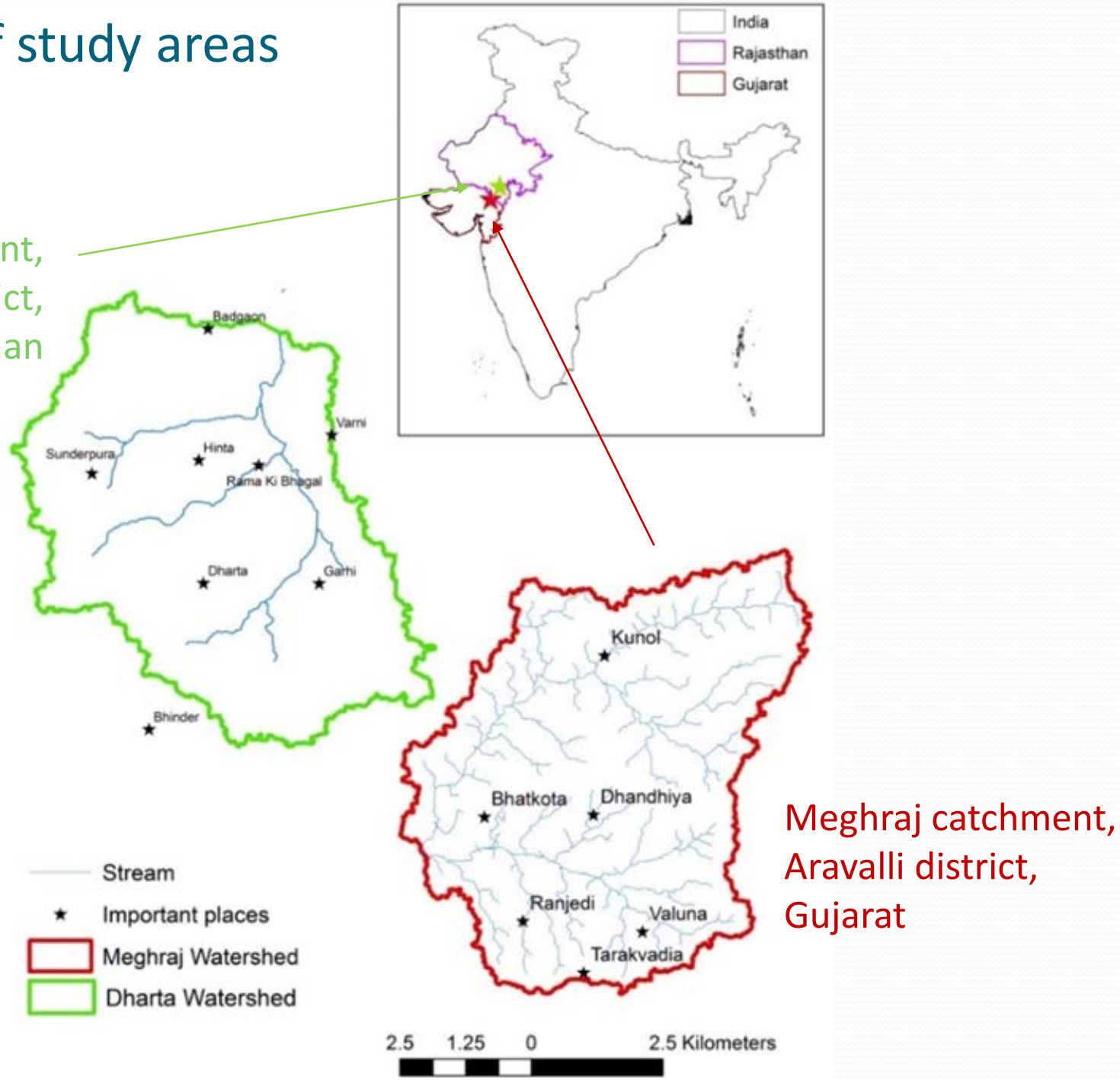
MARVI project – Key Activities

1. Participatory data collection;
2. Sharing information and building understanding;
3. Engaging with policy makers, government agencies, GW users and other stakeholders.

… see Maheshwari *et al* (2014) MDPI J Water

Location of study areas

Dharta catchment,
Udaipur district,
Rajasthan



Meghraj catchment,
Aravalli district,
Gujarat

Bhujal Jankaars (BJs)

- **Engaged local volunteers, called Bhujal Jankaars (BJs); Groundwater Informed’ (25 +10)**
- **Trainings: basic hydro-geologic concepts, mapping, watertable and water quality measurements;**
- **Local champions and interface between research team and community**
- **Empowered and felt valued**

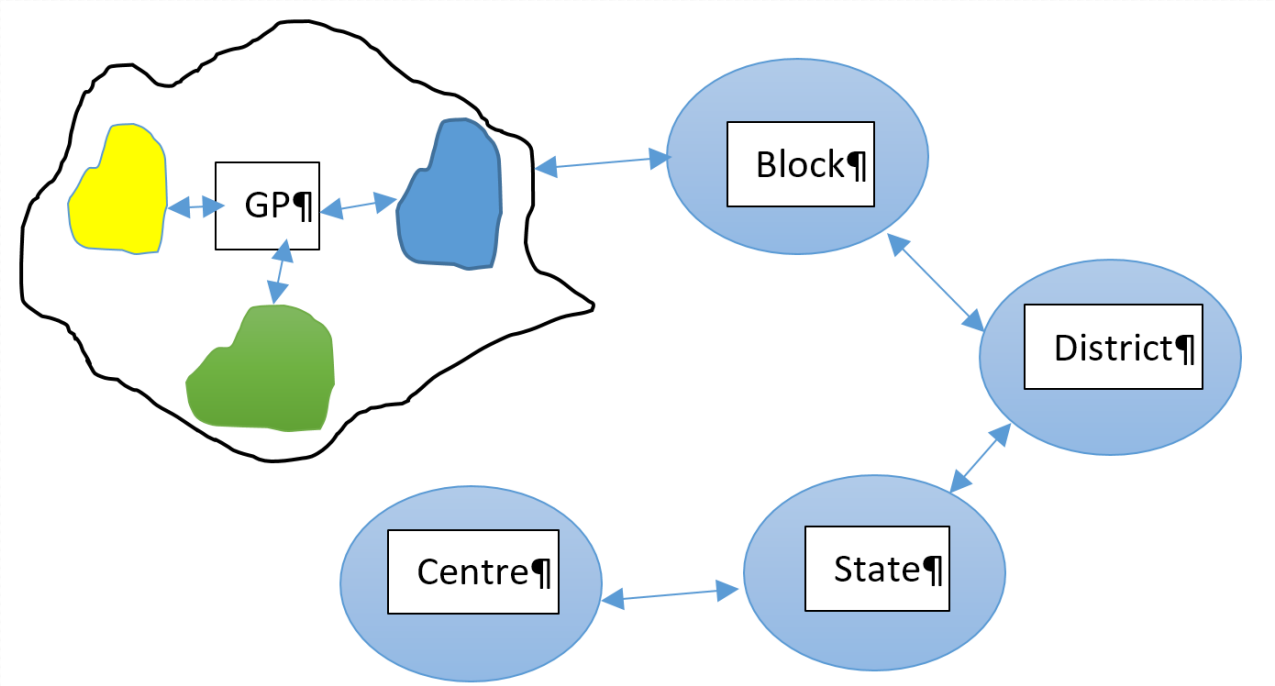
Tasks Performed by BJs

Resource Mapping

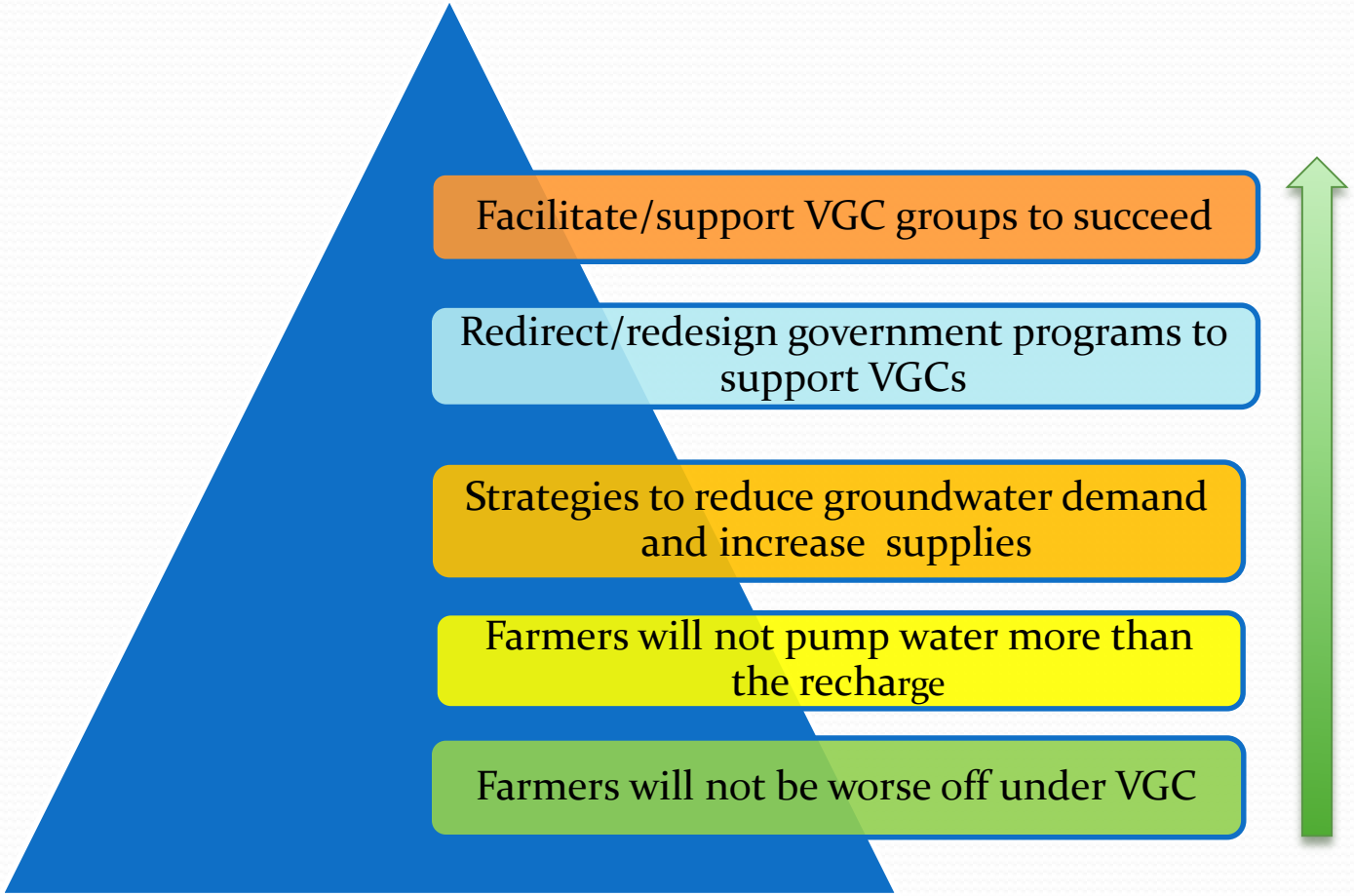
Bhujal Jaankars (BJs) were trained in making field measurements and in reporting back to communities

Kookana et al (2016) – gender and education; Packham et al

Village Groundwater Cooperatives



Framework for forming 'Village Groundwater Co-operatives



Key practical challenges during the initial dialogue

- Convincing farmers to share and manage groundwater as common resource is the hardest task.
- Farmers who have groundwater – why should I share? How will it benefit me?
- Those who do not have groundwater – they are not clear as to what will they have to contribute for sharing to take place.
- Some farmers are selling water to a neighbour farmer but this is not the same thing as sharing and managing the resource from commons point of view.

Points that make farmers see the merits of cooperative management of groundwater

- There is no guarantee that the good access to groundwater you have today will be there tomorrow. If your neighbour drills deeper, your groundwater could be their water anyway.
- If you work together, you may have a better access to government programs that may help you in terms of improved livelihood and security of water in the future.

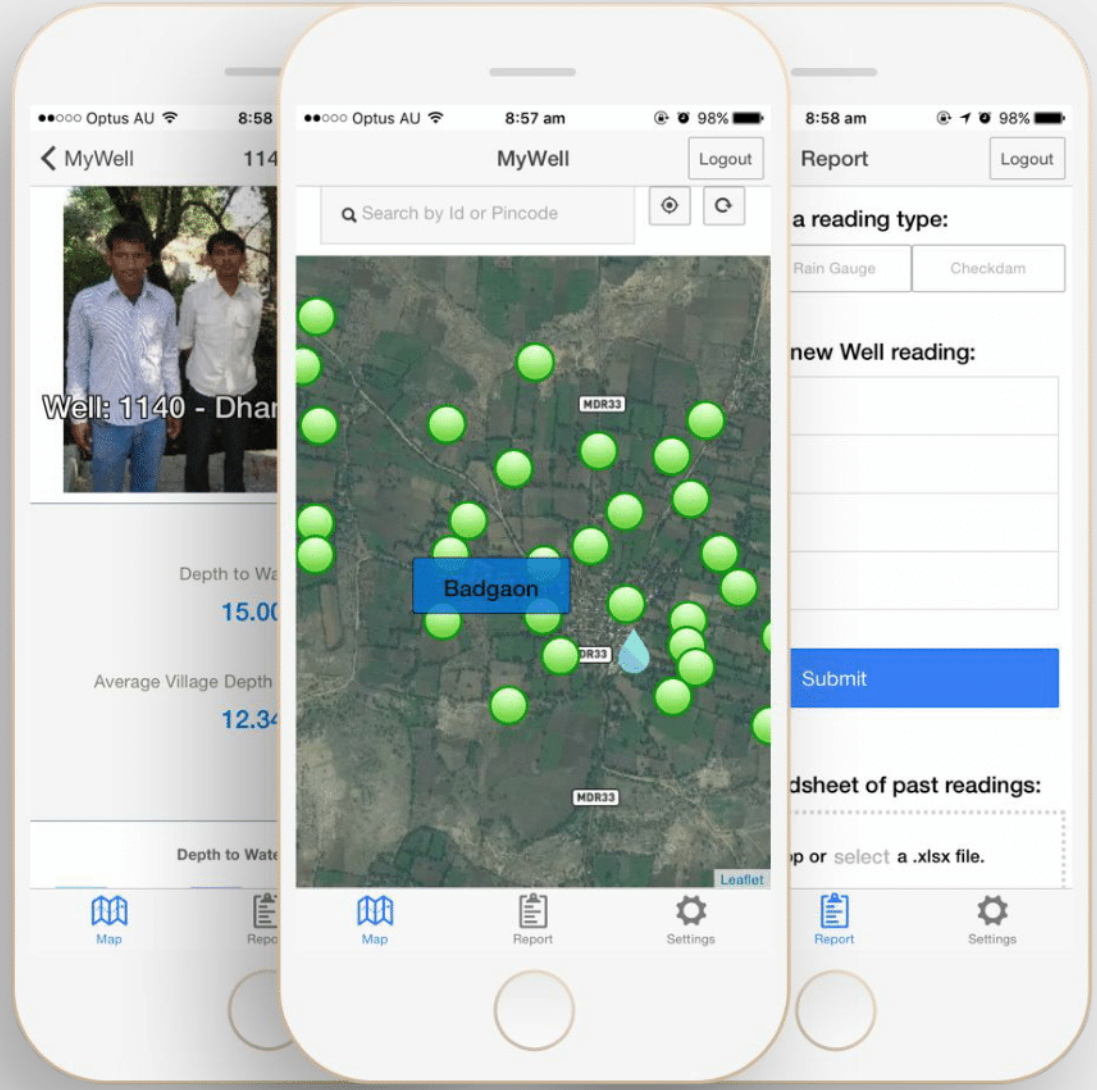
Need to change the hearts and mind of the people.

Achievements in forming VGCs

- Three VGC formed in Rajasthan and two in Gujarat through the farmers' own initiatives;
- VGCs have bank account and deposited money for common activities;
- The formation of VGC has encouraged member to work together on other initiatives that will improve their livelihood and sustainability; e.g., communal fencing to ward off blue bulls destroying their crops, establishment of seed cooperative etc.;
- This is just a beginning.

MyWell

Crowdsourcing Groundwater for project MARVI



Vessels Tech

vesselstech.com

WHO ARE WE?

- Social Enterprise out of Carnegie Mellon University
- Team of 4
- Working in AI, DLT and crowdsourcing projects in India & the Philippines

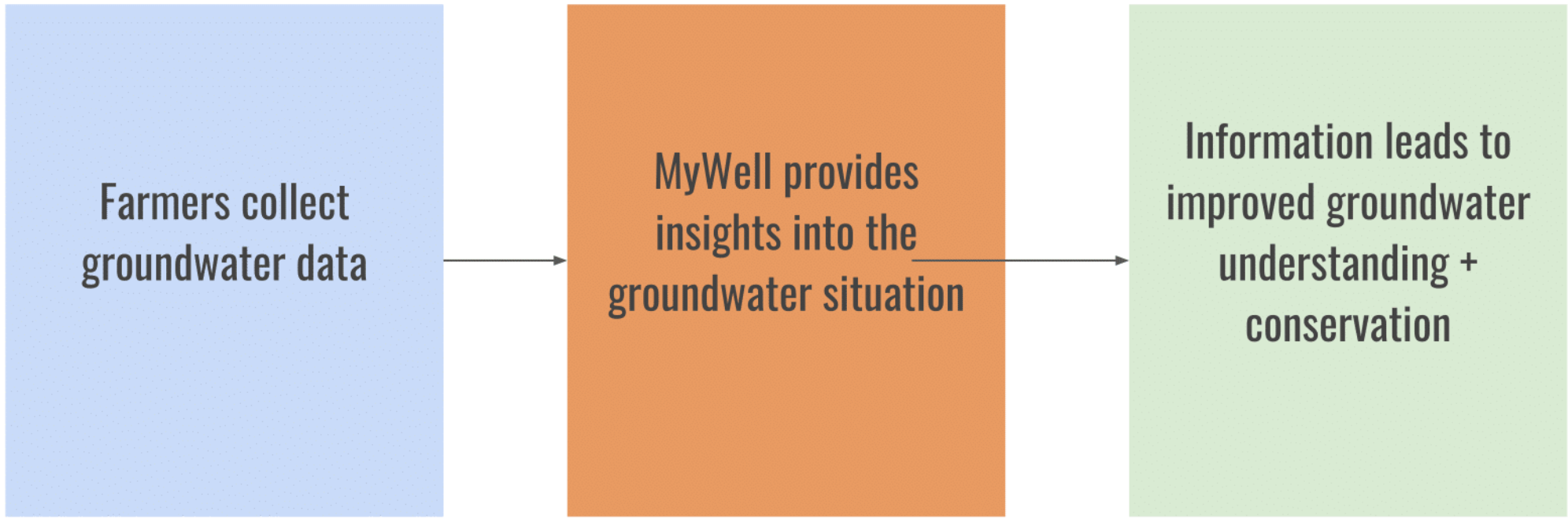
WE ARE DETERMINED TO SEE TECHNOLOGY USED TO BETTER THE LIVES OF OTHERS

MYWELL

WHAT IS MYWELL?

- Technology component of project MARVI
- Smartphone + Feature Phone (SMS) application for crowdsourcing groundwater data
- Allows farmers to participate in a network of data collectors

3 STEPS


Farmers collect groundwater data
MyWell provides insights into the groundwater situation
Information leads to improved groundwater understanding + conservation

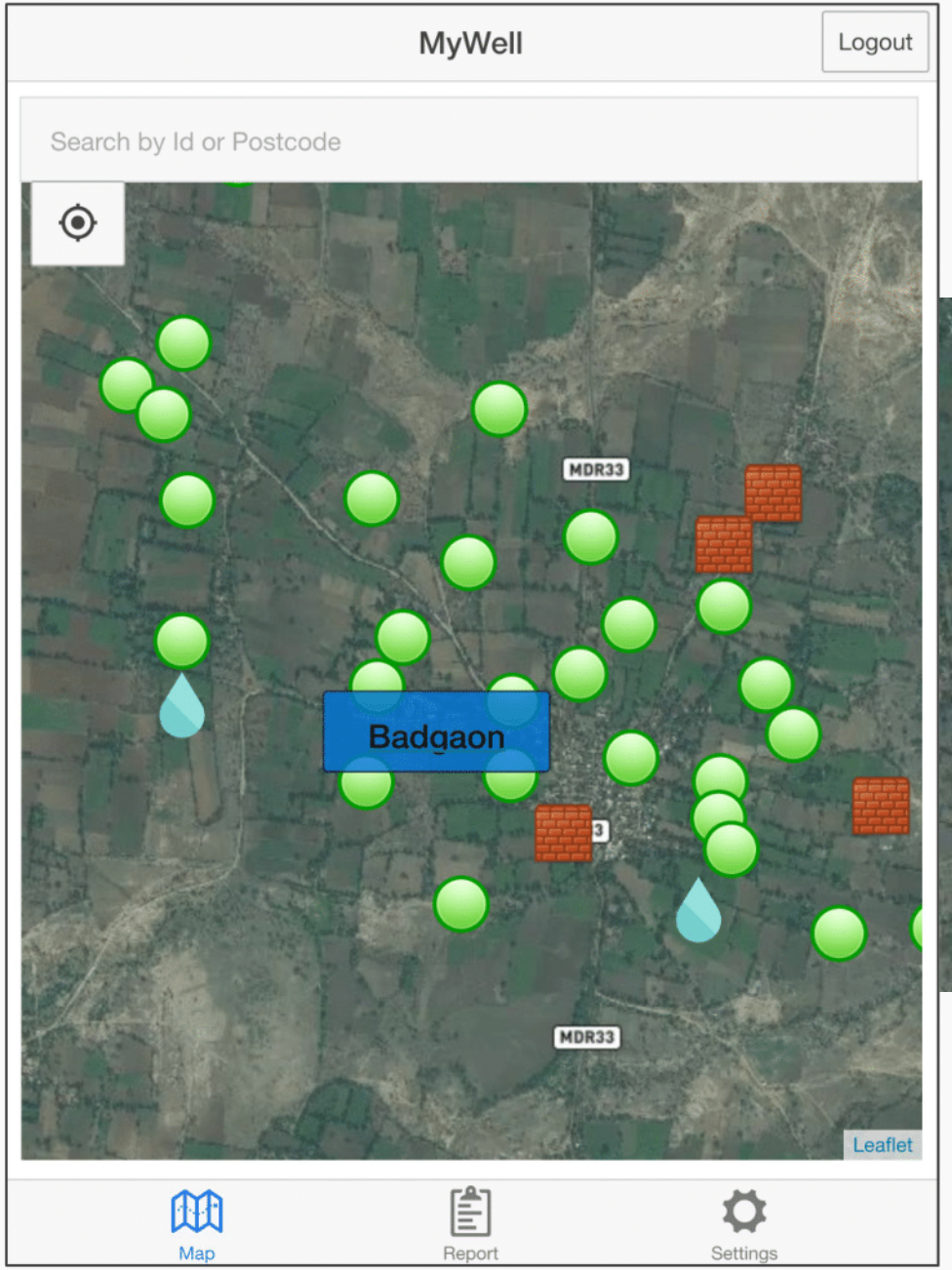
WHAT CAN IT DO?

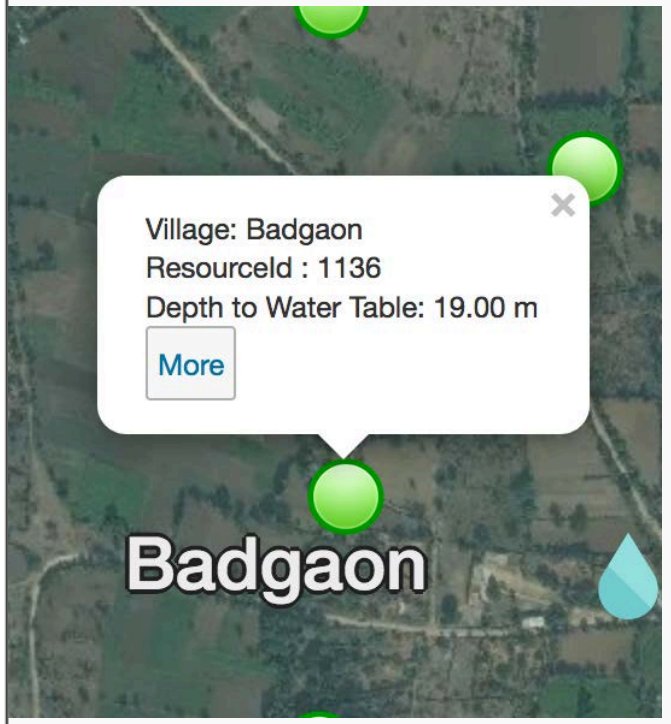
- Smartphone App, Website, or SMS
- Users can submit well readings, rainfall levels, checkdam readings
- *Coming soon*: water quality

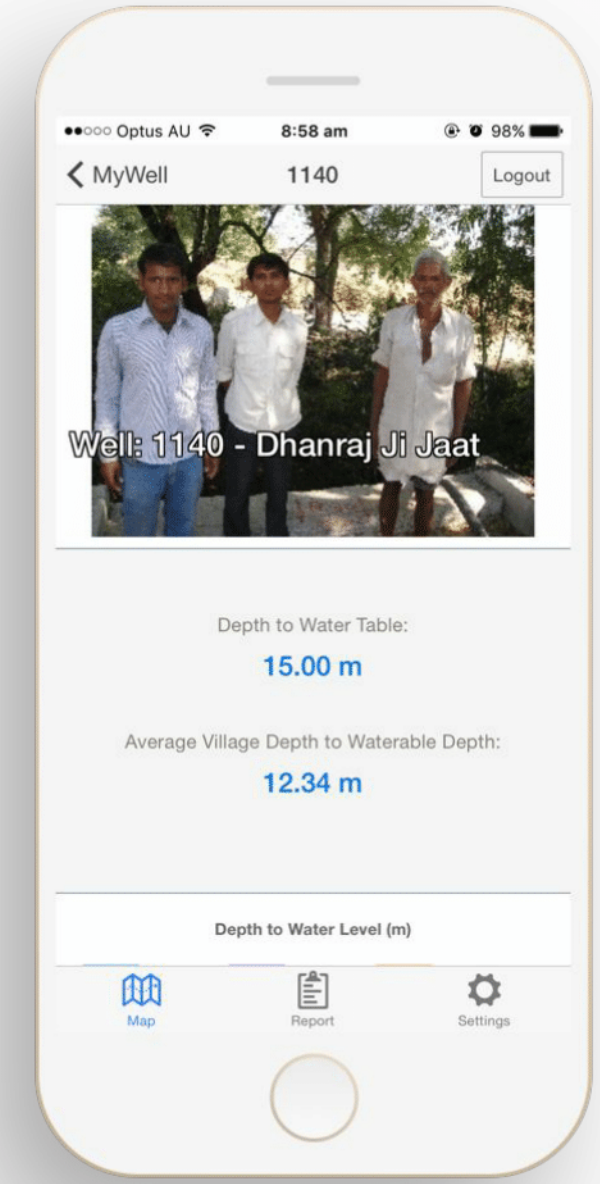
FEATURES

MAP PAGE

- View all Wells, Rain Gauges and Checkdams
- Well statistics at a glance
- Search for a Village or Resource





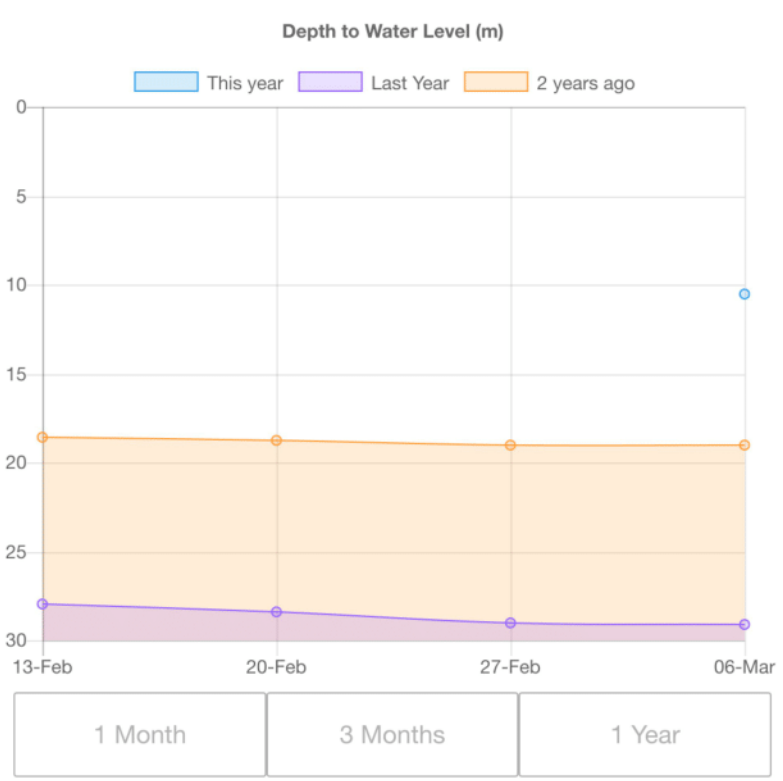


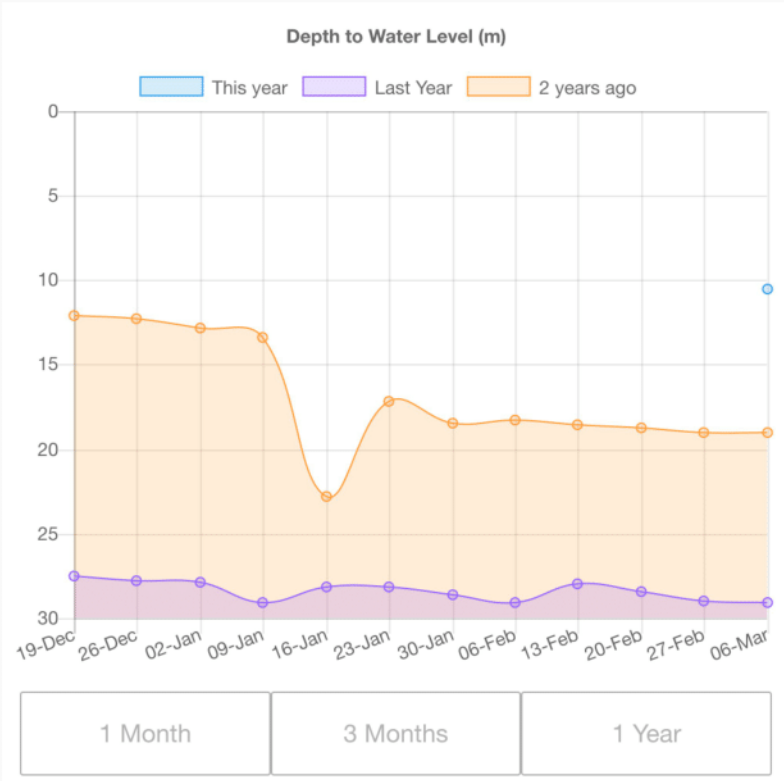
WELL DETAILS

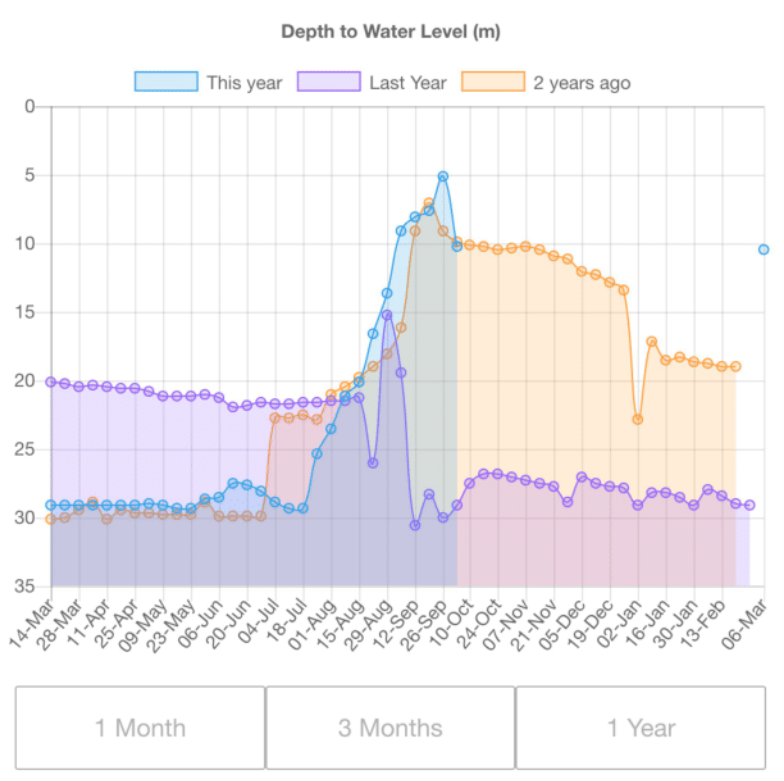
- Pictures of the well, crowdsourced from Farmers
- Detailed well statistics
- Village Level comparisons

HISTORICAL READINGS

- Historical readings for 1 month, 3 month, or year long intervals
- Compare today's readings with the trends over the last 2 years

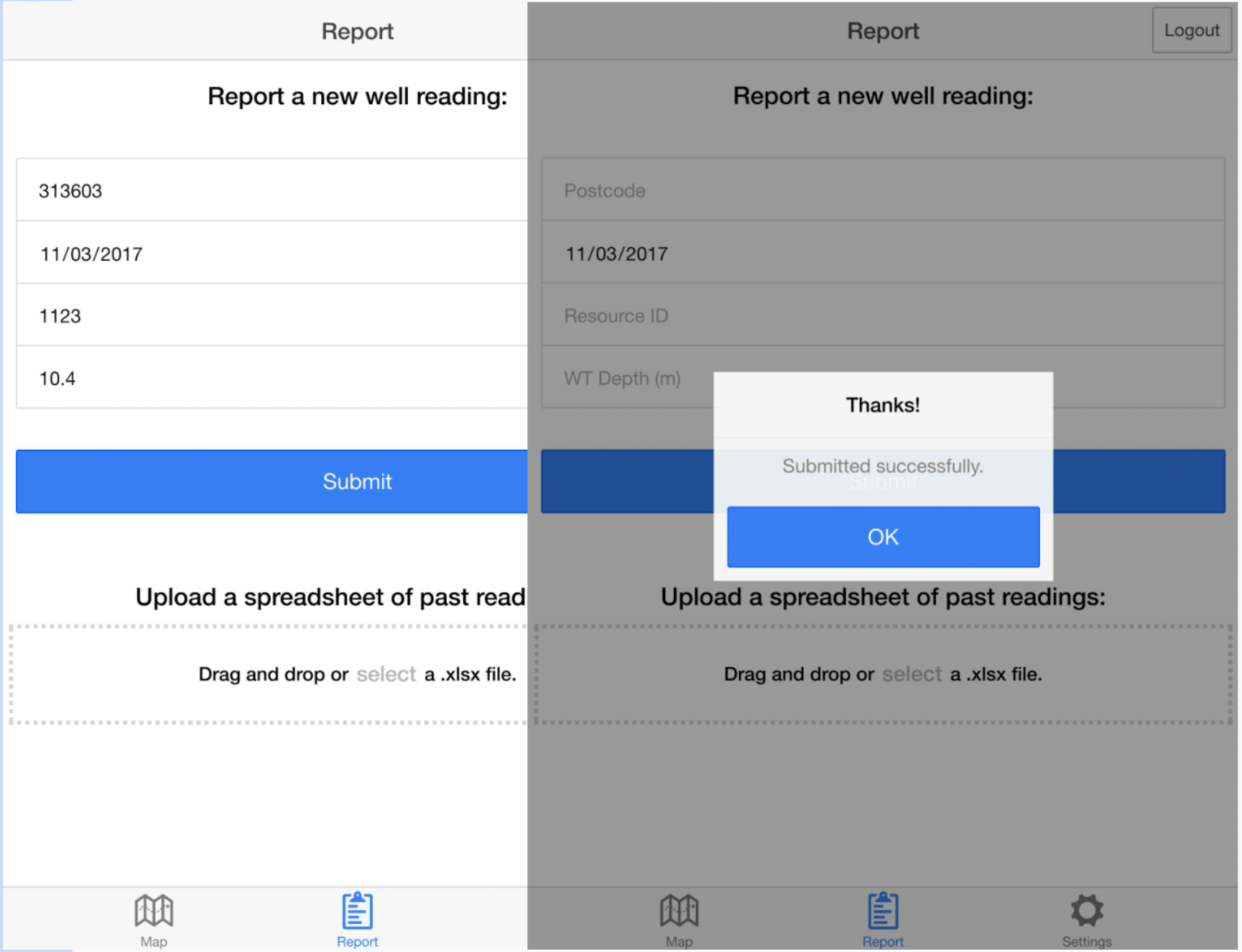






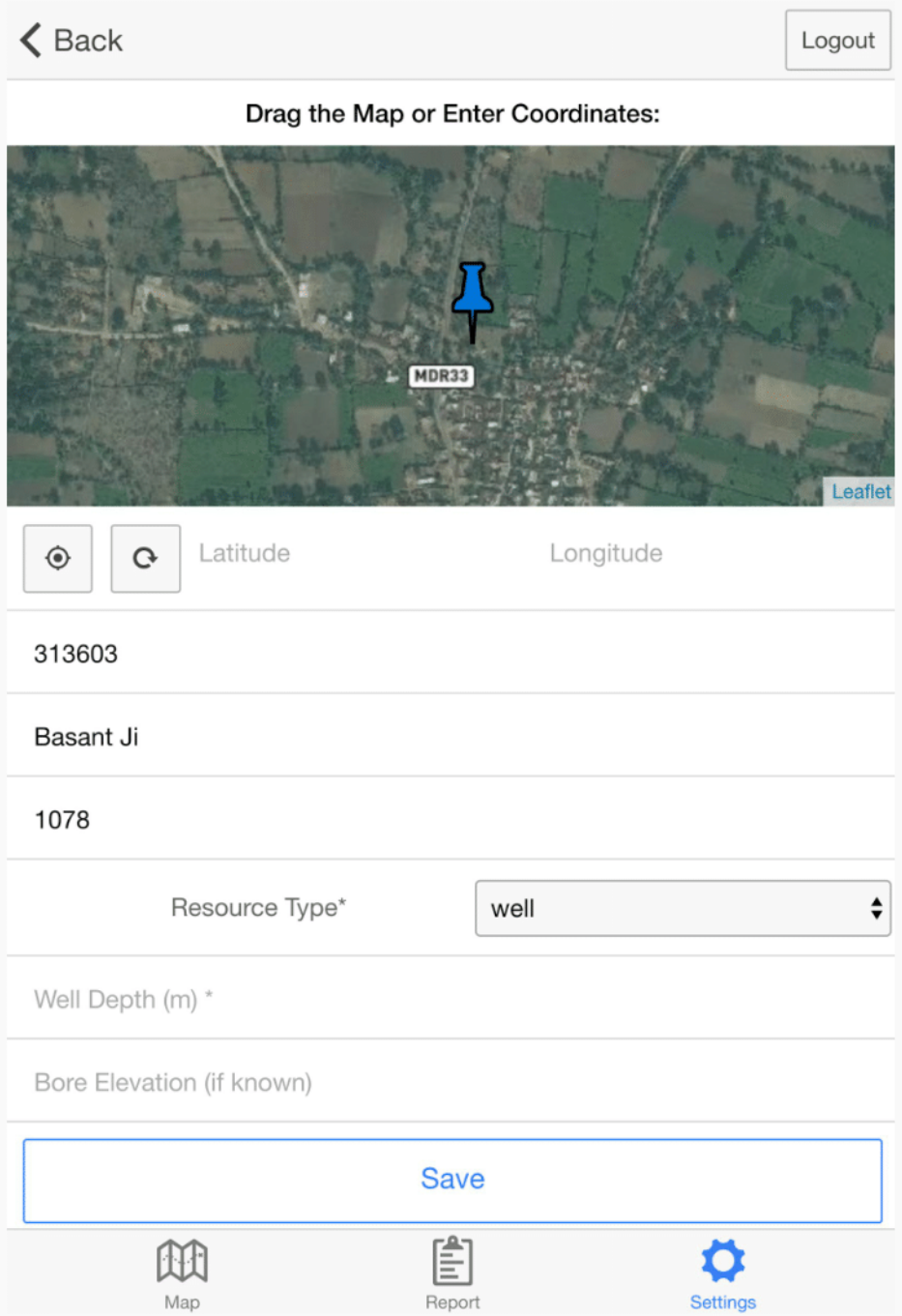
REPORTING

- Simply fill out 4 fields to record a new reading
- If no internet is available, save for later
- Drag and drop excel files to upload multiple readings at once



MANAGEMENT

- Register new wells quickly and easily
- Simply drag to the point in the map, and enter a few details



TECHNOLOGY

TECHNOLOGY OVERVIEW

- Highly modular, microservices approach
- Integrates with SMS providers
- Secure database hosted and backed up in AWS

IMPACT

MYWELL EMPOWERS FARMERS TO BE A PART OF THE SOLUTION

MYWELL HELPS BUILD GROUNDWATER SHARING WITHIN COMMUNITIES

MYWELL HELPS VISUALIZE THIS INVISIBLE RESOURCE

RESULTS

FIELD TRIALS + WORKSHOP

- Conducted field trials in Megraj and Dharta in early January
- Demonstrated how MyWell can be used on both feature phones (sms) and smartphones
- Conducted surveys of 15 BJs (groundwater monitoring volunteers)

GOOD

- BJs noted MyWell can make groundwater monitoring easier and more accurate
- Saw the potential to help with crop planning, and understanding water needs
- Loved that the data is secure and accessible

LESS GOOD

- English only version is hard to use
- Graphs on small screens were hard to read and understand
- Minor user interface issues made a big difference for low-digital literate users

NEXT STEPS

NEXT STEPS: SHORT TERM

- Translating MyWell into Hindi
- Improving the user interface and user experience
    - Well QR Codes
    - More accessible graphs
- Making MyWell more useful and accessible for researchers

NEXT STEPS: LONG TERM

- Pursuing Integrations and Partnerships
  - International Groundwater Resources Assessment Centre (IGRAC)
  - Please get in touch if you're interested!
- Looking for other projects where we can apply the MyWell approach
- Open Water Data Platform

THANKS FOR TUNING IN

We’re always looking for opportunities to use technology to make a difference.

Get in touch with me at:

lewis@vesselstech.com
@lewdaly
vesselstech.com
mywell.vessels.tech

The MARVI Final Workshop – The MARVI Declaration

- Make significant investments to build the capacity of the community (including schools) - groundwater literacy to dispel groundwater myths.
- Implement community-led village water security plans using local rainfall, groundwater levels, check dam and water quality data monitored by villagers themselves.
- Out-scale BJ program in other areas based on MARVI experience
- Formally connect BJs with Gram Panchayats and facilitate BJs' involvement in any groundwater and other natural resources management schemes of the government.
- Recognise watertable, rainfall, check dam water level and water quality data collected by BJs and make them widely available.

The MARVI Final Workshop – The MARVI Declaration (contd.)

- Facilitate BJs to play a significant role in integrated management of the 'five waters' concept: rainwater, surface water, groundwater, soil water and wastewater.
- Initiate a crowdsourcing program to measure rainfall in every village of India. The one-off investment required for installing raingauge will be less than Rs 250 per village with little on-going costs.
- Implement policies that give incentives to farmers to grow crops that use less number of irrigations.

Conclusions…

- BJs can collect highly reliable information for groundwater level, rainfall and recharge estimation.
- BJ collected data can be used for village scale groundwater balance analysis and modelling
- The participatory, village level monitoring approach developed in MARVI can empower local community and help develop their own groundwater management strategies.

Thank You