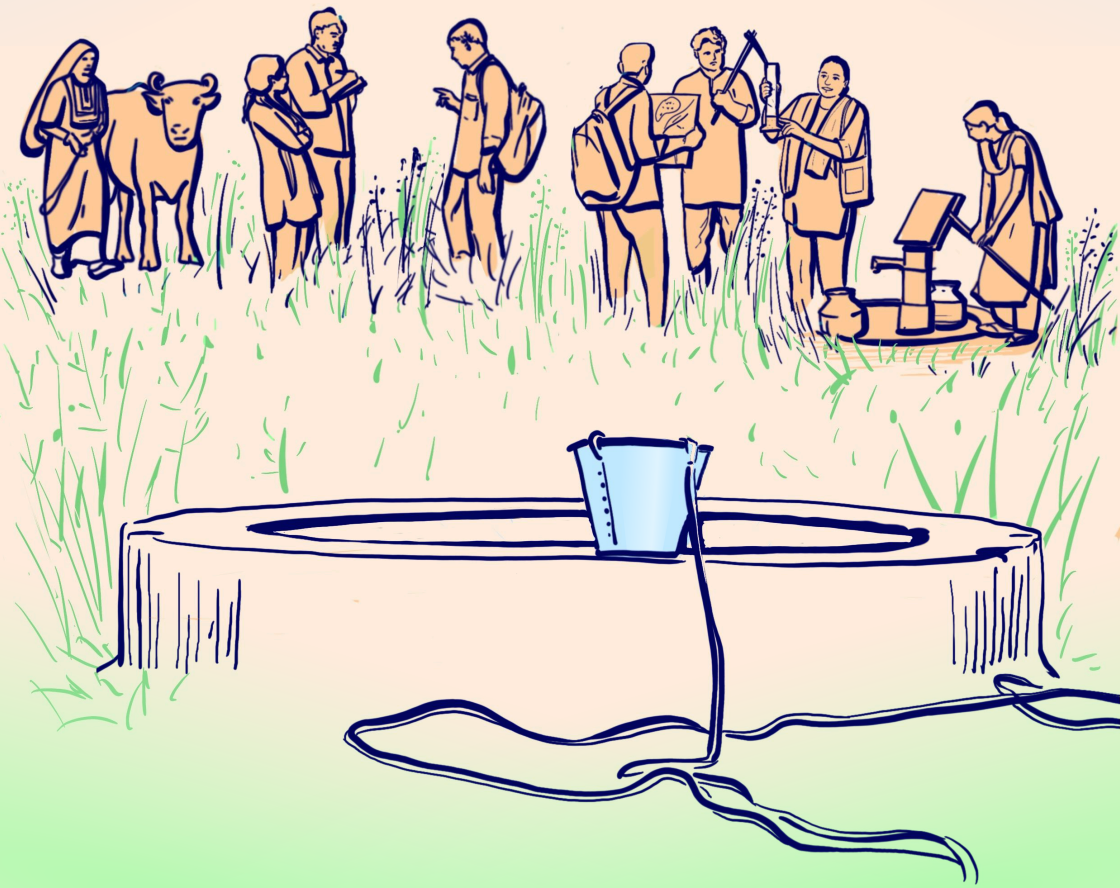
Community-led Water Management

Part 6 - Well Monitoring



What need does the playbook address?

Large swaths of the country are facing severe water stress, largely due to over-exploitation of groundwater and surface water resources. Lower water availability leads to unequal distribution of water resources, lower crop yields during dry months, and issues of salinity and aridity of the soil. Addressing this issue requires community participation and behavioral change.

Rather than designing top-down schemes for agrarian water use, DSC emphasizes on community planning of water resources. The design of field assessments, community mobilisation, village-level water budgets, water recharge structures, monitoring and the participatory approach to water security planning best exemplify this.

Who can use this playbook?

Practitioners, Trainers, Community Resource Persons, Progressive Farmers, Subject Matter Specialists, Local Governance Representatives

This playbook is designed using the expertise of **Development Support Centre (DSC)**, which works on participatory water management and judicious use of water in Gujarat, Madhya Pradesh, Rajasthan and Maharashtra.

dsc
Development
Support
Centre

These solutions by DSC have been designed and pioneered under the leadership of Anil Shah, founder chairman; Mohan Sharma, executive director; and Sachin Oza, former executive director. These community-empowering participatory technical and social processes in DSC`s 30-year journey led to the evolution of the approach to promoting community-led water security.

In this book you'll learn to

- Understand your village's water needs and resources
- Get involved in water management
- Prepare water budgets
- Plan for water security
- Replenish groundwater by building recharge shafts
- Monitor water resources
- Cooperatively manage irrigation

** This playbook is **Part 6** of a 7-part playbook series on cooperative water management. Find the complete set here: link*

Today we have gathered to talk about the water situation in our village. Let's see how deep is the water.

Did any of you notice that the soil is getting arid because water is saline?

How many of you had lower crop yields in this dry season?

Did some of you feel you received less water than your neighbouring regions?

If we manage our water properly we can solve these problems of irregular water supply and quality

6.

Well Monitoring

We need to keep monitoring the water levels and quality of our wells on a regular basis to be proactive in solving our water issues, and for response to emergencies.

Why should we monitor the wells on a regular basis? Let me explain.

- *Well monitoring within villages can be a powerful tool to raise **awareness** about the lowering water quality in wells and monitoring groundwater levels*
- *By conducting these measurements in front of villagers and by involving them in discussions about water quality trends, organisations can set the stage for long-term behaviour change towards **sustainable irrigation practices***

Our water supply might change over years? How do we prepare ourselves better for our future needs?

We need to keep monitoring water levels and quality on a regular basis to identify and solve our water issues proactively.

That's right. Regular monitoring of wells helps us to be better prepared to manage out water situation

*It is important to create a **baseline** of water quality and levels in wells to measure and compare values. This helps us prioritise interventions and take decisions in time.*

For instance, if we notice the lowering or a rise in water levels or increase in salinity recorded in tube-wells, we can plan to construct recharge shafts and farm ponds or, if there is high concentration of nitrates in wells, we need to use start using fertilisers judiciously.

Well monitoring is an important step in the scientific analysis of a village's water situation using locally-generated water data

*I have spent over a month getting **technical training** on how to carry out well monitoring in our village. We had eight modules that covered several important topics including*

- *Mapping Water Resources*
- *Land and Water resource analysis*
- *Geo-hydrology*
- *Water balance analysis*
- *Groundwater Fluctuation Analysis*

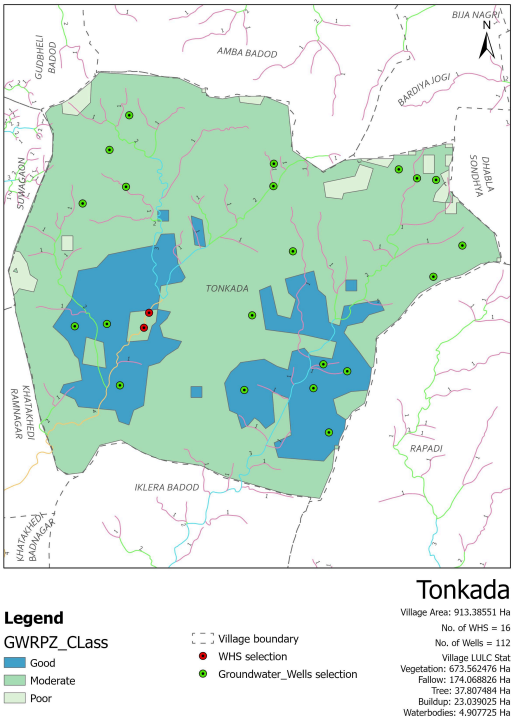
*And, I have received **water testing kits** which include:*

1. *Movable Rain Guage*
2. *Well-Measurement tape:*
    a. *30m tape for open wells*
    b. *Well-monitoring sounder* with sensor at the end of the tape and speaker near the head to announce water level.*
3. *TDS meter or Ph meter for water quality testing*
4. *Record Book for registering the numbers*
5. *Bucket for water sampling with rope*

** Sounder is an advanced and expensive device. The testing can be very well done with measuring tapes as well.*

Preparing a map of village wells

- A detailed study of village wells (open wells and borewells) is conducted.
- Wells are plotted on a maps of the village
- Approximate depth is noted based on interviews with well owner
- Layers of soil, stone and clay around the well or extracted during the drilling of the well should be noted on the map



Map designed by Kaushal, Development Support Center

Selecting wells for routine measurement

- After making the map, 4-5 wells are chosen for routine measurement.
- One well in each direction of the village (that is, one well in the north, south, each and west of the village) and one well in the centre of the village is chosen for measurement.
- Wells with different soil layers or uses are chosen, if possible
- Check dams, recharge shafts and other water interventions are also recorded and considered for routine measurements

Measurement of well levels

All readings are registered in a well water measurement sheet as well as submitted to the organisation through an online app.

A Well water measurement record sheet consists of two parts:

- One time Record: Records condition of the well and its ownership which includes the dimension, rock strata of the well.
- Continuous Record: Records water level on the dates measured.

S.NO

VILLAGE

OWNER NAME

LOCATION (LONGITUDE/LATITUDE)

TYPE OF WELL

DIAMETER (M)

HEIGHT OF MEASUREMENT POINT

DEPTH OF WELL (MBMP)

DEPTH OF WATER LEVEL

MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER

Measuring water levels

The Bhujal Jankaar or Jal Saathi lowers their measuring tape from the edge of the well (for open wells) or lowers the ringer tape from the cap of the borewell. Distance between start of the tape and ground level is measured.

Image source: Development Support Center

Subtracting the depth of the water level and the height of the edge of the well, can give the depth reading in meters below the ground.

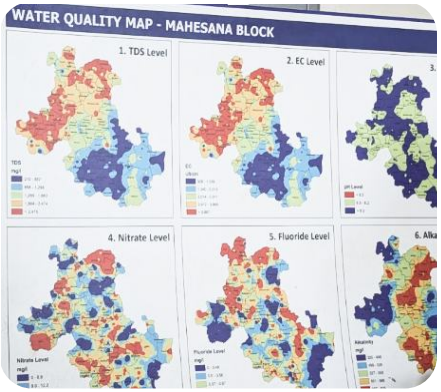
Monitoring water quality

A sample of water is taken by tying a cup/mug to a thread and lowering it till the water level (for open well) or by running the borewell and collecting it from its spout. This is then placed in the cup of the water quality reader, and values of Ph, TDS and Electrical Conductivity (EC) are noted down in the register.

Mapping water levels and quality

Water data collected over the years is plotted as graphs that capture trends in water levels and quality. This can be used to identify places where TDS or OH exceeds suitability for agriculture

TDS: <2000 suitable for agriculture
TDS: < 550 for drinking
Ph: 6.5-8.5 is suitable for agriculture
EC: <4000 is suitable for agriculture
EC: <1,100 for drinking



** This information is based on the agro-climatic region. Please consult your local agronomist for this*

Why are water levels falling in certain wells?

If the water table has declined, it can be for two reasons: Insufficient rainfall has reduced recharge or groundwater withdrawal has increased or continued.

What about the water quality? We can see it is falling down in certain wells.

This can either be due to increased local use of fertiliser and pesticides or higher withdrawal of groundwater or presence of underground mines.

These readings must be incorporated in the annual water budget. And we need to continue to monitor recharge shafts, earthen dams, and check dams to measure the success of these structures.

To help us plan better, once a year, water samples from monitored wells can be sent to labs for fluoride and nitrate analysis. This, combined with monthly, well-monitoring results can yield trends over the field areas. This also helps in determining the water holding/storage capacity of the aquifer.

We can analyse areas that require immediate focus and interventions and we can analyse impact of interventions, including recharge shafts, farm ponds, earthen dams and check dams

RESOURCE PERSONS

Kaushal Gadariya,
Programme Executive, Water Resource Development and GIS,
M. 9879051013

Hardi Sukhadia,
Programme Executive, Water Resource Development, DSC,
M. 7818970494

EXPERTS ON TECHNICAL PROCESSES

Mohan Sharma
Hardi Sukhadia, Program Executive-Water Resource
Kaushal Gadariya, Program Executive GIS and NRM

AXIS BANK FOUNDATION

WELL LABS
WATER · ENVIRONMENT · LAND · LIVELIHOODS

dsc
Development
Support
Centre