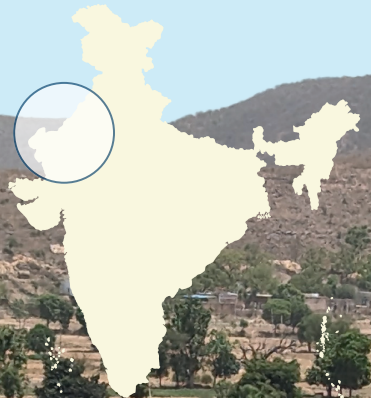


HOW TO

make community-level
rainwater harvesting
systems for agriculture





What need does the playbook address?

In the arid regions of North-West India, declining water access is leading to lower agricultural incomes. By capturing rainwater and soil moisture, the number of crops and areas under cropping can be increased. Rainwater harvesting can be expensive and needs the involvement of the community.

This solution can be adopted in:

Arid regions of north-west India

This solution can be adopted by:

Community-based organizations or **institutions** that can manage, construct, and maintain the structures

Who can use this playbook:

Trainer, Practitioner, Community Resource Persons (CRP)

This playbook is designed using the expertise of Ibtada, which has implemented projects that incorporate rainwater harvesting techniques to improve agricultural yields in Alwar, Rajasthan.



What are the benefits of community rainwater harvesting?

01 Ensures availability of **water**
for livestock in dry seasons

02 Involves **community** in
design and maintenance
of rainwater structures

03 Allows for **additional cultivation**
of crop and higher yields

04 Improved **soil moisture**
and preserves moisture
for longer periods

05 Improves
groundwater recharge



Story of Boojaka

There have been continuous reports of Boojaka village's water shortage. Do you know something about Boojaka, Reshma?

Yes, i have come across some data about the village.



Rains around 450mm-650mm annually



Annual rainy days are just 15-20 days: Much of the rains flows rapidly as a run-off into streams

Boojaka, is a valley village. (Hills running parallel and meeting at a ridge. Village and agricultural lands in the middle.) In essence, it is surrounded by hills on three sides (E-W-N).

I have been trying to strategise rainwater interventions for the area. Should I take you through it?

Yes, please

This is the map of Boojaka.
We can also get a topographic
map from Survey of India.



*This is great. It will help
us in understanding the
village better to be able
to design interventions.*

It is but we also need to tap into
knowledge of villagers and trace out
places where rainwater runs-off,
depressions where it accumulates, places
of slope.

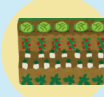
*Let's set up a village mapping and
PRA (Participatory Rural Appraisal)
exercise with the village people to
discuss the issues and potential
interventions.*





Today, we are here to discuss the issue of water scarcity and explore solutions together.

Yes, there are so many issues we face each day specially as farmers and herders.



Agriculture is primarily rain-fed and hence farming is done only in one season.



Water sources for livestock dwindle rapidly.

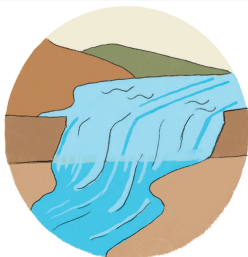
Goats can't graze in the post-monsoon cultivation season; and the hills do not have a water sources there.

There are multiple interventions like Checkdams, Contour Trenches, Contour Bunding, Ponds, Maeds, Gully Plug, Paal etc that can be made for rain water harvesting. In this case, we shall discuss about **Checkdams, Maeds and Ponds (Jhod)**.

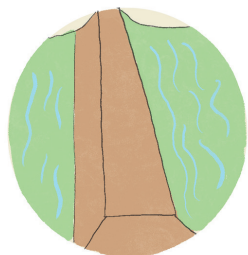
Can you tell more about them?



- 01 **Checkdam:** barrier to slow water and recharge groundwater



- 02 **Maeds:** embankments along agricultural fields



- 03 **Pond (Johad):** Widened existing depression in the area to store water.



"To understand each intervention in detail before starting our work. We have got pamphlets for all. Please go through and ask your doubts." - Facilitator



CHECKDAM

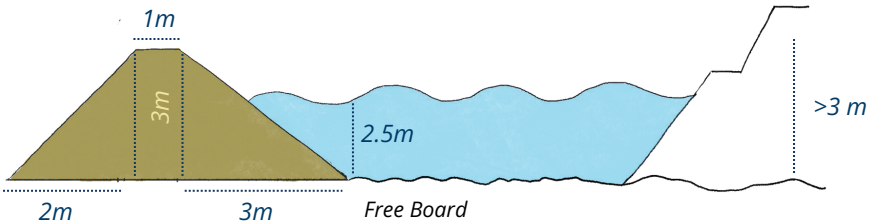


Where

Identify places where run-off is high during the monsoons. Ideally, to be built in places where there is elevation on either side of the run-off stream and also have some space at the back to store water.

How

Note: This is just an example.



- The dam has been built to store water up to 2m high.
- Height of the dam = 3m. The height was decided based on the slope - A little upstream of this dam, the slope reaches 3m or more in height (and so, if the dam is built in three meters height, it creates a bowl for the water to accumulate in).
- Area in front of the dam is sloped, cleared off of shrubs
- Soil scrapped and piled on the dam

When

1.5
months

August-March, when the mud has moisture due to the rains and becomes easy to compact.



Cost

5 - 8
lakh

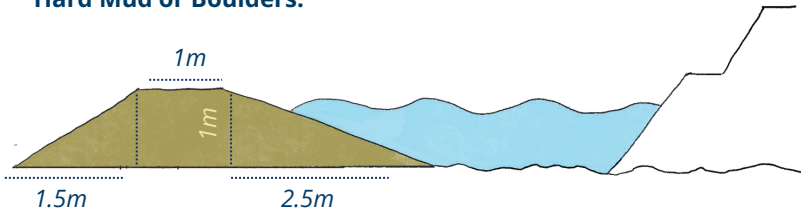
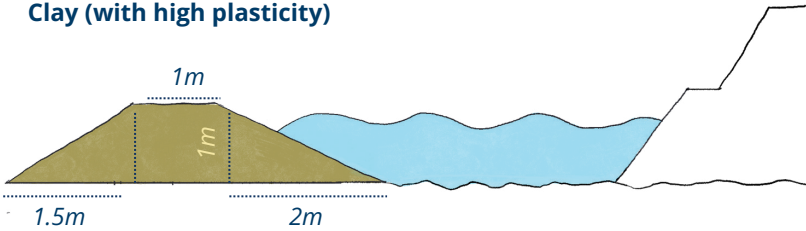
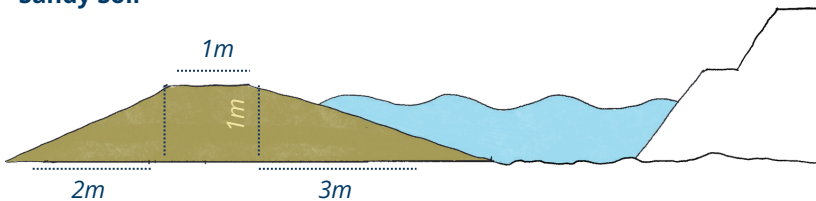
30% contribution from Villagers and 70% from (NGO + Government + Watershed Department, landholder farmers, watershed department/ forest department, MGNREGS)



Types



The dimensions of the dam depends on the type of mud in the area

Hard Mud or Boulders:**Clay (with high plasticity)****Sandy Soil**

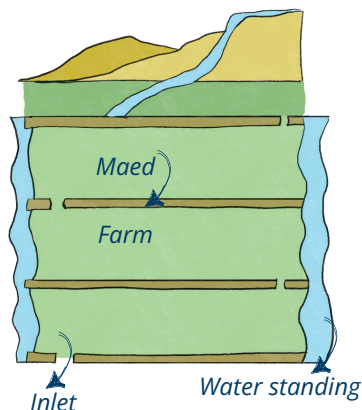
MAEDS: EMBANKMENTS ALONG AGRICULTURAL FIELDS



How

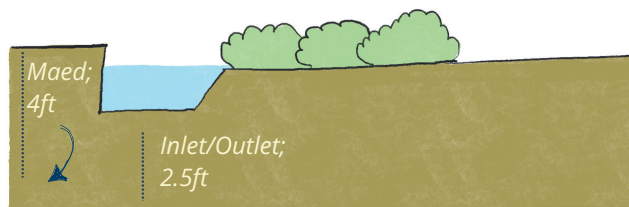
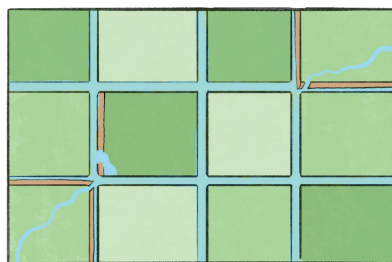
If the land is relatively **flat**
Embankment is kept at 1m -
so that water does not stagnate in the place.

If the land **slopes**
Embankment is kept higher
(If the land slopes by 2.5 feet, then, height of
the embankment is a minimum of 2.5 feet, with
an additional 1.5 feet as dry embankment).



Inlet/Outlet

There is an entry way (facing the hills) for rain water to enter the fields. There is an exit (built at the height of the maximum storage of water) for water to flow into neighbouring fields down the slope or adjacent to it.



In this field, the
maximum water level
will be 2.5 - 4 feet.



Cost

Rs 20,000 for a 4 acres plot if individual maeds are made. 50% of the cost is borne by the farmer- who usually deploys an Earth mover/JCB. If we are building common Maed, then the cost goes down.





How do we plan embankments as per our **seasonal crop cycle**?

- If the farmer wants to leave the field fallow in the monsoon season for the water to accumulate, but also wants to grow mustard or another crop in winter, then the embankment can be made high so that water is collected here during the monsoons and high moisture levels remain in the soil.
- For a monsoon crop (say, Bajra) and a winter crop (say, mustard) the embankment must be kept low. Excess moisture in the soil can destroy the Bajra crop.



What if these embankments lead to **disputes** amidst farmers?

- The shape of the embankment is ideally as per the slopes followed while building the check dam.
- However, often, compromises have to be made with equal slopes for the embankment so that it does not lead to conflict between neighbouring farmers.



Where does the **soil** for the embankments come from?

- Soil for the embankment is scrapped from the fields of the farmers. The top soil is scraped using an earth-mover/JCB.
- This is after a discussion with the farmer, who has to apply manure. It takes a year or two for the soil to regain its fertility. If organic manure is added, it takes a little lesser time.

These pamphlets are very useful! But we want to ask a few questions.





Where

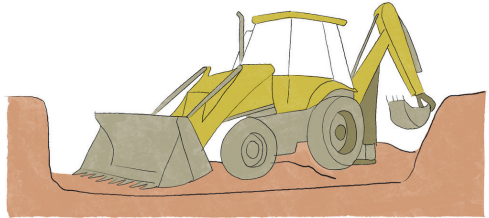
These ponds can be constructed in depressions where water gathered.



How

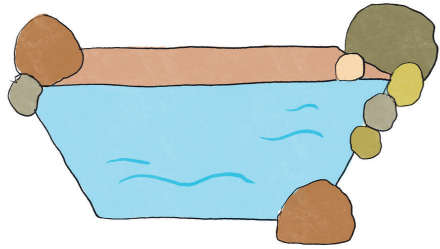
01 Increasing Volume

The soil is hollowed out, deepened and cleared of debris.



02 Stone Pitching

Small boulders (gravel, crushed rocks) are placed on the embankments and on its sides to increase its strength.



Cost

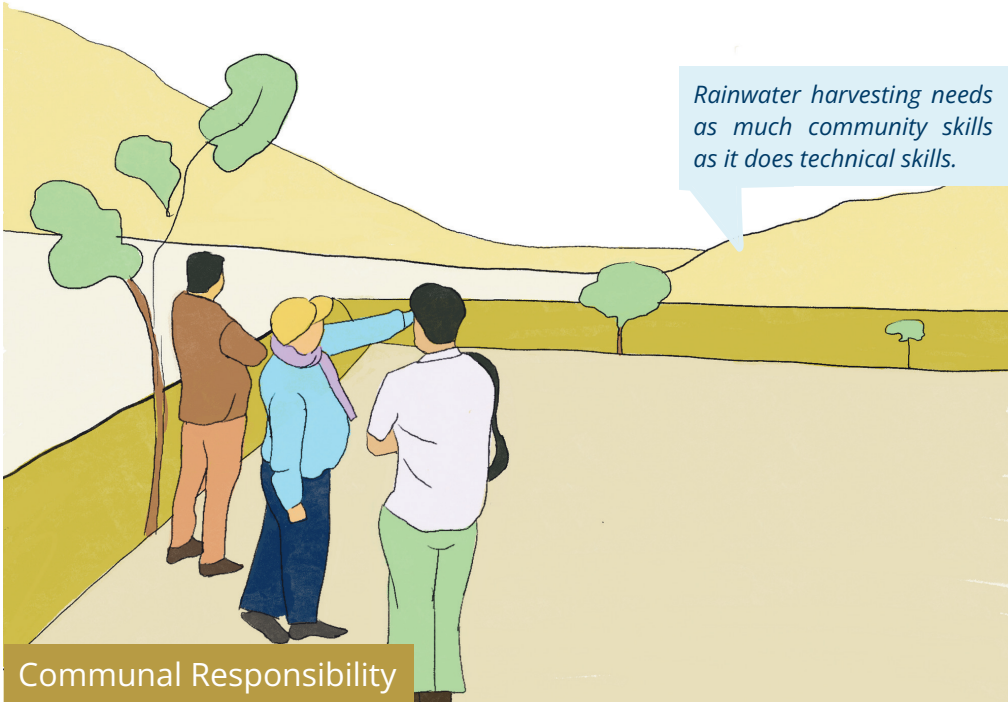
2.5 - 4

lakh

30:70 contribution by community and NGO

Collective Effort

To execute these interventions, it requires collective effort from community, non profits, government, researchers, and development practioners.



01

Hiring **Earth movers/JCB** (to scrape soil and pile into the earthen dam or pond or embankment).

02

Providing or paying for **manual labour** (removal of weeds, shrubs, sloping the region).

03

Formation of **village-level committee** to desilt the dam once in 5-6 years and resolve disputes amongst villagers if any.

04

Creation of awareness among goat-herders, shepherds and other community members to maintain and put back **loose rock along the dam** when they come there to graze.

For Trainers

01

Hold **regular meetings** with presentations in the village. Clearly communicate what the plan is using maps, charts and presentations generated through PRA exercise.

02

Explain benefits of the project, but **avoid guarantees and promises** (like, saying that “crop yields will double”).

03

Be Clear, Be patient.

04

Group meetings as well as **individual-level** meetings to discuss the project.

Resource Person

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