Electronic Participatory Rural Appraisal (ePRA) to Ensure Sustainable Irrigation

A Practical Guide for Canal Command Areas

About CLARE
CLARE is a UK-Canada framework research programme on climate adaptation and resilience, aiming to enable socially inclusive and sustainable action to build resilience to climate change and natural hazards. CLARE is an initiative jointly designed and run by the UK Foreign, Commonwealth and Development Office and Canada's International Development Research Centre. CLARE is primarily funded by UK aid from the UK government, along with the International Development Research Centre, Canada.

About CLARITY
CLimate Adaptation and Resilience In Tropical drYlands (CLARITY), a research project under CLARE, is building equitable, sustainable, and climate-resilient development pathways in tropical drylands. This Global South-led project will result in the creation of long-term assets (data and tools) and capacities to achieve transformational change.

What is ePRA:

The Electronic Participatory Rural Appraisal (ePRA) is a methodology that blends **traditional participatory techniques** with **digital tools** like GPS and satellite imagery.

What need does this playbook address:

In the agricultural sector, ePRA proves to be a **practical and inclusive tool** to address systemic challenges and strengthen community participation in planning and governance.

Water is a common resource, and its related issues should be resolved at the community level. ePRA **promotes collective decisions** and helps in identifying **effective interventions** for local water-related issues.
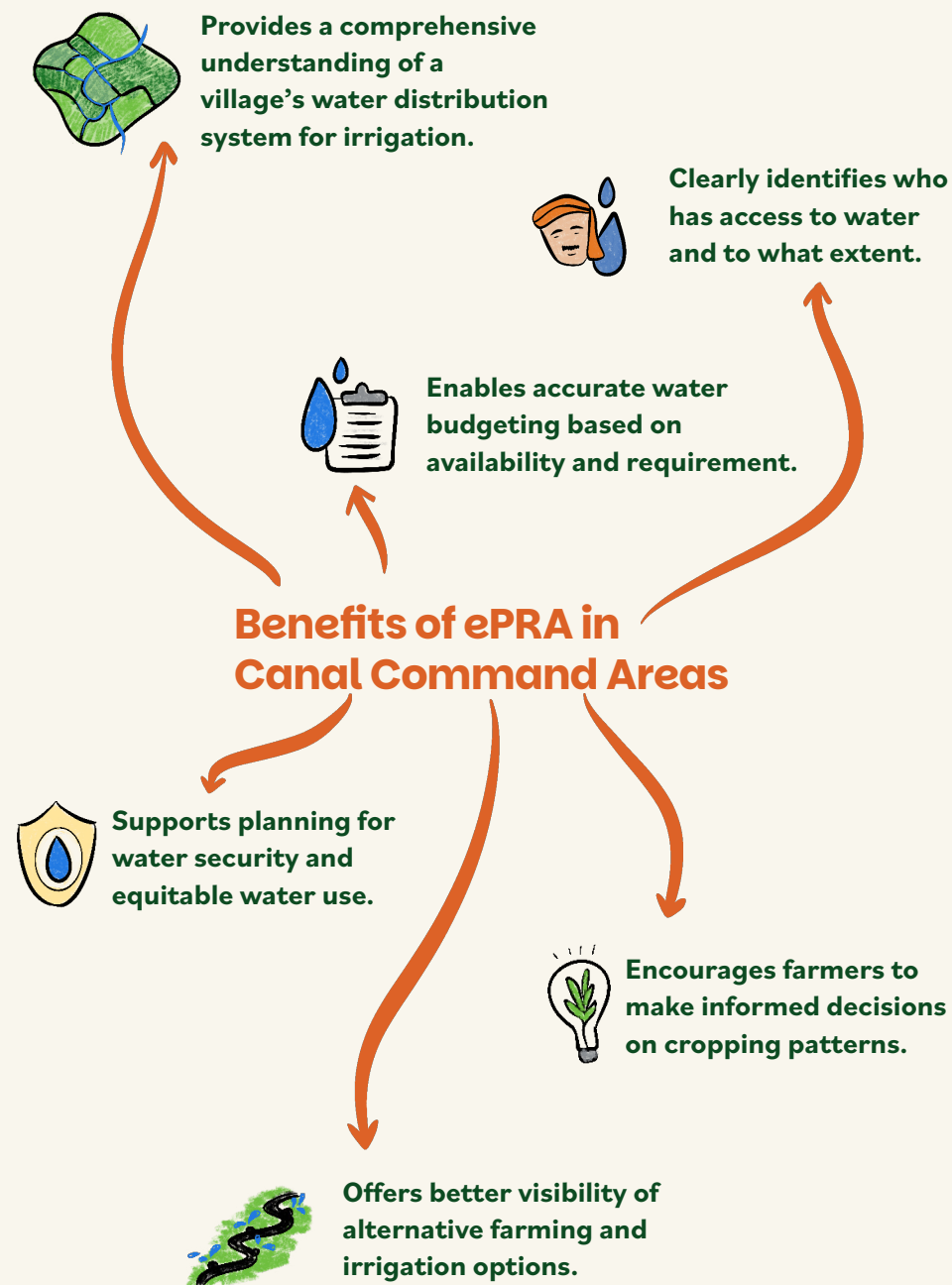
This playbook is a **step-by-step guide** to map, understand, and manage local irrigation resources through ePRA.

This solution is suitable if:

→ You aim to conduct **natural resource management (NRM)** planning in your village or command area.

→ You are open to combining technological tools (e.g., GPS mapping, digitisation) with community knowledge.

→ The community is interested in **identifying common issues** such as unequal water distribution, water stress, and imbalances in water demand and supply.

Who can use this playbook:

→ Trainers
→ Practitioners
→ Community Resource Persons

Benefits of ePRA in Canal Command Areas

Provides a comprehensive understanding of a village's water distribution system for irrigation.

Clearly identifies who has access to water and to what extent.

Enables accurate water budgeting based on availability and requirement.

Supports planning for water security and equitable water use.

Encourages farmers to make informed decisions on cropping patterns.

Offers better visibility of alternative farming and irrigation options.

STEP 1:
Pre ePRA Preparations

Collect and Verify Information From Relevant Sources

Collecting and verifying information ensures that the E-PRA map and planning process are accurate, and it helps cross-check community inputs, identify inconsistencies, and build a reliable database for decision-making
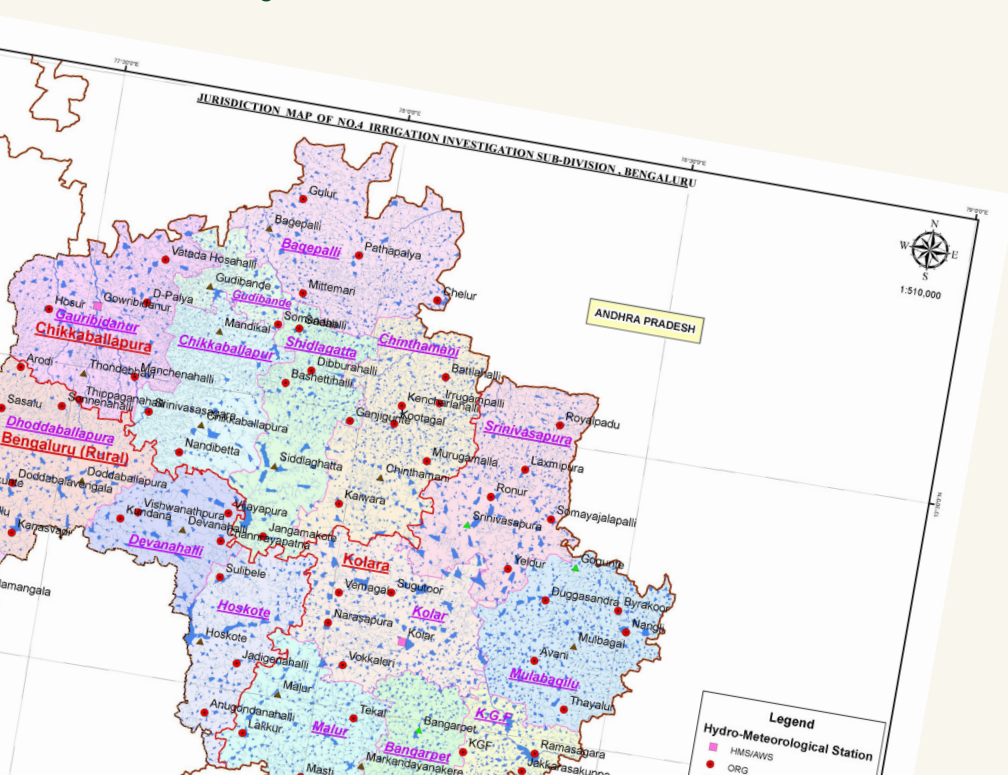
Water Resources Department/ Corporations:

Many states have basin-level irrigation corporations, like the **Krishna Bhagya Jala Nigam Ltd** in Karnataka, which manage large irrigation projects and publish technical data useful for planning. For ePRA, their maps of canals, distributaries, and laterals offer a reliable base to understand irrigation infrastructure. Such maps can also be obtained through remote sensing.

Command Area Development Authority (CADA):

Established under the national **Command Area Development Programme**, CADA works to improve irrigation efficiency and equitable water distribution in canal command areas. Most states with large irrigation systems have a CADA or equivalent unit. For ePRA, CADA provides maps of field irrigation channels (FICs) and supports on-ground irrigation planning.

KGIS Platform:

KGIS is Karnataka's dedicated **Geographic Information System** platform, covering the whole state with integrated spatial data. Every state has a unified GIS platform like KGIS, but with its own different versions or portals. For ePRA, village boundary shapefiles from the Karnataka GIS (KGIS) official website can be downloaded.

Water User Groups (WUGs):

These **farmer-led institutions** are formed under participatory irrigation management policies. While in Karnataka they are called WUCS, similar institutions exist across states with different names, such as **Water User Associations (WUAs)** in Andhra Pradesh, Telangana, and Maharashtra. For ePRA, they mobilise farmers, bring local knowledge into irrigation planning, manage water distribution, mediate disputes, and make decisions based on farmers' needs and demand.

Reverifying the Information:

Since FICs are earthen, it is important to verify their current paths, as they may have shifted over time. Updating FIC maps involves:

→ **Selecting village volunteers** or resource persons.

→ Having them walk along the channels and manually recording their paths using applications such as **Geo Measure or SW Maps.**

Google Earth Pro:
Use this to access high-resolution satellite imagery (ideally 1–1.5m spatial resolution) that matches the target village's timeline and location to ensure precise mapping of available infrastructure.
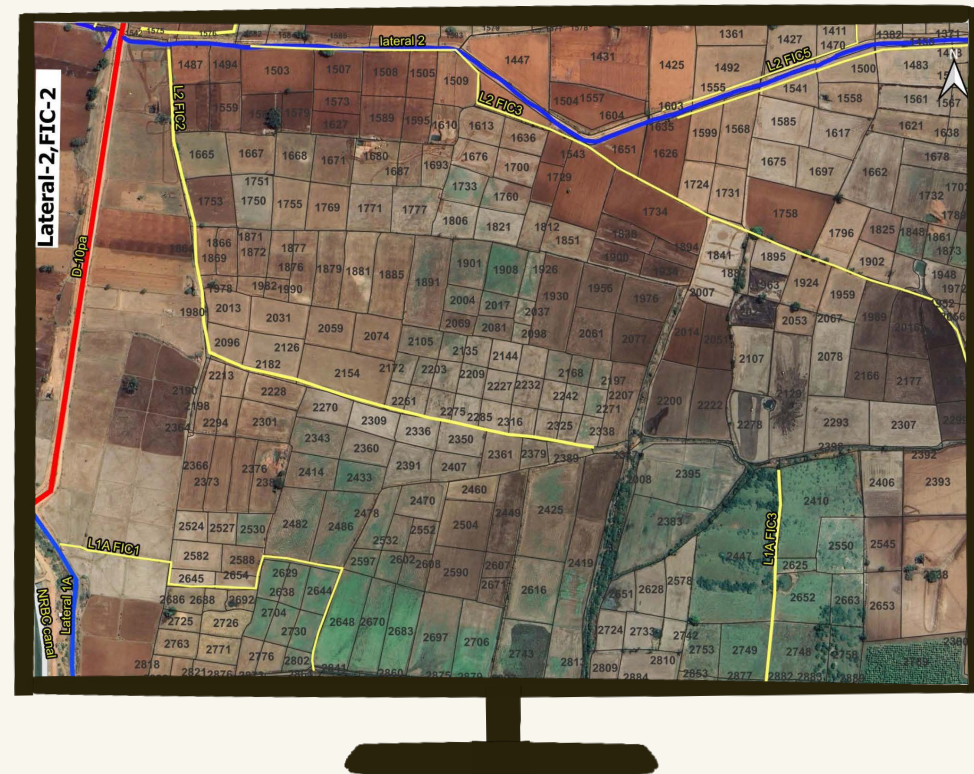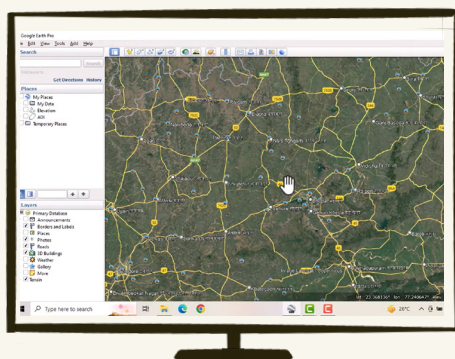
Digitise the Base Map:

→ A base map is the **foundational map layer** that shows the essential physical features of an area – such as canals, distributaries, laterals, field irrigation channels, farm plots, and village boundaries – on which further information can be added.

→ The initial mapping of these features should be carried out by a **GIS expert in QGIS**, using Google Earth imagery for reference.

→ The final map should be **simple and farmer-friendly,** with FICs and farm plots clearly highlighted to support community participation.
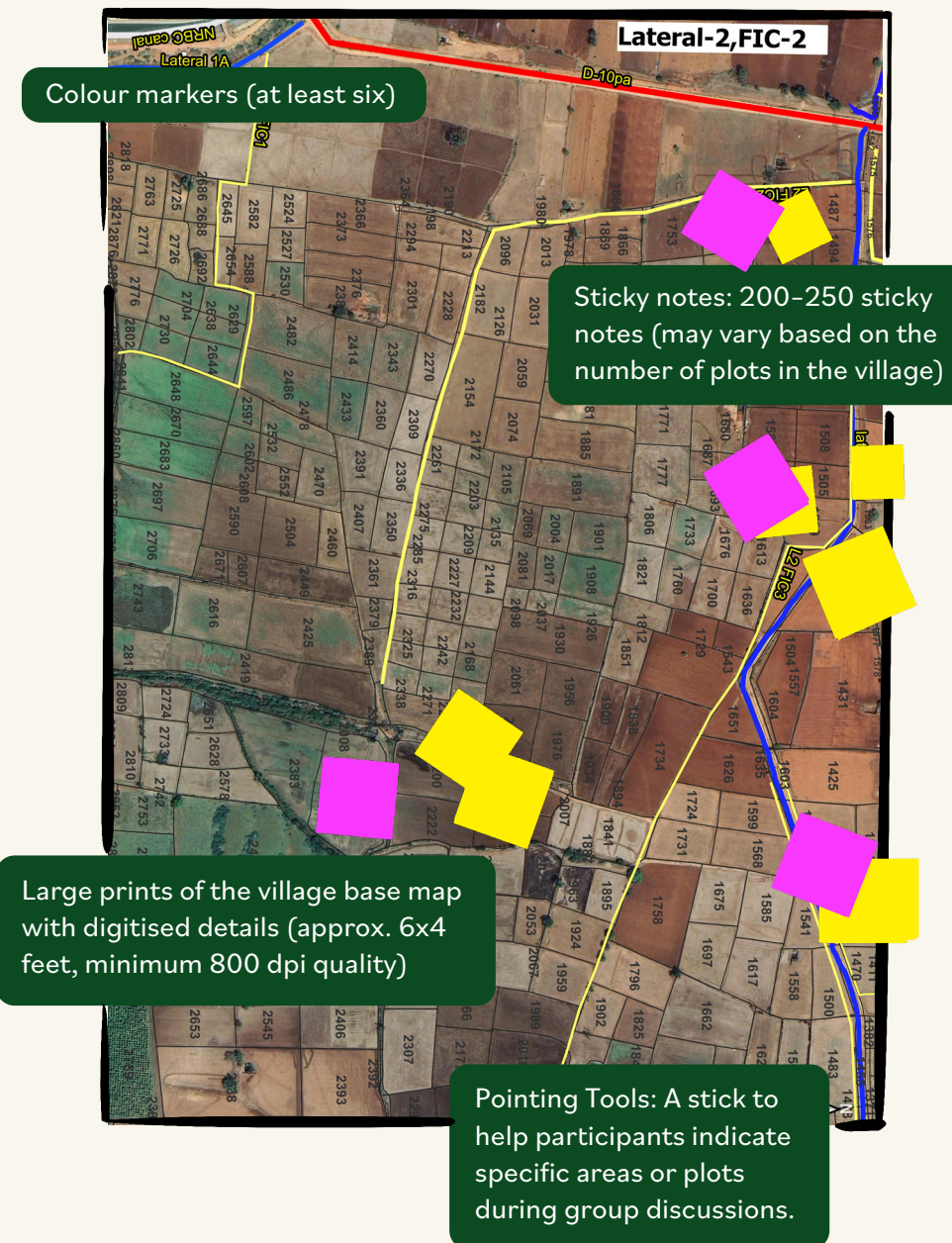
Mobilise the Community

→ After collecting and verifying information and digitising the base map, **a village-level orientation meeting** should be organised to inform the community about the purpose and process of ePRA and ensure participation in the process.

→ This mobilisation meeting **brings together all key stakeholders,** including water user group members, influential farmers, and village leaders.

→ **The time, date, and venue** for conducting the ePRA should be decided in this meeting, and at least 70% participation from FIC-connected farmers should be encouraged.

Best time and place to conduct an ePRA session

→ **Time:** Mornings (to ensure maximum farmer participation

→ **Place:** A common and easily accessible venue in the village (such as the panchayat hall, a school ground, or community space)

Gather Materials for the ePRA Session

Colour markers (at least six)

Sticky notes: 200–250 sticky notes (may vary based on the number of plots in the village)

Large prints of the village base map with digitised details (approx. 6x4 feet, minimum 800 dpi quality)

Pointing Tools: A stick to help participants indicate specific areas or plots during group discussions.
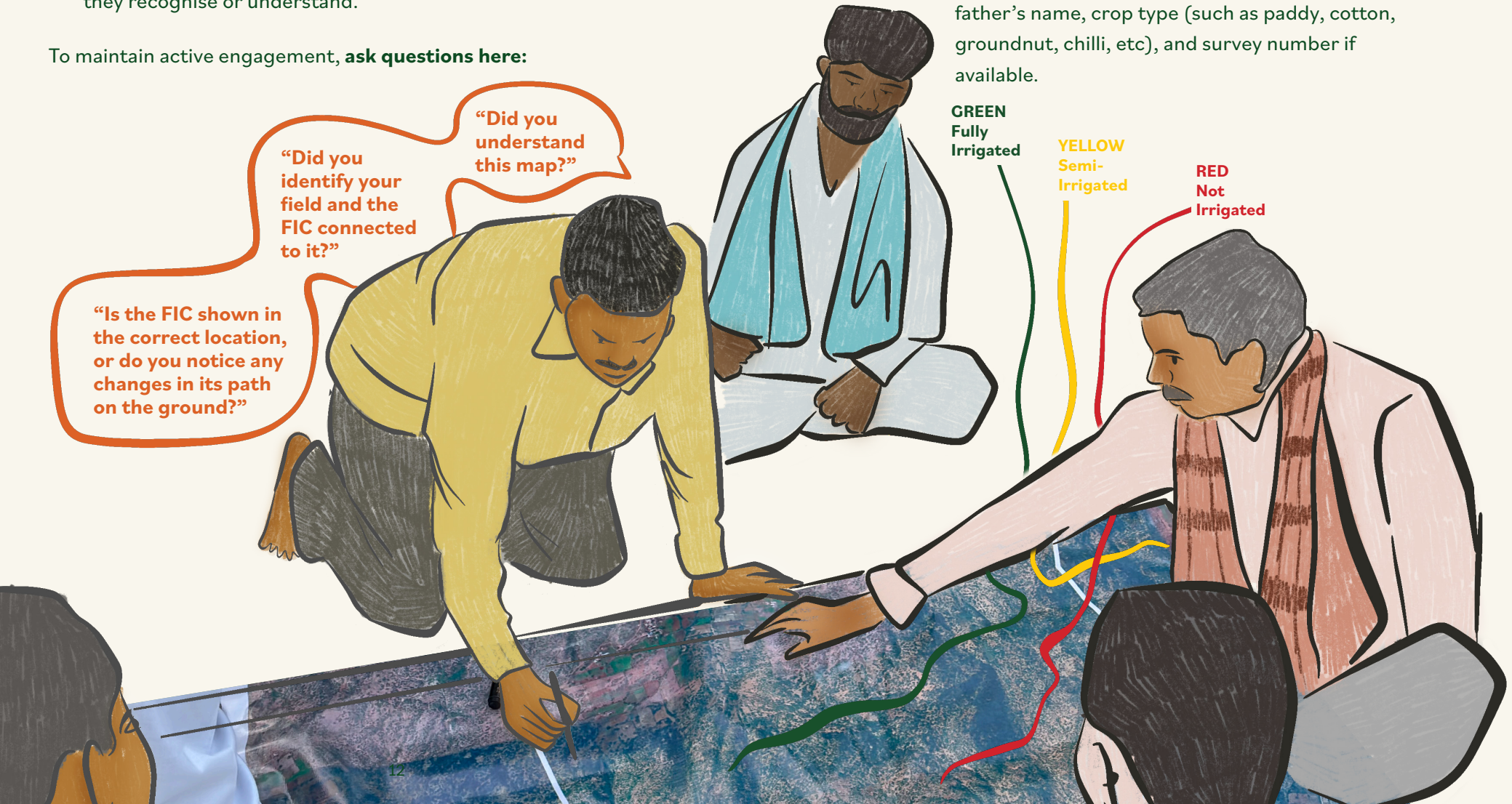
STEP 2:
During the ePRA

→ Begin the session with a **short introduction** explaining the purpose and importance of ePRA.

→ **Display the maps on the ground** and allow farmers to observe and engage with them.

→ Invite farmers to **interpret the map** and share what they recognise or understand.

To maintain active engagement, **ask questions here:**

→ Ask each farmer to:

- **Identify their plots** along the FICs from which they are drawing water.
- **Mark the irrigation source** (dug well, borewell, canal, farm ponds, etc) in the plot.
- **Colour-code the irrigation status** using sticky notes or markers on the map and confirm all the markings.
- **Label the plots** to include their full names, father's name, crop type (such as paddy, cotton, groundnut, chilli, etc), and survey number if available.

GREEN
Fully
Irrigated

YELLOW
Semi-
Irrigated

RED
Not
Irrigated

"Did you understand this map?"

"Did you identify your field and the FIC connected to it?"

"Is the FIC shown in the correct location, or do you notice any changes in its path on the ground?"

Identify the active participants and ask them if they'd like to be a resource person or lead the ePRA process. This will help:

→ Leverage their knowledge of the community and irrigation issues

→ Build trust and encourage open participation among others.

→ Effectively manage disagreements or conflicts, given their understanding of local dynamics.

Post ePRA Processes

Finalise a Digitised Map

Create a final digitised map that integrates all the information collected during the ePRA meeting with the help of a GIS expert.

→ All details, including **irrigated and non-irrigated plots,** must be accurately captured.

→ If there are doubts about plot boundaries or FIC alignments, Google Earth Pro's **historical imagery** can be used to verify locations, as it reflects year-wise and seasonal changes in the village landscape.

→ If a farmer **draws water from two FICs,** this should also be indicated on the digitised map.
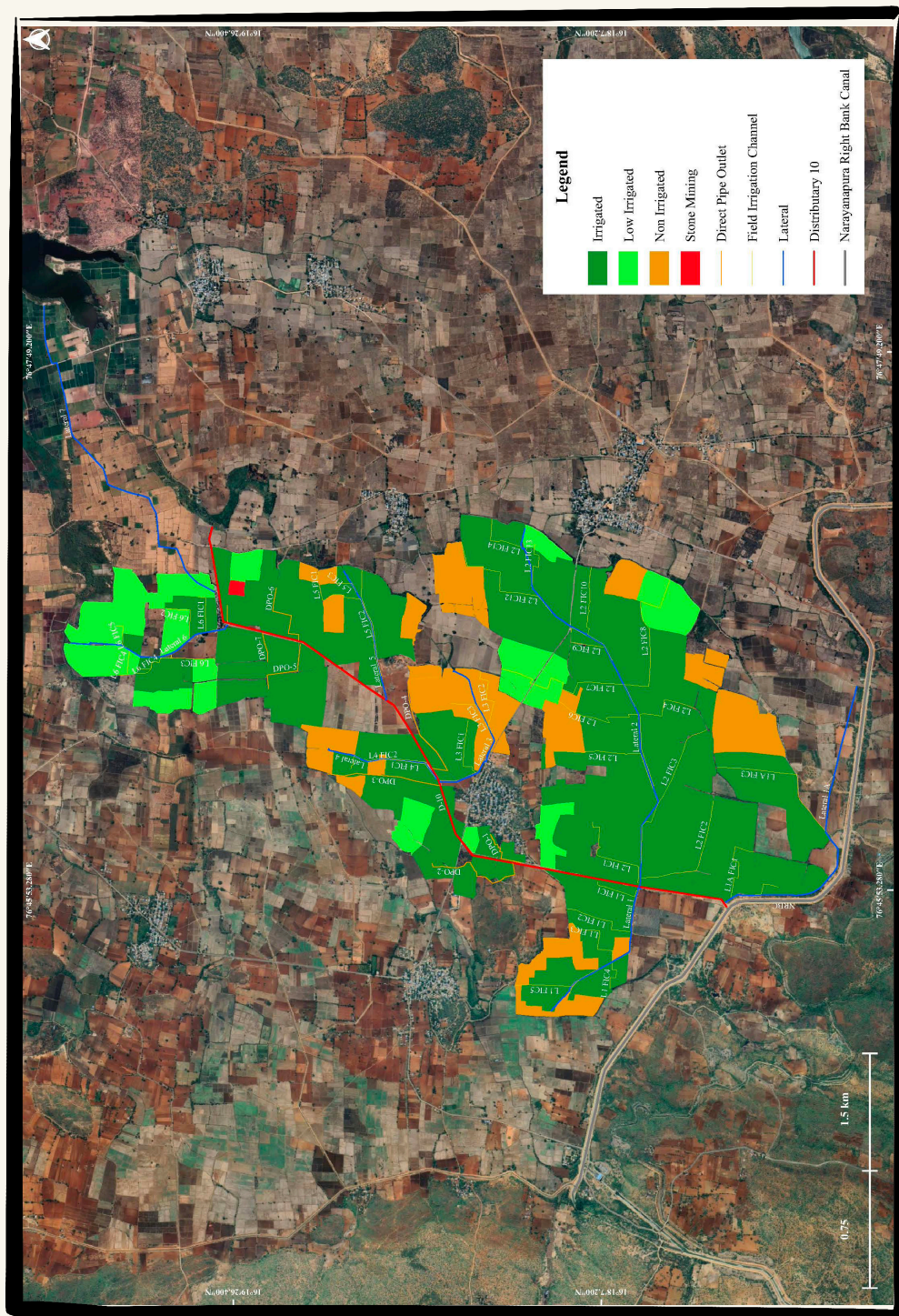
Validate the Digitised Map

Share the digitised map with community members to **confirm its accuracy** and note any missing or incorrect details. For example, **cross-check information** at the tail ends of FICs. If tail-end farmers receive water, upstream users are likely covered; if no water reaches the tail end, farmers under those FICs are likely not receiving water.

Use the Updated Map

Incorporate **field verification feedback** to finalise the digitised map. Use the updated version as the foundation for FIC interventions, water budgeting, irrigation planning, improved cropping patterns, and policy decisions.

ePRA data can be used to:
→ Support **watershed management** planning through detailed mapping of water resources, drainage patterns, and recharge zones.
→ **Aid irrigation management** by helping water user groups plan and ensure equitable water distribution.
→ Help prioritise and map **potential interventions** such as farm ponds, check dams, and bunds.
→ Inform **Gram Panchayat Development Plans (GPDPs)** with accurate, ground-based data for more inclusive planning.

Case Study: FIC Intervention Based on E-PRA Findings in Devadurga, Raichur, Karnataka

WELL Labs, in collaboration with Prarambha, recently conducted an ePRA exercise in Devadurga, Raichur district, Karnataka, and found:

→   Even within the canal command area, several tail-end plots lacked water access.
→   A clear mismatch between water availability and farmers' choice of water-intensive crops like paddy.
→   Plot-level insights on crop types, irrigation status, and water gaps.

FIC Intervention:
Based on these insights, we developed an intervention that focused on enhancing the field irrigation channel (FIC) infrastructure. To address water losses and ensure tail-end access, **earthen FICs were upgraded through the installation of pipelining.**

 Scan the QR code to read more about our work with ePRA.

**Earthen FICs
(Pre-ePRA intervention)**

Benefits of FIC Intervention:

With assured and timely water, farmers can adopt suitable cropping patterns instead of depending only on water-intensive crop like paddy.

More reliable and controlled flow of water directly to farm plots.

Pipelined FICs minimize seepage, leakage, and evaporation compared to earthen channels.

Ensures that water reaches tail-end farmers and not just head-end users.

When combined with WUCS management, farmers take ownership of the system, ensuring sustainability.

Unlike earthen FICs that need frequent repair and de-silting, pipelined channels are more durable and easier to manage.

**Pipelined FICs
(Post-ePRA intervention)**

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