CoRE Stack Landscape Solvability Workshop 2025

December 15-17, 2025

IIT Delhi

Workshop report

Host organizations

CommonsTech Foundation for
Participatory Technologies & IIT Delhi

CoRE Stack

As climate risks grow and public investments in natural resource management expand, the challenge is less about funding and more about how different actors come together and work closely with communities on the ground. At the second edition of the Landscape Solvability Workshop, with 80+ participants from 37 organizations, about 10 talks and multiple brainstorming sessions, we reflected on the role of CoRE Stack in building and sustaining community-led climate action in rural India.

We summarize below our key learnings from the workshop!

Building a Multi-Actor Platform (MAP) for landscape sustainability

The workshop began with an in-depth session on the Multi-Actor Platform (MAP) framework, led by Mr. Ravindra Adusumilli from WASSAN, who conceptualised MAP as a mechanism to strengthen convergence among multiple line departments and enable sustained, coordinated action towards climate resilience at the block level. He explained the MAP process, highlighting how it brings together government agencies, SHG federations, CSOs, and other actors on a common platform to jointly understand the block as a living landscape, identify priority climate and livelihood challenges, convert these into actionable proposals, and align them with appropriate policies, financing mechanisms, and institutional support systems for sustained on-ground impact.

This session set the stage for the entire workshop, making it clear that the real bottlenecks of climate action in rural India is often not adequate financial flows but a lack of synergy between different landscape actors leading to poor utilization of financial resources and local wisdom. These insights got us thinking through the role of data and analytics in identifying and scoping landscape issues that are ever evolving yet locally solvable. Simply put, can the integration of local ecological knowledge of communities, civil society organizations' field experience, and geospatial science aid surfacing of landscape problems, convergence of solutions, and impact monitoring.

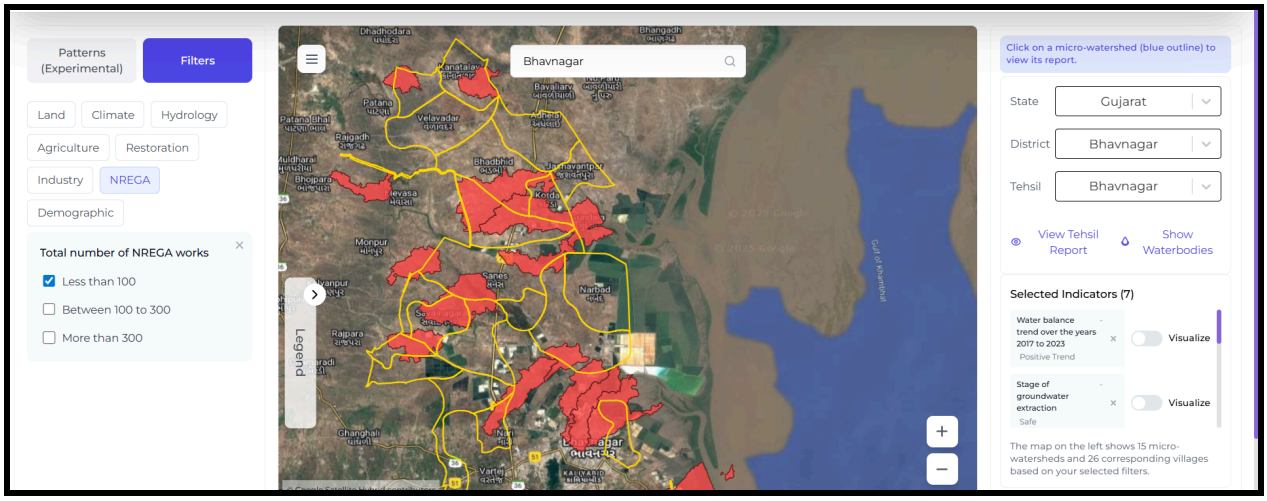
[Mr. Ravindra's presentation is available here]

Role of Know Your Landscape to facilitate MAP process

CSOs, researchers, and funding agencies working across various sectors including water security, climate resilient agriculture, agrohorticulture, and rural livelihoods came together to assess the potential of the Know Your Landscape dashboard in end to end landscape assessment, planning, and monitoring. The dashboard currently hosts 25 socio-ecological filters and 13 landscape stress patterns for over 200 tehsils in India. Here is what we collectively identified about the current potential and future roadmap of the dashboard:

Situation Analysis of landscape: CSO partners across Jharkhand, Odisha, Rajasthan, Gujarat, Karnataka, Maharashtra and Uttar Pradesh shared the social-ecological descriptions of their landscapes. For instance, Dron Kumar from FES described how Aathamalik region in Anugul district in Odisha gets plenty of rain, sits between two big rivers, and yet is agriculturally stressed due to poor infrastructure for groundwater recharge and runoff harvesting, and gaps in community engagement in forest management, which leads to soil erosion, dwindling forest cover, and human-wildlife conflict. With this context in mind that landscapes are ever evolving ecosystems of various social and ecological patterns, we brainstormed on potential use cases and limitations of the KYL dashboard.

There was a consensus that the dashboard helped program managers and field supervisors identify supply stress patterns such as seasonal water scarcity, forest degradation, and drought exposure, and demand stress patterns such as low crop yield due to poor crop selection and soil health degradation. The dashboard provided structure to thinking relationally between different landscape descriptors. Manisha Patel, program manager at Utthan, demonstrated how over 14 geospatial indicators collectively helped her assess the possibility of agricultural intensification in areas with low water availability. For Bhavnagar tehsil in Gujarat, she contrasted indicators within safe limits such as stage of groundwater extraction and water balance trend along with stress factors such as poor surface water availability and crop degradation, concluding the need for crop water budgeting discussion and potential for checkdam construction in selected areas.



Participants experimented with different indicators to understand landscape strengths and weaknesses

Going beyond landscape patterns: Different use cases emerged as stakeholders across various contexts interacted with the dashboard. Participants suggested the need for visualization of more types of granular patterns across time and specific land covers. For instance, assessing water quality and soil degradation was important for nearly all CSOs. Similarly, Rajalakshmi Deshpande from Jagriti, found it helpful to visualize areas with high tree cover loss as they set out to target human wildlife conflicts in UP. However, to be able to hold deeper conversations with resident communities, highlighting forest areas nearer to farmlands and distinguishing tree cover transitions to shrublands from transitions to cropping areas mattered more.

Next Steps: We identified three broad user personas who would be interested in using the dashboard.

1. Field experts: Currently, this is the dominant user group who is able to interact with the dashboard meaningfully. They have had years of field exposure and have a deep understanding of landscape changes in their areas of operation. To make the dashboard more useful for them, there is a need for us to make every indicator tell a story - that is, highlight its temporal variation over the years, its purpose/interpretation, its source, and our confidence in its accuracy. The social-ecological patterns being developed are a key component towards this direction and we plan to further refine them in consultation with the partners.
2. Program managers and geospatial researchers: When venturing into a new focus area or a new location, trust in data source and computation becomes even more important. Presenting each production system as an ecosystem, where remotely sensed indicators are combined with primary field data would help program managers and geospatial researchers understand the relationship between different landscape parameters. For

instance, an agricultural system can be described in terms of demand and supply indicators on KYL, such as agricultural intensification, poor water balance, waterbody health, etc. and combined with primary data collected from the ground on specific cropping patterns and market access, prompting discussions on suitable interventions.

3. Program managers: The landscape reports prepared using Know Your Landscape can serve as an intermediary document for discussions with funding agencies, policy experts, and village communities. Members involved in landscape planning preferred data mapped at revenue villages or panchayats instead of microwatersheds, as those are the administrative boundaries for intervention planning purposes.

Brainstorming in action! Participants held these conversations in 5 such breakout groups.

Landscape Assessment: Perspectives from IWMI and WELL Labs

Mohammed Faiz Alam, representing IWMI, presented how district- and block-level planning can be strengthened by integrating public datasets, such as Mission Antyodaya, Minor Irrigation Census, Census of Water Bodies, CGWB groundwater data, MGNREGS expenditure, soil grids, and climate data, into a unified analytical workflow. He highlighted tools like the Water Productivity Atlas, which enables crop-wise comparison of physical, economic, and nutritional water productivity to guide cropping and water-use decisions, and AWM Typologies and LEAF, which convert biophysical and socio-economic data into context-specific recommendations for irrigation, crop BMPs, and soil and water conservation. He also demonstrated how MGNREGS

Explorer and SolaReady support spatial analysis to realign public investments toward NRM, groundwater sustainability, and climate-resilient infrastructure.

[Link to presentation]

Vivek Grewal, representing WELL Labs presented the "Diagnose–Design–Assess" framework for water security, positioning it as a practical complement to CoRE Stack for improving on-ground outcomes. Drawing from field examples in Marathwada and watershed interventions, he showed how misdiagnosis of root causes, inappropriate solution design (e.g., misplaced recharge pits or farm ponds), and weak outcome indicators often lead to poor results. The presentation emphasised the need to democratise water science at scale by enabling CSOs and Community Resource Persons to act as community hydrologists using shared data, simple sensors, and participatory tools. He outlined modular approaches for problem diagnosis, solution design, and impact assessment, supported by field manuals, playbooks, continuous monitoring tools, and digital data capture, to ensure solutions are scientifically sound, context-specific, and measurable over time.

[Link to presentation]

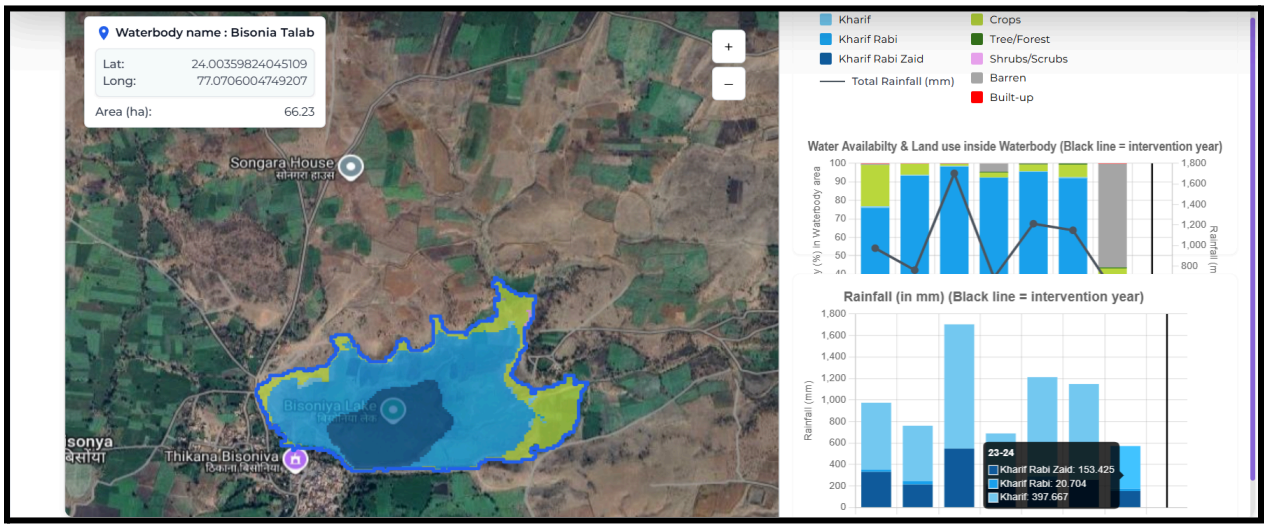
From these broader discussions on landscape assessment and planning for varied NRM interventions, we branched into putting together decision support frameworks for waterbody rejuvenation and agrohorticulture practices.

Insights from decision support system for waterbody rejuvenation discussion

In collaboration with ATE Chandra Foundation, and suggestions from FES and Arghyam, we had identified an initial list of indicators for prioritizing waterbodies for rejuvenation, implementation monitoring and impact assessment. Such indicators included remote-sensed measurements of changes in surface water availability over time, drought incidence, cropping intensity in the zone of influence of the waterbody, and whether it was on a drainage line or not. During the breakout sessions, we further expanded this list, with primary field indicators like community ownership, primary usage of waterbody, and damaged sluice gates or blocked inlet/outlet channels, as being important for determining critical waterbodies to be desilted. The relevance of measuring impact on short-term and long-term scale also came up; while impact on gendered labor norms can be immediately assessed post rejuvenation activity, improvement in water table and on livelihoods may take more than a year. Further, an

integrated dashboard that brings together primary data collection in a panel-based survey from participating farmers was suggested as being instrumental for impact monitoring.

An extensive waterbody tracking dashboard is now available on Know Your Landscape and will be enhanced soon with filters and patterns for decision support. Check out a screenshot from the dashboard below.



The dashboard provides a health status of a waterbody in terms of seasonal water availability, land use, zone of influence and NDVI using which the impact of desilting interventions can be assessed

[Link to CoRE Stack's methodology for impact assessment for waterbody rejuvenation]

Key learnings from decision support system for agrohorticulture discussion

Agrohorticulture is especially relevant for small landholders as it can diversify their source of livelihoods and help cope with increasingly harsh conditions for agriculture emerging from the changing climate. Manisha and Selva from Utthan set the stage with a presentation on their experiences with commons land restoration and agrohorticulture, and a listing of key indicators used by them for prioritizing suitable sites. This was followed by break-out discussions on further indicators to consider.

We received diverse and equally rich insights into various community driven indicators such as to consider community land ownership as a key factor to prioritize lands for agrohorticulture. Some contradictions in technical feasibility and field requirements of agrohorticulture also came up; higher rainfall and large land area are favorable conditions for agrohorticulture to be

successful, whereas areas with lower rainfall and farmers with small lands are likely to benefit more from it despite the land being less suitable for agrohorticulture. These insights led us to distinguish between landscape relevance for a particular type of intervention and site suitability for the intervention. While site suitability can be associated with technical feasibility of growing crops and plants together on a land, relevance accounts for other social and ecological parameters such as alternate livelihoods and resources available to participating farmers, to guide government support in providing saplings to individuals. Indicators for relevance and suitability can be parameterized whereby organizations can tweak thresholds for each indicator depending on their specific context.

Participants also recommended that we distinguish between agrohorticulture on private farms from social forestry, where factors like type of common land and interventions possible there would also need to be considered. We will soon begin to build out customizable decision support and impact monitoring systems for agrohorticulture and social forestry separately. Site suitability assessment for agrohorticulture on private farmlands is now integrated in Commons Connect!

[Link to Utthan's presentation]

A dashboard for assessing site suitability for plantation and agrohorticulture interventions is available on Know Your Landscape.

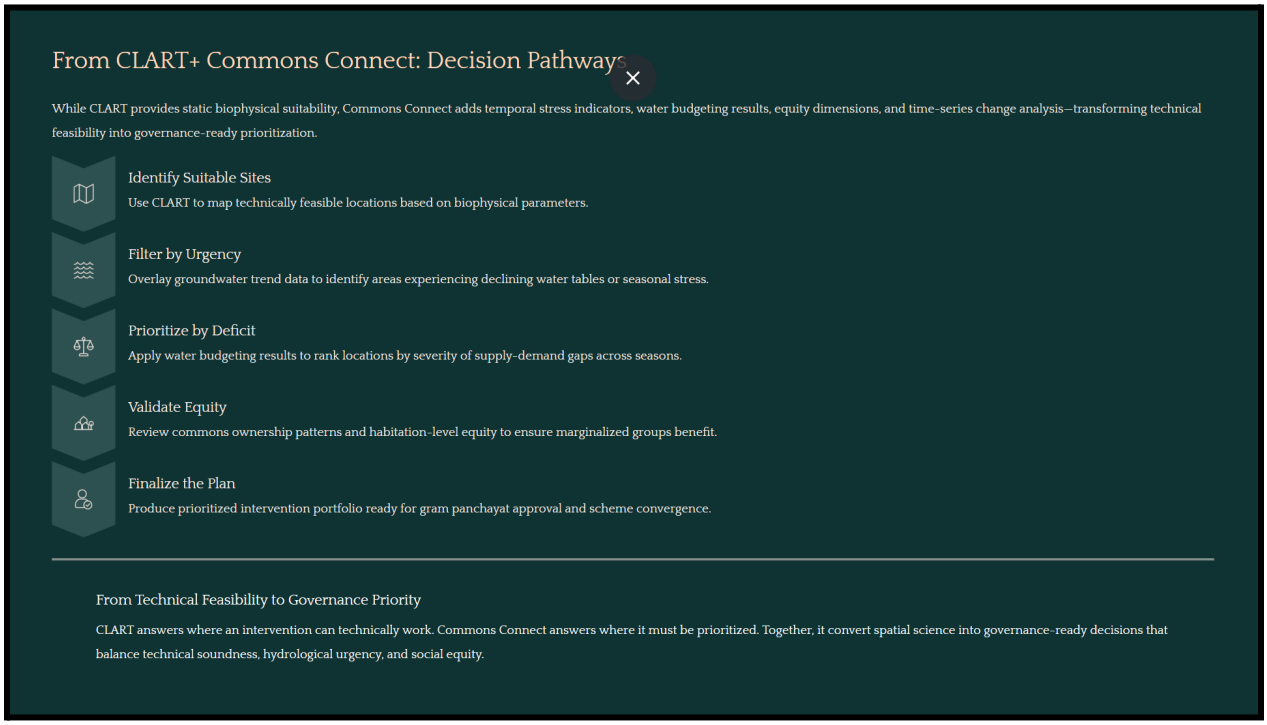
[Link to CoRE Stack's methodology for decision support framework for plantation's site suitability assessment]

Developing shared understanding of water security plans

Dron Kumar, from FES, kicked off the session with a presentation on their process for developing water security assessment plans in Odisha. Water security plans are developed every five years, indicating the importance of engaging resident communities as decision makers in building long-term resilience. A key component of this goal is democratizing communities' access to geospatial science, so they may be able to integrate their local knowledge with geospatial assessment of their landscapes and make decisions grounded in sustainability.

FES developed the Composite Land Assessment and Restoration tool (CLART), which helps in identifying technically appropriate locations for soil and water conservation structures, reducing random, low-impact interventions and improving long-term recharge efficiency. Dron described

that the integration of CLART in Commons Connect, which combines localized data such as existing natural resources and geospatial data like temporal land cover changes, equips landscape stewards to hold data-driven consultations and planning with the community. Attached below is a snapshot of his presentation, where he shared how Commons Connect transforms mere geospatial assessment of a landscape into a governance-ready prioritization plan for natural resource management interventions.



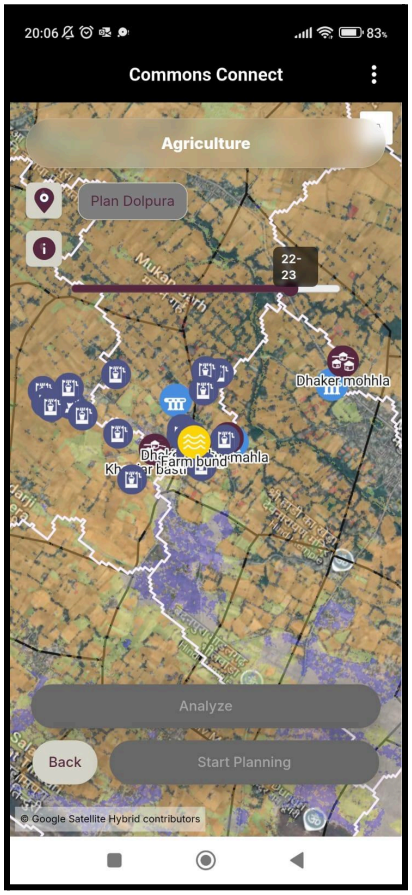
A snapshot of Dron's presentation highlighting the significance of CLART and Commons Connect in NRM

[Link to Dron's presentation]

How Commons Connect is helping partners in water budgeting exercises

Partners shared that Commons Connect supports water budgeting by offering a structured and spatially grounded approach to analysing both supply and demand. On the supply side, the tool integrates remote sensing and spatial layers to map rainfall, runoff, water balance, and surface water bodies, helping partners understand seasonal water availability during Kharif and Rabi. On the demand side, water requirements are mapped through local consultations, capturing crop types, irrigation practices, and domestic and livestock use. Additional features are needed to visualize especially the primary data alongside the remote sensed data pulled together from various secondary sources.

Commons Connect also allows visualisation of micro-watershed boundaries, drainage lines, and CLART maps which help partners assess where water conservation or recharge structures are most appropriate and how much runoff can realistically be captured. Compared to approaches that depend mainly on primary data, the tool helps integrate multiple data sources to help build a justification of what kind of interventions are needed where, and separately, if the site selection is appropriate. Overall, partners viewed Commons Connect as a practical decision-support tool that strengthens local planning, improves transparency, and supports more informed and grounded water management decisions.



Data on land-holdings, livelihoods, resource access, and caste identity can be visualized on the cropping pattern of the village in Commons Connect

Partners' Experiences with the Commons Connect Tool

In a dedicated experience sharing session some partners shared their experiences with using Commons Connect, ranging from piloting it to successfully submitting the proposed plans to the Gram Sabha.

SUPPORT shared that 30 DPRs developed during the pilot were placed before the Gram Sabha, leading to the approval of more than 230 additional demands. Encouraged by this outcome, they are now planning to extend the approach to other panchayats.

Abhivyakti Foundation reflected that the pilot was useful in very practical ways. Information on MGNREGA job cards, both existing cards and new applications, helped them follow up with relevant line departments and support communities in accessing entitlements. They also see scope to link the DPRs prepared through Commons Connect with the *Adikarmi Yogi* scheme.

SEWAK highlighted that using Commons Connect for data collection allowed their team to spend more time with community members. This process helped build trust, understand local needs more clearly, and include community perspectives in planning. The mapping features also enabled villagers to see and discuss their own assets, making the exercise more inclusive and transparent.

PRADAN shared that the pilot findings were presented to district officials, which opened up closer engagement between government agencies and communities. The data helped frame problem statements more clearly, and the visual maps and outputs made it easier to communicate evidence and priorities to officials.

[Also take a look at our blog on field stories on Commons Connect usage]

Perspectives on the community engagement chatbot for demand generation

An end-to-end digital system has been rolled out to support CSOs in managing NRM projects and collecting community demands in a structured manner. CSOs can create and monitor projects, track village plans linked with Commons Connect, and manage community-based NRM working groups across locations through a single dashboard. Community members can directly submit their demands through a simple chatbot interface to the NRM working group operating in their landscape, which will help bring in voices of women and marginalized caste groups who often have limited participation in Gram Sabha processes, while also raise questions about balancing individual demands with collective priorities. These submitted demands can then be

reviewed by landscape stewards and moderated by project supervisors in the working group, and linked with PRA findings and village plans being built on Commons Connect. Further, once the final DPRs are approved, the system also enables tracking of budgets and work implementation.

Several CSOs shared some positive speculations on chatbot's potential in reaching vulnerable citizens directly to collect their demands. At the same time, there were apprehensions related to proper governance of the process and we brainstormed mechanisms to ensure that the tool reaches the intended beneficiaries without increasing the digital labor of landscape stewards. Collectively, we concluded to pilot the community engagement bot in some locations, allowing CSOs to customize if they want to use the bot for individual demand collection or only knowledge dissemination.

Community can register their NRM demands directly via the chatbot

Pathways for building sustained financial flows for landscape stewards

The final day of the workshop focused on practical strategies that have been tested on the ground to sustain landscape stewardship efforts. A consistent concern raised by CSOs was the lack of clear exit plans when they begin working in a community. In many cases, stewardship processes and funding weaken once an organisation withdraws. Participants stressed the need to plan for continuity from the beginning of any intervention.

Integration with government programmes emerged as a key pathway for financial and institutional continuity. Several CSOs shared examples where Krushi Sakhis trained under projects were later absorbed into government systems, allowing their work to continue beyond the project period. In other cases, CSOs chose to work directly with government-appointed field staff after facing limits in scaling their own network of community resource persons. While this approach supports scale and continuity, challenges remain, particularly around digital adoption and flexibility in government systems, and the siloed nature of working of field-cadre aligned with specific line departments.

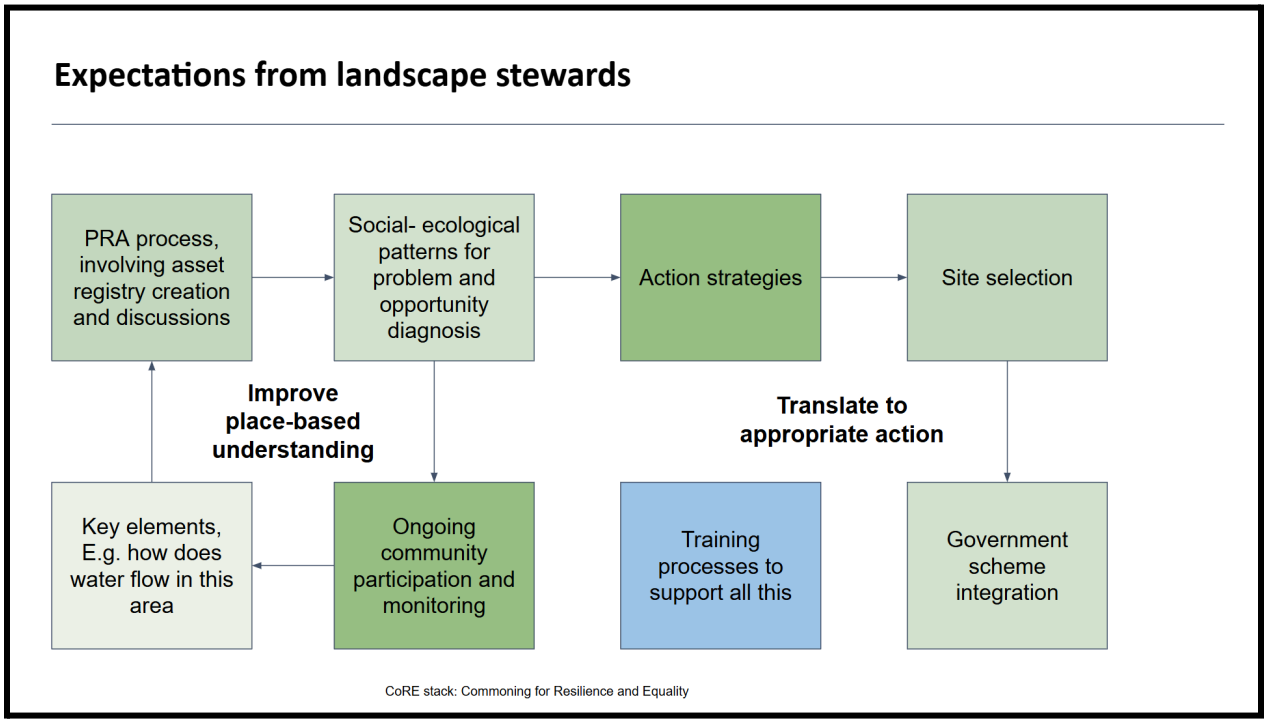
For this purpose, it was suggested that a network of landscape stewards is key to align the work of different field-cadre, and can emerge from the cadre itself, but needs to have more broad-based skills and a reliable income stream for deep engagement. There was broad agreement that stewardship must be viewed as long-term work rather than project-based engagement. Building an entrepreneurial outlook among landscape stewards was seen as important, enabling them to sustain their activities without long-term dependence on a single organisation or donor.

Discussions also highlighted diverse perspectives on how stewardship is organised on the ground. These included differences in job roles, the number of stewards per panchayat, ways of reporting outcomes, and whether funds should be routed to individuals or to collective structures such as stewards' groups or village-level clubs.

Key Points from the Discussion included

- Encourage learning of all stakeholders, broaden participation for greater equity, strengthen local institutions for landscape governance, improve livelihood to meet aspirations, strengthen local governance through social accountability and transparency.
    - Stewardship models must be locally designed; no single approach works across regions or contexts.
    - Strengthening existing village-level workers and spreading knowledge locally is key. Stewards are most effective when they are local, trusted, and selected through fair community processes.

    - Linking stewardship roles with government systems improves continuity, though flexibility and capacity remain challenges.
    - Stable and mixed compensation models help retain stewards better than short-term or irregular payments.
    - Long-term continuity depends on strong local institutions and visible results, not just funding.
- Adopt a landscape approach, understand ecosystems as complex adaptive systems, bring together scientific and local ecological knowledge, maintain diversity and redundancy of ecosystem processes.
    - Stewards should be trained to balance technical skills with community engagement and problem-solving abilities.



We collaboratively put together this flowchart highlighting some of the key expectations from landscape stewards

At the CoRE Stack, we are hopeful that Commons Connect has the potential to support on ground stewardship activities. Additionally, a framework is being operationalized for impact projection of these activities so that funding agencies can discover various organizations and stewards in the climate action space, analyse the efforts and impact of their stewards, and fund locations where there is a clear need and potential for these activities. More on this soon!

[A short note we drafted on landscape stewardship and natural resource governance]

Drones and bioacoustics sensors for biodiversity and restoration initiatives

This session, presented by IIT Delhi PhD student Dhruvi Goyal and post-doc fellow S. Jayakrishna, highlighted forthcoming work on how biodiversity and ecological restoration interventions can be systematically planned, monitored, and sustained through the use of practical tools and clear standards. Continuous biodiversity monitoring using bioacoustic sensors, drones, and satellite imagery can enable regular assessment of species presence, habitat description and seasonal variation, and long-term landscape-level changes. Together, these approaches can support evidence-based decision-making, adaptive management, and the generation of new hypotheses for furthering science. New innovations included tracking bird species behavior such as temporal regularity in their daily activity and their habitat affinity, differences across sensor sites in terms of acoustic patterns of sound complexity and diversity, and the use of drones to identify tree crowns and classify them on broad traits-based differences like feathered leaves and radial canopy vs. broad large leaves and clustered canopies.

Acknowledgements:

We sincerely thank all the organisations that participated in the **CoRE Stack Landscape Solvability Workshop 2025** for their active engagement, insightful discussions, and contributions to collaborative learning.

Participating Organisations: Abhivyakti Foundation, Acqalite, CAT, ATE Chandra Foundation, Badlao Foundation, Common Ground, CommonsTech Foundation, CSA India, Eicher Motors, FES, 4S, Gram Vaani, Green Hub – North East, IFMR, IIT Delhi School of Public Policy, IIT Delhi CSE/SIT Departments, ISB, IWMI, Jagriti, Kalamandir, MSSRF, NIRMAN, PHIA Foundation, Plaksha University, PRADAN, Rainmatter Foundation, Reliance Foundation, Say Trees, SEWAK, SUPPORT, TRIF, Utthan, WOSCA, WRI, WASSAN, WELL Labs.

We would also like to extend our sincere thanks to the speakers who shared their expertise and guided the workshop discussions:

- **Mr. Ravindra Adusumilli (WASSAN):** Multi-Actor Platform framework and process.
- **Mohammed Faiz Alam (IWMI):** Data integration for district- and block-level planning, Water Productivity Atlas, AWM Typologies, LEAF, MGNREGS Explorer, and SolaReady.
- **Vivek Grewal (WELL Labs):** Diagnose–Design–Assess framework for water security, participatory monitoring, and outcome-based planning.
- **Moumita Mukherjee (ATE Chandra Foundation):** Waterbody rejuvenation, decision support, and impact assessment.
- **Dron Kumar (FES):** Creation of water security plans with community-facilitated water budgeting exercises.
- **Manisha Patel and Selva Kumar (Utthan):** Considerations for agroforestry planning and implementation.

Building on the insights shared by the participants and speakers, and the collaborative discussions facilitated during the workshop, the following calls to action are proposed to guide future initiatives and strengthen multi-actor engagement in landscape solvability.

Call to Action

1. **Build a shared knowledge repository**
   Create and maintain a repository of short explainer videos, practical tutorials on MAP processes, landscape assessment, water security, agrohorticulture, fisheries, and

monitoring methods. This repository should support CSOs and stewards working in both familiar and new geographies.

2. **Strengthen the Know Your Landscape dashboard for practice, not just analysis**
   Improve the dashboard by making indicators easier to interpret through time-series trends, clear narratives on what each indicator means, its data source, and its limitations. Add flexibility for CSOs to work with more granular indicators relevant to their field realities.
3. **Pilot and govern bottom-up demand generation tools**
   Pilot the community engagement chatbot in selected locations with clear governance guidelines. Allow partners to choose whether the tool is used for demand collection, knowledge dissemination, or both, while ensuring that moderation efforts remain manageable.
4. **Deploy decision support systems for priority interventions**
   Finalize and deploy customizable decision support and impact monitoring systems for waterbody rejuvenation and agrohorticulture, accounting for rainfall, landholding size, and local livelihood strategies.
5. **Invest in landscape stewardship capacity**
   Support the training of landscape stewards as long-term actors with technical, facilitation, and entrepreneurial skills. Encourage convergence with government programs and explore sustainable funding models beyond project cycles.

About CoRE Stack

The CoRE Stack (Commoning for Resilience and Equality) is a community-based digital public infrastructure consisting of datasets, algorithm pipelines, and user-facing tools, that can be used by rural communities and other stakeholders to improve the sustainability and resilience of their local landscapes. Being jointly developed by a network of computer scientists, practitioners, and environmental research institutions, it enables innovators to build upon and contribute their own datasets, and monitor socio-ecological sustainability through a systems approach, while ensuring interoperability with other public infrastructure.

The CoRE stack broadly consists of four layers. First, datasets comprised of novel geo-spatial layers on changes over the years in cropping intensity, water-table levels, health of waterbodies, forests and plantations, and welfare fund allocation, among others, sourced from multiple contributors or built using open ML models operating on satellite data. Second, rich analytics on diverse socio-ecological indicators through scientifically validated monitoring and modelling methodologies and algorithms. Third, digital tools and dashboards that enable communities to build a shared understanding about their landscape, align on informed action to improve the resilience and sustainability of their landscape, monitor progress, report insights and aid collective decision-making. Fourth, integrate their outputs, including community demands, for public and private landscape funding mechanisms that support community stewardship of landscapes.

Many key geospatial datasets are already populated in the CoRE stack and have been embedded into tools that are guiding landscape action in over 400 villages, led on the ground by 15+ civil society organizations. Further enhancement with climate projections, social-hydrological modeling, and community-integrated ecological restoration, are underway to enrich the CoRE stack and amplify the impact it can bring.