# CHAPTER: 03

# FOSTERING INCLUSIVE LAND GOVERNANCE: INSIGHTS FROM COMMUNITY-LED MAPPING OF COMMON LANDS IN RAJASTHAN, INDIA

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## *ABSTRACT*

*Land governance in India grapples with significant challenges in documentation, including unclear land titles, incomplete records, and inconsistent survey practices. While private lands have been the focus of technological advancements and modernisation programmes since the 1980s, common lands continue to face hurdles in documentation and management, resulting in ecological degradation and loss of livelihoods. This study advocates for community mapping as a potent tool to democratise land data collection and foster participatory decision-making, thereby enhancing transparency and inclusivity in land management. Shedding light on the theoretical framework of participatory land mapping, it draws insights from community-led mapping exercises that documented community pastures across 949 villages in the Chittorgarh district of Rajasthan. Its findings highlight the need to integrate local perspectives into land policies, thereby contributing to the broader discourse on effective and inclusive land governance strategies.*

***Keywords:*** *Participatory mapping, Commons, Land governance, Inclusive development, Rajasthan*

## INTRODUCTION

Land records management systems play a pivotal role in facilitating the effective implementation of land use policies. In India, however, the maintenance of land records has infamously fallen short, often criticised for its failure to reflect the on-ground realities (De' & Sen, 2004, Morris & Pandey, 2009, Mishra & Suhag, 2017 &Thakur et al., 2020). While historically, meticulous documentation of land records was carried out during both pre-colonial and colonial times as it served the purposes of revenue collection (Baden-Powell, 1907), the contemporary focus shifted away from updating these records when land became a central element in developmental policies (Babu & Nautiyal, 2013). Record maintenance was perceived to be a high-cost, low-incentive endeavour (Ahuja & Singh, 2005; Prabhakar, 2020). However, since the late 1980s, renewed attention has been given to land record management and access (Habibullah & Ahuja, 2005), spurred by initiatives like the Computerisation of Land Records and the subsequent Digital India Land Record Modernization Programme (Burman, 2019, Kaur & Thadaboina, 2020). Leveraging modern technologies such as drone mapping, through schemes like the Svamitva Yojana, also became a priority to create property ownership records in rural areas, improve tax collection, and facilitate easier access to credit markets (Government of India, n.d.).

In contrast to the evolving narrative surrounding private land use, the fate of common lands – such as grazing lands and forest lands – has followed a distinct trajectory (Fox, 1998). Common lands represent areas that are collectively accessed, used, and managed by local communities. They encompass 15 to 25 percent of the Indian territory (Chopra and Gulati, 2001), and support the livelihoods of over 350 million rural people (Gopalakrishnan, 2012; FES, 2012), providing both tangible and intangible benefits valued at 7.5 trillion rupees annually (Sandhu et al., 2023). In the state of Rajasthan, grazing lands constitute a vital part of its common lands, covering 4.07 million acres of permanent pastures according to the 2011 Census. Livestock rearing sustains the livelihoods of over 80 percent of rural families in the state, with a population of 56.8 million livestock (Government of India, 2019) that predominantly rely on open grazing in common village pastures. The livestock sector also makes a significant contribution to the state's economy, constituting 46 percent of the total value added by the agriculture sector (Directorate of Economics & Statistics, 2023).

Despite the crucial role common lands play for various socio-economic and ecological outcomes, their governance has been a longstanding challenge. Since the colonial era, common lands have been under state administration as they cannot be privately owned. Despite the implementation of the Panchayati Raj system, which delegated the management of community assets to local panchayats, both land ownership and the responsibility to record land-related information remain under the jurisdiction of state departments. This critical aspect has not received sufficient attention (Lele & Purushothaman, 2011), with many areas persisting under the colonial label of 'wastelands', regardless of their significance to local communities (Singh, 2013). In Rajasthan, 13.4 million acres of land were classified as wastelands during the 2011 Census, despite potentially being used by communities for common purposes such as livestock grazing without any formal access or use rights.

The absence of updated information puts the generational systems of communal tenure at risk and steers common lands towards private property and mainstream developmental agendas (Lele & Purushothaman, 2011; Robinson, 2008). As a result, common lands in India are experiencing a swift decline (NSSO, 1999; Tian et al., 2014), with the country's total grassland area alone losing 31 percent or 5.65 million hectares between 2005 and 2015 (Pandey, 2019). There is also a lack of data on communities with pastoralist identities (PIB, 2023; Köhler-Rollefson & Kishore, 2021), which adversely affects land use planning and policies. These widespread shifts in land use have fostered alarming levels of ecological degradation (Zhao, 2006), loss of livelihoods and indigenous knowledge (Robertson & Pinstrup-Andersen, 2010), and an escalation of conflicts (Fernandes, 2020). This oversight underscores the urgent need to prioritise the documentation of common lands, crucial not only for the well-being of local communities, but also for preserving ecological integrity and realising several sustainable development goals.

In response to these challenges, scholars, community movements, and commentators advocate for a departure from the traditional top-down, expert-driven model of land administration. They propose integrating participatory approaches such as community mapping into land documentation processes, aiming to establish a more inclusive, transparent, and democratised land governance system (Parker, 2006; Aberley, 1993; Warren, 2005; Chapin et al., 2005). Community-led mapping initiatives are recognised as avenues to understand rural landscapes, serving as a catalyst for discussions at the intersection of land, use, and governance (Bauer, 2009; Parker, 2006). These approaches offer alternative perspectives on land, liberated from the constraints of capital and wealth production, where communities reclaim their access to their commons through practices of commoning. This shift not only informs local resource management but also integrates valuable local knowledge into assessments of risks and vulnerabilities in the face of climate change (Chapin et al., 2005; Sullivan-Wiley et al., 2019).

This paper presents insights from community-led mapping initiatives documenting pasturelands across 949 villages in the Chittorgarh district of Rajasthan. Section 2 provides an overview of the study area, data sources, and methods, while Section 3 presents the resulting findings, highlighting the potential of participatory community mapping in incorporating local perspectives into land policies. These insights contribute to the broader discourse on crafting effective and inclusive land governance strategies, as elucidated in Section 4. In conclusion, the paper advocates for a conceptual shift in our understanding at the convergence of local communities, land governance, and stewardship practices.

## MATERIALS AND METHODS

### a. Study area

Chittorgarh district, located in the southeastern part of Rajasthan, is a historically and culturally significant region. It spans a total area of 7,822 square kilometres, accounting for 3.17 percent of the state's total area. The topography of the district is characterised by undulating terrain, with a gradual slope from south to north. The Banas River Basin covers a significant portion of the district, while the eastern region falls within the Chambal River Basin, and the southern part is in the Mahi River Basin.

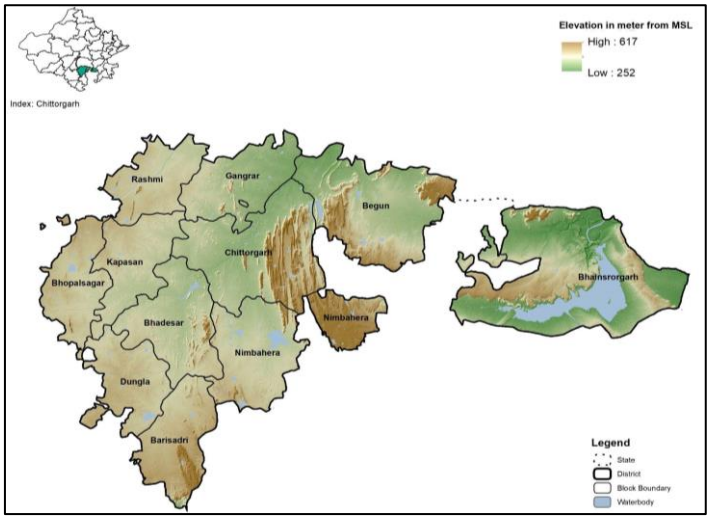


**Figure 3.1: Chittorgarh district**

According to the 2011 Census, Chittorgarh's population stood at 15.44 lakhs, representing approximately 2.25 percent of Rajasthan's total population. The demographic distribution is predominantly rural, with over 80 percent of the population residing in rural areas. The district's economy is primarily agrarian, with agriculture – including livestock raising – being the mainstay for rural communities. Administratively, Chittorgarh comprises 299 gram panchayats and 1772 villages, spread across 11 blocks of Badi Sadri, Begun, Bhadesar, Bhainsrorgarh, Bhopalsagar, Chittorgarh, Dungla, Gangrar, Kapasan, Nimbahera, and Rashmi.

**b. Community mapping activities**

Well-defined boundaries are essential for identifying community resources, facilitating resource planning, and ensuring transparency in action. These boundaries serve as records of people's use of such resources, substantiating claims and serving as evidence for their direct linkages to local livelihoods. To enable this, the mapping process has to be intuitive; tools and techniques easy to understand and implement. With precision, these tools should also be affordable for the communities to use for an extended period of time.

To map the grazing lands, the locals walked along the common land boundaries using a mobile-based digital application called the Common Land Mapping (CLM) tool, developed by the India Observatory <https://www.indiaobservatory.org.in/>. As they traversed the area, the Global Positioning System (GPS) coordinates were recorded by the CLM application. This process continued until the entire boundary was demarcated and recorded on their mobile device. The geo-referenced points, indicative of the land boundaries, were then stored on the cloud. The skills required to use such GPS-enabled applications are easily transferable, making them inherently scalable. The resulting outputs also integrate with a diverse range of open-access and proprietary systems, enhancing interoperability.

**Figure 3.2: Mapping exercise being carried out in a village using CLM tool**

Cohorts of community representatives were also periodically trained on aspects such as land governance, protocols for encroachments, community mapping techniques, and map-based deliberations, so as to support them to actively contribute to the initiative and enable them to make claims on their own knowledge of the place. The idea that community mapping can strengthen place-based knowledge systems was demonstrated by the swift uptake of community mapping practices across the district.

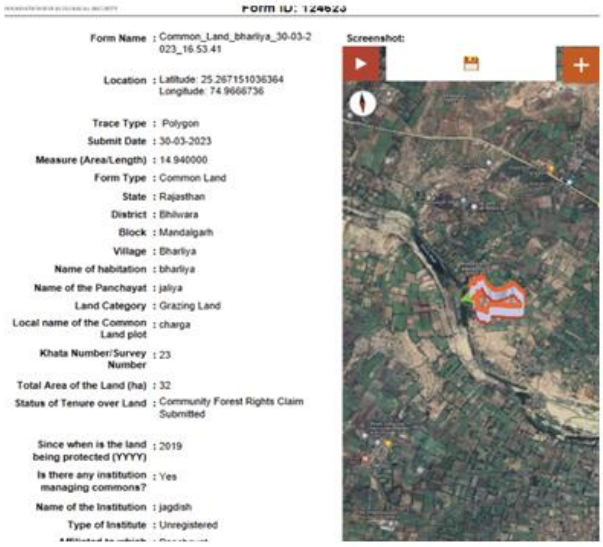


**Figure 3.3: User interface of the CLM portal after land mapping**

**c. Data sources and analysis**

This study presents primary data derived from the community mapping exercises with supplementary insights drawn from open-access datasets. The spatial representation of this exercise involved the base maps for administrative boundaries, sourced from the Survey of India, over which the data collated by the CLM tool, derived from community knowledge, was overlaid (See Figure 3.4 for

details). The study also involved secondary literature review to develop a contextual framework which situates community mapping within broader societal and historical dynamics.

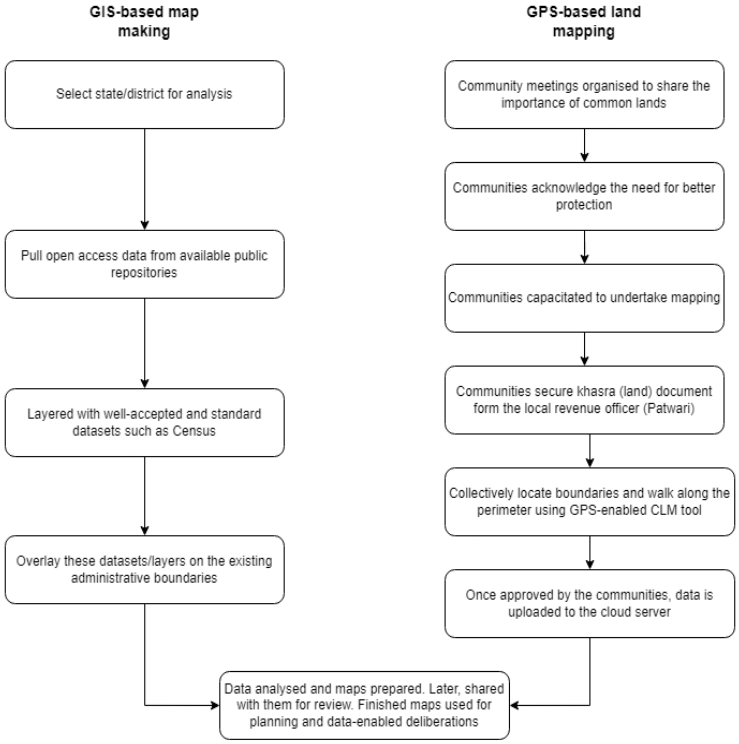


**Figure 3.4: Community map-making process flow**

## RESULTS

In the arid landscape of Rajasthan, where erratic rainfall and frequent droughts are common, grazing-based animal husbandry plays a pivotal role in the rural economy. In such areas, 37 to 68 percent of annual fodder requirements are met from common lands (FES, 2012). Recognising the vital role of grazing lands in sustaining their livelihoods, communities in 949 villages of Chittorgarh systematically mapped the grazing lands during a three-year period from 2020 to 2023.

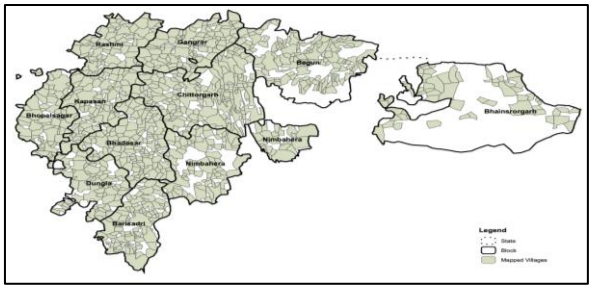


**Figure 3.5: Chittorgarh villages where pasturelands were mapped**

The mapping efforts covered a total of 46,152 hectares of land, distributed among 1,790 patches of grazing land across the district. These areas were formally documented in the land records as pasturelands and revenue wastelands, locally referred to as *gochar, charagah,* and *charnot*. Notably, a single village could have multiple patches, each customarily designated for grazing, with some even encompassing water bodies like ponds and tanks.

**Figure 3.6: 155 hectares of grazing lands mapped in Anandapur village in Begun block**

The resultant maps played a pivotal role in facilitating the entry of the common lands into the panchayat asset register, with more than 700 village institutions actively participating in this process. This led to the recording of 32,224 hectares of common land in the registers, guiding land-use decisions within the communities (Chandran & Singh, 2022b). Additionally, the mapping initiative served as a tool to identify encroachments on common lands. In instances where the encroachers were local residents, the community engaged in internal negotiations and conflict resolution mechanisms to facilitate the removal of encroachments and illegal structures. Where community-level interventions were inadequate, resolutions were sought through legal measures. A total of 348 villages took formal action against encroachments by filing complaints at the panchayat, block, and district levels, while leveraging institutional mechanisms such as the Public LandProtection Cells (Chandran & Singh, 2022a).

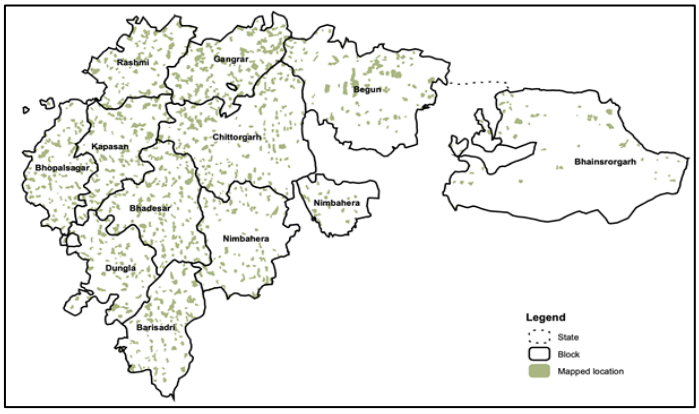


**Figure 3.7: Pasturelands mapped in the project villages**

Community institutions provide a stable foundation for the local economies and cultures to thrive and evolve. These institutions play a pivotal role in supporting and enabling communities to prosper. Over a span of three years, the concerted efforts by local communities resulted in the establishment of *Charagah Vikas Samitis* (Pastureland Development Committees) in 922 villages. These institutions are formed to effectively manage, protect, and conserve pasturelands at the grassroots level.

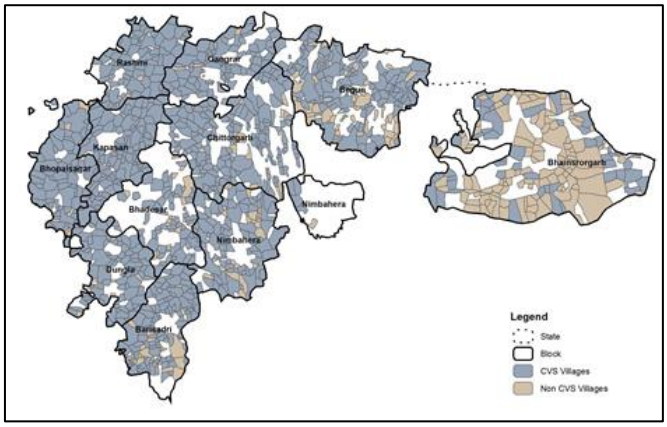


**Figure 3.8: Villages where community institutions were formed**

## DISCUSSION

As a livelihood diversification strategy, livestock keeping is known for its ability to nurture social-ecological resilience in regions grappling with extreme climatic uncertainty and resource scarcity (FAO, 2021; Krätli et al., 2022). In Rajasthan, where arid and semi-arid conditions significantly influence livelihood patterns and adaptive capacities (Ram, 2019), the conservation and protection of pasture lands are essential for the realisation of several sustainable development goals, particularly amidst the challenges posed by climate change (Government of Rajasthan, 2022). To enable these conservation efforts, establishing robust land administration systems is critical to effectively carry out the essential functions of land tenure, land value, land use, and land development (Williamson, 2001).

## MAPPING FOR INCLUSIVE GOVERNANCE

Traditionally, mapping has been considered a legitimate function of state or authoritative bodies aligned with government objectives. However, involving local communities is crucial to align mapping with local aspirations. Mapping is a medium to embed public participation to register both objective and subjective perceptions of rights, restrictions, and responsibilities (Chipofya et al., 2020). The inclusion of communities in land documentation processes enhances data accuracy and transparency, effective in processes like environmental impact assessments, as they facilitate better memorability and easier understanding of complex issues (Oliveira & Partidário, 2020). Conversely, excluding communities from land administration processes can heighten the risk of processes being co-opted by local elites, perpetuating deprivation of the poor and the marginalised, and disproportionately allocating resources based on elite interests (Panda, 2022).

In developed countries, spatial frameworks have evolved over centuries, supported by cadastral mapping and highly accurate property boundary surveys. However, less developed countries face challenges in adopting these advanced technical standards. Therefore, establishing an initial spatial framework requires fast, cost-effective, and reliable methods, potentially incorporating volunteered information through crowd-sourcing, particularly where data is otherwise unavailable (Enemark et al., 2014; McLaren, 2012). Community mapping exercises can prove instrumental in filling this gap, facilitated by advancements in spatial technologies that make producing high-quality maps at various scales more accessible. The learning curve for these technologies has significantly reduced, as evidenced by the CLM tool, empowering communities to use them independently with minimal support from civil society and other external actors (Harris & Weiner, 1998; McCall & Minang, 2005).

It is crucial for participatory mapping methods to adopt flexible and context-specific approaches, particularly in countries like India that have complex and organic nature of customary tenure systems. For instance, Rajasthan is home to several pastoral communities such as the Raika, Gujjar, Sindhi Muslims, and Gairi, who have traditionally relied on livestock rearing for their livelihood and cultural heritage. Having developed a deeper understanding of their local environment, some communities have also evolved transhumant practices, where they move their herds to different grazing grounds within Rajasthan and neighbouring states (Köhler-Rollefson & Kishore, 2021). Standardisation in land administration systems may fail to adequately capture their dynamic movements, tenure arrangements, and customary knowledge of such communities, which can undermine the accuracy and relevance of land records (Chipofya et al., 2020).

## MAPPING FOR SECURE TENURE

50 percent of the world's land is used and managed by communities (Rights and Resources Initiative, 2015), yet 70 percent of the global population lacks access to formal systems for registering and safeguarding their land rights (Heider & Connelly, 2016). For effective governance, it is crucial for formal systems to recognise and protect customary rights held by local communities (FAO, 2013). Establishing clear resource boundaries is the essential first step, as they provide a basis for determining the rights and responsibilities associated with natural resources. This, in turn, enables institutions to form rules for sustainable management and conflict resolution, ensuring that communities confidently invest in restoring, managing, and protecting their natural resources (Chigbu et al., 2022), and improve their ability to adapt to climate change (Hurlbert et al., 2022).

Globally, considerable progress has been made through legislative efforts to recognise customary-based tenure regimes, particularly in African countries where much of the land is unregistered community land (Wily, 2018). In India, community mapping practices over common lands often stand outside the norm of dominant, state-led map-making exercises that declare political boundaries or propose developmental plans. However, mechanisms can be adapted from existing frameworks that govern particular resource systems. For instance, the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 places significant emphasis on the Gram Sabha's authority to determine the nature and extent of forest rights by preparing maps that delineates the area. Similarly, the Coastal Regulation Zone

(CRZ) Notification, 2011 mandates state authorities to produce zonal management plans considering the existing use of coastal and ocean commons by fisherfolk. As the implementation has been weak, fisherfolk communities in states like Tamil Nadu routinely use self-mapping exercises to assert their rights (Kumar et al., 2014; Sharma, 2011).

By implementing analogous provisions, Gram Sabhas could be empowered and entrusted to undertake similar responsibilities for other types of common lands, which might otherwise be designated as 'wastelands. This broader application of community-centric practices aligns with the principles of decentralised governance and participatory decision-making. In Rajasthan, institutions such as the *Banjar Bhoomi Evam Charagah Vikas Samiti* (Wasteland and Pastureland Development Committee) at the village, block, and district-level can support this endeavour. Building synergy with agencies such as the Public Land Protection Cells can also improve action around removal of encroachments. Further steps can be taken to ensure the inclusion of these resources into community records such as the panchayat asset registers, allowing communities to exercise greater control over resources by tracking and monitoring their status (Chandran & Singh, 2022b).

## MAPPING FOR INTEGRATED PLANNING AND ECOLOGICAL RESTORATION

Land degradation is a pervasive challenge with implications for food security and environmental quality (Bhattacharyya et al., 2015; Gomiero, 2016). In India, nearly 30 percent of the total geographic area is affected by degradation, primarily attributed to water erosion and vegetation degradation (SAC, 2021), especially in water-scarce regions like Rajasthan that experience uneven resource distribution and high drought probability (Singh et al., 2019; Rathore & Verma, 2013). This poses disproportionate risks to the poor, landless, and marginalised during the unfolding climate crisis (IPCC, 2022).

Simultaneously, the country has the potential to restore nearly 140 million hectares to sequester 3 to 4.3 billion tons of above-ground carbon by 2040 (Chaturvedi et al., 2018). These restoration efforts promise a myriad of benefits, including biodiversity conservation, increased water availability, enhanced soil nutrient management, improved pollination services (Dodds et al., 2008). It also offers the creation of sustainable livelihood opportunities (Singh et al., 2021). Notably, grasslands, constituting a considerable share of the terrestrial carbon stocks, are also important carbon sinks (Bai & Cotrufo, 2022). However, estimating resource conditions itself is a challenging endeavour due to poor state of land records and the absence of spatially-referenced boundaries, even for 'state-owned lands' (Lele & Purushothaman, 2011). Recently, it was also estimated that nearly 70 percent of the areas with open natural ecosystems overlap with those the state labels as 'wastelands' (Madhusudan & Vanak, 2022).

To ensure enduring impact, active involvement of local communities is critical by co-creating sustainable conservation regimes that are tailored to the local context (Singh et al., 2022). By offering pathways to access place-based information, mapping techniques can inform decision-making and facilitate data-enabled deliberations among local communities, government functionaries, and civil society organisations. By doing so, stakeholders can be made aware of the importance of restoration activities, and critical partnerships can be forged and strengthened between diverse stakeholders who can leverage

opportunities such as the Jal Shakti Abhiyan in Rajasthan. Yet, the success of such endeavours functionally depends on the devolution of agency to encourage participatory modes of decision-making and institutional building at the local level to effectively manage natural resources. This can be achieved through contextual training, refresher sessions, and the use of asynchronous communication tools to provide assistance to local institutions.

**Box 3.1: Mapping for Prosperity: Empowering Arthala through MGNREGS and Sustainable Land Management**

In Arthala, a village within Chittorgarh's Dungla block, the transformative potential of the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) was brought to fore by a community mapping exercise. The difficulties faced during the COVID-19 pandemic in 2020 initiated a process of change in the village. Recognising the degradation of village pastures and its impact on their lives, the community initiated a mission to map their grazing lands, aiming to deepen their understanding of local resources. This led to the formation of diverse group, including elders with traditional knowledge of the land, and young individuals adept in technology and mapping software.

Beyond boundary delineation, the mapping project evolved into a journey of rediscovery. The interconnectedness of their lives and land became vivid as they documented not only 62 hectares of grazing areas but also identified small water bodies in them. This process also highlighted areas in immediate need of conservation measures. This led the community to organise and form a *Charagah Vikas Samiti* (Pastureland Development Committee) for collaborative decision-making and pasture land development through soil and water conservation measures. Key to this agenda was the formal inclusion of activities in village development plans, actively leveraging MGNREGS to drive change.

After years of dormancy, MGNREGS witnessed a renaissance in Arthala from 2021 onwards. Through the *Samiti*, the community identified opportunities to improve water availability, soil health, and moisture retention in the pasture lands. Detailed plans were prepared to undertake restoration works like digging cattle-proof trenches, planting local tree and shrub species, and deepening the existing traditional water harvesting structures called *naadis.* With a total budget of Rs. 36.51 lakhs estimated for the endeavour, plans were submitted to authorities and, upon approval, restoration works commenced within the village.

The results of these efforts are already promising. Since 2021, 110 families from the village have actively participated in restoration projects totalling Rs. 14.39 lakhs. MGNREGS wage employment has facilitated annual incomes between Rs. 15 to 19 thousand for each family, thereby helping to stabilise their livelihoods. Kisan Rawat, one of the beneficiaries, shared "*I had been thinking of repairing my house for a few years and was saving money for it. Extra income from MGNREGS increased my savings so I could get the repairs done*." With time, as the local ecology improves, the community anticipates greater benefits from their collective efforts.

## MAPPING FOR COMMUNITY SOLIDARITY

The significance of the mapping process extends beyond its outcomes, serving as a catalyst for continuous dialogue around human-space interactions. This collaborative effort establishes a framework that nurtures both communities and the environment, promoting horizontal distribution of knowledge, reinforcing existing solidarities, and enhancing democratic practices. It positions communities as active partners in a long-term journey of listening, organising, gathering information, and communicating ideas. It dispels myths surrounding their abilities to solve complex problems and instil a sense of ownership and responsibility among them regarding the sustainable use and management of these lands (Alix, 2010). This approach can ultimately mobilise community-led action and influence local decision-making processes. This concerted approach not only builds the agency, autonomy, and capacities of local communities but also contributes to the development of stronger and more resilient communities.

## ACKNOWLEDGMENTS

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