

Government of Rajasthan



FOUNDATION FOR ECOLOGICAL SECURITY

# Perspectives on MGNREGA and Climate Adaptation in Rajasthan: The impact of NRM works on rural livelihoods and well-being

## 2021-22





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Adaptation in Rajasthan: The impact of NRM  
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## Executive Summary



Rajasthan is the largest state in India, characterised by distinct arid and semi-arid climatic conditions. In terms of geography, 66% of its area accounts for dryland. 22% of Rajasthan's population falls below the poverty line. The rural economy here is principally characterized by mixed farming system with households depending on rain-fed-agriculture, complimented with animal husbandry. The state lies in a socially and environmentally vulnerable region. Due to continued distress and ecological degradation, the state poses a complex set of challenges in terms of development-based issues. Public investments through social security programs such as the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) hold immense potential to reduce the vulnerability of farmers by providing economic opportunities and improving ecological conditions which are critical for production systems and livelihoods.

**Chapter 1** gives a profile of Rajasthan and an overview of MGNREGS as a scheme empowering the rural poor. MGNREGS was launched in 2006 by the Government of India, and since then, has grown to be the largest employment guarantee scheme in the world. (UNDP, 2015) It plays a pivotal role in providing a safety net for rural households by guaranteeing wages and 100 days of work in a year. One of the primary objectives of the scheme is to create durable assets to increase land and water resources available to rural areas, thereby enhancing the livelihoods of communities. While the visible effects of MGNREGS are evident in terms of income, employment and livelihood security of the rural poor, its potential for creating long-term productive assets (ecological infrastructure), strengthening local governance, and building robust socio-ecological systems still remains untapped.

Jal Shakti Abhiyan (JSA) was launched as a national campaign to urge communities to conserve water and promote water security in the country in convergence with MGNREGS. This study primarily focuses on natural resource-based (NRM) works under JSA in different agro-climatic zones across Rajasthan.

In this context, in collaboration with the Government of Rajasthan, Foundation for Ecological Security (FES) undertook a rapid assessment study in 10 districts of Rajasthan to assess the economic, social and environmental impact of MGNREGS investments on NRM works, with a special focus on understanding the scheme's impact on rural women's well-being, in the overarching context of climate change resilience.

**Chapter 2** describes the detailed methodology to select the study sample comprising 10 districts, each representing different agro-climatic zones of Rajasthan. 2 blocks from each of these districts were further sampled on the maximum and minimum expenditure of Jal Shakti Abhiyan (JSA) works between the year 2018-21. From each of the blocks, one gram panchayat was then identified based on the maximum expenditure on JSA works. The number of villages sampled in each panchayat varies according to the number of works done.

Quantitative data on the social aspects was collected through household surveys, the MGNREGS dashboard and other online sources, while ecological data was collected through detailed vegetation assessment. For qualitative data, focus-group discussions (FGDs) were conducted in each of the selected villages in a panchayat, separately with community members and women-only groups.

The analysis looks at results through a theoretical framework targeting three key elements: the strengthening of institutions and community-based planning in MGNREGS; perceiving MGNREGS, a social protections scheme, as a safety net for rural households (as it guarantees minimum wages and the right to work); and creation of natural resource-based infrastructure. The impact of MGNREGS on ecological indicators has been explored in detail in a biophysical assessment, biomass and carbon stock calculation, calculation of species diversity and phytosociological analysis. Further, the Gender Assessment Tool (GAT) was adapted for a gender analysis of the scheme, based on broad indicators, to assess the on-ground impact of the scheme's provisions on rural women who routinely contribute to more than 60% of the total person days generated under MGNREGS. In short, the key argument of this study lies in perceiving improved livelihoods and climate-resilience of communities through MGNREGS by strengthening of institutions and local, community-driven planning processes.



**Chapter 3** looks at the findings demonstrating the socio-economic and ecological impact of MGNREGS. It is further divided into subsections looking at: a) Community participation and emphasis on natural resource management in MGNREGS gram sabhas, b) The significance of ensuring the quality of MGNREGS works, leading to socio-economic benefits to the community, and c) Impact of MGNREGS on ecological indicators.

Overall, community participation in MGNREGS planning processes and gram sabhas was found to be good for women and the marginalized. 73% of the total households surveyed for the study reported attending gram panchayats regularly, while 63% of the women attend gram sabhas. Communities in a few of the villages shared "*lack of information about the convening of Gram Sabha*", "*Gram Sabha being held in far off locations*".

Interlinked with participation is the significance of the communities' perception of the quality of works undertaken under MGNREGS. 42% of the sampled villages in this study found the NRM works to be of good quality and 79% of the panchayats from the FGDs reported to have benefitted from the work on Commons specifically.

Further in this chapter, the ecological assessment reveals that standing biomass and carbon stock was 2.3 times higher in the sites where restoration was undertaken through MGNREGS as compared to the sites where it was not. Species diversity was however, found to be less in all the study sites. Shannon diversity index value 1.3 for both the intervention and non-intervention sites indicates less species diversity in the area. *Prosopis juliflora* was present and spreading fast in more than 70 % of the sample sites.

**Chapter 4** emphasizes the role of MGNREGS in women's empowerment by attempting to capture its impact on women's well-being, including provision of livelihoods and how it intertwines with their gender roles. As per the gender analysis, a GAT score of 4 (Gender-Specific) highlights that the scheme's provisions have been gender-sensitive by design. However, field observations reveal that contrary to the score and despite women's sentiment that the scheme provides some degree of financial autonomy, their gender roles cause them to face significant restrictions in exercising autonomy in spending their own wages. Moreover, the time required to work at the MGNREGS site severely impacts the time required for other household chores such as cooking, caring for children, taking care of livestock.

**Chapter 5** looks at the risks associated with climate change, the various strategies adopted by communities in response to the same, and building climate resilience of communities through an employment guarantee scheme such as MGNREGS. It demonstrates that rural communities in Rajasthan being especially dependent on rainfed agriculture and livestock for livelihoods, despite being in an arid and semi-arid region prone to frequent droughts, need MGNREGS, and in particular the NRM works undertaken under this scheme, to provide a potential avenue for building climate resilience.

MGNREGS has consistently enhanced the physical, natural and financial capital of rural households. Despite limitations, perceiving it through the lens of climate change adaptation is key to empowering rural communities in present times. Livelihoods combined with local governance, women's empowerment and climate change adaptation make MGNREGS a stepping stone to building communities' overall resilience to climate change vulnerability.

# 1. Introduction

## 1.1 Background

Situated in the north-western part of the country, Rajasthan is the largest state and covers an area of 3,42,239 sq km or 10.40% of the geographical area of India. The Aravali hills intersect the state diagonally from south-west to north-east, demarcating the arid parts. The state is further characterized by zones with distinct arid and semi-arid climatic conditions, influenced deeply by the geographical division created by the Aravallis. The annual temperature ranges between 0°C to 50°C and the average annual rainfall is in the range of 500 mm to 750 mm approximately. Consequently, the State is a socially and environmentally vulnerable region.

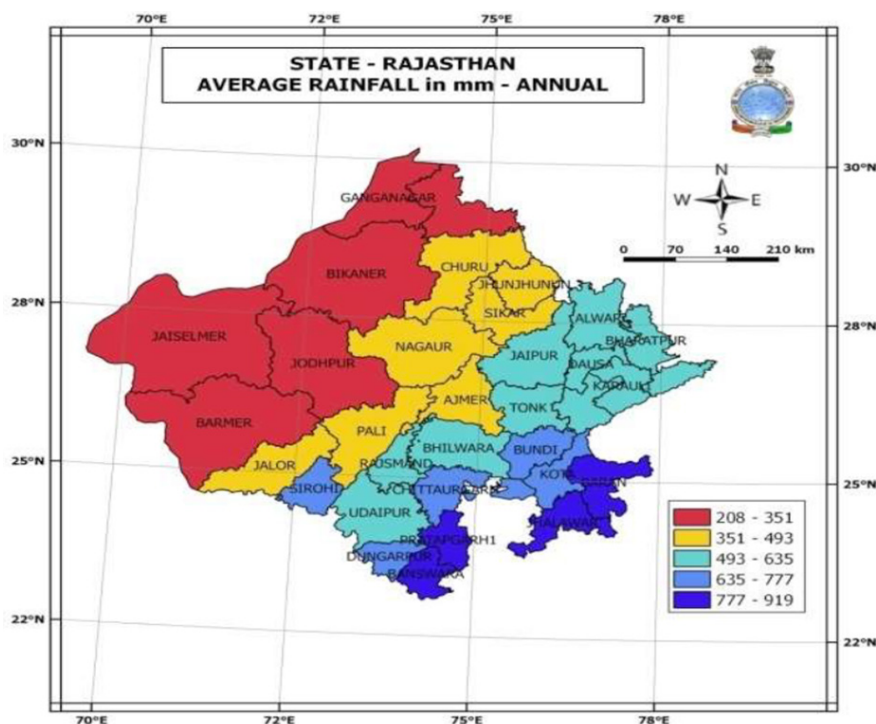


Figure 1: Rainfall pattern of state Rajasthan; source: IMD, Pune, 2020

The entire state experiences extreme heat conditions. The areas west of the Aravallis are characterized by hostile temperatures, prolonged and severe droughts, high wind velocity and low humidity. The eastern regions experience less climatic stresses though there are great variations in rainfall and temperature.

Analysis of rainfall patterns, trends, and variability can provide insight into recent changes for climate change adaptation and management. Figure: 1 shows the annual rainfall pattern of Rajasthan. Overall, the state experiences extremely erratic and low rainfall (ranging from 100 mm to 1000 mm), which decreases as one moves from the south-west to the north-east. Rainfall is the main source of all the surface and subsurface water. Highly erratic rainfall also causes floods and droughts simultaneously at the same place. Thus, it is a critical climate risk facing communities in Rajasthan.

In terms of the socio-economic impact of climate-change risks on vulnerable rural communities, unpredictable rainfall has direct linkages with agriculture and other livelihood activities such as livestock management. Apart from these, climate risks also adversely affect poor livestock keepers and households with high dependence on wage labor by intensifying out-migration from villages to neighboring towns and cities with better employment avenues.

Rajasthan's economy is principally an admixture of farming systems, with households depending on rain-fed agriculture primarily and complementing the same with animal husbandry. The 19th Livestock census of 2012 reported a total livestock population of 57.73 million in the state. Most of Rajasthan's livestock is kept in grazing-based systems or extensive systems dependent on common lands. The role of the Commons is critical for livestock rearing, especially for landless, marginal and small farmers. The Commons, by providing fodder and water, make direct contributions to livestock rearing.

Common land, including forest and pastures, constitute 30.7 percent of the geographical area of Rajasthan and harbor rich biodiversity. (Land Use Statistics, Ministry of Agriculture, GOI, 2014-15) They contribute significantly in meeting the fodder, fuelwood, non-timber forest produce and water requirements of the local communities. Jodha's study (1986) in 82 villages across 21 districts in the arid and semi-arid zones of India highlights the relevance of Commons to the rural economy at large, and their importance as a 'safety net' for the poor in particular. Jodha estimated that there is approximately 84-100% dependence amongst the rural poor on the Commons for fuel, fodder and food items, in comparison to 10-19% dependence of better-off households. However, the Commons continue to face neglect due to unfavourable property rights and weak institutional arrangements for local management and governance, leading to widespread degradation.

Due to continued distress, ecological degradation and changes in climatic conditions, Rajasthan now poses a complex set of challenges in terms of developmental issues. The effects of climate change are also unevenly distributed. The marginalized are more vulnerable due to intersecting social processes, thus creating multidimensional inequalities. (IPCC, 2014)

Social protection programmes, beyond supporting households and communities in coping with poverty and marginalisation, also play a vital role in helping households and local economies absorb the effects of climate risk, adapt to the impact of climate change, and transform their ability to address escalating and imminent climate stresses by integrating climate risk management into their design and provisions. (Agrawal *et al.*, 2017)

As of January 2, 2020, it has enabled the generation of 29.88 billion person days of work at a total cost of Rs.5633 billion (2018-19), which comes to Rs. 189.5 per person, per day. Despite the scale, however, expenditure on MGNREGS has never exceeded an annual 0.4 % of the GDP since inception and has usually hovered around 0.33%. Similarly, although a quarter of all rural households worked for at least one day on MGNREGS in 2011-12, at no time in its short history has it accounted for significantly more than 3% of total rural employment (Chand, 2014). It plays a pivotal role by providing a safety net of wages for rural households by guaranteeing at least 100 days of work in a year. Further, it also enables gram panchayats to plan and undertake community interventions strengthening livelihoods, be it the restoration of land and water resources.

One of the primary objectives of the scheme is to create durable assets to increase land and water resources available to rural areas to enhance the livelihood of communities. Almost 67% of all permissible work under the scheme comprises Natural Resource Management (NRM) activities on public or private land of the poor and vulnerable. The NRM assets created through this scheme deliver upon two major arenas of impact: firstly, they contribute to the livelihood of communities by focusing on employment and community-based planning and management, and secondly, they deliver ecological benefits to the community by strengthening the natural resource base.

Thus, in the context of climate change adaptation, MGNREGS must be viewed holistically as a scheme which goes beyond providing a safety net to communities in rural Rajasthan. It contributes to bottom-up planning, gives a voice to the community and enriches their livelihoods, natural resources and climate change adaptation strategies.

## 1.2 Jal Shakti Abhiyan (JSA)

Jal Shakti Abhiyan (JSA) was launched in two phases in 2019: the first lasting between 1 July to 30 September, and the second between 1 October to 30 November, 2019, in 1592 blocks out of 2836 blocks in 256 water-stressed districts across the country. It was a national campaign to urge communities to conserve water and promote water security in the country, involving collaborative action by many ministries of the Indian government as well as state administration.

Under this campaign, government officials, groundwater experts and scientists collaborated with the state and district administration in the water-stressed districts to promote water conservation and resource management. Implementation of the campaign was accelerated through five target interventions, viz. water conservation and rainwater harvesting, renovation of traditional and other water bodies/tanks, reuse and recharge of bore wells, watershed development, and intensive afforestation. Through JSA, massive awareness-building has been emphasized in rural communities and numerous stakeholders have taken up water conservation through diverse means. Subsequently, around 1 crore water conservation and rainwater harvesting structures have been built and over 75 lakh traditional and other water bodies and tanks were restored.

JSA was integrated into MGNREGS and accordingly, certain NRM works in Category A and Category B<sup>1</sup> are reported as Jal Shakti Abhiyan Works, with assets created on either public or private land.<sup>2</sup> These works, forming a subset of NRM Works under MGNREGS, include: i) Intensive Afforestation ii) Renovation of Traditional and Other Water Bodies/Tanks iii) Water Conservation Works iv) Watershed Works and v) Reuse and recharge structures.

## 1.3 Rationale of the study

Rural India is characterized by high levels of unemployment, migration and declining farm incomes associated with the impact of climate change. Increased prevalence and intensity of droughts and uneven rainfall patterns inflict a negative influence on the livelihoods of the poor. These effects of climate change may also be exacerbated by other factors contributing to the vulnerability of rural

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1 Paragraph 4 of Schedule 1 of the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGS), 2005 divides permissible works under the scheme (MGNREGS) into four categories, namely A, B, C and D.

Category A provides for public works relating to natural resource management, mostly water conservation, watershed management, micro and minor irrigation, renovation of traditional water bodies, land development in common land and afforestation.

Category B provides for community or individual assets for the most vulnerable households.<sup>1</sup> These are Scheduled Castes (SCs), Scheduled Tribes (STs), nomadic tribes, denotified tribes, below the poverty line (BPL) families, women-headed households, physically handicapped households, beneficiaries of land reforms and the Pradhan Mantri Awas Yojana (PMAY), and traditional forest dwellers as listed in the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006. Small and marginal farmers, as defined in the Agricultural Debt Waiver and Debt Relief Scheme, 2008 are also eligible for the benefits of the category B assets, but only after exhausting the list of above-mentioned eligible beneficiaries.

Category C makes provision for common infrastructure for the National Rural Livelihood Mission-compliant self-help groups (SHGs) that promote agricultural productivity by creating durable infrastructure for biofertilizers, warehouses for post-harvest storage and common work sheds for livelihood activities of SHGs

Category D provides for rural infrastructure like all-weather roads, rural sanitation related works like individual household latrines, school toilets, anganwadi centre toilets, playfields, compound walls for government schools, construction of gram panchayat buildings, etc

2 Details of JSA works can be found in R.13 of MGNREGS MIS (Management Information System) report.

households, including unfavorable conditions for local economic activities and unequal control over key productive assets such as land and water. Public investments through social security programs such as MGNREGS hold immense potential to reduce the vulnerability of women, the landless, and small and marginal farmers by providing economic opportunities and improving ecological conditions critical for rural production systems.

Being the largest state in India in terms of geography, with 66% of its area accounting for dryland and 22% of its population falling below the poverty line, Rajasthan is a socially and environmentally vulnerable region. Due to the continued persistence of distress and ecological degradation, the state poses a complex set of challenges in terms of development-based issues. In this context, increasing MGNREGS allocation towards NRM provides an opportunity for improving the well-being of rural communities.

According to the MGNREGS dashboard, since 2016, more than 50 % of the funds have been disbursed for NRM-activities. Several studies have shown that NRM assets have a positive impact on overall income, employment and livelihood security of the rural poor, especially the landless, small and marginal farmers and women. NRM assets have also been shown to improve water availability, soil health, green cover and agricultural productivity. Additionally, they contribute to vulnerability reduction in the context of climate change by increasing the resilience of rural communities (Tiwari *et al.*, 2011; Esteves *et al.*, 2013; Ranaware *et al.*, 2015; Ravindranath and Murthy, 2021). While the visible effect of MGNREGS is evident in income, employment and livelihood security of the rural poor, its potential for creating long-term productive assets (ecological infrastructure), strengthening local governance and building robust socio-ecological systems still remains untapped.

Institutions also emerge as major stakeholders in achieving the outcomes of this community-driven planning and implementation process. This is because in order to realise the potential of MGNREGS as a social protection scheme and to ensure its success as a conduit for creation of resilient community assets, there is a need for building a broader 'ecosystem' of institutional support and community feedback targeting diverse local needs. A strong socio-political architecture allows vulnerable groups to access the benefits of the scheme on the ground .

Although MGNREGS mainly targets social protection for the rural poor, it incorporates three key elements with innate potential to advance pro-poor climate assistance objectives. These include:

- strengthening of institutions and community-based planning,
- social protection (minimum wages and right to work), and
- creation of natural resource-based infrastructure (Fischer, 2020; Godfrey-wood *et al.*, 2018)

The key argument at the foundation of this study, therefore, lies in perceiving improved livelihoods and climate-resilience of communities through MGNREGS by strengthening of institutions and local, community-driven planning processes.

In this context and in collaboration with the Government of Rajasthan, Foundation for Ecological Security (FES) undertook a rapid assessment study in 10 districts of Rajasthan spread across different agro-ecological zones. The study assesses the economic, social and environmental impact of MGNREGS investments on natural resource-based works, with a special focus on understanding the scheme's impact on rural women's livelihood and well-being in the context of climate change.

## 2. Methodology of the Study

### 2.1 Theoretical Framework

In the context of increasing climate vulnerabilities, as discussed in the previous chapter, this study uses a theoretical framework adapted from various studies, which look at MGNREGS as a climate resilient building initiative. The thrust of the framework is majorly on: strengthening of institutions and community-based planning, social protection and creation of natural resource-based infrastructure. (Fischer, 2020; Godfrey-wood *et al.*, 2017)

While MGNREGS guarantees wages and employment as rights, it also involves the creation of natural resource-based assets through public funds which can improve the ecological health and livelihood base of the communities. Most importantly, the design of the programme gives agency to communities to influence their natural resources (pastures, forest land, farming land and water resources). The framework emphasizes that by participating in the planning process of MGNREGS, communities can incorporate local needs in the official plans of the district and state administrations. In the context of decentralised approaches to building adaptive capacity, the communities thus possess better information about the vulnerabilities they face and the local resource context. (Godfrey-wood *et al.*, 2017) This makes their participation vital for any activities aimed at building the resilience of communities.

Our study design and analysis are guided by this theoretical framework. The Figure:2 gives a graphical representation of the theoretical model:

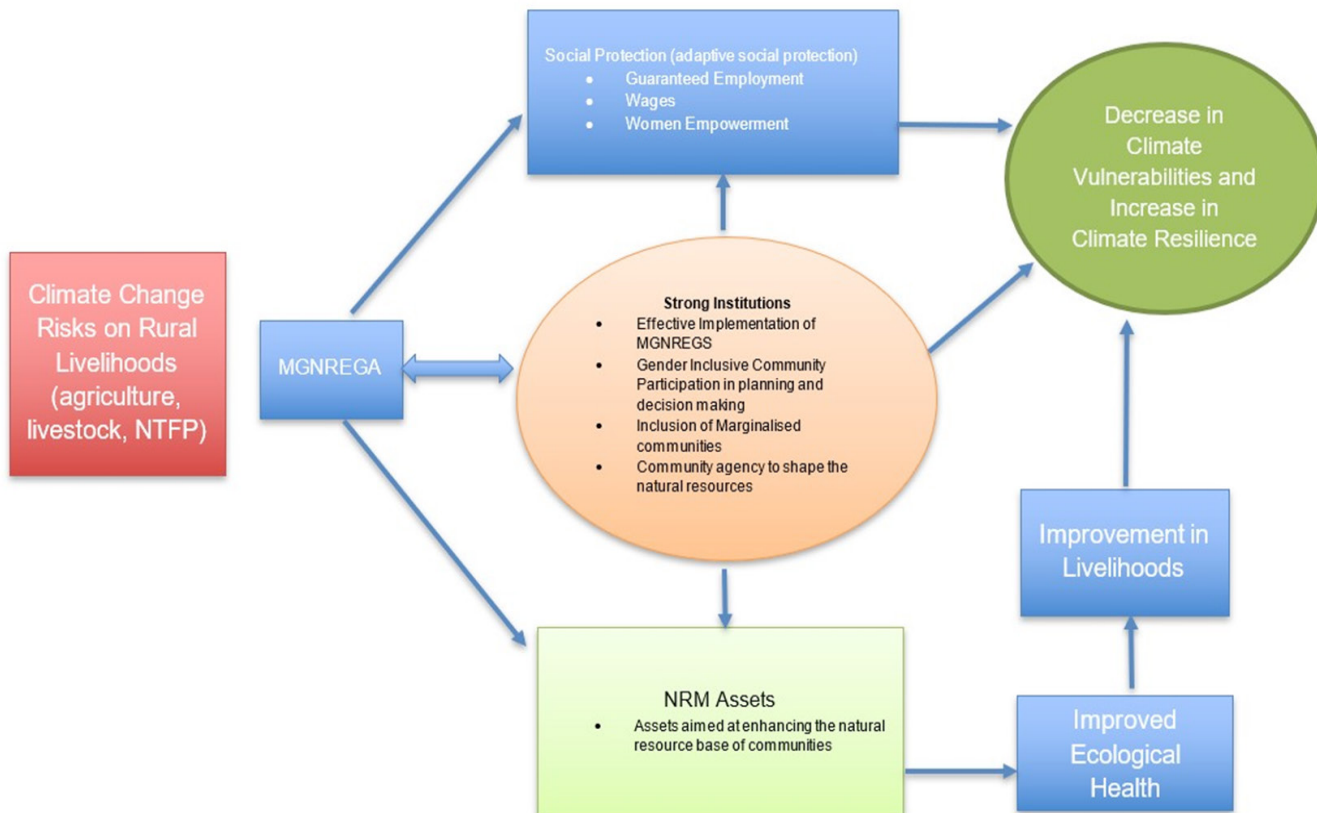


Figure 2: Theoretical framework (Adapted from: Fischer, 2020; Godfrey-wood & Flower, 2017)

## 2.2 Objectives of the study

- To build evidence for understanding the socio-economic and environmental impact of JSA activities undertaken through MGNREGS, and how they contribute to the livelihood security of local communities
- To understand the impact of JSA activities undertaken through MGNREGS on women's wellbeing
- To understand how JSA activities build the resilience and adaptive capacity of communities (particularly of women) in response to climate change

## 2.3 Sampling

The state of Rajasthan can be classified into five major groups/zones. These represent not only agro-climatic/ecological differences but also correspond to distinct socio-cultural identities inclusive of natural resource management practices, beliefs and resource use (Please see Figure 1).

The five zones are:

- The Western Desert region, including the districts of Barmer, Jaisalmer, Sri Ganganagar, Bikaner and parts of Jodhpur and Hanumangarh
- The North Aravalli region, spanning across the districts of Jalore, Sirohi, Pali, Nagaur, Sikar, Jhunjhunu, Churu, parts of Jodhpur and Hanumangarh
- The Eastern Plains extended across Jaipur, Alwar, Dausa, Karauli, Bharatpur, Dholpur and Sawai Madhopur
- The South Aravalli Region spanning across Udaipur, Dungarpur, Rajsamanad, Bhilwara, Ajmer and Tonk
- The Southern Plateau and South-eastern Ravines of Chambal, including Jhalawar, Baran, Kota, Banswara, Chittorgarh and Bundi

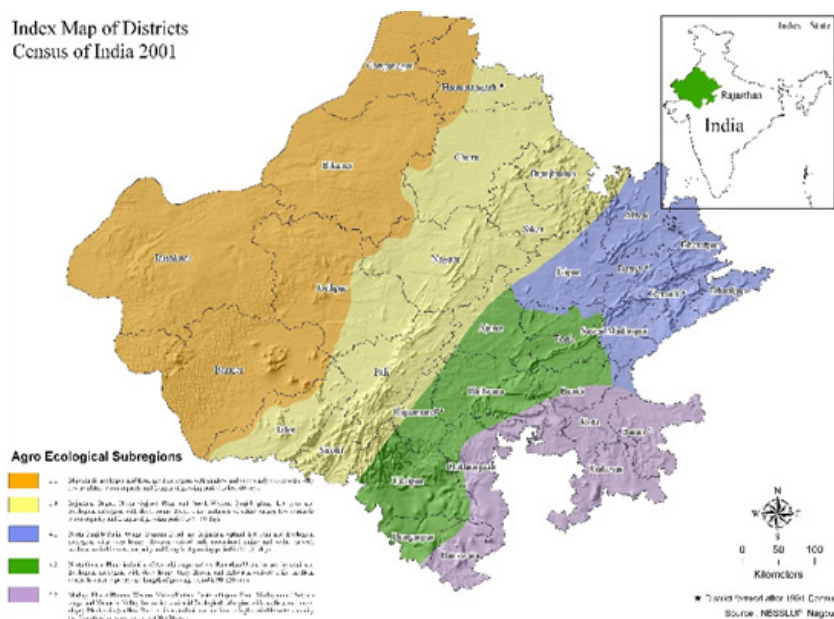


Figure 3: Agro ecological zones of Rajasthan

### 2.3.1 Identification of districts for the study sample

Two districts were selected from each of the five agro-climatic/ecological zones. They are as follows:

Table 1: Districts in respective AgroEcological Zones

S.N.	Name of Zones	Name of districts
1.	Eastern Plains	Bharatpur, Dausa
2.	South Aravalli	Bhilwara, Udaipur
3.	North Aravalli	Jalore, Churu
4.	Western Desert	Bikaner, Barmer
5.	Southern Plateau	Baran, Bundi

### 2.3.2 Identification of blocks for the study sample

From these 10 districts, 20 blocks were selected for the study, 2 from each district based on the maximum and minimum expenditure of Jal Shakti Abhiyan (JSA) works in 2018-21.

### 2.3.3 Identification of gram panchayats for the study sample

20 gram panchayats were identified, one from each of the 20 blocks, based on the maximum expenditure on JSA works in 2018-2021. For identification of panchayats, since the number of works done in each panchayat in the year 2018-21 was either too small or alluded to a sample too small to represent diverse JSA categories, expenditure from 2018-2021 was considered for the study. Gram panchayats with highest expenditure during this period were selected for the study.

### 2.3.4 Identification of villages for the study sample

Certain assets were chosen purposely based on the number of JSA works done in the gram panchayats between 2018-21, the type of JSA works and expenditure on the works. Purposive sampling of assets was done to ensure diverse JSA categories were included from each panchayat. Assets classified as public works, on which the highest expenditure was evident, were given priority. Villages where these assets are located were selected for the study. From each panchayat, 3-4 villages were selected. The number of villages sampled in each panchayat varies according to the number of works done.

Table 2: Sample Gram Panchayats selected for the study

S.N.	Districts	Block with minimum JSA expenditure 2019-20	GPs based on JSA expenditure from 2018-21	Block with maximum JSA expenditure 2019-20	GPs based on JSA expenditure from 2018-21
1.	Baran	Baran	Lisadiya	Chhipabaraud	Amlavada Auli
2.	Bharatpur	Wair	Moloni	Nagar	Jhanjhar
3.	Bhilwara	Kotri	Badla	Raipur	Thala
4.	Bikaner	Dungargarh	Rajedu	Bikaner	Napasar
5.	Barmer	Samdadi	Kotri	Dhorimana	Lukkhu
6.	Bundi	Hindoli	Tonkra	Nainva	Jajawar
7.	Churu	Bidasar	Baerasar	Rajgarh	Kaanjad
8.	Dausa	Sikrai	Manpur	Mahawa	Badabuzurg
9.	Jalore	Aahor	Dayalpura	Raniwara	Raniwada Kala
10.	Udaipur	Jhadol	Thobawada	Mavli	Mahuda

## 2.4 Profile of the Study Area

A detailed profile of the districts selected for this study is given below:

Table 3: Profile of study area

District	Geographical area (in 000' ha)	% of common land other than forestlands *	Total livestock population (in Lakhs)	% of Schedule Caste and Scheduled Tribes	Multidimensional Poverty Index (MPI) **	Irrigated Area (in 000'ha)	Unirrigated Area (in 000' ha)
Baran	681.9	14.1	7.4	40.7	0.16	62.1	37.9
Barmer	2814.4	26.3	47.6	23.5	0.29	7.1	92.9
Bharatpur	487.2	6.0	11.6	24.0	0.19	51.5	48.5
Bhilwara	1021.9	40.7	22.8	26.5	0.14	10.5	89.5
Bikaner	2846.4	29.0	25.0	21.2	0.11	62.2	37.8
Bundi	565.5	22.0	8.6	39.5	0.16	62.2	37.8
Churu	1345.2	7.3	14.7	22.7	0.09	3	97
Dausa	338.3	16.5	10.3	48.2	0.121	63.3	36.7
Jalor	1038.6	20.2	11.3	29.3	0.21	42.9	57.1
Udaipur	1070.3	37.3	28.2	55.9	0.26	22.8	77.2

Source: Census 2011, Livestock census 2011

\*Common land comprises the area under four categories of census-2011 (1) Permanent Pastures and Other Grazing Land Area, (2) Culturable Waste Land Area, (3) Fallows Land other than Current Fallows Area and (4) Barren & Un-cultivable Land Area.

\*\*Multidimensional Poverty Index (MPI): Multidimensional Poverty Indices use a range of indicators to calculate a summary poverty figure for a given population, in which a larger figure indicates a higher level of poverty.

### 2.4.1 Rainfall pattern in sample districts

According to the rainfall pattern, the 10 districts chosen for the study each belong to one of the aforementioned agro-climatic zones. Bikaner and Barmer with rainfall in the range of 208-351 mm; Jalore and Churu with 351-493 mm rainfall; Udaipur, Bhilwara, Dausa and Bharatpur with 493-635 mm rainfall; Bundi with rainfall ranging between 635-777 mm; and Baran with 777-919 mm demonstrate that rain plays a significant role in determining the vulnerability of the communities, as majority of them are dependent on agriculture and livestock for their livelihood. Rainfall changes not only jeopardize water security but also create a major setback for socio-economic stability.

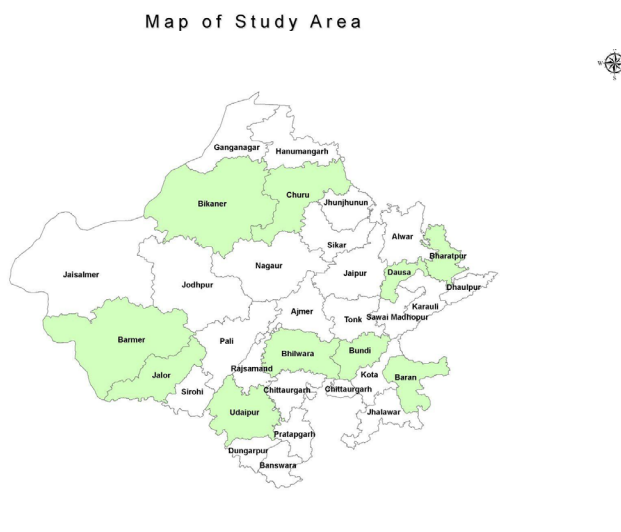


Figure 4: Map of study area

## 2.4.2 Groundwater level trend in Rajasthan

Figure 5 and 7 shows the trend in groundwater level in pre-monsoon and post-monsoon seasons respectively. Figure 6 and 8x shows the district-wise groundwater level in pre-monsoon and post-monsoon season respectively. Pre-monsoon data from 2007-2017 shows that groundwater level increased in 59% of the areas and decreased in 41%. Post-monsoon data from the same period shows that groundwater level increased in 68% and decreased in 32% of the areas.

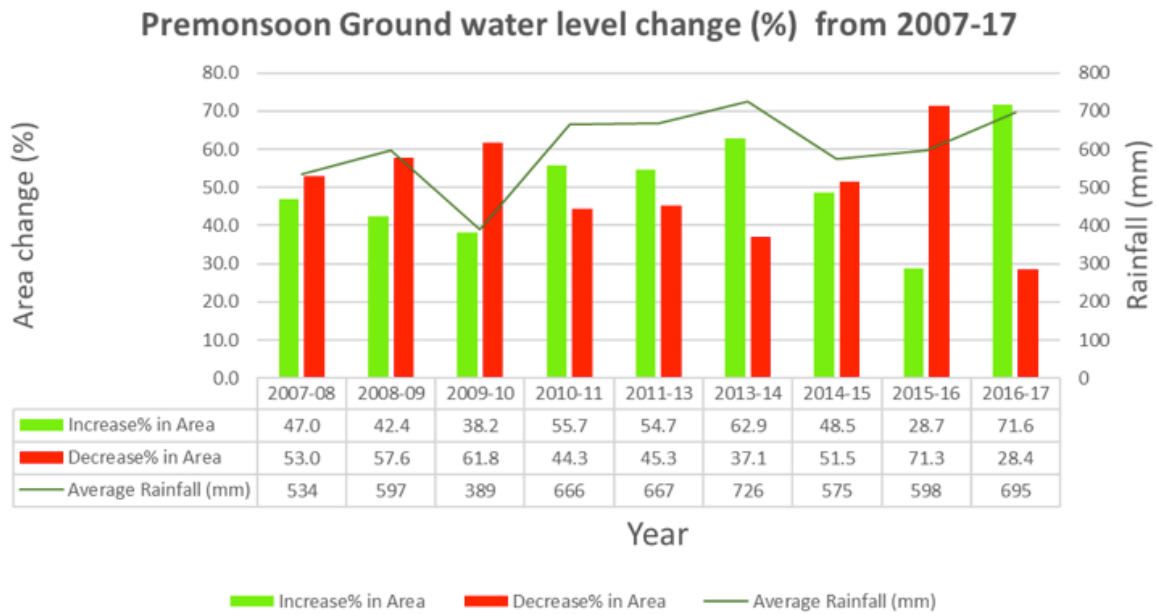


Figure 5: Premonsoon Ground water level change (%) from 2007-17

Source: Central Ground Water Board data published in WRIS-NRSC

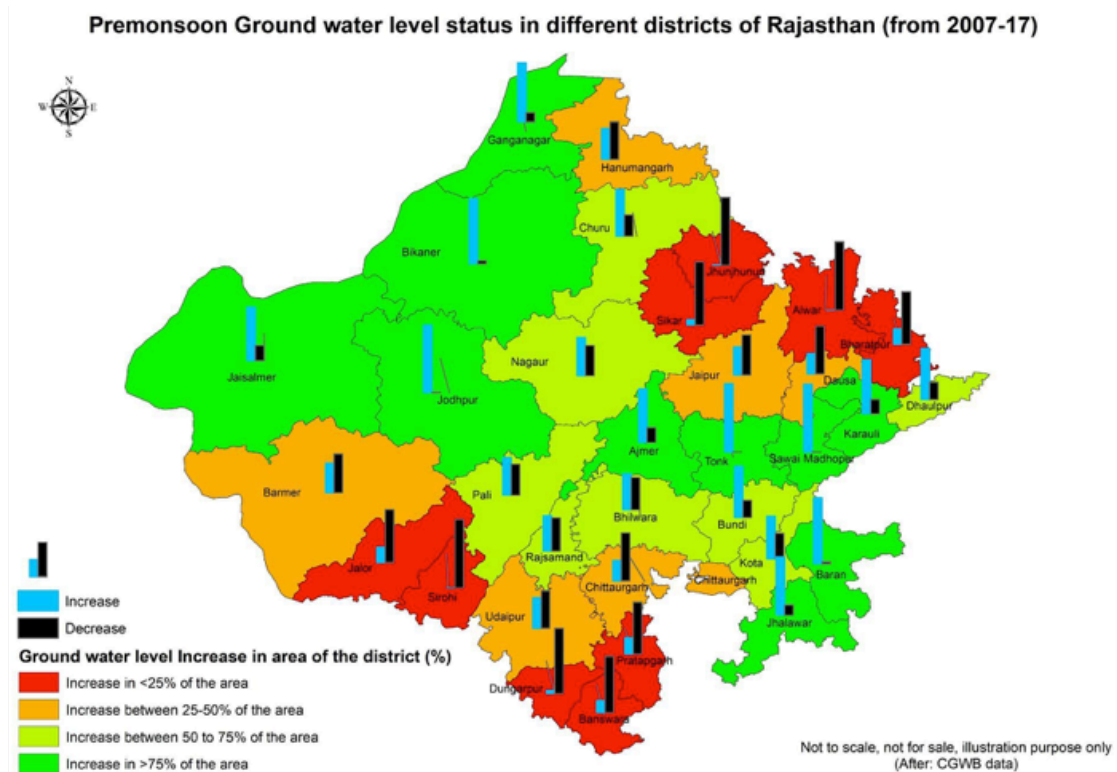


Figure 6: Premonsoon Ground water level status in different districts of Rajasthan (from 2007-17)

Source: Central Ground Water Board data published in WRIS-NRSC

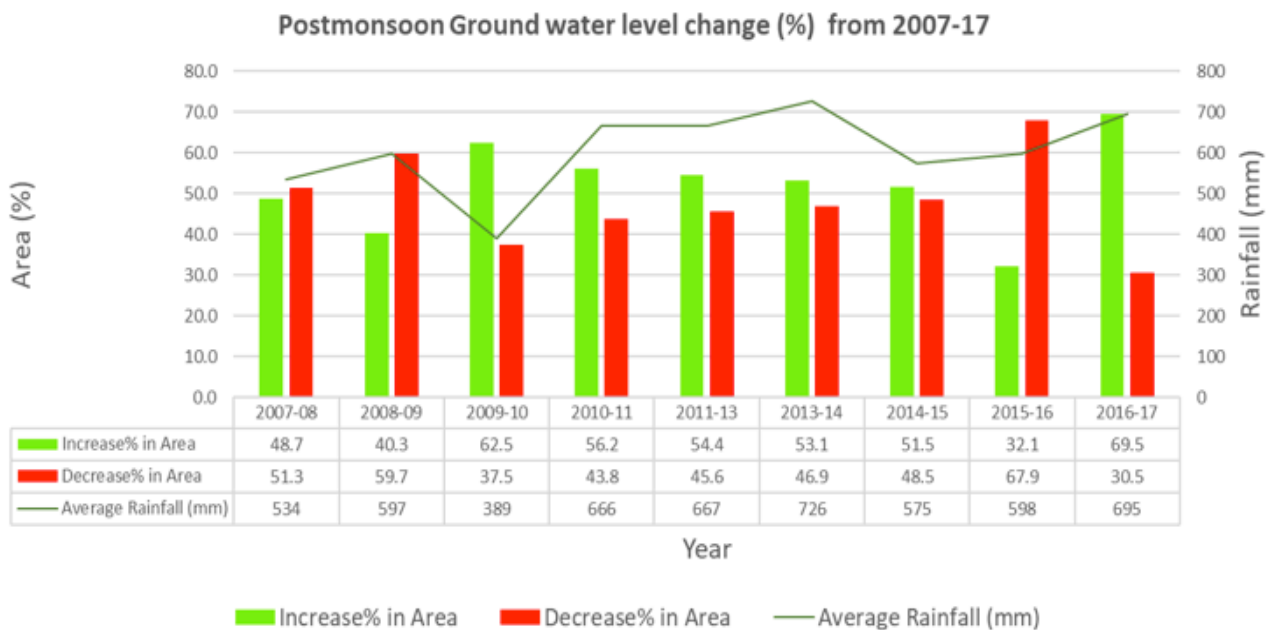


Figure 7: Postmonsoon Ground water level change (%) from 2007-17  
 Source: Central Ground Water Board data published in WRIS-NRSC

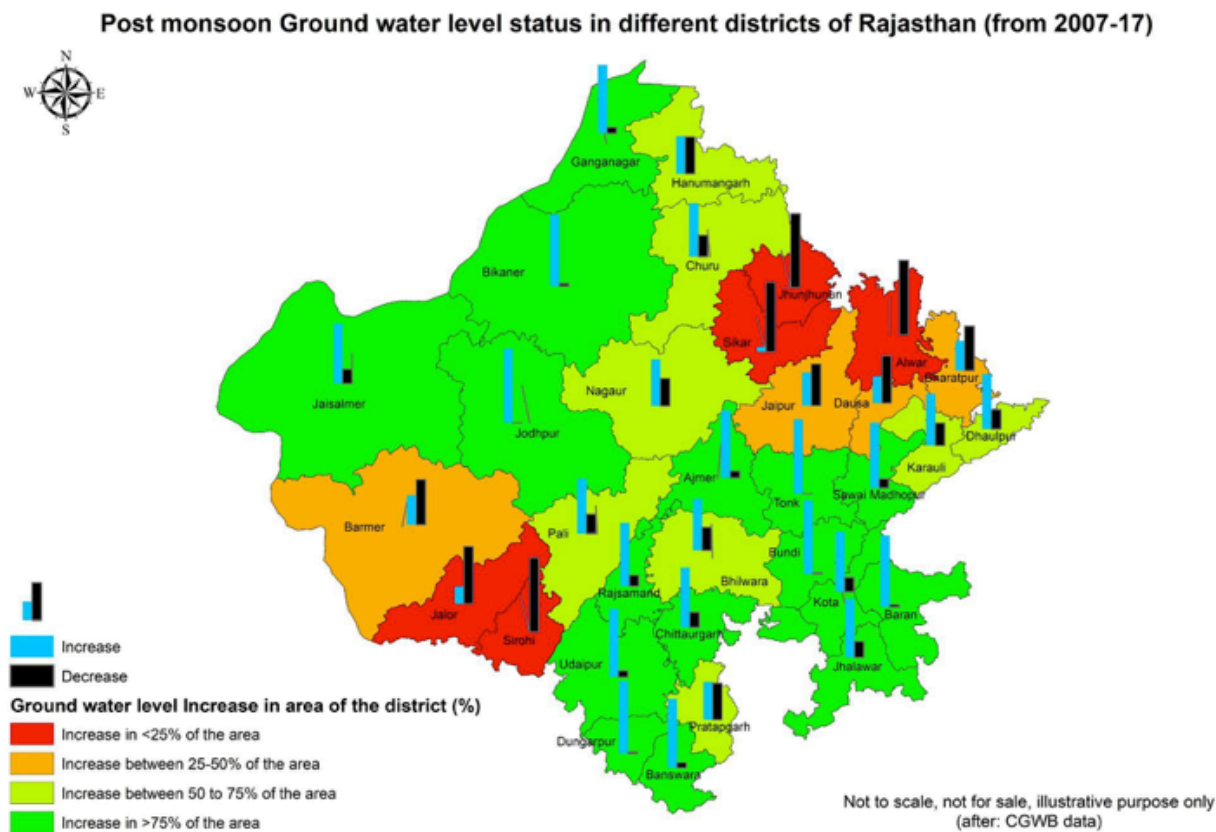


Figure 8: Postmonsoon Ground water level status in different districts of Rajasthan (from 2007-17)  
 Source: Central Ground Water Board data published in WRIS-NRSC

## 2.4.2 Cropping area in sampled districts

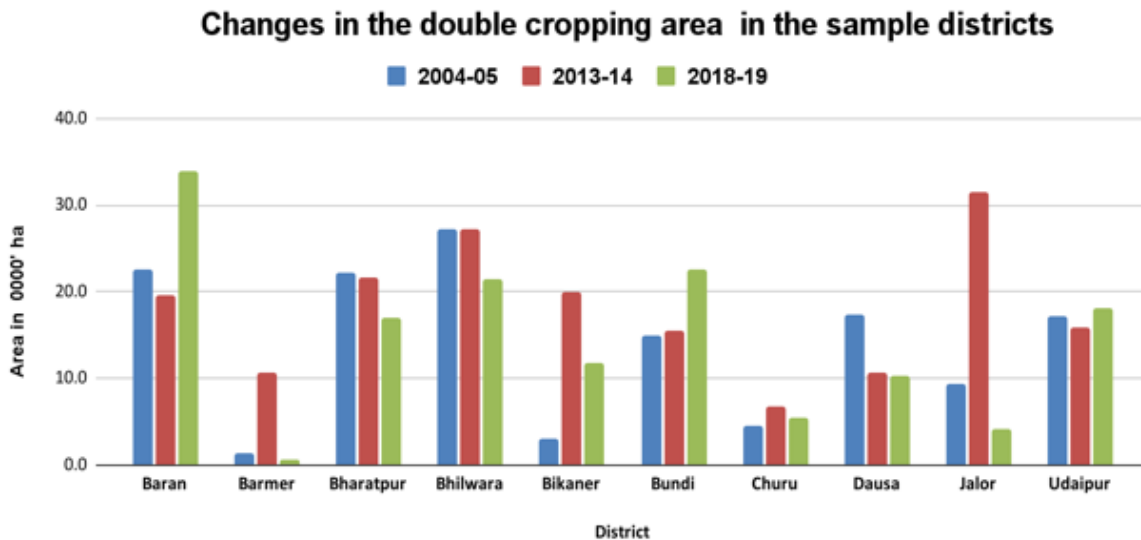


Figure 9: Double cropped area of sampled districts

Source: Bhuvan, NRSC (multi-temporal satellite data of IRS AWiFS sensor with 56 meter spatial resolution)

Agricultural productivity is moderate in Rajasthan and some of the major crops grown in the area are jowar, bajra, maize, pulses and groundnut during kharif season and wheat, barley mustard and gram in Rabi season. The graph given above represents changes in the double cropping area in the last 15 years. Over the years, double cropping has increased significantly in the southern districts i.e. Baran, Bhilwara, Bundi and Udaipur. Cropping area, especially double cropping, also depends on availability and access to irrigation sources and technology for extracting water (such as borewells). There are several studies which show that with the infiltration of borewells and pumping technologies, people were able to get more water for irrigation and increase their double cropping area (besides taking water intensive crops). Above mentioned graphs represent changes in the double cropping area in last 15 years. Over the years, double cropping has increased significantly in the southern districts i.e. Baran, Bhilwara, Bundi and Udaipur, as these districts receive comparatively higher rainfall than the other districts.

## 2.4.3 Livestock population in sampled districts

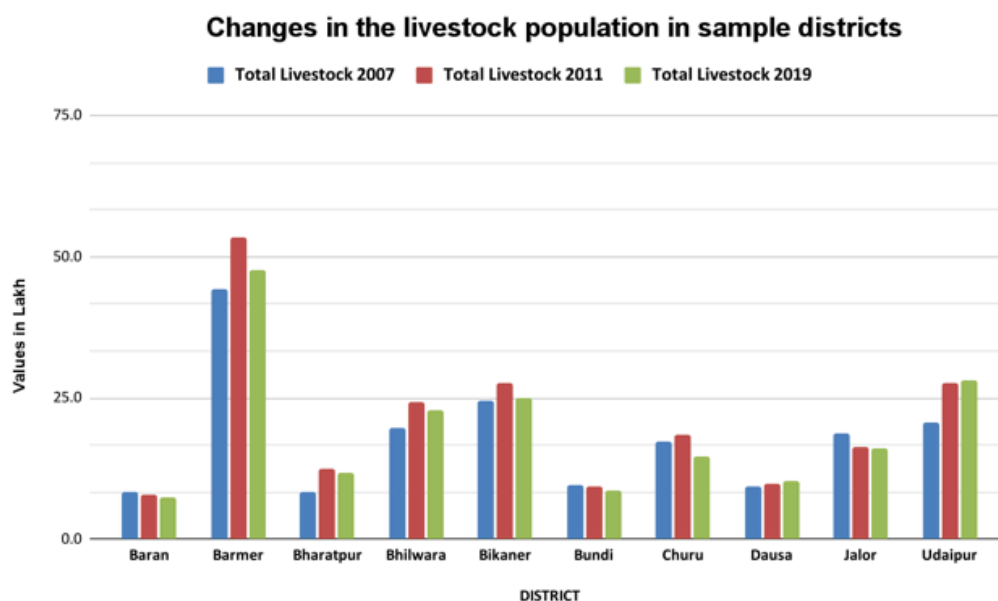


Figure 10: Changes in the livestock population in sample districts

Source: Livestock Censuses 2007, 2011 & 2019

Livestock rearing has been an important component of rural livelihoods. Communities living in arid and semi-arid lands have historically incorporated animal husbandry into their livelihood strategies. This is reflected not only in livestock rearing among diverse groups like pastoralists, agro-pastoralists, tribal farmers, etc., but also in the large livestock holdings found in these areas. The livestock systems in these locations are predominantly based on the rearing of cattle, buffalo, goat and sheep. Poultry is another growing livestock category, especially in tribal villages. However, it still constitutes a very small portion of the total livestock asset base. The Figure 10 shows changes in livestock population between 2007 to 2019. The districts of Baran, Bundi, Churu and Jalore have seen an increase in livestock population in this period. All the other districts show a declining population in the same period. Bharatpur has shown the maximum decline of 38% followed by 36% in Udaipur and 14% in Bhilwara.

#### 2.4.4 Sample Household Profile

##### a) Caste-wise profile of sample households

In the sample households, 50% belong to SC/ST categories and 36% belong to OBC categories. General households are the least represented in this sample.

Table 4: Caste-wise profile of sample households

Caste category	Number of Households
General	45
OBC	347
SC	279
ST	107
Total	778

##### b) Ration card profile of sample households

In the sample households, 62% are Above Poverty Line (APL) Households while 38% are Below Poverty Line (BPL) households.

Table 5: Ration card profile of sample households

Ration Card	Number of households
Antyodaya	23
ABL	482
BPL	247
No ration Card	2
State BPL	24
Total	778

### c) **Income-based profile of sample households**

In the sample households, 83% of the households have reported to have average net annual income of less than Rs. 50,000.

Table 6: Income-based profile of sample households

Income	Number of Households
Less than 50,000	646
50,000 to 2 lakhs	129
Above 5 lakhs	3
Total	778

### 2.4.5 Identification of works

This study mainly focuses on the pool of completed NRM works under JSA between 2018-2021. There are total 5 categories of such works, out of which 4 were selected for this study as they were taken up in the sample villages based on the agro-climatic conditions and suitability of the region. Thus, the following works were used as reference while completing the household survey in each village:

Table 7: Completed JSA works in sample Panchayats

S.N.	NRM Works	No. of Units of Completed Works between 2018-2021
1	Intensive Afforestation	110
2	Renovation of Traditional and other Water Bodies/ Tanks	13
3	Water Conservation	373
4	Watershed	186
5	Total	682

## 2.5 Method of Data Collection

For the purpose of this study, both qualitative and quantitative data was collected. Quantitative data on the social aspects was collected through household surveys, MGNREGS dashboard and other online sources, and ecological data was collected through detailed vegetation assessment. For qualitative data, focus-group discussions (FGDs) were conducted in each of the selected villages in a panchayat, separately with community members and women-only groups.

### 2.5.1 Qualitative data

#### a) **FGD with community members**

In total, 58 FGDs were conducted with community members in selected villages. An FGD was held in each of the selected villages (selected based on the villages with maximum number of completed works in a panchayat) with representatives from different caste groups, representatives from households with different landholdings, MGNREGS workers, Motveer/Mukhiyas, Sarpanch/ Secretaries of the panchayat and other members of the community. There was a special focus on JSA assets in the FGD instrument.



Enumerators conducting focus group meeting with village communities

The purpose of the FGD was to understand the socio-economic impact from MGNREGS (wages, employment, improvement in livelihoods) and also to gauge how NRM assets created under MGNREGS cater to climate-change risks faced by the community.

#### ***b) FGD with women-only groups***

In total, 58 FGDs were conducted with women-only groups in selected villages. An FGD was held in each of the selected villages (selected based on the villages with maximum number of completed works in a panchayat) with women MGNREGS workers and mates to understand the socio-economic



Enumerators conducting focus group meeting with village communities

impact from MGNREGS (wages and employment) and how it trickles down to influence the lives and livelihood of women. The questions have been adapted from Care's *Gender Sensitive Climate Vulnerability and Capacity Analysis (GCVCA)* framework to suit the context of the impact study.

For further details, please refer to section 4.1 (Gender Analysis using the Gender Assessment Tool) in *Chapter 4*.

## 2.5.2 Quantitative data

### a) Household Surveys

The household survey was conducted in 778 households across the sampled villages with the objective of finding out the socio-economic impact of MGNREGS on households. Households with MGNREGS workers and beneficiaries (SC/ST households, small and large landowners), or women-headed households, were selected for the survey. From each panchayat, 2 villages where maximum works have been done were selected for surveys. Further, 20 households were selected from each village (a total of 40 households) from a gram panchayat. The panchayat's assistance was sought by the enumerators to identify these 20 households.

### b) Vegetation assessment



Detailed vegetation assessment was undertaken in the common land to understand the impact of restoration activities on local vegetation. Ecological indicators are slow moving variables and it is often difficult to assess the changes in these variables in a span of merely 2-3 years. Therefore, sample sites where intensive afforestation work was undertaken in the past 10 -12 years were selected as intervention sites, and where afforestation work has not been undertaken were taken up as non-intervention sites. The purpose of selecting both the sites for assessment was to understand the differences in ecological conditions and to assess the potential of non-intervention sites in the next 10 years, if they are restored properly.

For further details regarding the methodology used in ecological assessment, please refer to Section 3.4 (Impact of MGNREGS on ecological indicators) of *Chapter 3*.

### 3. Socio-economic and ecological benefits from MGNREGS

#### Summary:

- Community participation in MGNREGS Gram Sabhas is pivotal for effective implementation of the scheme and natural resource management by communities.
- Benefits from MGNREGS assets can only be sustained by ensuring their quality in terms of planning, utilization and maintenance.
- Natural resource-based works in sample GPs generated persondays to the tune of 1.7 million in the period between 2018-2021. Average employment generated per household in gram panchayats of the blocks with minimum expenditure ranges between 31 to 61 days, and in panchayats of blocks with maximum expenditure, it ranges between 39 to 81 days. The average wage rate in the gram panchayats of the blocks with minimum expenditure ranges from Rs. 104 to Rs. 170, while in panchayats of the blocks with maximum expenditure, it ranges between Rs. 108 to Rs. 200.
- Assets created on common lands between 2018-2021 shows that it created person days to the tune of 1.4 million and disbursed Rs.1782 lakhs in wages. From works on common lands alone a household receives income up-to Rs 6410 per year.
- NRM assets built from MGNREGS have positively impacted water availability in the study area. Communities have reported improved water availability for drinking, livestock and irrigation.
- Increased water availability has benefited farmers and livestock. On an average, the farmers are able to cultivate 0.5 acres of additional land because of increased water availability. It has also decreased the time taken to fetch water for women from 30 minutes to 1 hour.
- Standing biomass and carbon stock in MGNREGS plantation sites were almost 2.3 times higher than without intervention sites. There were a lot of geographical and ecological differences in the restored sites, with their standing biomass ranging from 1- 49.5 tonnes/ha in the sites. 31 species of plants were recorded.
- Major challenges: Relatively low participation of women and SC/ST communities in Gram Sabhas; quality of MGNREGS works could be improved; average wages received in most of the study areas is lesser than the state's overall minimum wage; presence of invasive species such as *Prosopis juliflora*.

Apart from the fact that it guarantees the right to work, MGNREGS is also a vehicle to strengthen local democracy by ensuring community participation in government processes. The scheme provides an avenue to activate gram sabhas where people's needs are discussed, compiled and reflected in official plans. This demand-driven, bottom-up approach gives agency to rural communities to find local solutions to their own developmental problems. Since a major objective of the scheme is to enhance the livelihood-base of rural communities, it gives people control over the management of their natural resource base by leveraging a large-scale public works program. As opposed to top-down planning in dealing with climate change vulnerabilities, this approach to adaptation planning reflects local, social, economic, technical and ecological realities at multiple levels. In this regard, two indicators emerge as being significant for improving the natural resource base of communities:

- a. Community participation and emphasis on natural resource management in MGNREGS gram sabhas
- b. The significance of ensuring the quality of MGNREGS works, leading to socio-economic benefits to the community

## Community participation and emphasis on natural resource management in MGNREGS gram sabhas

In our surveys, 75% of the households reported regular participation in MGNREGS gram sabhas and women from 62% of the households participated in the same. In our survey, 73% of the households reported regular participation in MGNREGS gram sabhas. However, the caste-wise household participation in MGNREGS gram sabhas is given in Figure 11.

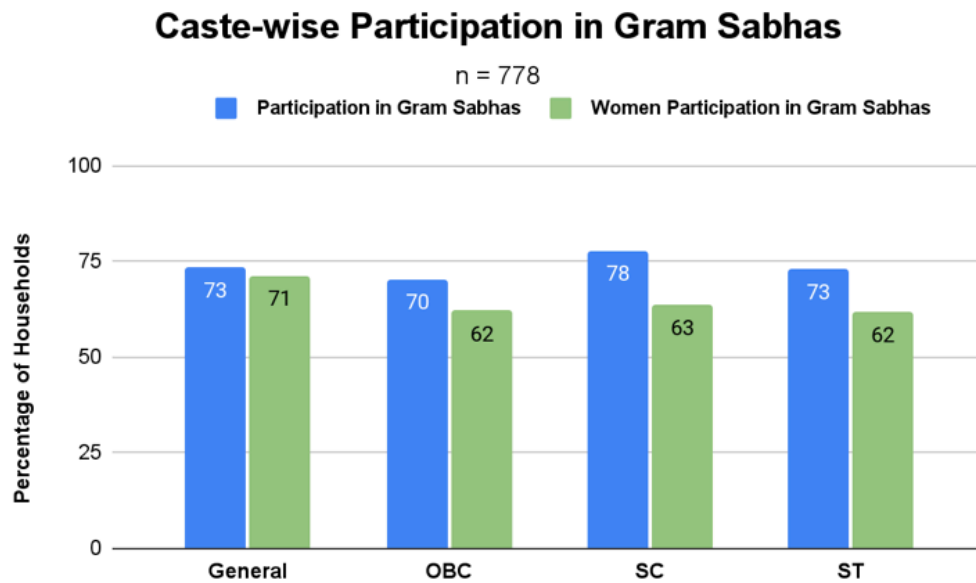


Figure 11: Caste-wise participation in MGNREGS Gram Sabhas (household data)

From the sample households, 70% OBC households, 78% SC households and 72% ST households have reported to be participating in MGNREGS Gram Sabhas. Similarly, women from 62% of OBC households, 63% of SC and 67% of ST households reported to be participating in MGNREGS. Data from FGD responses reveal that in 57% of the sample villages, SC/STs communities do not actively take part in the MGNREGS planning process. Some of the reasons cited by the community members were “lack of information about the convening of Gram Sabha”, “Gram Sabha being held in far off locations” and some sharing that “it is not useful for them’.

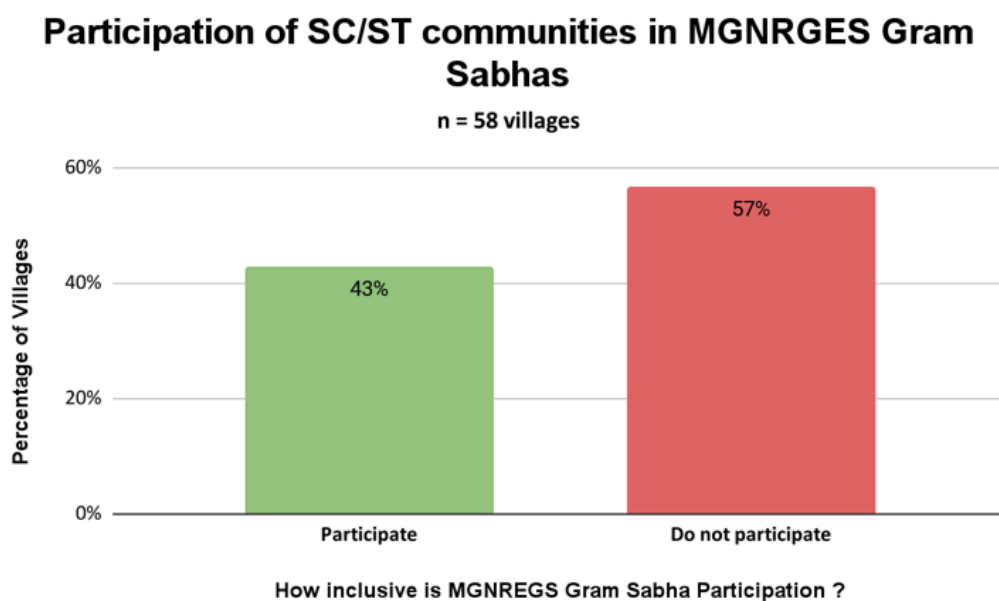


Figure 12: Participation of Communities in MGNREGS Gram Sabha (FGD data)

However, keeping the participation aspect aside, it is also to be seen if the communities raise issues related to their natural resources in the gram sabhas. In order to understand this further, community members were asked in the FGDs if they discussed local issues of water scarcity in the gram sabhas. 59% of the responses answered in affirmative while in 41% of the sample villages, it was stated that there is no such discussion (Please see Figure 13). The communities also shared that issues pertaining to roads, houses and other infrastructure feature on priority in the gram sabhas.

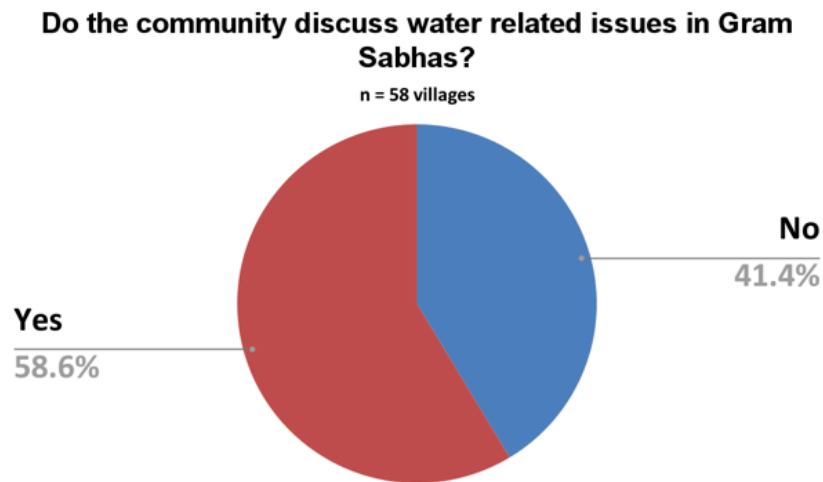


Figure 13: Discussions in sample panchayats on water issues (FGD data)

### **Ensuring quality of MGNREGS works to safeguard socio-economic benefits for the community**

Previous research has persistently highlighted that asset-creation under MGNREGS is significant to the community's well-being. However, the output it delivers has been found to be lacking in some aspects. Though asset-creation is essential both to the community and regular wage generation in a particular region, it suffers from issues of improper planning and design, effective utilization and adequate maintenance. (GOI, 2014; Dreze & Khera, 2009) Thus, research finds that for assets to be beneficial to the community and to deliver sustained benefits, a minimum standard of quality has to be ensured.

In 44% of the sampled villages from our study sites, the communities find NRM works to be of good quality and in 22% of the villages, the works are perceived to be of average quality. In the FGD responses too, community members expressed concern regarding the quality of the assets though they were appreciative of the overall scheme. In some villages, respondents mentioned that structures get damaged soon after completion. Further, during the FGDs, they proposed periodic quality assessment of each asset as a remedial intervention.

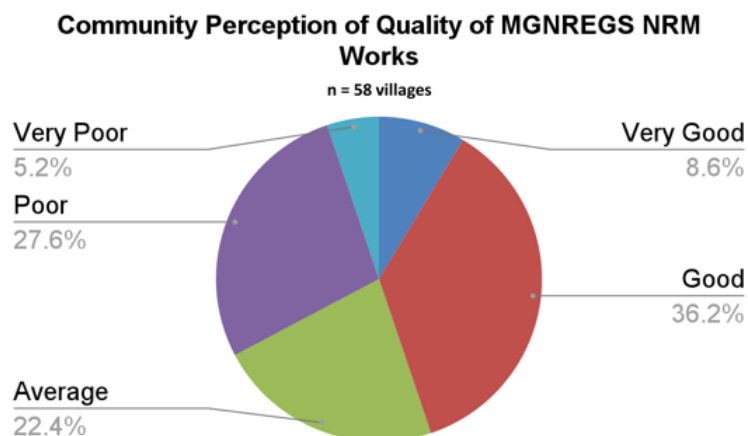


Figure 14: FGD data on the perception of NRM Works under MGNREGS

### 3.1 Empowerment of Rural Communities: MGNREGS as a safety net and provider of jobs and wages

*Employment Generated:* Between 2018-2021 in the sample gram panchayats, a total of 682 NRM assets were created. Cumulatively, they generated 17,61,336 lakh persondays of employment. In the gram panchayats in blocks with maximum expenditure, 77% of the total expenditure is on NRM works. In the gram panchayats in blocks with minimum expenditure, 59% of the total expenditure is on NRM works. Further, 52% of the total persondays generated in maximum expenditure block gram panchayats are specific to NRM works, while 33% persondays generated in minimum expenditure block gram panchayats are specific to NRM works (Table 8).

Table 8: NRM Expenditure and Persondays Generated in Sample GPs

	NRM works expenditure in sample GPs (as a percentage of total )	NRM Persondays in Sample GPs( as a percentage of total)
Minimum Block GPs	59%	33%
Maximum Block GPs	77%	52%

(Source: Data from MGNREGS dashboard)

*Average number of workdays per household:* In the sample panchayats, between 2018 and 2021, the average number of workdays received per household is shown below( Figure 15 & 16). Amongst the gram panchayats from the blocks with maximum expenditure, in five panchayats the average number of workdays comprises more than 60 days, with one panchayat completing more than 80 days. Amongst the gram panchayats from the blocks with minimum expenditure, in six panchayats the average number of days of employment received per household comprises more than 50 days, with two panchayats completing more than 60 days.

Between 2018-2021, the average days of employment received per household in the entire state of Rajasthan increased from 53 days to 56 days, with the figure reaching 61 days in 2021 (Figure 15). The average number of days of employment generated per household in the sample households are in line with the figures for Rajasthan.

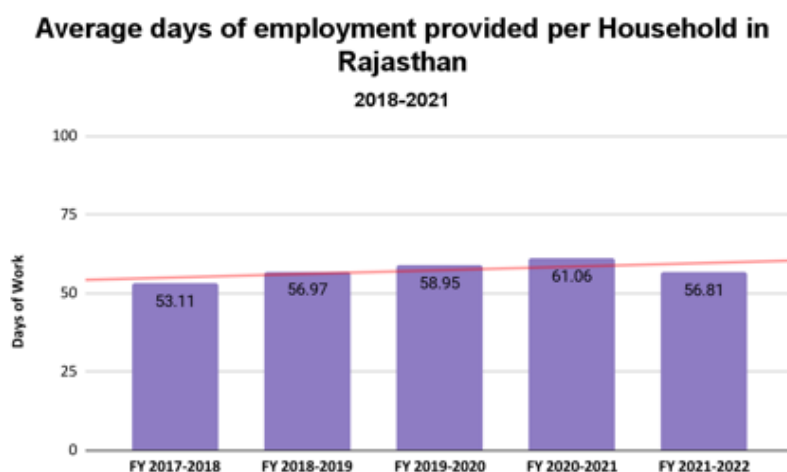


Figure 15: Average days of employment per household in Rajasthan

(Source: Data from MGNREGS dashboard)

### Average Days of Employment Provided Per Household in GPs from Blocks with maximum expenditure

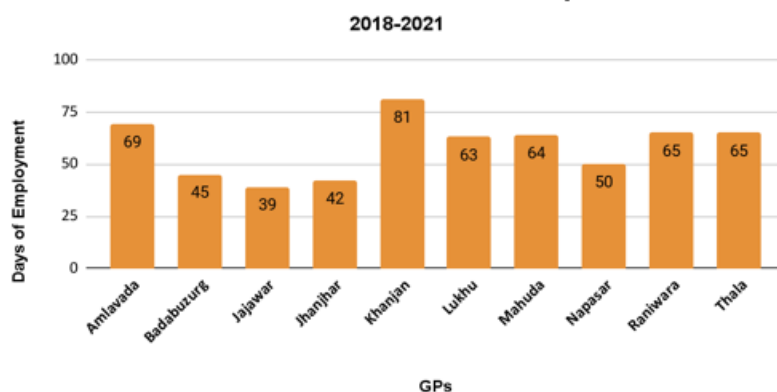


Figure 16: Average days of employment per Household in GPs in blocks with maximum expenditure  
(Source: Data from MGNREGS dashboard)

### Average Days of Employment Provided Per Household in GPs from Blocks with minimum expenditure

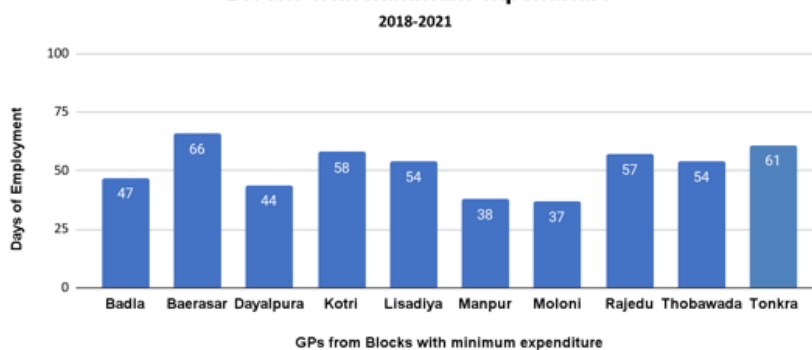


Figure 17: Average days of employment per Household in GPs in blocks with minimum expenditure  
(Source: Data from MGNREGS dashboard)

Percentage of Households which have completed 100 days of work: MGNREGS guarantees 100 days of work per household in a year. Between 2018-2021, only in two gram panchayats from the blocks with maximum expenditure more than 20% of the households received 100 days of work (Figure 18). Similarly, only in 3 gram panchayats from the blocks with minimum expenditure, more than 20% of the households received 100 days of work (Figure 19).

### Percentage of Households Completed 100 days of work in GPs from blocks with maximum expenditure

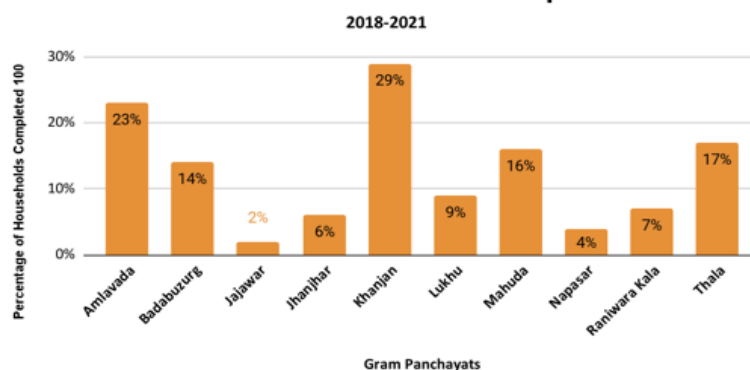


Figure 18: Percentage of Households which have completed 100 days of work in GPs in blocks with maximum expenditure  
(Source: Data from MGNREGS dashboard)

### Percentage of Households Completed 100 days of work in GPs from blocks with minimum expenditure

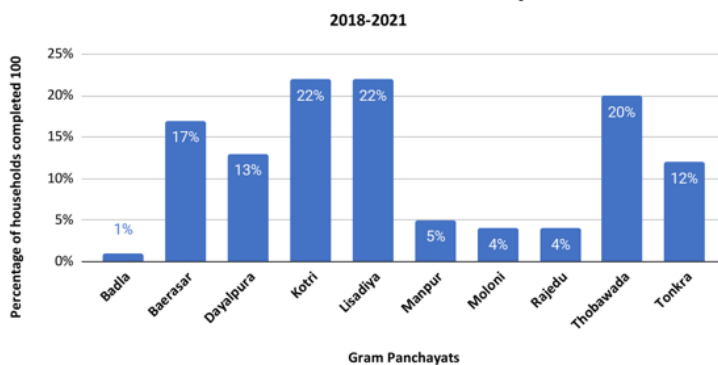


Figure 19: Percentage of Households which have completed 100 days of work in GPs in blocks with minimum expenditure  
(Source: Data from MGNREGS dashboard)

**Wage Rate:** Between 2018-2021, the average wage rate generated in the sample gram panchayats is given below in Figure 20 and 21. In the gram panchayats in blocks with minimum expenditure, 6 panchayats have a wage rate of more than Rs. 150 per day. Similarly, in the gram panchayats in blocks with maximum expenditure, 6 Panchayats have a wage rate of more than Rs. 150 per day per person, with one panchayat touching the mark of Rs.200 per day.

Between 2018-2021, the average wage rate per day per person in Rajasthan saw an increase from Rs. 136.84 to Rs. 182.57 (Figure 20). This shows an increasing trend in daily wages.

### Average Wage rate per day per person(Rs.) in Rajasthan

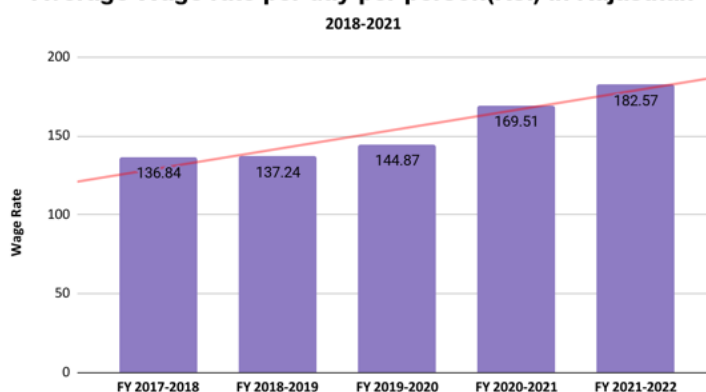


Figure 20: Average Wage Rate per day per person in Rajasthan

### Average Wage Rate in GPs from Blocks with minimum expenditure

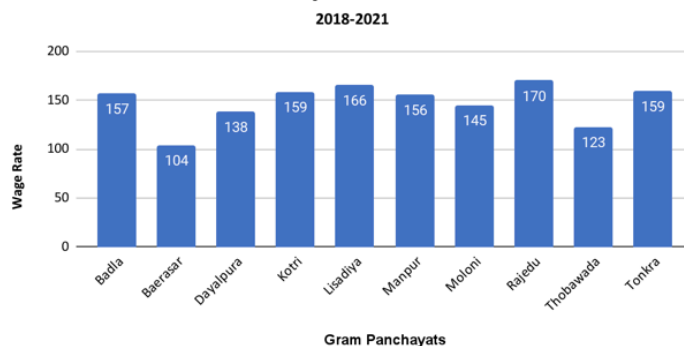


Figure 21: Percentage of households which have completed 100 days of work in GPs in blocks with minimum expenditure  
(Source: Data from MGNREGS dashboard)

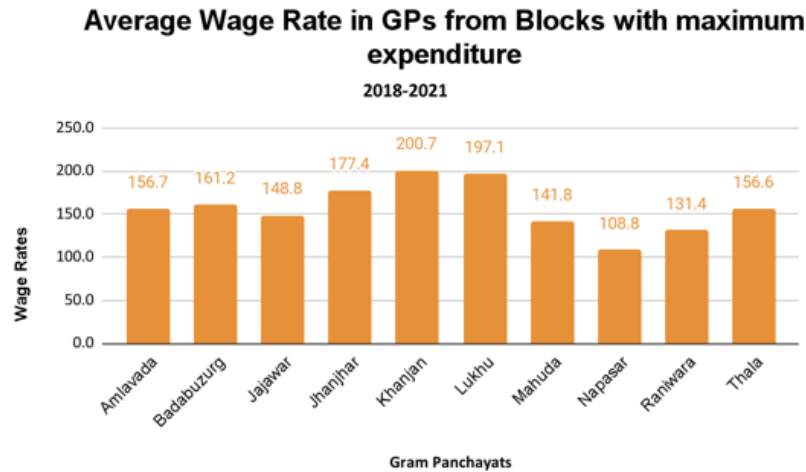


Figure 22: Percentage of households which have completed 100 days of work in GPs in blocks with maximum expenditure  
(Source: Data from MGNREGS dashboard)

**Wages from Works on Common lands:** MGNREGS assets are created on public or common lands as well as individual lands. An analysis of assets created on common lands between 2018-2021 shows that it created person days to the tune of 1.4 million and disbursed Rs.1782 lakhs in wages. From works on common lands alone a household receives income up-to Rs 6410 per year.

### 3.2 Impact of natural resource-based infrastructure on rural communities

One of the objectives of MGNREGS is to enhance the natural resource base that rural livelihoods are dependent on. In this section, we discuss the impact of NRM-based works under MGNREGS, more specifically water conservation works, on rural livelihoods and rural communities.

The household survey reveals that NRM works under MGNREGS tend to benefit poorer households the most. Out of the total surveyed households, 58% reported to be benefiting from MGNREGS works done on public or private land in the last five years. Among these households, 84% belong to the category of those earning less than Rs. 50,000 per annum (Figure 23). A caste-wise analysis also reveals that out of the total households surveyed, 58% reported to be benefiting from MGNREGS. Further, 47% of these households were OBC, 35% percent were SC and 12% were ST households (Figure 24).

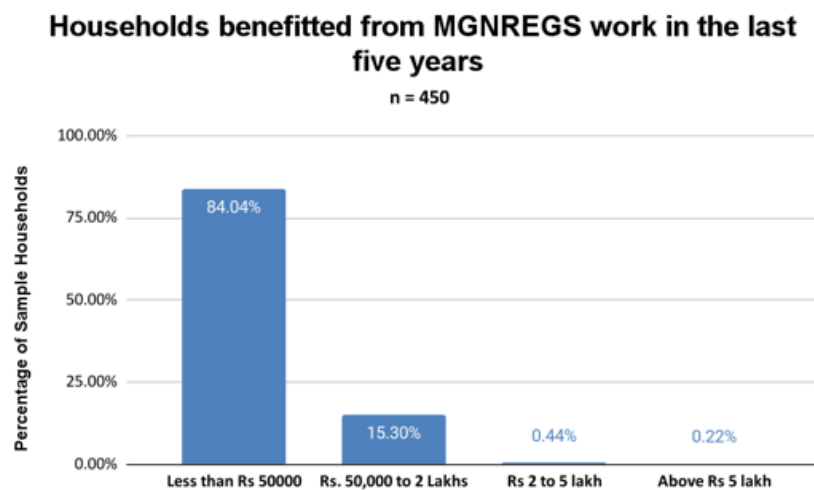


Figure 23: Sample households which have benefited from MGNREGs works (income-wise)

### Caste-wise households benefitted from MGNREGS in the last five years

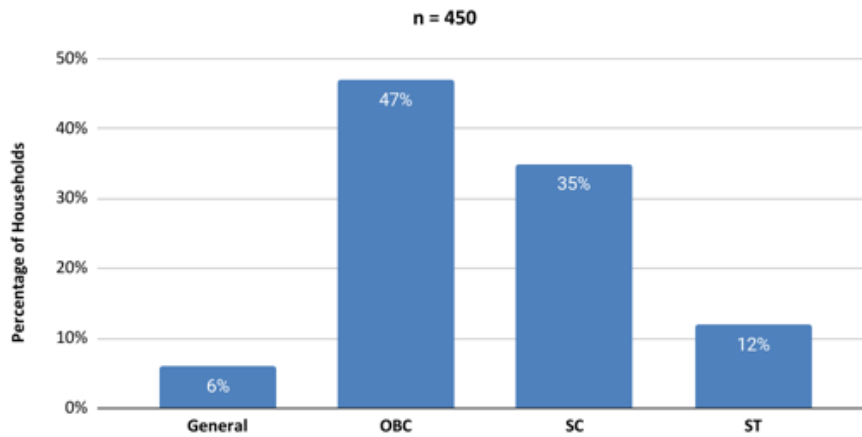


Figure 24: Sample Household benefitted from MGNREGS works (caste category-wise)

### 3.2.1 Impact of MGNREGS on water availability

Water is an integral part of ensuring well-being and plays a critical role in strengthening the livelihoods of rural communities. Several parts of Rajasthan are severely water-stressed and the resources there remain over-exploited. One focus area of the Jal Shakti Abhiyaan (JSA) has been boosting water resources through MGNREGS works in water-stressed zones. Under the campaign, there was a renewed focus on building various water structures and assets which enhance water availability.

#### FGD Responses on the Perception of Water Availability

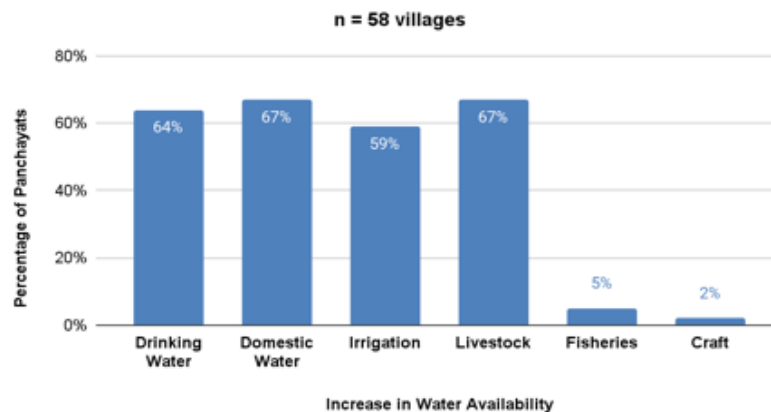


Figure 25: Perceptions on Water Availability from the Sample Panchayats (FGD responses)

In the sampled area, more than 60% of the villages reported an increase in drinking water availability, domestic water availability, and irrigation and livestock in the last 5 years due to NRM works. The results from FGDs are supplemented by the data from household surveys. Among the 778 households sampled in the survey, 74% reported an increase in water availability for drinking water, 55% percent reported an increase in water availability for irrigation, and 76% reported an increase in water availability for livestock.

Caste-wise analysis of household data that reports that almost all caste-groups have reported an increase in water availability (for drinking/domestic use, irrigation and livestock. This points to MGNREGS' significance in addressing the climate vulnerabilities faced by marginalized communities.

## Caste-wise Perception of Increase in Water Availability from MGNREGS

n = 778

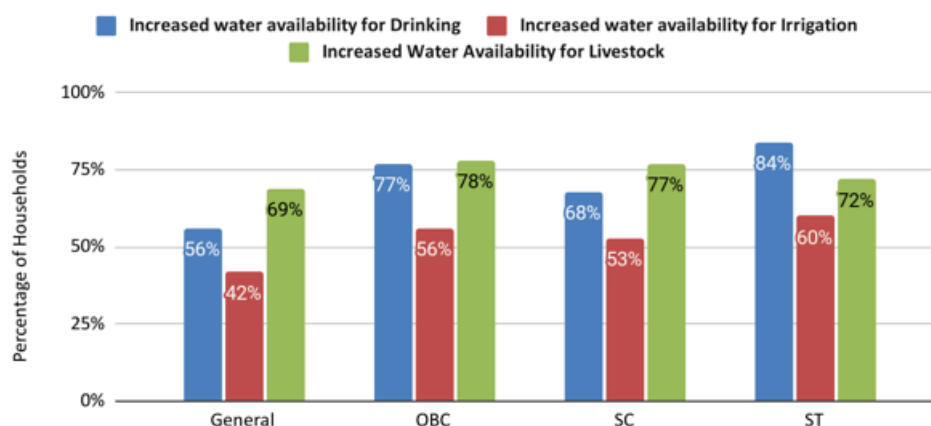


Figure 26: Caste-wise Perception of Increased Water Availability

### 3.2.2 Significance of increased water availability on Agriculture, Livestock and Women's workload

In the FGDs and household surveys conducted for this study, three major points of positive impact on livelihoods emerged from increased water availability due to MGNREGS works. These comprised the impact of water availability on agriculture, on livestock and on women's workload.

**Agriculture:** In our sample of 778 households for the household surveys, 273 (33%) households have been able to irrigate more land because of increased water availability from MGNREGS assets on their individual or common land. On an average, the farmers were able to cultivate 0.5 acres of additional land because of increased water availability through MGNREGS in the last five years. Nearly 70% of the sampled households reported increase in income from agriculture from five years ago due to improved water availability. Subsequently, in the FGDs, farmers reported that MGNREGS has helped majorly in boosting agricultural incomes.

### Change in income from Agriculture in the last five years in sample households

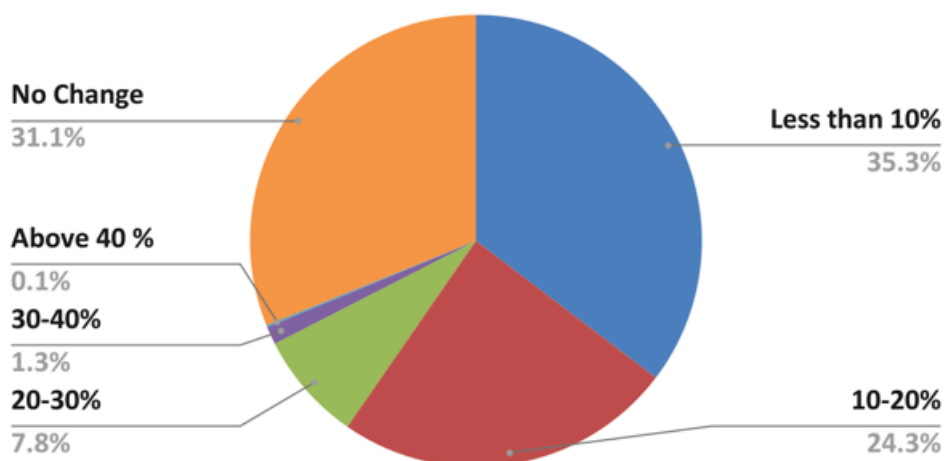


Figure 27: Change in Agriculture income in sample households

## NRM assets improve water availability and mitigate farmer's vulnerability: A case study from Barmer District

From 2018-2021, through MGNREGS, Samdadi Panchayat in Barmer District has built around 192 taka structures in the plots of individual farmers at an expenditure of Rs 414 lakhs. Taka is a concrete rainwater harvesting tank built with a wide catchment area that collects all the rainwater which falls on it and channels it to an underground tank where water is stored for later use. Once fully filled, the water is sufficient for a family of 4-5 members for a period of 2-3 months, and saves it from every day-water-fetching-drudgery. The water from the taka is used for irrigation/drinking in post-monsoon months. Each taka in this panchayat has the capacity to store approximately 15,000-20,000 litres of water (with an average diameter of 2.5 m).



Taka built through MGNREGS



Wheat cultivation through rain water harvesting

In 2018, Bhagwan Lal from the panchayat was able to get a taka built on his individual land through MGNREGS. Before that, Bhagwan Lal did not have enough water for cultivating in the rabi season. The agriculture in the region is predominantly dependent on groundwater and over the years, water level has been declining in the region. In the last two years, he was able to harvest rainwater because of the *taka*. This allowed him enough water to grow wheat in his 2.5 acres of land in the past two years during rabi season. The water from the taka is also used for drinking purposes as well for the livestock.

**Livestock:** In the sample households, 77% have reported an increase in income from livestock from five years ago. About 25% (195) households have reported that water structures built through MGNREGS have increased water availability for livestock. This was also evident from FGDs where, farmers reported that MGNREGS has helped in boosting livestock-based income by making more water available (Figure 24).

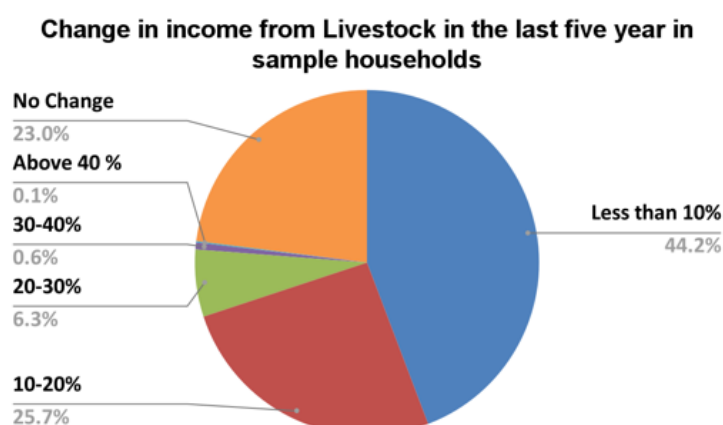


Figure 28: Change in Livestock income in sample households.

## **NRM assets enhanced water availability and boosts income from livestock - A Case study from Bhilwara district**

In Mokhampura village in Thala Panchayat of Raipur Block, Bhilwara various water structures like ponds, anicuts, earthen check dams were built through MGNREGS from 2018-2021. The village suffered severe water scarcity in the last five to six years. Communities in the village used to take their livestock to the neighboring villages because water sources used to dry up in their village and was barely enough for human needs. The water harvesting structures like ponds, earthen check dams built through MGNREGS resulted in storage of rainwater and prevented runoff. The mentioned structure called Dharm ki Nadi was created and maintained using MGNREGS funds and now in case of good rainfall years water is stored in the structure throughout the year and more than 80% of the livestock drinking requirement is met from Dharm ki Nadi. In 2020 the community was also able to open a dairy unit in the village.



Water harvesting structure (Dharam ki Nadi)  
in Mokhampura village

*Impact on Women:* Women often bear the burden of fetching water for drinking, household purposes and fulfilling the needs of livestock. In the household surveys, women reported spending upwards of 4 hours fetching water for various household needs. During summers, the situation worsens further.

From our sample villages for the household survey, 274 households (35%) reported that the time taken for fetching water decreased from 30 minutes to an hour due to MGNREGS investments on rejuvenating the water resources in their village.

### **3.3 Impact of MGNREGS on ecological indicators**

MGNREGS works are largely related to rejuvenation of natural resources such as cropland, grazing land, forests and water resources. They are mainly targeted towards land development and water conservation and management. These works have the potential to generate environmental benefits such as ground water recharge, soil, water and biodiversity conservation, sustenance of food production, halting land degradation and building resilience to current climate risks such as moisture stress, unpredictable rains, droughts and floods. (Tiwari et al., 2011; Esteves et al., 2013; MoRD, 2012)

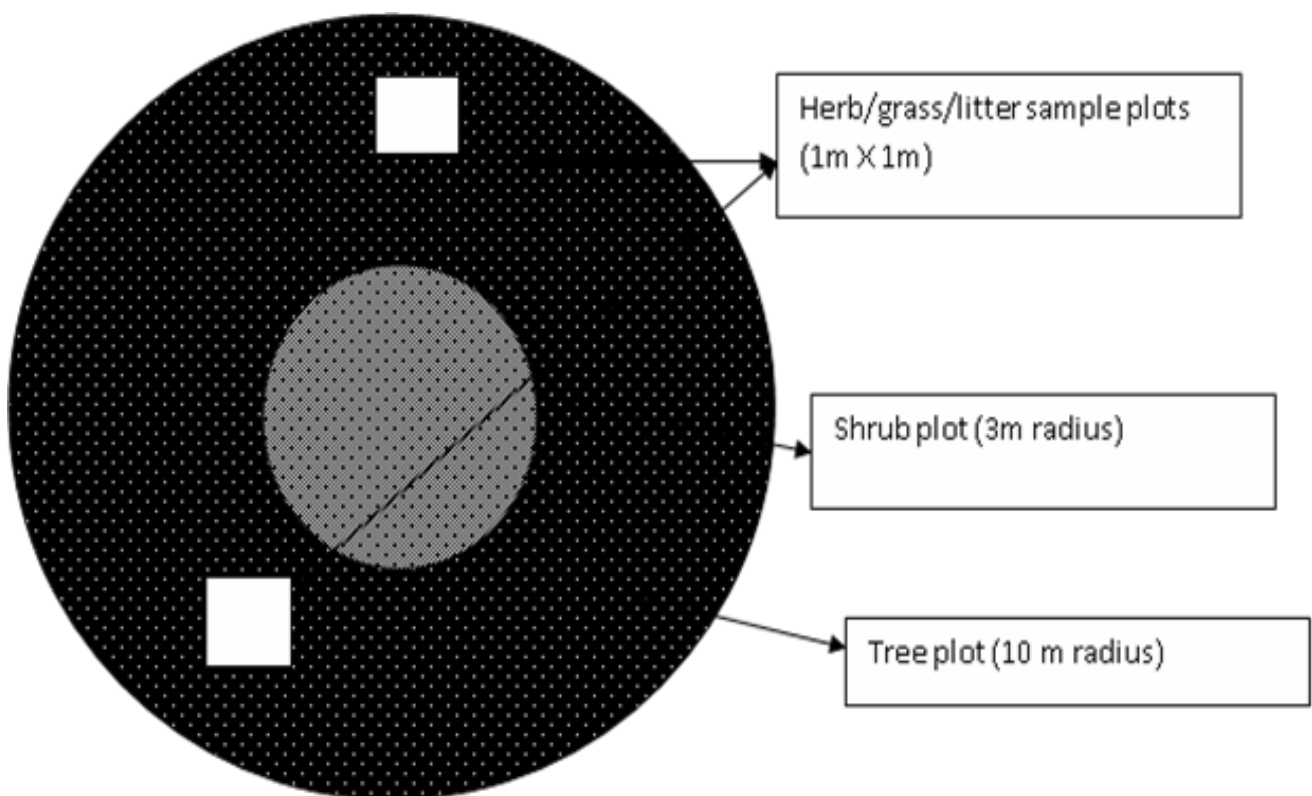
Apart from reducing vulnerability to climate variability and change (Esteves et al, 2013), MGNREGS works also have the potential to sequester carbon in soil and biomass under different activities such as land development, soil and water conservation, enhanced irrigation and activities targeting improved water availability. The outcome of such activities is visible through increased vegetation cover, crop biomass production and soil organic carbon enhancement.

Vegetation assessments were undertaken in 13 intervention sites and 6 non-intervention sites to understand the differences in ecological indicators in the sites where intervention were undertaken using MGNREGS and areas where no intervention took place sites. Further, as a part of the sampling process, the study site boundary was demarcated using a GPS (Global Positioning System). A Google

map of the site was prepared and random sample points were selected using GIS software. Measures were taken to select the sample points in a way that they represent the entire sample area. These points were then tracked in the field with GPS and the required data was collected. 10 -20 sample plots from each of the sites were laid to understand detailed vegetation conditions of the sites. A total of 200 sample plots were laid during the study.

### 3.3.1 Biophysical Assessment

Ecological assessment was carried out to quantify and generate data on vegetation in the sampled area. To quantify the vegetation parameters, the sample plot was set to 314 m<sup>2</sup> (10 meter radius) for trees having a girth above 15 cm at breast height (GBH). A sub-plot of 28 m<sup>2</sup> was nestled within this sample plot to gather information on shrubs, saplings/regeneration, and climbers (below 15 cm GBH) (Modified Whittaker Method). Limitation-data on grasses and herbs were not collected.



Layout of the sample plots for vegetation assessment

### 3.3.2 Biomass and Carbon stock calculation

Above-ground tree biomass was calculated using non-destructive methods. For this purpose, the GBH (Girth at breast height) and height (in meters) of all the tree species within the plot were noted and then extrapolated for the entire study area. The equations developed by Brown (1997) were used for calculating the biomass for the tree species.

i) Tree Biomass (kg) =  $\text{Exp}^{(-2.134 + (2.530 \cdot \ln D))}$  (Brown, 1997)

ii) The Carbon stock was calculated at 45% of Biomass (Indu K. Murthy *et al.*, 2015)

Within a 10 meter radius plot, a 3 meter radius plot was marked and the maximum diameter and height of shrubs and saplings were recorded and biomass of each species was calculated. Shrub biomass can be estimated through estimation of green weight/ Maximum diameter and height.



Vegetation Assessment being carried out in MGNREGS sites

### 3.3.3 Diversity and density

Rajasthan being in an arid and semi-arid landscape, comprises tropical dry-deciduous vegetation characterized by thorny and scrub species. A total of 32 species of trees and shrubs were reported from the sample sites. The tree flora was found to be dominated by thorny species like *Acacia nilotica* (Babul), *Acacia leucophloea* (Arunjia), *Acacia catechu* (Khair), *Balenitis aegyptica* (Hongota) and *Prosopis cineraria* (Khejadi). In the shrub layer, *Prosopis juliflora*, *Ziziphus nummularia* (Ber) and *Capparis sepiaria* (Kanthar) were dominant. The fodder productivity across the majority of study sites was low and one of the reasons for the same is the spread of *Prosopis juliflora* across the sites. The dominant grass species of western Rajasthan was *Cenchrus biflorus* (Bhurat grass), whereas *Aristida adscensionis* (Lapri), *Cenchrus setigerus* (Kali Dhaman) and *Bothriochloa pertusa* (Bhakhada) were found to be dominant in Southern Rajasthan.

Differences in key ecological indicators in intervention and non-intervention sites are as follows:

Table 9: Key Ecological indicators of study sites

Particulars	Intervened sites (with MGNREGS work)	Without intervention
Standing Biomass (tonnes/ha)	14	6.01
Carbon Stock (tonnes/ha)	6.3	2.7
Total number of species	31	12
Shannon Index	1.3	1.3
Dominant Species	<i>Prosopis juliflora</i> and <i>Acacia nilotica</i>	<i>Prosopis juliflora</i> and <i>Acacia nilotica</i>

Species diversity is the measure of an ecosystem's species richness. An ecosystem that has poor species diversity indicates a less stable ecosystem. Good species diversity contributes to communities' livelihoods and well-being by providing food security (via enhancing resilience against future risks and changing conditions), pollination, and supporting pest and disease control in agricultural systems. It also helps improve the availability and quality of fresh water and regulates climate and air quality in the region. The number of species and density was higher in intervention sites and a total of 31 species was recorded there. Most of the sites were abundant with the species like *Acacia nilotica*, *Acacia leucophloea*, *Prosopis cineraria* and *Prosopis juliflora*. It was found that soil and water conservation and gap filling/planting were undertaken using MGNREGS funds to restore the sites.



Kotri village of Barmer district (Work undertaken in the year 2018)

### Species abundance in intervened sites (MGNREGS work)

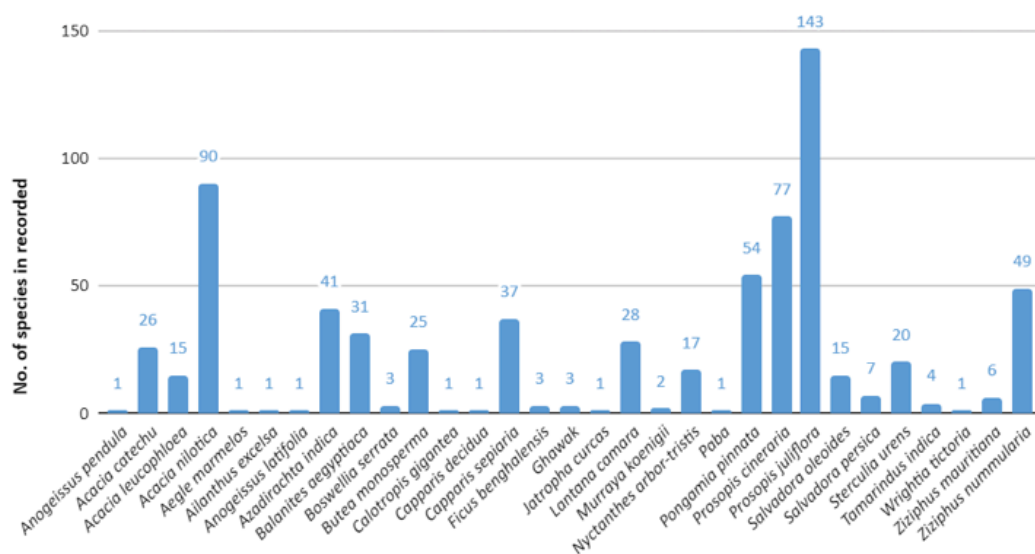


Figure 29: Species Abundance in intervened study sites

A total of 12 species of trees and shrubs were reported from the sites where interventions have not been undertaken. Less number of plant species (ranges from 3 to 9) were reported from these sites where *Acacia nilotica* and *prosopis juliflora* were the dominant plant species. Average Shannon Diversity Index was less than 2 for both sites which shows less diversity in these study sites. *Prosopis juliflora*, an invasive species, was recorded in 70 % of the intervention sites and its presence was reported from all non-intervention sites (100%). Occurrence of these species was recorded to be high in the sites at Baran, Bundi, Jalore and Dausa.

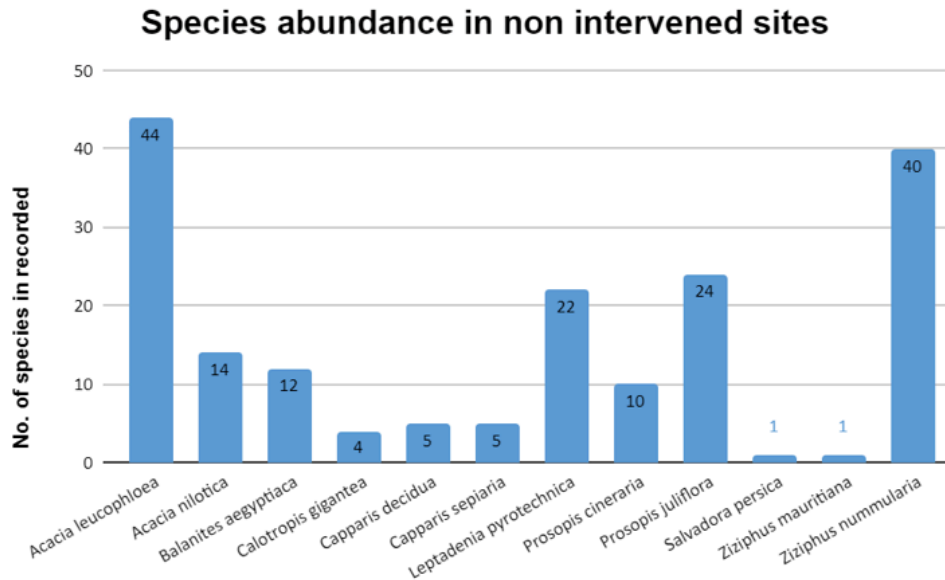


Figure 30: Species Abundance in non-intervened areas

Phytosociological analysis of trees and regeneration was calculated from the data collected from 200 sample plots across study sites. 10m radius plots for trees and 3m radius plots for regeneration/saplings were established. The Diameter at Breast Height (DBH) of all the trees and regenerating plants and maximum diameter of shrubs were measured. Basal area was used as a dominance measure. The Importance Value Index of each species was also calculated. (Curtis and Cotton, 1956) The ratio of abundance to frequency for different species was determined for eliciting a distribution pattern. This ratio indicates regular (<0.025), random (0.025-0.05) and contiguous (>0.05) distribution patterns. (Whitford 1949)

Phytosociological analysis presents the vegetation structure of the area. Here, the analysis shows less species diversity at the sites. Higher relative dominance, low density and frequency of *Acacia nilotica* shows abundance of large trees of the species in some of the sites. Higher relative density and frequency of *Prosopis juliflora* shows its spread across sample sites. Uprooting of *Prosopis juliflora* before soil and water conservation work or planting may improve soil health and local vegetation conditions.

Table 10: Phytosociology of top 10 species of trees and shrub in intervened sites

S.N.	Name of species	R. density	R. freq.	R. dominance	IVI	A/F Ratio
1	<i>Acacia nilotica</i>	12.8	14.3	42.7	69.8	1.4
2	<i>Prosopis juliflora</i>	20.3	18.2	6.5	45.0	0.4
3	<i>Prosopis cineraria</i>	10.9	9.3	13.1	33.3	0.4
4	<i>Pongamia pinnata</i>	7.7	3.1	12.1	22.8	0.1
5	<i>Azadirachta indica</i>	5.8	6.6	4.4	16.8	1.4
6	<i>Ziziphus nummularia</i>	7.0	8.1	0.2	15.3	1.4
7	<i>Capparis sepiaria</i>	5.2	7.8	1.0	14.0	1.4
8	<i>Acacia catechu</i>	3.7	3.9	4.2	11.7	0.2
9	<i>Lantana camara</i>	4.0	5.4	0.0	9.4	0.7
10	<i>Acacia leucophloea</i>	2.1	2.7	4.0	8.9	0.5

Phytosociological analysis of non intervention sites shows very less species diversity at the sites. Higher relative dominance, density and frequency of *Acacia leucophloea* shows dominance of this species in all sites. Less frequency and density & higher Dominance shows presence of *Prosopis cineraria* in a few of the sites but having large individuals. Higher relative density and frequency of *Prosopis juliflora* shows its spread across sample sites.

Table 11: Phytosociology of trees and shrub in non-intervention sites

S.N.	Name of species	R. density	R. freq.	R. dominance	IVI	A/F Ratio
1	<i>Acacia leucophloea</i>	24.18	20.41	43.17	87.75	0.07
2	<i>Prosopis cineraria</i>	5.49	7.14	26.68	39.32	0.10
3	<i>Prosopis juliflora</i>	13.19	19.39	6.20	38.78	0.45
4	<i>Acacia nilotica</i>	7.69	9.18	19.09	35.97	0.15
5	<i>Leptadenia pyrotechnica</i>	12.09	10.20	0.32	22.62	0.75
6	<i>Balanites aegyptiaca</i>	6.59	4.08	1.03	11.71	0.19
7	<i>Capparis sepiaria</i>	2.75	4.08	0.05	6.88	0.13
8	<i>Calotropis gigantea</i>	2.20	4.08	0.09	6.37	0.12
9	<i>Capparis decidua</i>	2.75	2.04	1.04	5.83	0.04
10	<i>Salvadora persica</i>	0.55	1.02	1.29	2.86	0.60

### 3.3.4 Standing biomass and carbon stock

Biomass is an important parameter for the characterization of an ecosystem, since it reflects the ecosystem's capacity in accumulating organic matter during a particular timespan. The distribution and dynamics of biological resources must be understood to provide a rationale for planning and management decisions, without which conservation of these resources in the natural habitats would be impossible. Such knowledge on ecological processes, information on forest composition and association, biotic pressure and types of vegetation existing in the system help in understanding the persistence of certain plant communities and the resources they provide to the people. Hence, it becomes easy to formulate management plans. The current study is thus aimed at providing basic information distribution of vegetation resources along with an attempt to quantify diversity, density, above ground biomass, and carbon stock of the area.

Reducing emissions from deforestation and degradation (REDD) is now recognized as a critical component of climate change mitigation. (UNFCCC, 2007) A good understanding of the carbon dynamics of forests (FAO, 2007) is therefore important, particularly how carbon stocks vary in relation to environmental conditions and human land-use activities. The standing biomass and carbon stock of intervention sites was found to be 2.3 times higher than non intervention sites.

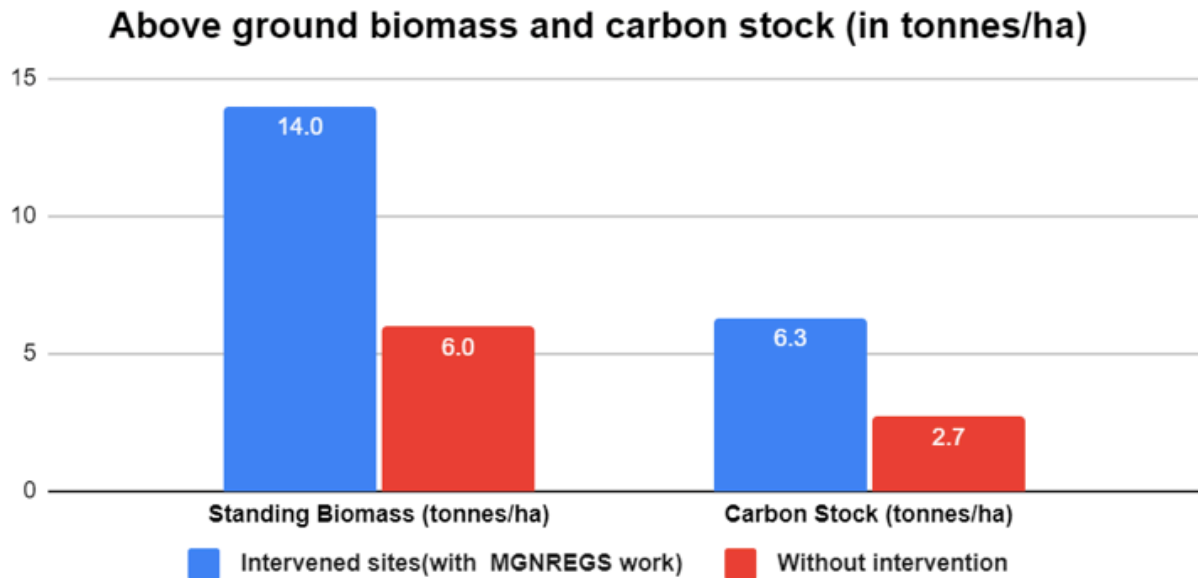


Figure 31: Biomass and Carbon Stock of study sites

Species diversity of most of the sites was less and the sites were dominated by only one or two species. *Acacia nilotica* (Babul) was growing well in most of the sites and big sized trees were reported, which contributes to higher standing biomass. *Acacia leucophloea* (Arunjiya) and *Prosopis cineraria* (Khejri) were also thriving in many of the sites and contributing significantly to maintaining the green cover of the sites. Community members were found to be using pods and leaves of Babul, Arunjiya and Khejari for their livestock. Among the shrubs, *Prosopis juliflora* was dominant and spreading fast across the sites. Increased density of *Prosopis juliflora* is one of the main reasons for low biodiversity, as this species does not allow other tree, shrub and grass species to regenerate and grow.

Table 12 Above ground biomass (in tonnes/ha) of top 10 Species:

S.N.	Name of Species	Intervened sites (with MGNREGS work)	Without intervention sites
1.	<i>Acacia nilotica</i>	6.4	1.2
2.	<i>Pongamia pinnata</i>	1.9	-
3.	<i>Prosopis cineraria</i>	1.5	1.1
4.	<i>Salvadora persica</i>	0.9	0.1
5.	<i>Prosopis juliflora</i>	0.7	1.2
6.	<i>Acacia leucophloea</i>	0.5	2.0
7.	<i>Acacia catechu</i>	0.5	-
8.	<i>Azadirachta indica</i>	0.5	-
9.	<i>Capparis sepiaria</i>	0.3	0.001
10.	<i>Salvadora oleoides</i>	0.2	-

In short the results indicate:

- Total number of species reported is 32, out of which 31 are from intervention sites and 12 are from non-intervention sites
- Less species diversity in both intervention and non-intervention sites, both the sites having a Shannon Diversity Index value of 1.32
- Presence of *Prosopis juliflora* in both the sites and higher density of the same in non-intervention sites
- Higher tree density contributed to higher standing biomass and carbon stock in intervention sites
- Higher vegetative cover in intervention sites

### 3.3.5 Significance of Improved Vegetation on Community

The revegetation activities or intensive afforestation work of MGNREGS is aimed at improving the common lands/pastureland. Village Commons are an important source of livelihood and food security for the landless as they provide valuable assets like firewood, fodder, non-timber forest produce (NTFPs) and several others. They also provide valuable ecosystem services. Activities on Commons, such as pastures, forests, grasslands and water bodies are likely to have the maximum impact on the lives of the poor. (Jodha, 1986) The Figure-32 shows common land availability across Rajasthan between the years 1991 and 2011. It can be seen that common land availability has declined over the years.

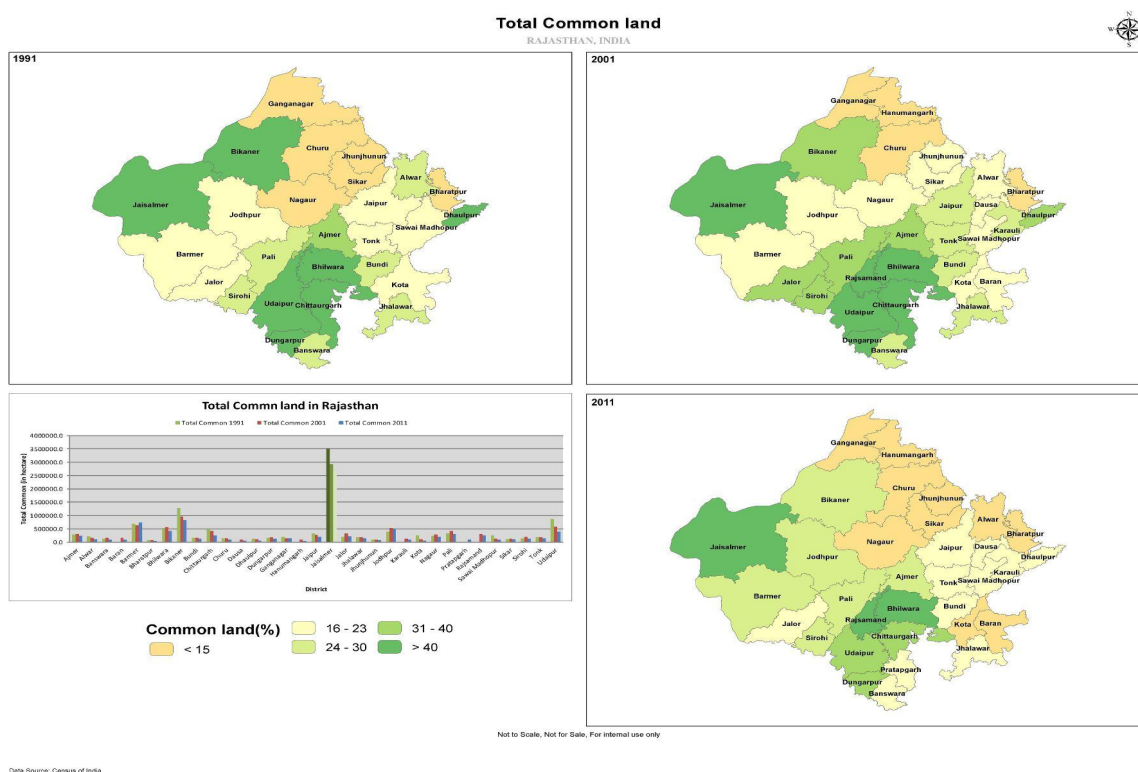


Figure 32: Changes in total common land area

While earlier, the traditional village institutions in Rajasthan had to pool in resources from community members for managing their common land, now MGNREGS shoulders the economic burden. In our FGD responses, community members from 79% of the panchayats have reported benefitting from works on Commons.

## Villages benefitting from MGNREGS Works on Common Lands

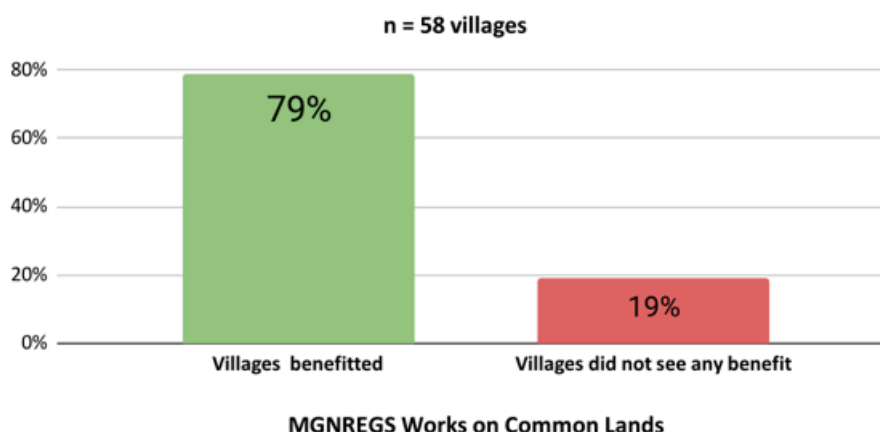


Figure 33: Perception of MGNREGS NRM Works (FGD data)

During the study, communities shared that the revegetation activities done through MGNREGS in the sample villages have demonstrated an increase in the availability of fuelwood, fodder and NTFPs in the last 10 years. From FGD data, 71% of the total villages reported an increase in the availability of firewood on nearby common land. 21% of the villages, in which communities used to collect forest produce, have said that there was an increase in the availability of NTFPs for their households, and 29.3% of the villages responded that there is an increase in vegetation as well as fodder availability in the village (Figure 30).

## Impact of revegetation activities under MGNREGS

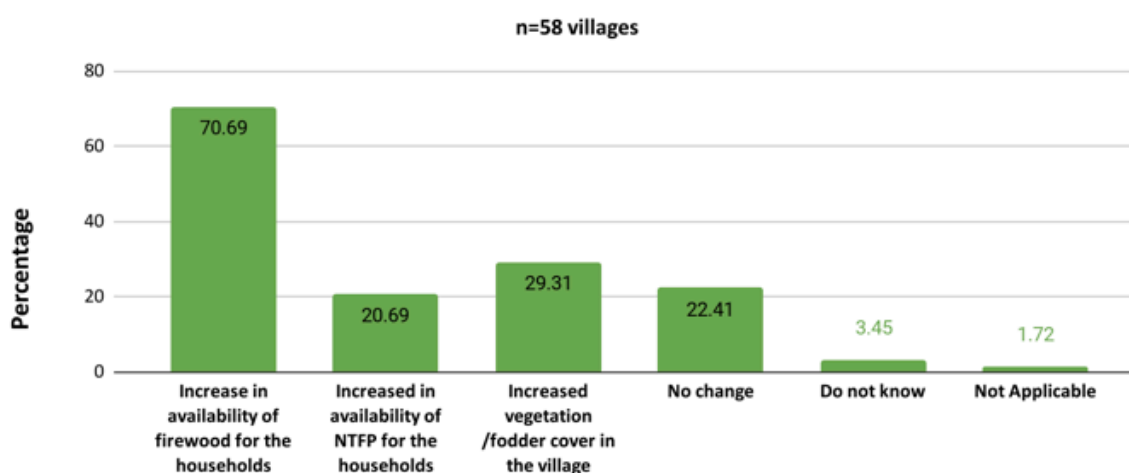


Figure 34: Impact of MGNREGS revegetation activities on the communities

## **MGNREGS work on common lands benefit marginalised communities - A Case study from Nagar, Bharatpur**

Jhanjhar Panchayat in Bharatpur district borders the neighbouring district of Alwar. The pasturelands in the panchayat had been overgrazed and overexploited and this led to severe resource depletion of the pastures. However, these pasturelands are vital for the livelihoods of the Jatav communities of neighbouring Alwar district. Jaatav's are a predominantly forest dependent SC community. The women of the community walk over two hours to reach the pasturelands to collect phoola jhunda (*Saccharum bengalense*)- a grass species used for making roofs, chairs, cots and fences. They also collect firewood and fodder from the pasturelands. Over the years, the availability of phoola jhunda has decreased.

Recognising the importance of pasturelands in the livelihood of the Jaatav community, the Panchayat of Jhanjhar has channelised funds through MGNREGS for building cattle protection trenches (CPTs) to prevent overgrazing of the pasturelands. The panchayat also carried out planting activities in the pasturelands. The women from Jaatav communities whom we have interacted with have reported that the works have improved the grass availability. Now they are able to collect grasses (phoola jhunda) from the land for 4-6 months, this contributed to increase their annual income by Rs. 10,000. The case study signifies the importance of leveraging MGNREGS for common land development as it is likely to have the most critical impact on the vulnerable communities.



Women from Jaatav community collecting Phoola Jhunda

### 3.3.6 Land Use and Land Change Analysis

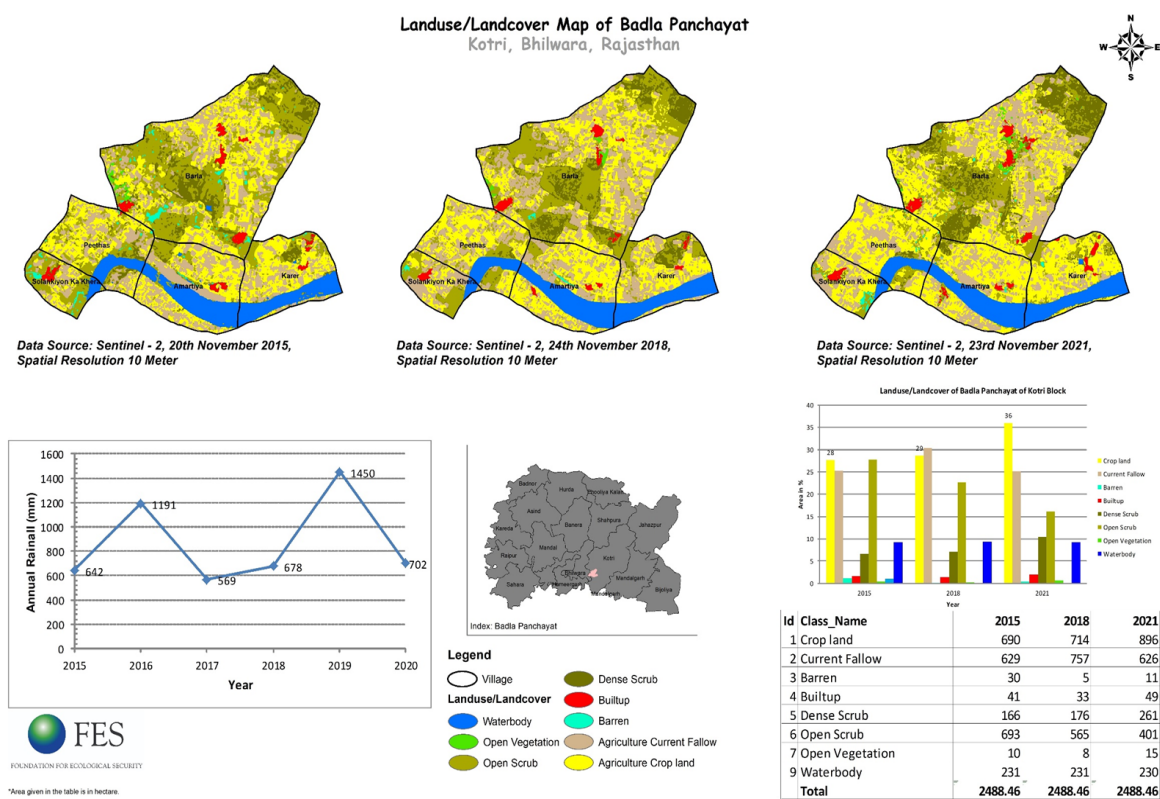


Figure 35: LULC Dashboard of Badla Panchayat, Bhilwara

### Land Use and Land Change ( LULC)

Land use and land cover analysis is done using satellite imagery. Imageries of Remote Sensing (RS) satellites provide data on the temporal and spatial status of natural resources. Repetitive coverage helps in understanding various changing physical processes in a particular area as also in monitoring closely, the changes taking place across different areas.

These landscape analysis helps to understand the changes in various land categories (like crop land, fallow land, waterbodies, scrubland) over a period of time. By juxtaposing land cover changes along with other indicators like trends in rainfall, it provides valuable insights into how the landuse and landcover changed over a period of time with changing rainfall patterns. We can correlate these changes with natural resource conservation work.

The above map of Badla Panchayat, Bhilwara district gives land use changes from 2015 to 2021. In the period from 2015 to 2021, cropping area has shown an increase from 690 to 896 ha (29% increase). The area under open scrub reduced by 42% and dense scrub area has increased by 65%.

This observation co-relate with the MGNREGS works carried out in the panchayat in the same period. Between 2015-2021, through MGNREGS, 9 water structures harvesting structures, specifically check-dams, were built in the panchayat along with common land development work in 5 plots across the Panchayat. Also, watershed activities like drought proofing and earthen bund were carried out in 5 locations.

## 4. Women and MGNREGA

### Summary:

- Gender analysis using the Gender Assessment Tool (GAT) assesses the gender responsiveness of MGNREGS programme and finds it to be 4 (Gender-Specific). This conveys that the scheme has been designed keeping women’s differential needs in mind.
- MGNREGS provides guaranteed employment and wages for women. But adequate worksite facilities, such as creches, need to be provided uniformly across regions.
- Assets built through MGNREGS have an impact on improving women’s well-being. MGNREGS has an impact on improving the financial autonomy of women and increasing their bargaining power in households.
- More than half of the FGD responses demonstrate that women feel that they are ‘heard’ in Gram Sabhas.
- Major challenges: Issues stemming from gendered social relations and norms still prohibit women from exercising autonomy and their unpaid care work goes unacknowledged.

Rajasthan is exemplary of MGNREGS being utilized by the rural poor, especially women, as a source of supplementary income and platform for empowerment. (Ali & George, 2019) This is because apart from being a social protection measure, as discussed in previous sections, the scheme has “more transformative outcomes in terms of empowerment and social justice.” (Carswell & De Neve, 2014)

Secondary data from MGNREGA dashboard on persondays generated between the financial years 2018-2021 shows that women have contributed to more than 50% of the person days.

Table 10: Person days generated between the financial years 2018-2021

Women Person-days out of Total (%)	FY 2021-2022	FY 2020-2021	FY 2019-2020	FY 2018-2019	FY 2017-2018
	66.57	65.68	67.33	66.07	65.34

Source: At a Glance Report, <https://nrega.nic.in/>

In the sample areas selected for this study too, the gram panchayats of both the blocks with maximum and minimum expenditure demonstrate that women persondays account for more than 60% of the total persondays generated. In other words, they form a significant portion of the beneficiaries of this scheme.

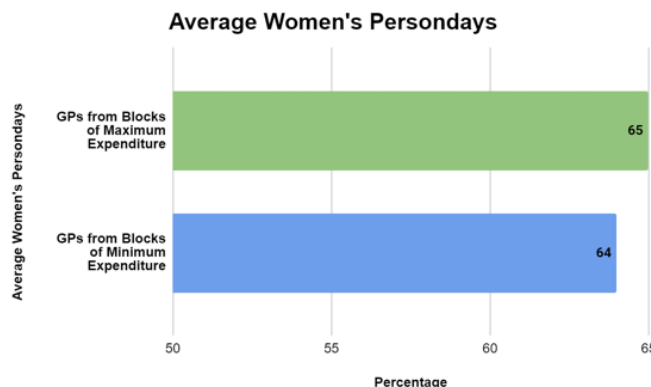


Figure 36: Average Women Persondays

Source: At a Glance Report, <https://nrega.nic.in/>

However, it was visible during FGDs and field observation that there is an underlying disparity in the ways and degrees to which men and women perceive the scheme and benefit from it. To capture the same, certain indicators were selected specifically for a broader gender analysis of the sampled region. Further, in the sections proceeding thereafter, various interlinkages and points of discussion captured from the FGDs and field observations have been delineated.

#### 4.1 Gender analysis using the Gender Assessment Tool (GAT)

The World Health Organisation’s Gender Assessment Tool (GAT) highlights policy gaps and incumbent measures for gender analysis of a particular policy/programme. Adapting the same and screening MGNREGA through a gender lens entails looking closely at two aspects: firstly, what the FGD responses and their score reveals, and secondly, how the FGD responses compare to the situation observed on the ground.

##### 4.1.1 Methodology for gender analysis

The Gender Assessment Tool (GAT) is a broad and overarching tool for rapid assessment of the ‘gender-responsiveness’ of a policy or programme along a scale. For the purpose of this study, the tool framework was modified to fit the local context. FGD questions for women-only groups were designed keeping in mind some of the most significant indicators, further adapted to highlight women’s practical and strategic needs in everyday life in the sampled region.

Eight major indicators (in the form of Yes/No questions) were selected from the FGD questionnaire for women-only groups for gender analysis, and a relevant scale constructed for scoring the responses against each indicator. The scale followed is as given below:

Table 11: FGD responses and Score

Cumulative FGD response score	Equivalent GAT score
<57	1 (Gender-Unequal)
57-114	2 (Gender-Blind)
115-228	3 (Gender-Sensitive)
229-342	4 (Gender-Specific)
343-456	5 (Gender-Transformative)

A total of 57 FGD responses were recorded. For each of the 8 selected indicators, the number of “Yes” responses were recorded against a total of 57 possible “Yes” responses. Then the cumulative score of “Yes” responses was calculated and compared with the total cumulative score possible, that is,  $57 \times 8 = 456$ . Thereafter, the cumulative score of “Yes” responses was compared against the scale to find the cumulative GAT score and arrive at an overall level ranging between 1 (Gender-Unequal) to 5 (Gender-Transformative).

##### 4.1.2 Gender analysis results

The cumulative score of 317 (based on the responses for 8 indicators) out of a total possible cumulative score of 456 makes the result eligible for a Level-4 (Gender-Specific) status. According to GAT analysis, a Level-4 status for a policy/programme indicates that it considers the role of gender norms and relations in defining women’s access to resources, considers men and women’s differential needs, and makes it easier for men and women to fulfill their respective duties based on their gender roles, but also intentionally targets women or men as specific beneficiaries to achieve certain policy/programme goals.

Indicators	No. of FGD responses with "Yes"	Total FGD responses	Cumulative GAT Score
Sufficient women mates being appointed by the panchayat	49	57	
Receiving equal wages/women's wages are at par with men's wages	56	57	
Receiving wages within 15 days of completing work	55	57	
Not facing delays in getting work	30	57	
Younger women participating actively in the MGNREGA gram sabha	45	57	
Having knowledge of the prevailing wage rate in the panchayat	36	57	
Satisfied with worksite facilities	46	57	
MGNREGA work hours suitable and leave time needed for other chores	0	57	
<b>Cumulative score</b>	<b>317</b>	<b>456</b>	<b>4 (Gender-specific)</b>

Figure 37: Gender Assessment using the Gender Assessment Tool (GAT)

## 4.2 Impact of MGNREGA provisions and work conditions on women's everyday lives

Juxtaposing the cumulative Gender Analysis results with other FGD responses, responses from the household survey, and observations from visits to the various MGNREGS worksites, what emerges as a highlight is that some indicators reveal a different impression of the ground reality, or that to look at the whole picture, there is a need to analyse certain underlying issues in greater depth than the preliminary gender analysis reveals.

For instance, in the household survey, 274 households (35%) in the sample villages reported a decrease in the time taken by women to fetch water, by approximately 30 minutes to an hour. This emerged as a positive impact. However, when compared to the time required by women for other chores and how MGNREGS working hours impact them, one could gauge that there has not been a significant change in the working hours or workload. The women were appreciative of the reduction in time taken to fetch water but were also aware and vocal regarding the time they are normally required to spend on other household chores, including cooking, cleaning and taking care of livestock.

Time spent at the MGNREGA worksite every day

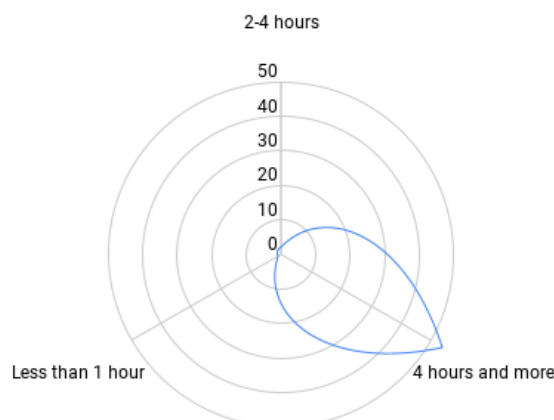


Figure 38: Average time spent by women at the MGNREGA worksite per day

The majority of women-only FGD responses from across the districts indicate that on an average, women spend more than 4 hours per day at the MGNREGS worksite. When consulted further on how this affects other aspects of routine work including household chores, all the responses pointed out uniformly that MGNREGS work negatively impacts the time needed for other chores. Women were also quick to emphasize underlying gender relations at the core of the issue. This is because on one hand, women are seen as primary caretakers of the household and must partake in unpaid care work. On the other hand, men are expected to necessarily go out of the household and earn a living for the family. In other words, women pointed out that prevailing gender norms lead to stereotyping wherein women must take sole charge of all household duties.

### Opinion on worksite facilities

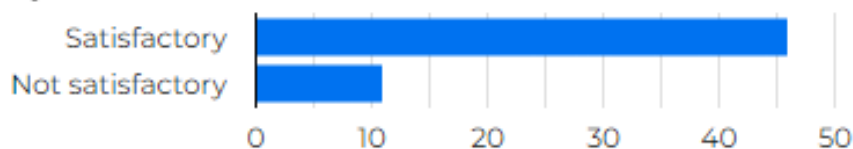


Figure 39: Women-only FGD responses regarding overall worksite facilities

### Whether creche facilities are available at the workplace

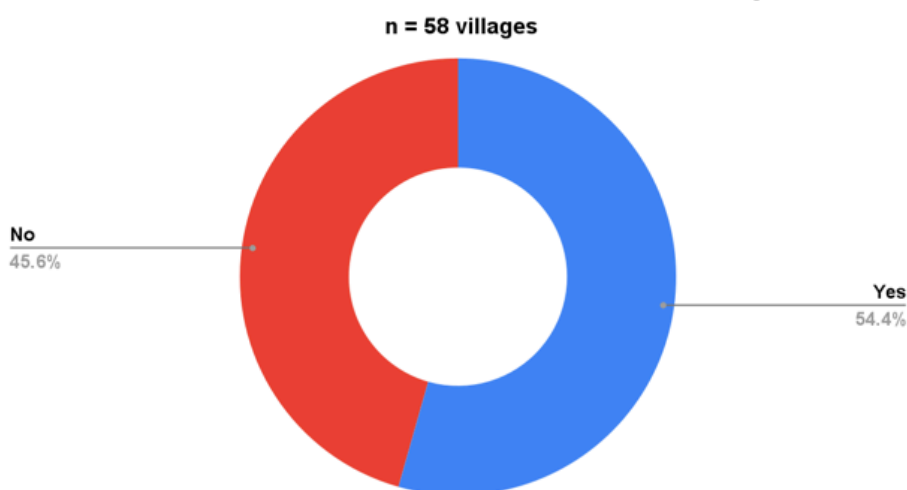


Figure 40: Women-only FGD responses regarding availability of crèche facility at the worksite

In another example, the majority of women pointed out that they were satisfied with overall worksite facilities. However, when probed further regarding the availability of a crèche at the worksite, more than 50% of the women-only FGD responses stated that it was unavailable. Further, during detailed discussions at the worksite, a consensus regarding the necessity and utility of such facilities emerged strongly. The rationale provided by them for the same was that it encourages newly-wed women/ women with young children to also take up work.

### 4.3 Women's empowerment through MGNREGA: A case of representation and financial autonomy

A major point of discussion emergent from the women-only FGDs was concerning women's representation and participation at two levels: during the initial MGNREGS planning process through participation in Gram Sabhas, and at the fag end of the process, when it comes to spending the wages received after completion of work.

During field visits, it emerged that while women considered MGNREGS to be an important source of livelihood and economic empowerment for themselves, they were still not perceived as the primary decision-makers in a household. This is despite the fact that owing to the gendered division of labour and ascribed gender roles, women are seen as being mainly responsible for activities such as irrigation, processing agricultural produce, collection of NWFPs (Non-Wood Forest Products), cooking and caring for children, and fetching drinking water.

## Do women feel their voices are heard in the Gram Sabha?

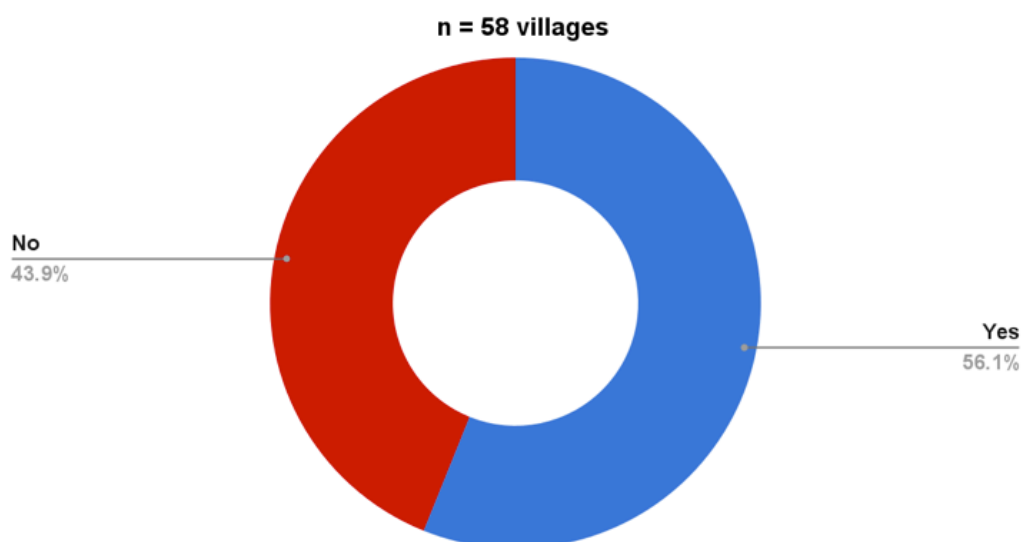


Figure 41: FGD responses for whether women feel 'heard' in Gram Sabhas

When it comes to active participation in the planning process, a little more than 40% of the responses from women-only FGDs state that women do not feel 'heard' in Gram Sabhas, though 56% of the responses also highlight that it is not the case. In other words, nearly half of the responses from the sampled areas state that women see themselves as equal participants in the decision-making process, while an almost equal number of responses state that it is not so in their region. However, here, women's participation in Gram Sabhas must also not be taken at face value. This is because many confessed to being a part of larger meetings and discussions but not truly participating there due to a lack of interest/information regarding key processes and legal provisions.

In case of total non-participation in Gram Sabhas, when women were asked to elaborate on the reasons for the same, many stated that unlike the men and male elders of their village, they were not informed of Gram Sabhas and "meetings" by virtue of their gender. The other major reason cited for the same was an overarching stereotypical assumption that women would naturally not be interested in/have time for politics and participation in the MGNREGS planning process, as they are expected to primarily focus on caring for children and completing household chores in time. As a result, women often get left out of key decisions made during the planning process.

In terms of the expenditure of wages, two lines of exploration emerged starkly. Most women revealed during the FGDs that the fixed wages were too low if one adjusts for inflation. Further, a greater issue was that they seldom found themselves to be in charge of decision-making at home. By extension therefore, they did not always have the independence to assert control over the entirety of their wages. However, in households where both the male and the female adults were working and women were allowed to spend their wages themselves, they primarily used the money for buying ration, children's school uniforms and textbooks, on weddings and other ceremonies, and occasionally to buy jewellery. Overall, they lauded MGNREGS for being a scheme which opens avenues for women's empowerment and financial autonomy.

## 5. MGNREGA and Climate Resilience

### Summary:

- An environmentally vulnerable region, Rajasthan faces imminent risks from climate variability affecting the availability and quality of land and water resources.
- Over the years, severe patterns of erratic rainfall, shifting monsoon and decrease in the availability of pastureland have been observed in the sampled districts.
- These climate risks impact rural livelihoods negatively by affecting agricultural productivity, livestock-rearing and income from agriculture.
- Along with climate variability and reduced income from agriculture, unemployment has led to distress-migration to other towns and cities.
- To combat climate risks, communities have various adaptation strategies such as diversification of crops and livelihoods, increased reliance on social security schemes such as MGNREGS, changes in farm and water management practices and shifting from rainfed to irrigated agriculture.
- MGNREGS also feeds into communities' adaptation mechanisms by improving fodder availability, livestock productivity and reducing soil erosion and water logging.

Resilience is commonly defined as the 'ability to resist, recover from, or adapt to the effects of a shock or a change'. (Mitchell and Harris, 2012) Programs that build climate resilience need to increase the capacity of individuals, households and communities to resist and recover in the face of climate-related shocks, as well as their ability to accumulate assets which would strengthen them in the future. (Bene et al., 2012) It thus refers not only to people's assets at the household level, but also to their access to public goods which insulate their livelihoods from the impacts of climate change and are necessary to support asset accumulation in the future. (Kuriakose et al., 2012) Beyond this, it is acknowledged that in order to be progressive and empowering, resilience needs to go beyond unequal social structures and aim to be 'transformative' by empowering the poor and climate-vulnerable to challenge unequal structures perpetuating their vulnerability. (Pelling, 2011; Bahadur and Tanner, 2014)

Rajasthan spans across a socio-ecologically vulnerable area. Water resources are unevenly distributed and the state harbours the highest probability of drought occurrence in the country. Since the rural population in the state is primarily dependent on rainfed agriculture and livestock-rearing, climate resilience becomes increasingly significant in this context.

### 5.1 Climate risks in Rajasthan and their challenges

In order to understand the climate vulnerability faced by communities, this study has focused on identifying their perceptions around the climate risks which they face, across 10 districts of Rajasthan.

The pie chart (Fig. 38) shows the response of people to various risks. A major proportion of the respondents refer to changes in rainfall patterns and increased temperatures in the last few years. Around 25% of the responded that erratic rainfall patterns and shifting monsoons have been observed while 22% pointed out a change in temperatures.

Pastureland plays an important role in the lives of people across Rajasthan. However, due to climate variability and degradation of land and water resources, there is a debilitating effect. During the discussions, people shared that there has been a decline in the grazing spaces. People stated that they have been facing issues like groundwater depletion and degradation of local water bodies.

Communities also responded that they observed decreasing soil fertility and other risks like deteriorating water quality. In the western desert region, people were facing increased fluoride content in water which made it unfit for drinking.

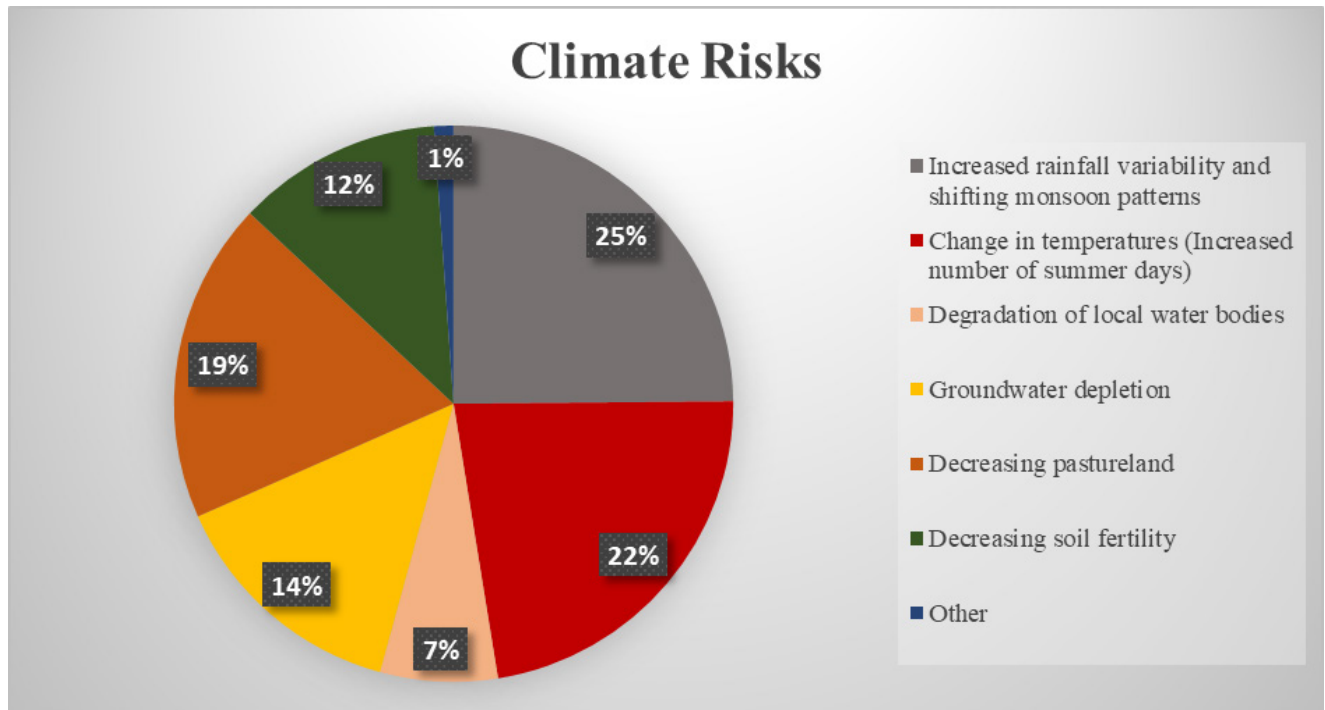


Figure 42: Climate related risks faced by people in rural Rajasthan

## 5.2 Socio-ecological changes brought about by climate-risks

Figure 30 shows the response of communities across sampled districts to various existent challenges posed by climate variability in their region. The majority confirmed that they are facing crop loss and diseases in humans and livestock in their locality. People have also responded that pest incidents are increasing in their crop area along with incidents of soil erosion and water logging, Changes in rainfall variability made people more dependent on irrigated agriculture. Hence, fewer people responded that conflicts over water sharing and irrigation have increased in their area. This indicates that there is a perceived impact of rainfall pattern and water availability in the region and conflicts related to water depend a lot on people's perceptions.

## Existing Challenges

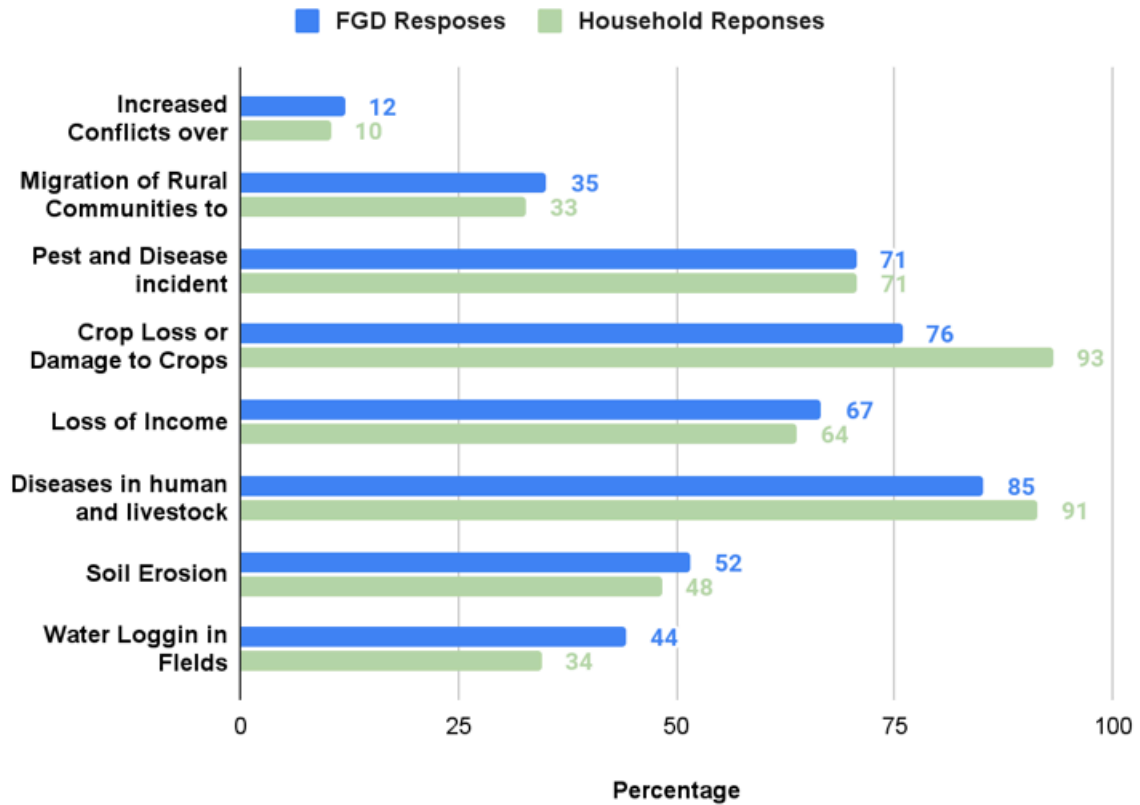


Figure 43: Socio-Ecological challenges faced by the communities

### 5.3 Current Adaptation Techniques of Communities

The negative impact of climate change can be significantly reduced by using adaptation strategies without causing further harm or incurring much cost. They provide both short and long-term benefits but also have limitations with regard to implementation. This is because the success of future adaptation measures to tackle climate change also depends on the success of communities in adapting to overall climate extremes and variability.

Figure 31 shows various adaptation mechanisms practised by households across the villages where the study has been conducted. Around 75% of the total households rely on social protection schemes to tackle livelihood vulnerability and 44% of the total households shifted from rainfed agriculture to irrigated agriculture, mainly depending on groundwater as a source of irrigation. 47% of the households have also reported to followed a better water management strategy while 42% altered their farm management practices too, such as changing cropping patterns and crop varieties.

The study sought to look at the perceived impact of JSA-related activities on people's livelihoods, including how MGNREGS feeds into climate change adaptation strategies.

## Existing Adaptation Mechanisms to the climate risks recorded

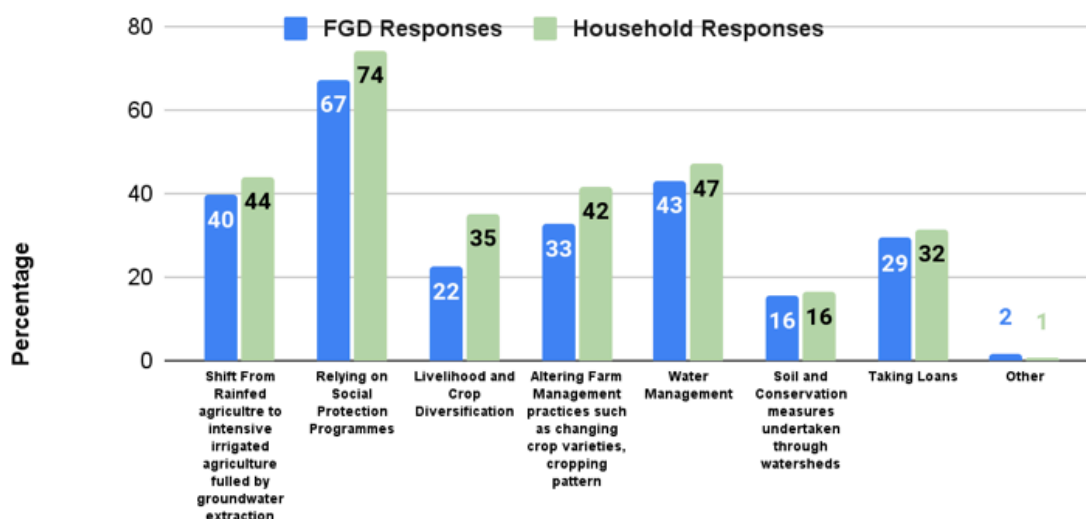


Figure 44: Types of adaptation mechanisms practised by communities

### 5.4 How can MGNREGS feed into existing climate adaptation mechanisms?

Previously, numerous studies have pointed out that MGNREGS plays a crucial role in climate change mitigation by helping households prepare, cope and recover from climate risks such as droughts. (Steinbach et al., 2020) A broad survey of wage-seekers in Maharashtra finds that 90% of the wage-seekers perceive the assets to be 'very useful' or 'somewhat useful'. 87% of the assets are still functioning too. (Ranaware et al., 2015) Similarly, a survey by Sambodhi Research (2013, as cited in UNDP, 2015) finds that 85% of the wage-seekers report improvements in land due to MGNREGA assets. A study of 1,000 wells in Jharkhand finds that the assets impact productivity to the extent that the return on investments can be seen within 19 years. (Bhaskar and Yadav, 2015) Meanwhile, a 2013 study using a survey of 2057 households in four states finds that MGNREGS assets have reduced climate vulnerability by improving ground water levels, increasing the area irrigated by irrigation, improving drinking water availability, improving soil quality, reducing erosion, increasing the land area under cultivation and contributing to increasing yields. (IIS, 2013)

In our study, approximately 67% of the total households reported increased groundwater levels as a result of JSA-related work. In figure 32, we can see that households have also mentioned that there is now increased area under irrigation and an increase in the number of days of irrigation due to both increase in groundwater levels (as mentioned by 39.7% of the sampled households) and surface water (as mentioned by 32% of the sampled households). Better irrigation facilities helped these households to increase the area under cultivation (confirmed by 39.5%) and crop yield (confirmed by 53.7%), besides providing critical irrigation to their crops during prolonged periods of dry spells.

In the context of Rajasthan, livestock keeping has been an important adaptation strategy for the local communities (besides contributing to the household's income). MGNREGA works play an important role in enhancing fodder and water availability that are critical for the sustenance of livestock. As described in Section 3.2, about 77% of the households indicated increased availability of water for livestock and 56% reported an increase in fodder availability in the last 5 years. 37.3% reported an increase in livestock productivity due to improved fodder and water availability.

Households also responded that JSA-related works reduced soil erosion and water logging (shared by 30% of the respondent). Reduced agricultural productivity was causing large-scale migration from rural to urban areas. Figure 32 shows that 55.5% of the households reported an increase in employment and reduced intensity of rural migration due to JSA works.

Climate change adaptation plays a significant role in increasing the resilience of communities and enhancing their livelihoods. From the aforementioned responses, it emerges that MGNREGS works play a role in directly and indirectly assisting communities to bridge the gap between livelihood vulnerability and adaptation.

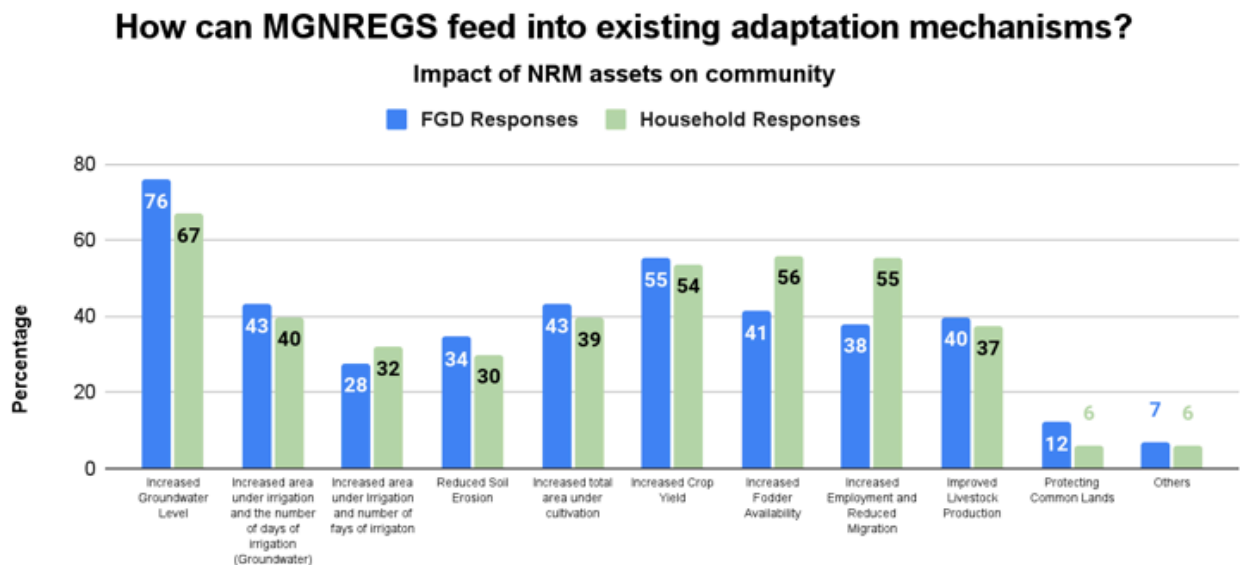


Figure 45: Various impacts of JSA works on communities

### Mitigating Climate Change Vulnerabilities: A Case Study from Khanjan Panchayat, Churu District

Churu district is located in the northern part of Rajasthan. It is bounded by Mahendragarh and Hissar districts of Haryana towards the east; Hanumangarh district towards the north; Nagaur, Sikar and Jhunjhunun towards the south and southeast; and Bikaner in the west. Churu is known to have an extreme climate, having the highest as well as the lowest temperatures in peninsular India. The temperatures dip to freezing points in the winters and reach over 50<sup>o</sup> C in the summers. The district receives an annual rainfall of 351-493 mm. Due to the extreme temperatures experienced, the rate of evapotranspiration is also very high in the region. People face water scarcity and groundwater depletion. Churu's Rajgarh block is, in fact, in the 'Over Exploited' category on the basis of the stage of development of ground water, warranting the need for urgent conservation measures. Increasing rainfall variability, changes in temperature, groundwater depletion and degradation of water bodies are some of the main climate risks faced by households in Khanjan.

Under MGNREGS, mainly two types of interventions were taken up at Khanjan: one pertaining to rainwater harvesting and the second involving afforestation activities. Under the former, kunds (traditional water harvesting structures) and community ponds were constructed.



a) Kund



b) Sunken Pond

Under MGNREGA, more than 50 sunken ponds and kunds have been constructed for water conservation and water harvesting. These were constructed on public land so that people from neighbouring villages could come and collect water too. The structures also provide water for livestock and wild animals.

The kund has a diameter of 4 m. and an average depth of 4 m., with a catchment area spanning 15 m. in diameter. Each kund has the potential to store approximately 50,000 litres of water. This gives an approximate storage capacity of 25 lakh litres of water for 50 kunds. The actual storage, however, depends on the annual rainfall received in that region.

Intensive afforestation activities in collaboration with the Forest Department were also taken up in Churu under MGNREGS. The gram panchayat used the Forest Department's expertise to identify the plot where afforestation activities must be carried out. MGNREGS workers provided the labour and plants were provided by the Forest Department's nursery. Collective action through the collaborative efforts of the Gram Panchyat and Forest Department brought about successful afforestation in Khanjan.

NRM works under MGNREGS help resolve the environmental challenges faced by communities. Here too, the communities saw three major benefits stemming from the NRM works undertaken in their region: a) increased availability of fodder and fuelwood b) increased availability of water c) increased employment.

## 6. Conclusion and The Way Forward

This report concludes that in the context of increasing climate change vulnerabilities, MGNREGS is an empowering scheme delivering upon several fronts, including social protection and livelihood security (by guaranteeing wages and employment), strengthening of institutions, decentralization of local governance, and the creation of natural resource-based assets. Since research has come to increasingly focus on empowerment and the role played by such social protection interventions in arenas of democratic governance and climate change (Devereux, McGregor & Sabates-Wheeler, 2011), it is imperative to acknowledge MGNREGS' potential in these arenas too. By providing livelihoods and agency to the community, the scheme provides scope for effective climate change adaptation, especially for women. Moreover, being a conduit for gender-inclusive, participatory, decentralized local governance, it "has interacted with local histories of social and institutional change, leading to different trajectories of political transformation" (Fischer & Ali, 2019), which it continues by altering and transforming social relations in the context of livelihoods and natural resources.

MGNREGS is not only to be seen as a safety net programme for the rural poor, enhancing their livelihood security, but also as a vehicle for enhancing the natural resource base of communities, thus mitigating the drivers of climate change vulnerability. It has been recognised for "biodiversity conservation, sustaining food production, halting land degradation and building resilience to current climate risks such as moisture stress, delayed rainfall, droughts and floods." (Meena, 2015) As a scheme that guarantees equal wages and gives employment at scale for women, MGNREGS also has tremendous potential to empower millions of rural women. It attracts them to employment through provisions of equal wages, creche facilities at the worksite, work organized by women groups, regular wage disbursement, and so on. (Kanungo, 2012)

Overall, the performance trajectory of MGNREGS promises the following transformative outcomes along these broad indicators:

- (a) Social protection, through the provision of minimum wage labour
- (b) Development of small-scale, through natural resource-focused infrastructure
- (c) A robust decentralized and inclusive community-based planning architecture

Based on secondary literature and the findings of this study, the following arenas and interventions may be underscored further for improving the effectiveness of MGNREGS and leveraging the scheme for benefiting the community at scale:

### 6.1 Leveraging MGNREGS as a vehicle for building climate resilience

At COP14 in New Delhi, India pledged to restore 26 million hectares of land by 2030. However, it is significant to note that about 29% of India's land (almost 96.4 million hectares) is in a permanent state of degradation, costing 2.5% of the country's GDP. Estimates suggest that this land has the potential to create 1058 million days of labour and provide jobs to 5.2 million individuals at the rate of 200 days of guaranteed work, per worker (Goswami et.al, 2020). Our study revealed how natural resource-based asset creation, including water-related works, create millions of jobs, lead to restoration of degraded land, and is especially relevant to the livelihoods of rural women. Thus, in the context of increasing climate change vulnerabilities, MGNREGS should be recognised not only as a social safety net but also as a generator of green jobs ensuring improvement in ecological health.. (Bhaskar, Shah & Gupta, 2016)

Against this background, the scheme must also establish a more prominent and cohesive strategy converging the gamut of climate risk management options available under rural development to contribute effectively to climate resilience, especially as larger climate risks become imminent. For the same, there must be better incorporation of climate risk management in the design and delivery aspects as well as strengthening of the linkages of MGNREGS with other risk management tools.

We have previously discussed how MGNREGS helps households absorb the effects of low-intensity risks by adapting and modifying their livelihood strategies to cope with more frequent and higher-intensity risks. Our study reveals that asset-building on common land, for instance, has particularly positive impact on the life of marginalised communities. It has been recorded that these communities are more dependent on common lands for their livelihood. (Beck & Nesmith, 2001) Thus, MGNREGS should be channelized for enhancing the resource base in common land to have the maximum impact on the lives of such communities.

## 6.2 Interlinkages between institutional planning and ecological indicators for restoration under MGNREGS

Similarly, in planning natural resource-based community assets, it is to be ensured that a 'landscape approach' is adopted by linking various systems—including water, soil, vegetation and livelihoods. Land must not be viewed as an isolated resource and communities should be involved in planning its utilization. It must be recognised that "landscapes are not isolated entities, but embedded in local, regional and global contexts." (Forman, 1995; Liu & Ashton, 1999 as cited in Liu & Taylor, 2002) Therefore, plans which reflect the interlinkages between multiple systems are required for building resilient assets.

In this scenario, viewing the interlinkages between ecological indicators specific to a region, the existence of robust institutions, and community-based planning and management emerge as being significant to ensuring the sustainability of land and natural resource-based assets. Effective afforestation and removal of the invasive species *Prosopis juliflora* provide two instances where naturally-occurring ecological systems and community-based management must co-exist in a symbiotic relationship to ensure the well-being of communities.

Revegetation of degraded areas should be embedded in the larger goal of restoration of Common land (shared natural resources such as pastures, forests, water bodies) by enabling rural communities to organize themselves, access secure legal rights to their Commons and prepare resource management plans and access resources to support interventions aimed at restoring degraded landscapes.

Revegetation efforts (including planting) on common land have had a major influence on the livelihoods of forest and livestock-dependent communities. Common land provides fodder and water, making direct contributions to livestock-rearing. Paying heed to the community's strong belief in nature's potential to heal itself, emphasis should be given to assisted natural regeneration and planting of only local, endemic forest tree species and associated shrubs and grasses. Moreover, revegetation is also a time-bound activity to be initiated and completed within a particular period. Only if planned using apt ecological principles and community feedback (Roy & Datta, 2018) can it also enhance local biodiversity. Including zone-wise distribution of saplings and seeds on Common land, as decided by the community, it should involve selection of species for planting considering the local habitat conditions, suitability of the species to those conditions, stages of succession, and the specific needs of the communities. Methods and techniques which improve species' survival should be adopted. These would also improve soil health and involve promoting local nurseries,

mulching, crescent making, 1+3 strategy (one sapling with three seeds), seeding in thorny bushes for natural protection etc.

Similarly, a major problem noticeable across planting sites was the prevalence of the invasive species *Prosopis juliflora*. Uprooting of *Prosopis juliflora* before soil and water conservation work or planting may improve soil health, biodiversity, fodder productivity and vegetation conditions. However, the same is not effective without the community's active participation and decision-making.

Therefore, the distribution and dynamics of biological resources must be understood to provide a rationale for planning and management decisions, without which conservation of these resources in natural habitats would not be possible.

### 6.3 Improving the community's role and participation in the MGNREGS planning process

In the sample panchayats for this study, only a small portion of households were found to be receiving 100 days of work. The average wage received was also below the minimum wage recorded in the state. But social protection in the form of wages and employment is one of the main assurances of MGNREGS for the rural poor, as it also plays a major role in arresting vulnerabilities. As discussed in the previous section, the community's feedback is invaluable to sustainable asset-creation too. Thus, there needs to be significant collective effort to strengthen this aspect of the scheme across the regions.

One major channel for focusing on community participation is to look at the opportunities and mechanisms provided for participatory governance. In this context, gram sabhas and participatory water governance are two major arenas where the community's active participation is vital and must be ensured. This study finds that in the villages sampled for the household survey, though over 70% of the respondents from SC and ST communities and over 60% of the women from those communities participate in gram sabhas, active participation and decision-making do not always feature in the scene. Women, for instance, responded in the FGDs with women-only groups that they do attend the gram sabhas when informed. However, they may not always be aware of the proceedings or be able to actively contribute to them. In the end, which issues are discussed on priority and whose voices are heard in these meetings decide the course of MGNREGS planning and overall development in the village. Thus, there is a need to focus on targeted capacity-building and intra-community dynamics to ensure a robust planning process.

In many ways, the processes through which MGNREGS functions in each location is also unique to the community's perceptions and the agro-ecological conditions of a particular region. Traditional knowledge, especially with regard to water conservation, has continued to shape community life for centuries in many parts of Rajasthan. Folklore, narratives and the 'cultural labour' traditionally performed by women highlight the role of women in natural resource governance in the rural context. Women have been central to communal narratives of cultural socialization which prohibit wasting even a single drop of water, especially in regions closer to the desert. (Sharma, 2021) Given the imminent crisis of water scarcity, women must be recognised as the "primary caretakers of water" (O'Reilly, 2006) and involved as critical stakeholders in the MGNREGS planning process. In fact, in this case the capacity-building of women in water governance and management could transform the rural landscape by ensuring that the 'traditional' woman is also aware of modern tools and technologies for managing community resources. (Ibid) Recognition of gendered roles and unpaid care work, and leveraging the community and women's traditional knowledge with regard to natural resource management could thus prove to be key in livening up the planning process and discussion in gram sabhas.

Being a demand-driven scheme with emphasis on bottom-up planning, the provision of social audits is a domain significant to the architecture of MGNREGS. Lack of transparency and accountability can cripple any intervention at the core. However, with MGNREGS social audits, there is scope to ensure that the same is prevented in time by the communities. "Social audit is a process in which the people work with the government to monitor and evaluate the planning and implementation of a scheme or programme." (Swain & Sen, 2009 as cited in Lakha, 2011) There is a need to strengthen audit processes and promote the right to information for awareness generation. In Rajasthan specifically, the *Rozgar Evum Suchana Ka Adhikar Abhiyan* (Campaign for Right to Work and Right to Information) has been successful in propelling social audits and local accountability. In a similar vein, Mihir Shah argues for capacity-building and developing a cadre of "barefoot professionals" (Shah, 2008 as cited in Lakha, 2011) at the panchayat level to empower individuals and communities. Such models, campaigns and capacity-building interventions should be promoted to develop a robust community-based planning architecture for communities.

#### 6.4 Tools and technology for informed decision-making and active community participation under MGNREGS

Since the entire planning process in a bottom-up approach is dependent on the community's awareness and ability to contribute to decision-making, community-centric planning and capacity-building tools and technologies must be utilized for efficient information dissemination about local ecology (water and soil systems) and livelihoods, helping communities make informed decisions.

ICT (information and communication technology) tools have championed sustained public access and information dissemination globally, especially in developing countries and for women. (Sandys, 2005) In the FGD with women-only groups for this study too, a stark gap emerged between women's knowledge and ability to communicate key decisions regarding planning processes in the gram sabhas with regard to male community members. Knowledge gaps and ineffective communication also keeps marginalized communities from actively participating in these processes. In such a scenario, the role of simplified digital communication including dashboards and relevant, contextual visuals may be explored further to boost the awareness and participation of all communities.

In this context, one may turn to the 'ICT Enabled Ecosystem' project by the Government of Rajasthan, United Nations Development Program (UNDP) and One World Foundation India, which was piloted in 20 villages of Udaipur and Bhilwara districts in Rajasthan in 2009. It comprised a Digital Knowledge Repository, *Soochna Sewa Kendras* (information kiosks) with computers having touch screen panels and speech-to-text technology, community radio, GPS Verified Attendance Tracking Tool, SMS job card retrieval displaying number of hours/days worked and remaining hours/days of work of an individual. (Gupta et al., 2017) Such measures can bridge the information gap in areas with lower levels of literacy while encouraging both the younger and older generations, especially women, to attend gram sabhas, demand awareness and information regarding MGNREGS, and participate actively in local governance.

Similarly, the Composite Landscape Assessment and Restoration Tool (CLART) developed by Foundation for Ecological Security (FES) is a geographic information system (GIS) tool developed to address an observed gap in considering different, equally important parameters while planning region-specific soil and water conservation measures. It provides location and context-specific data which can improve planning and decision-making by 70-80%. It is a combination of Q-field software for GIS mapping and an excel-based tool (Design Estimate) for technical designs, helping rural users evolve plans and prepare budgets by themselves. Available in the offline mode, it uses GPS to pinpoint locations, which then appears on the tablet where the colour code on the interface suggests possible activities. CLART is an open-source tool loaded on Android-based devices. Scientific

recommendations are translated through colour-coded maps which depict recharge potentiality by over-laying the layers depicting lithology, drainage, slope, landuse and landcover. Recommendations further help the user identify the optimum location for a water harvesting structure.

The treatment recommendation map indicates codes according to four area types:

- green indicates high recharge area where good recharge structures like percolation tank and contour trench can be constructed;
- yellow indicates moderate recharge area where structures like trench, loose boulder check dam and gully plug can be undertaken;
- red indicates low recharge area where surface storage structures like farm bund and farm pond can be constructed;
- violet indicates regeneration area where interventions for regeneration like grass seeding, stone bunding and bench terracing can be done.

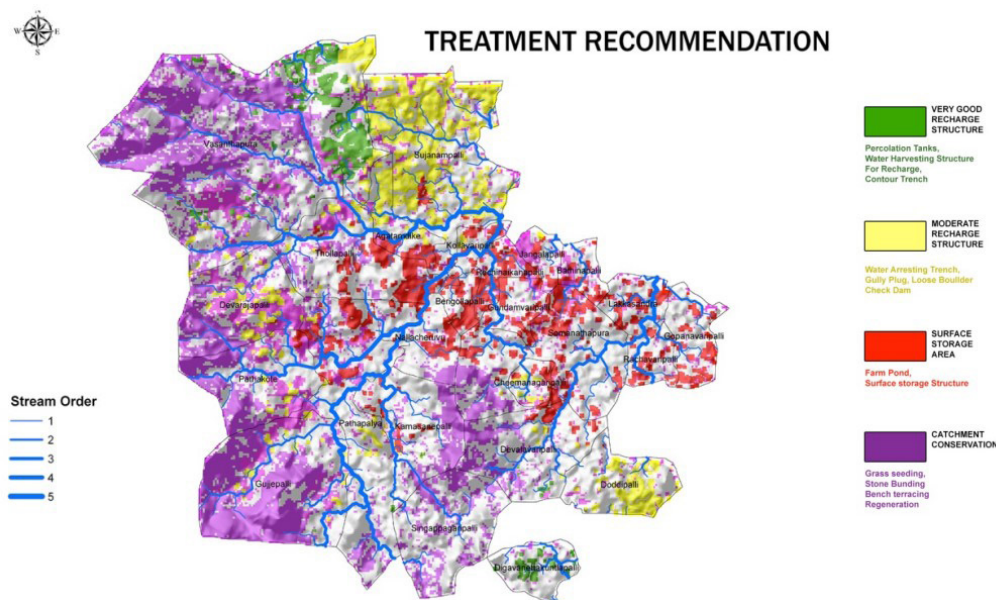


Figure 46: CLART map of an area in Karnataka

## 6.5 Increasing women's participation and agency through MGNREGS

“Empowerment is a process aimed at changing the nature and direction of systematic forces, which marginalize women and other disadvantaged sections in a given context.” (Gnyaneswar, 2016) In the context of this study, it emerged that while women considered MGNREGS to be a source of empowerment on account of harnessing financial autonomy for themselves, they also defined their terms of empowerment based on a number of related variables such as the hours spent in unpaid care work, social relations within the community, literacy levels and overall gendered structures.

MGRNEGA itself holds several gender-sensitive provisions such as the provision of childcare facilities at the worksite, one-third quota for women's participation, 50% reservation for women mates and so on. However, as shared by the communities, it is not the easiest to maneuver patriarchal mindsets and social relations as dexterously as the provisions of a legislation, in order to ensure that women are 'present' in the planning process in the truest sense. In the context of Rajasthan, women's hesitancy to speak up in a mixed crowd could also be perceived clearly. Thus, it is suggested that

separate *mahila sabhas* be held and promoted for the institutionalisation of women's participation in the planning process. Further, the issues discussed in these meetings should be taken up and incorporated in the MGNREGS plans in gram sabhas.

With the advent of ICT-based community-centric tools such as the community radio, digital multimedia campaigns and information dissemination through SMS, as discussed in the previous section, it becomes easier to involve women despite variations in literacy levels. Women leaders and other vocal community leaders may also be promoted as exemplary role models for increased political participation of women in the planning process.

Though merely ensuring women's participation is not an end in itself, it should be considered a beginning towards implementing change in mindsets. Next, the focus should be on the community's capacity-building to improve women's visibility and voice in local governance and ensuring the recognition of unpaid care work by basing the terms of empowerment on women's lived experiences. (Chopra, 2019)

## 6.6 Coupling the right to employment with the right to resources: The significance of NRM works on common land

By granting the right to employment, MGNREGS has become "one of the only programmes in the world to nest a government workfare program within a legal entitlement." (Sheahan et al., 2016) Moreover, the Act was designed keeping in mind an ecological perspective, aimed at long-term sustainability of assets and environmental improvement when promoting livelihoods and the right to work. In other words, it is an "ecological Act" (NP, 2020) by design.

The provision of NRM works on public land provides immense scope in intertwining the right to work with communities' right to resources. Based on Foundation for Ecological Security's (FES) past experiences on working with the communities in field locations, it has been observed—from a practitioners' viewpoint—that considerable funds under MGNREGA are spent on common lands adjacent to village settlements i.e lands not under individual ownership, as they contribute to the resilience of local agriculture and livestock production systems, thereby enhancing the robustness of the village economy. Such expenditure could contribute to creating durable assets if the State Governments could take measures to acknowledge and promote institutional arrangements such as demarcation of land, access and benefit-sharing rules, and restrictions to divert such restored lands. This would, on the one hand, help communities take a long term interest in safeguarding the assets created, and on the other hand, secure land from being diverted for other non-communitarian uses. The right to employment, supplemented with the right over resources, can have a significant impact in creating durable assets thereby ensuring more purposeful use of the financial investments being made under MGNREGA.

To conclude, this study finds that in the context of climate change vulnerabilities in Rajasthan, MGNREGS is not only a social protection scheme but one which also has immense potential to strengthen the voice and agency to women and the marginalized, and complements the architecture of local governance and bottom-up planning in the rural landscape. NRM works, in particular, provide an avenue to improve the livelihoods, climate adaptation strategies and natural resource base, including land and water resources, of the rural poor. Communities have reported improved vegetation, water availability and increased livestock productivity as some of the examples for the benefits accrued from MGNREGS. While there is scope for improvement and greater inclusivity in terms of community participation, women's leadership and leveraging technology for community-centric planning, on the whole, this scheme remains pivotal to championing the issues of the rural poor and ensuring the subsistence of rural economies through its safety net in terms of regular wages and 100 days of guaranteed work to communities.

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## Summary

Public investments through social security programs such as the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) hold immense potential to reduce the vulnerability of farmers by providing economic opportunities and improving ecological conditions which are critical for rural production systems.

Chapter 1 gives a profile of Rajasthan and an overview of MGNREGS as a scheme empowering the rural poor. MGNREGA was launched in 2006 by the Government of India, and since then, has grown to be the largest employment guarantee scheme in the world. Jal Shakti Abhiyan (JSA) was launched as a national campaign to urge communities to conserve water and promote water security in convergence with MGNREGS. This study primarily focuses on natural resource-based (NRM) works under JSA in different agro-climatic zones across Rajasthan.

The study aims to understand the socio-economic and environmental impact of JSA works undertaken through MGNREGS; how JSA works contribute to building climate resilience and adaptive capacities of local communities; and to understand the impact of JSA works on women's well-being.

Chapter 2 describes the detailed methodology to select the study sample comprising 10 districts, each representing different agro-climatic zones of Rajasthan.

The 10 districts selected for the study were: Baran, Barmer, Bharatpur, Bhilwara, Bikaner, Bundi, Churu, Dausa, Jalore and Udaipur. From these, 20 blocks were selected and 1 gram panchayat (GP) identified in each block, based on the JSA expenditure under MGNREGS between 2018-2021. Both qualitative and quantitative data was collected for the study through household surveys, FGDs with women and community members, and the MGNREGS dashboard.

Chapter 3 looks at the findings demonstrating the socio-economic and ecological impact of MGNREGS. It is further divided into subsections looking at: a) Community participation and emphasis on natural resource management in MGNREGS gram sabhas, b) The significance of ensuring the quality of MGNREGS works, leading to socio-economic benefits to the community, and c) Impact of MGNREGS on ecological indicators.

- Community participation in MGNREGS Gram Sabhas is pivotal for effective implementation of the scheme and natural resource management by communities. Benefits from MGNREGS assets can only be sustained by ensuring their quality in terms of planning, utilization and maintenance.
- NRM works in the sampled GPs generated 1.7 million persondays in the period between 2018-2021.
- NRM assets built from MGNREGS have positively impacted water availability in the study area. Communities have reported improved water availability for drinking, livestock management and irrigation.
- Increased water availability has benefited both the farmers and livestock. On an average, farmers are able to cultivate 0.5 acres of additional land because of increased water availability. It has also decreased the time taken by women to fetch water by 30 minutes to 1 hour.
- Standing biomass and carbon stock in sites restored through MGNREGS were found to be almost 2.3 times higher than in sites without intervention. There were a lot of geographical

and ecological differences in the restored sites, with their standing biomass ranging from 1- 49.5 tonnes/ha in the sites. 31 species of plants were recorded.

- Major challenges: Relatively low participation of women and SC/ST communities in Gram Sabhas; quality of MGNREGS works could be improved; average wages received in most of the study areas is lesser than the state's overall minimum wage; presence of invasive species such as *Prosopis juliflora* is a major concern.

Chapter 4 emphasizes the role of MGNREGA in women's empowerment by attempting to capture its impact on women's well-being, including provision of livelihoods and how it intertwines with their gender roles.

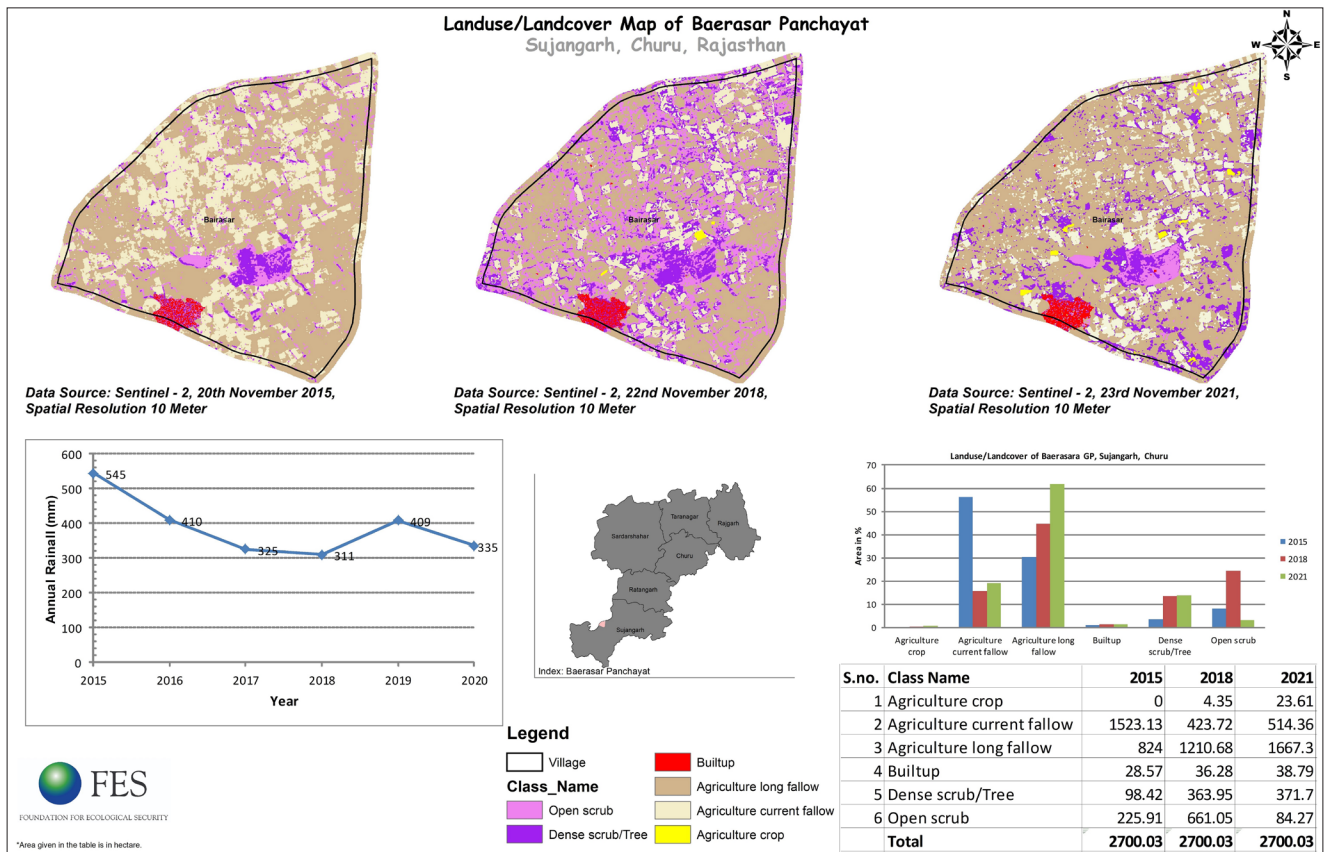
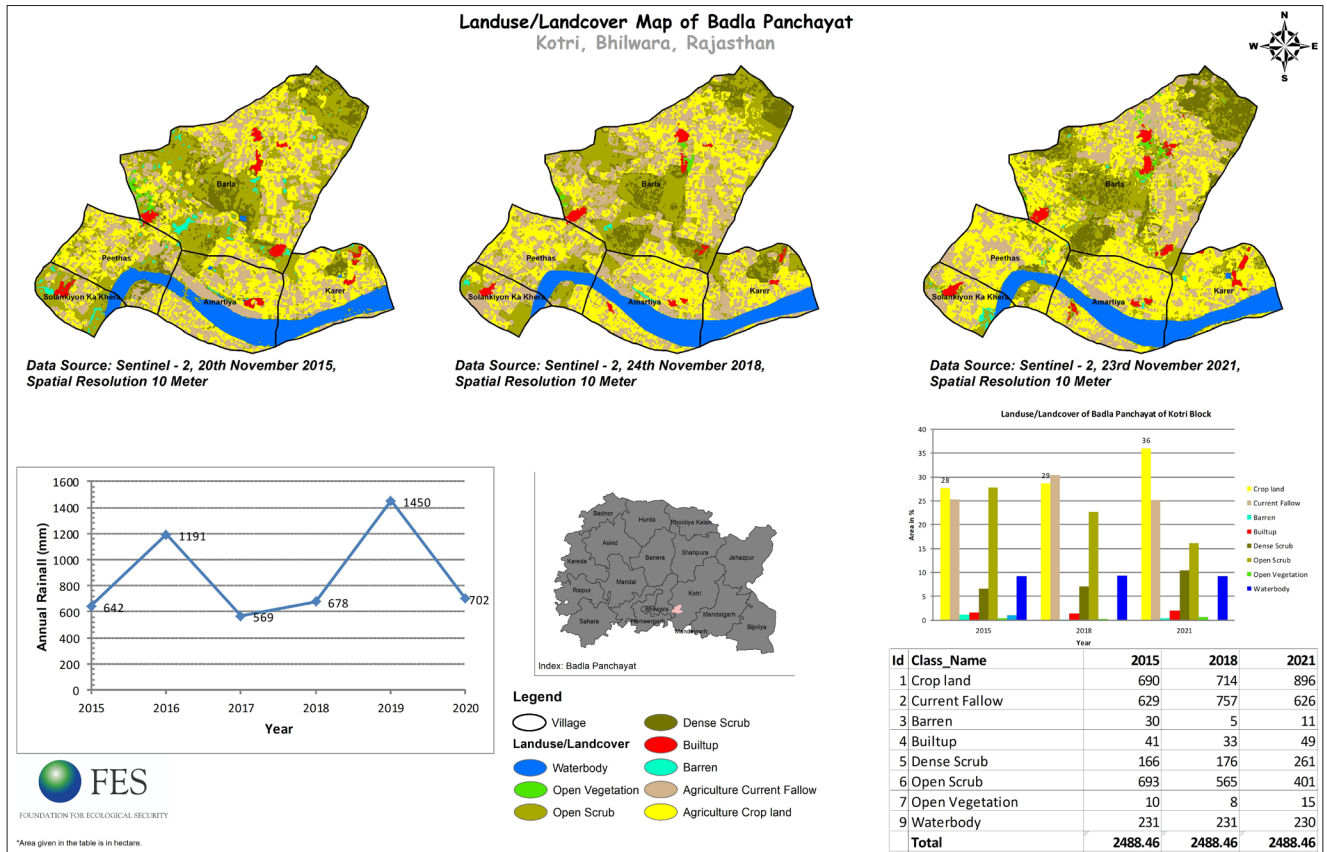
- Gender analysis using the Gender Assessment Tool (GAT) assesses the gender responsiveness of MGNREGS programme and finds it to be 4 (Gender-Specific). This conveys that the scheme has been designed keeping women's differential needs in mind.
- MGNREGS provides guaranteed employment and wages for women. But adequate worksite facilities, such as creches, need to be provided uniformly across regions.
- Assets built through MGNREGS have an impact on improving women's well-being. The scheme has an impact on improving the financial autonomy of women and increasing their bargaining power in households.
- More than half of the FGD responses demonstrate that women feel that they are 'heard' in Gram Sabhas.
- Major challenges: Issues stemming from gendered social relations and norms still prohibit women from exercising autonomy and their unpaid care work goes unacknowledged.

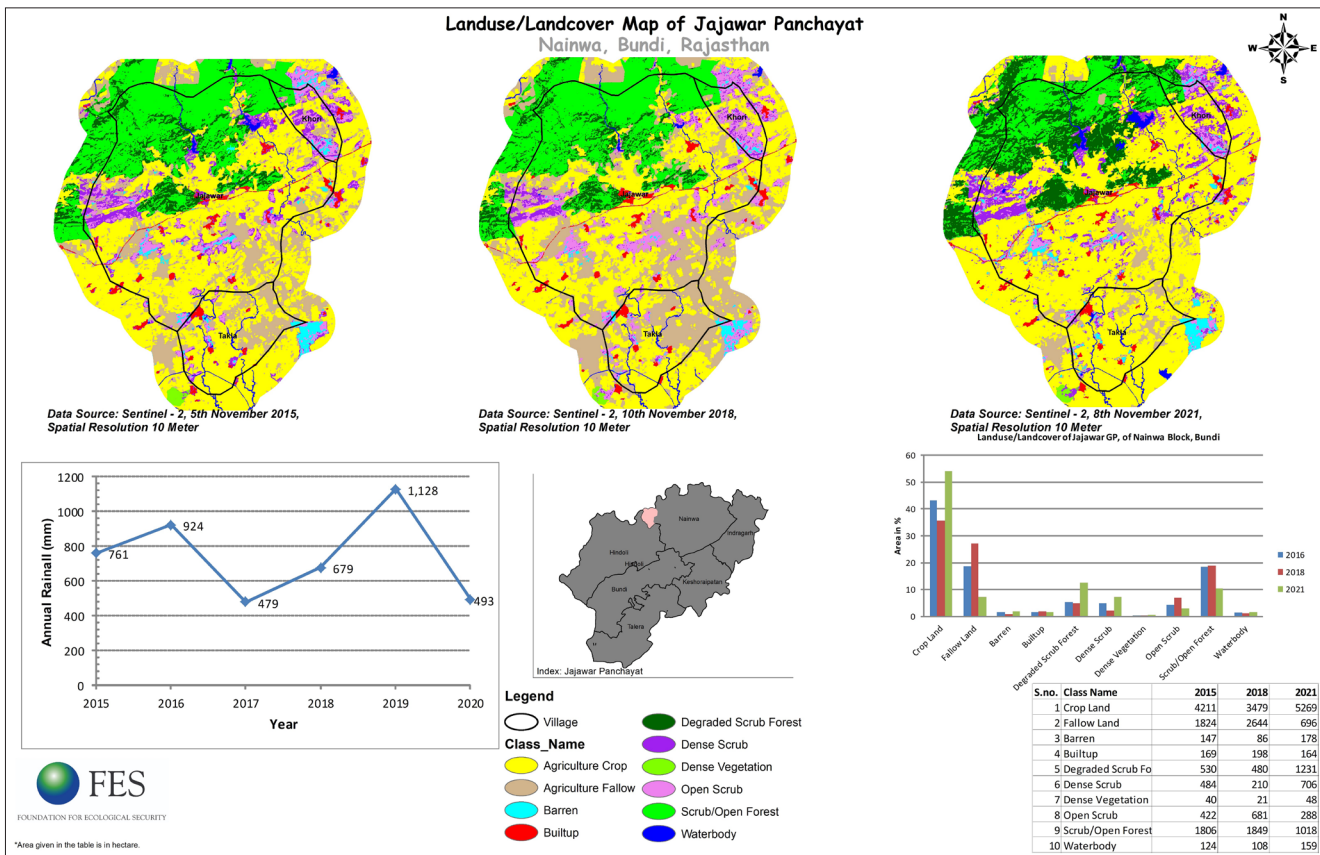
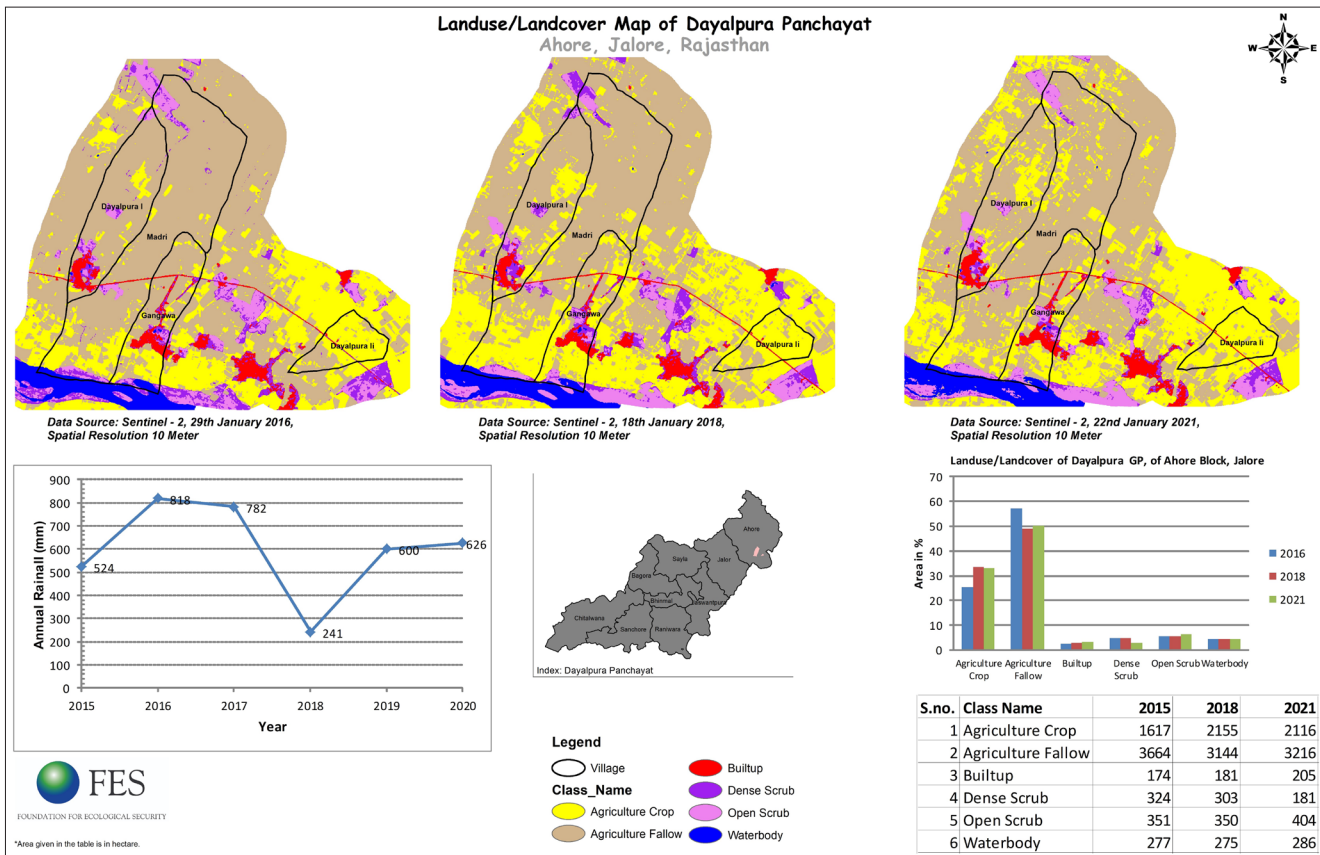
Chapter 5 looks at the risks associated with climate change, the various strategies adopted by communities in response to the same, and building climate resilience of communities through an employment guarantee scheme such as MGNREGS.

- Rajasthan is an environmentally vulnerable region that faces imminent risks from climate variability, affecting the availability and quality of land and water resources.
- Over the years, severe patterns of erratic rainfall, shifting monsoon and decrease in the availability of pastureland have been observed in the sampled districts.
- These climate risks impact rural livelihoods negatively by affecting agricultural productivity, livestock-rearing and income from agriculture.
- To combat climate risks, communities have various adaptation strategies such as diversification of crops and livelihoods, increased reliance on social security schemes such as MGNREGS, changes in farm and water management practices, and shifting from rainfed to irrigated agriculture.
- MGNREGS also feeds into the communities' adaptation mechanisms by mitigating vulnerabilities like water availability and positively impacts agriculture, livestock and forestry.

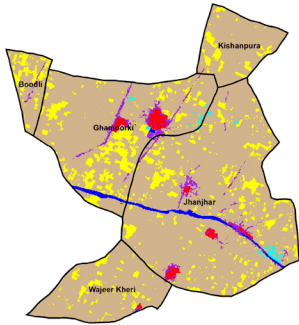
MGNREGS has consistently enhanced the physical, natural and financial capital of rural households. Despite limitations, perceiving it through the lens of climate change adaptation is key to empowering rural communities in present times. Livelihoods combined with local governance, women's empowerment and climate change adaptation make MGNREGS a stepping stone to building communities' overall resilience to climate change vulnerability.

# Annexures

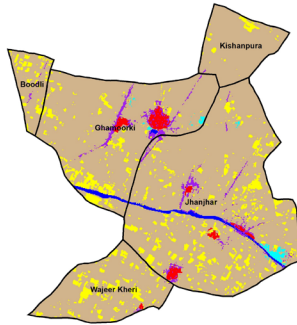




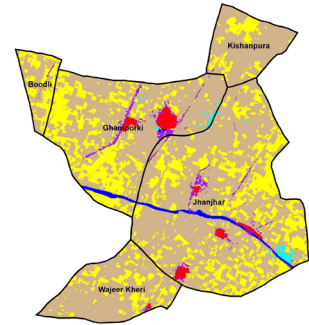
### Landuse/Landcover Map of Jhanjhar Panchayat Nagar, Bharatpur, Rajasthan



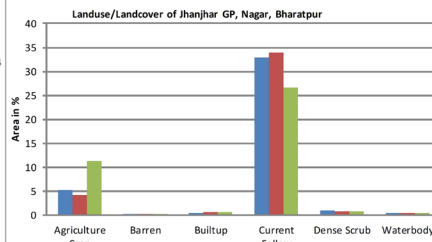
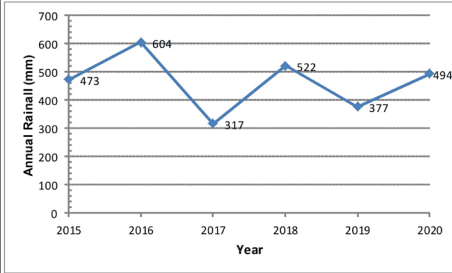
Data Source: Sentinel - 2, 20th November 2015, Spatial Resolution 10 Meter



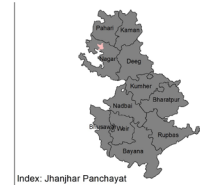
Data Source: Sentinel - 2, 23th November 2018, Spatial Resolution 10 Meter



Data Source: Sentinel - 2, 22th November 2021, Spatial Resolution 10 Meter



S.no.	Class Name	2015	2018	2021
1	Agriculture Crop	175.76	139.39	380.29
2	Barren	5.56	7.21	6.83
3	Builtup	15.99	17.49	18.83
4	Current Fallow	1106.86	1139.98	897.94
5	Dense Scrub	31.06	28.95	25.74
6	Waterbody	15.79	15	15.39
<b>Total</b>		<b>3366.02</b>	<b>3366.02</b>	<b>3366.02</b>

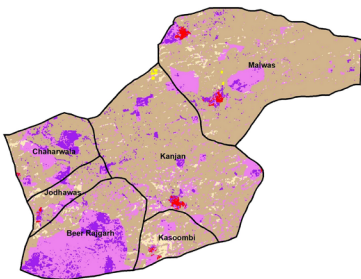


#### Legend

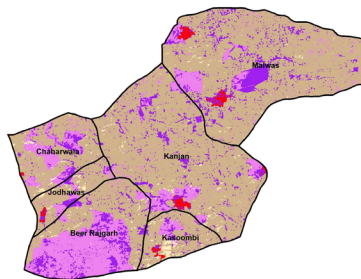
- Village
- Dense Scrub
- Builtup
- Agriculture Crop
- Waterbody
- Current Fallow
- Barren

\*Area given in the table is in hectare.

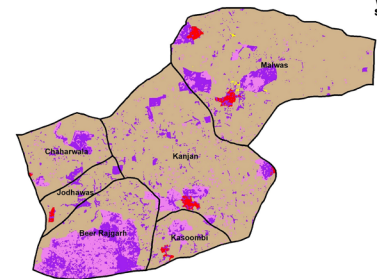
### Landuse/Landcover Map of Kanjan Panchayat Rajgarh, Churu, Rajasthan



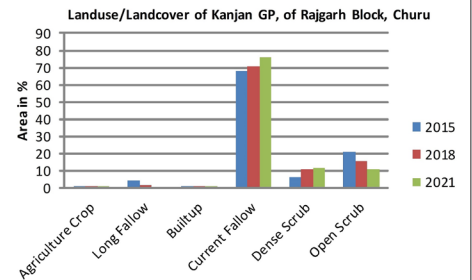
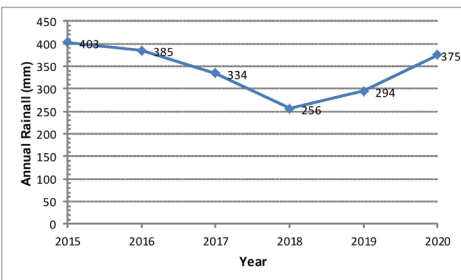
Data Source: Sentinel - 2, 20th November 2015, Spatial Resolution 10 Meter



Data Source: Sentinel - 2, 24th November 2018, Spatial Resolution 10 Meter



Data Source: Sentinel - 2, 23rd November 2021, Spatial Resolution 10 Meter



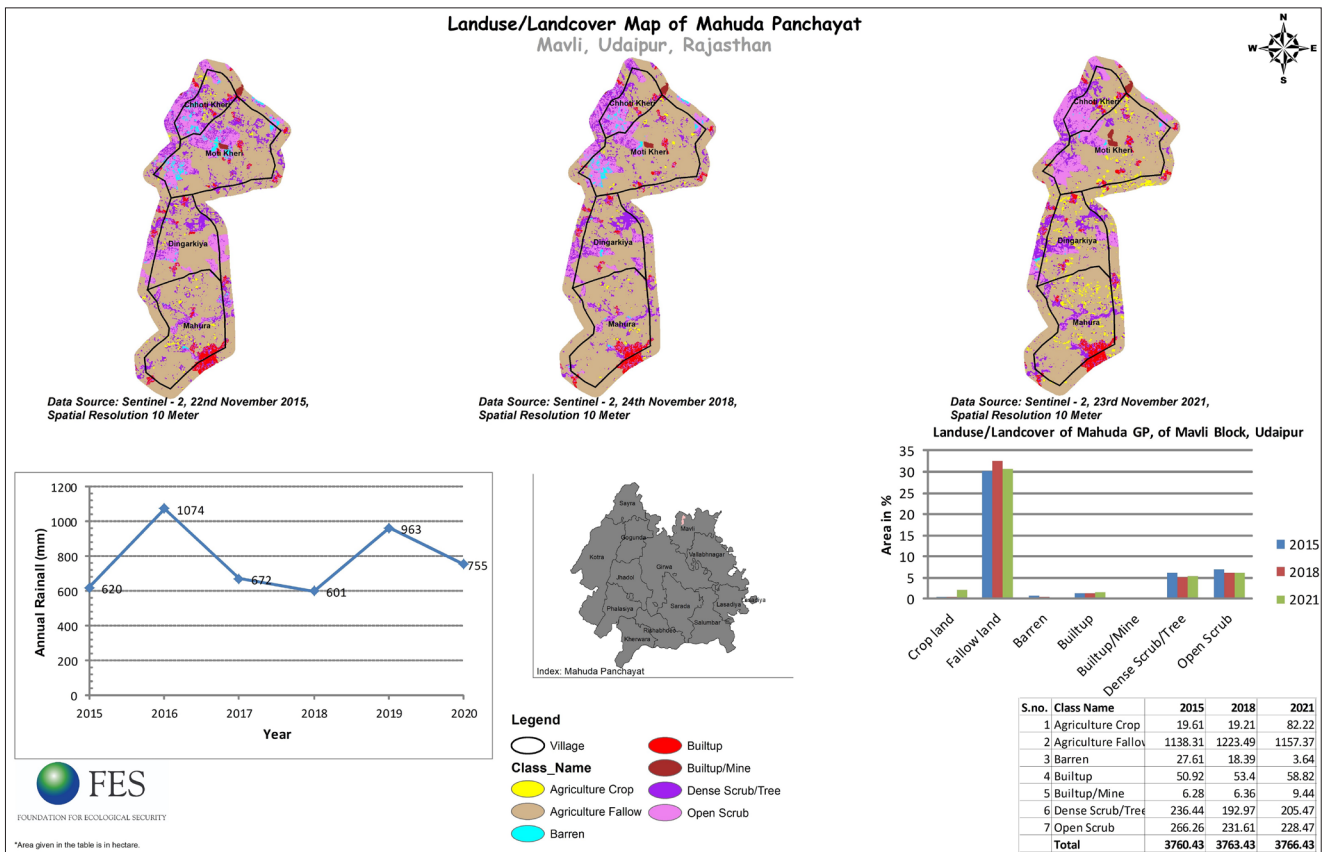
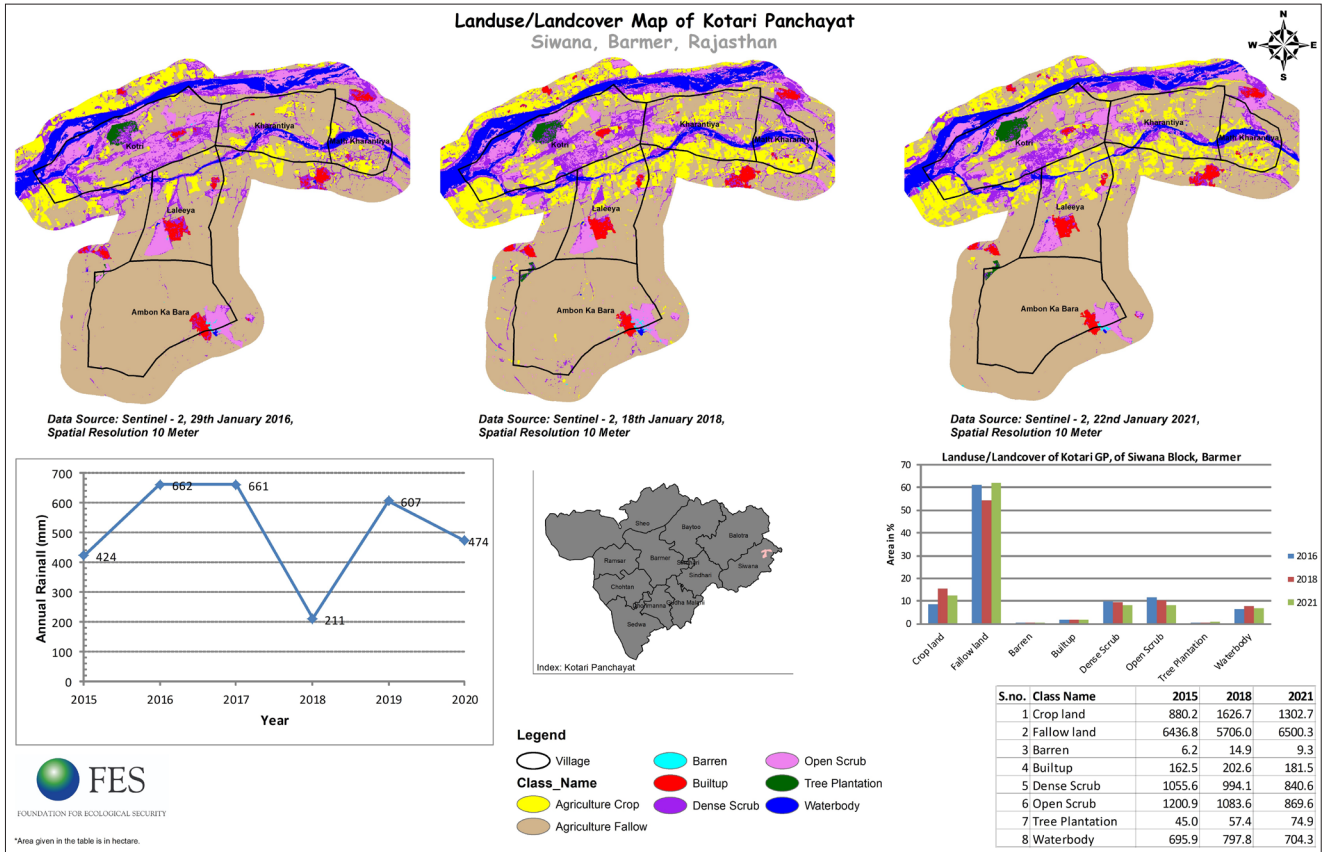
S.no.	Class Name	2015	2018	2021
1	Agriculture Crop	5.05	0.82	4.4
2	Long Fallow	235.59	98.1	0
3	Builtup	35.46	51.72	55.66
4	Current Fallow	3866.13	4032.63	4344.41
5	Dense Scrub	354.29	624.43	656.01
6	Open Scrub	1202.31	891.13	638.35
<b>Total area</b>		<b>5698.83</b>	<b>5698.83</b>	<b>5698.83</b>



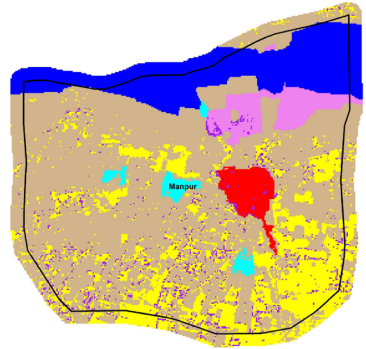
#### Legend

- Village
- Current Fallow
- Open Scrub
- Dense Scrub
- Builtup
- Long Fallow
- Agriculture Crop

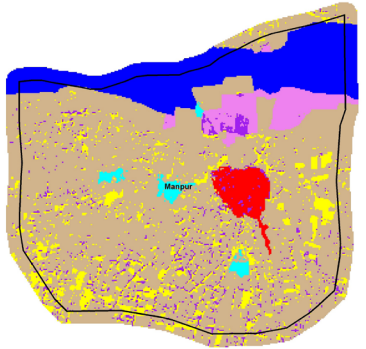
\*Area given in the table is in hectare.



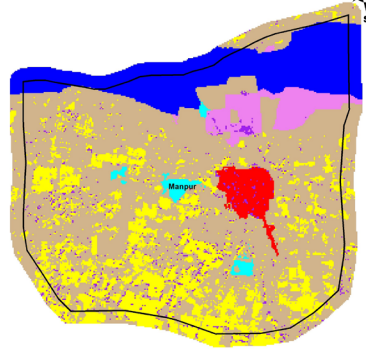
### Landuse/Landcover Map of Manpur Panchayat Sikrai, Dausa, Rajasthan



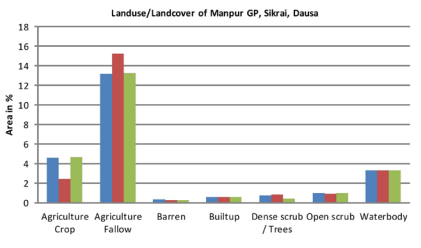
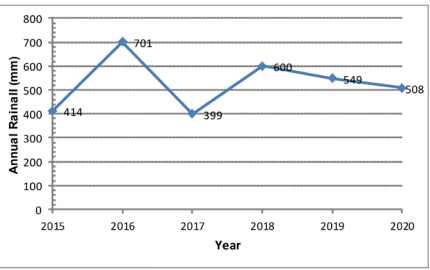
Data Source: Sentinel - 2, 20th November 2015, Spatial Resolution 10 Meter



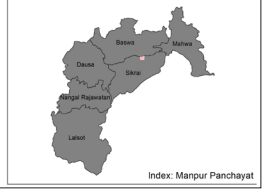
Data Source: Sentinel - 2, 22th November 2018, Spatial Resolution 10 Meter



Data Source: Sentinel - 2, 24th November 2021, Spatial Resolution 10 Meter



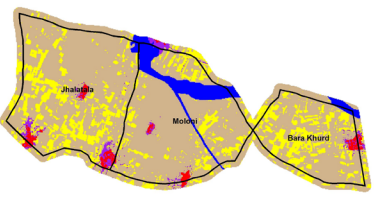
S.no.	Class Name	2015	2018	2021
1	Agriculture Crop	121.05	63.72	124.1
2	Agriculture Fallow	348.17	403.41	349.32
3	Barren	8.36	6.33	6.5
4	Builtup	14.69	14.55	14.89
5	Dense scrub / Tree	19.57	22.34	12.23
6	Open scrub	26.47	25.03	25.31
7	Waterbody	87.84	87.77	87.8
	<b>Total</b>	<b>2641.15</b>	<b>2641.15</b>	<b>2641.15</b>



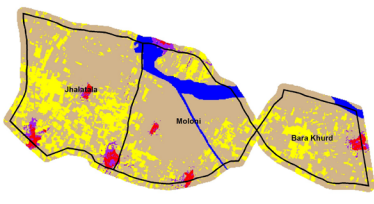
- Legend**
- Village
  - Class\_Name**
  - Agriculture Crop
  - Agriculture Fallow
  - Barren Land
  - Builtup
  - Dense scrub / Trees
  - Open scrub
  - Waterbody

\*Area given in the table is in hectare.

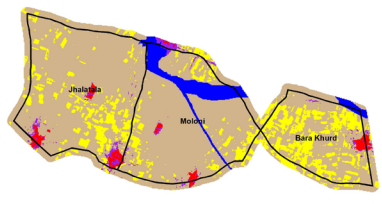
### Landuse/Landcover Map of Moloni Panchayat Weir, Bharatpur, Rajasthan



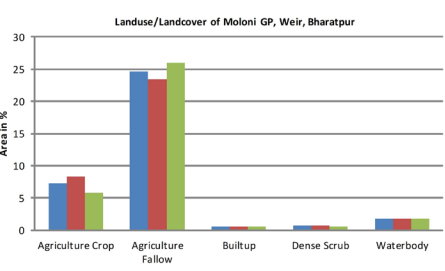
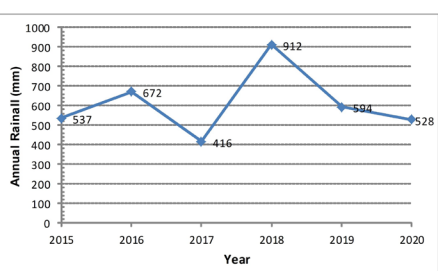
Data Source: Sentinel - 2, 20th November 2015, Spatial Resolution 10 Meter



Data Source: Sentinel - 2, 22th November 2018, Spatial Resolution 10 Meter



Data Source: Sentinel - 2, 24th November 2021, Spatial Resolution 10 Meter

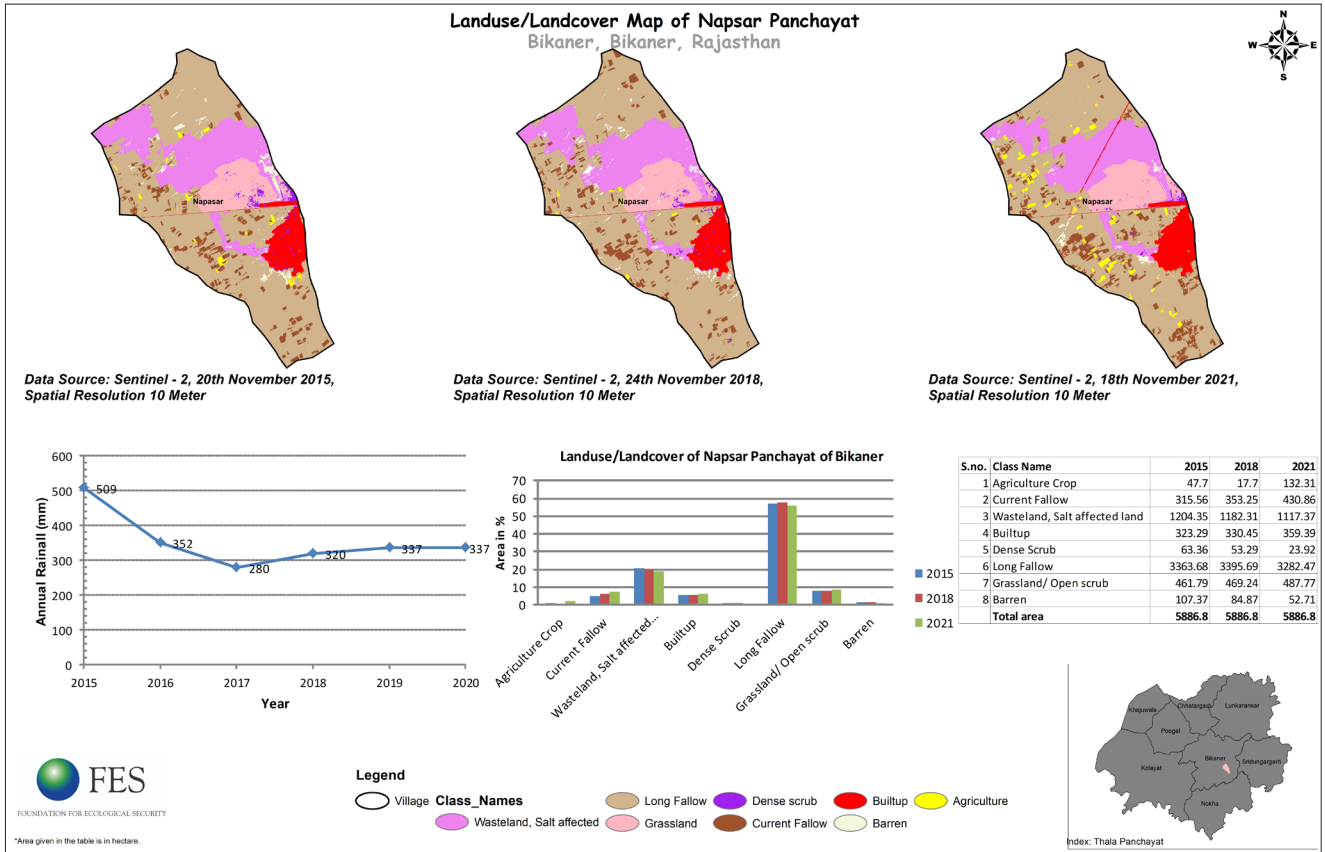


S.no.	Class Name	2015	2018	2021
1	Agriculture Crop	224.84	256.2	180.19
2	Agriculture Fallow	762.04	727.39	804
3	Builtup	17.37	18.14	18.86
4	Dense Scrub	19.99	20.14	16.89
5	Waterbody	55.46	54.83	53.76
	<b>Total</b>	<b>3094.7</b>	<b>3094.7</b>	<b>3094.7</b>

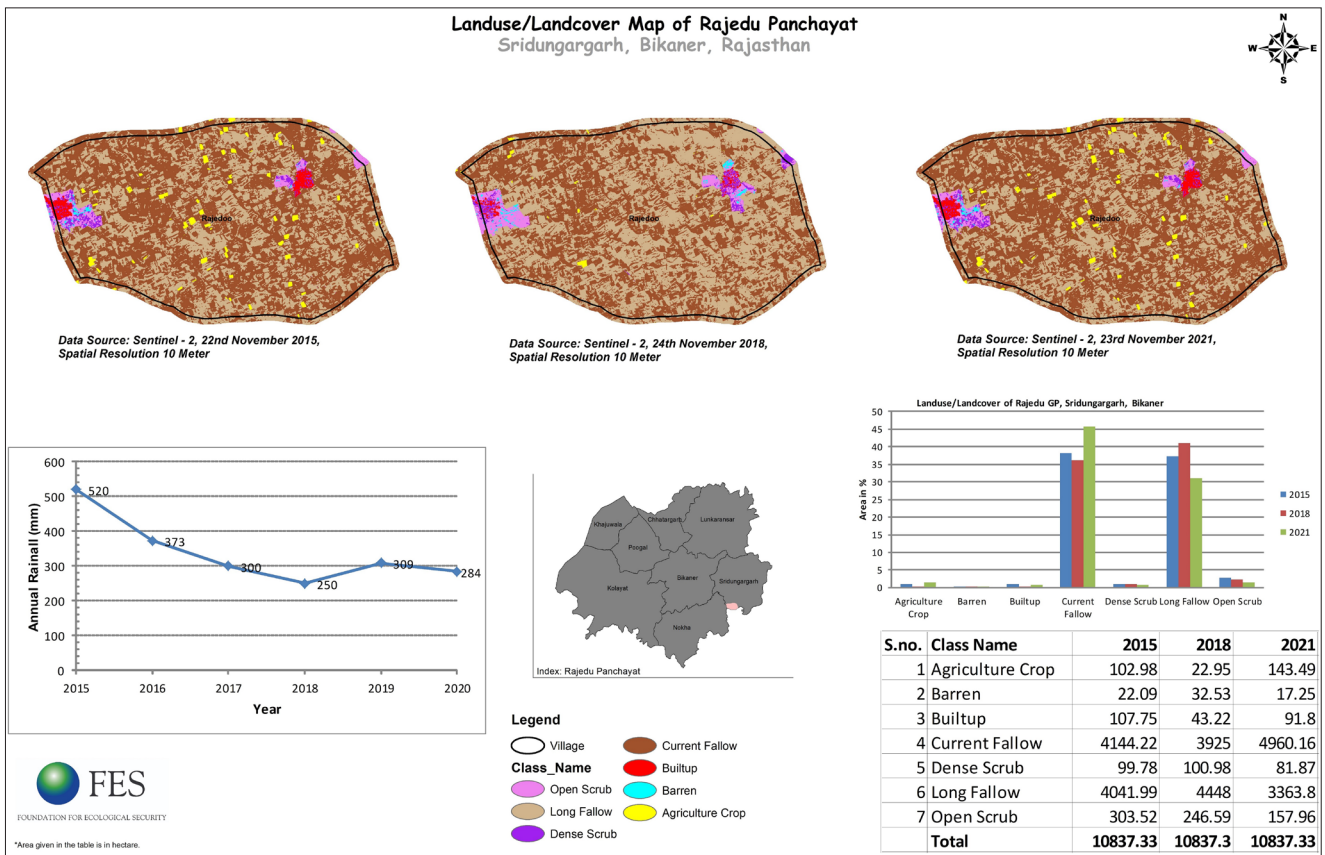


- Legend**
- Village
  - Class\_Name**
  - Agriculture Crop
  - Agriculture Fallow
  - Builtup
  - Dense Scrub
  - Waterbody

\*Area given in the table is in hectare.

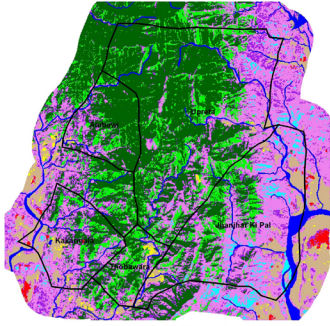


\*Area given in the table is in hectare.

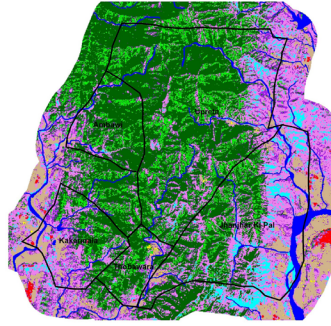


\*Area given in the table is in hectare.

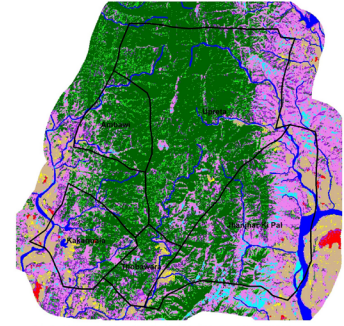
### Landuse/Landcover Map of Thobawara Panchayat Jhadol, Udaipur, Rajasthan



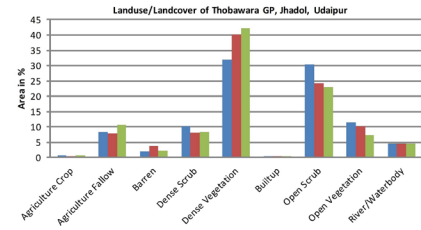
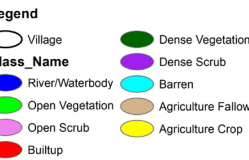
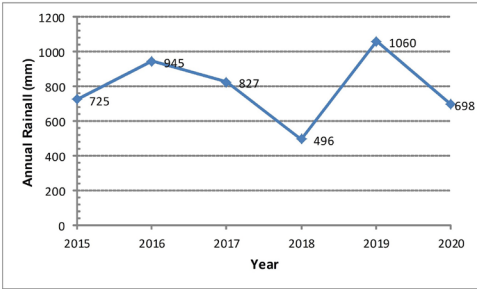
Data Source: Sentinel - 2, 20th November 2015, Spatial Resolution 10 Meter



Data Source: Sentinel - 2, 19th November 2018, Spatial Resolution 10 Meter



Data Source: Sentinel - 2, 23rd November 2021, Spatial Resolution 10 Meter

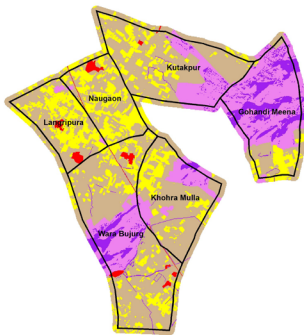


S.no.	Class Name	2015	2018	2021
1	Agriculture Crop	35.1	24.49	46.33
2	Agriculture Fallow	462.46	434.82	601.23
3	Barren	105.83	205.15	129.45
4	Dense Scrub	571.99	452.83	459.63
5	Dense Vegetation	1773.81	2234.81	2345.1
6	Builtup	30.71	27.4	25.85
7	Open Scrub	1688.76	1354.3	1279.57
8	Open Vegetation	631.54	565.68	410.74
9	River/Waterbody	256.78	260.5	259.08
<b>Total</b>		<b>5556.98</b>	<b>5559.98</b>	<b>5556.98</b>

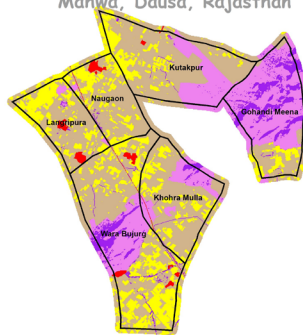


\*Area given in the table is in hectare.

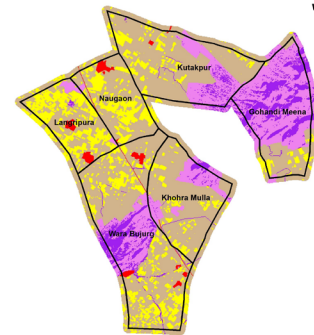
### Landuse/Landcover Map of Warabujurg Panchayat Mahwa, Dausa, Rajasthan



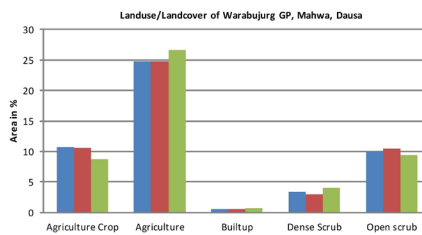
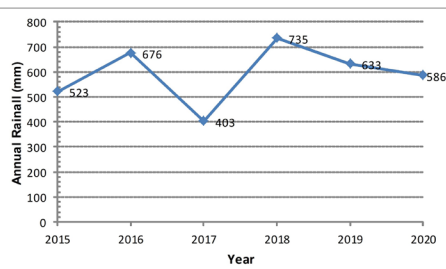
Data Source: Sentinel - 2, 20th November 2015, Spatial Resolution 10 Meter



Data Source: Sentinel - 2, 22th November 2018, Spatial Resolution 10 Meter



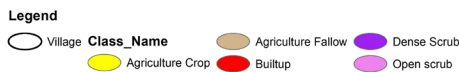
Data Source: Sentinel - 2, 24th November 2021, Spatial Resolution 10 Meter



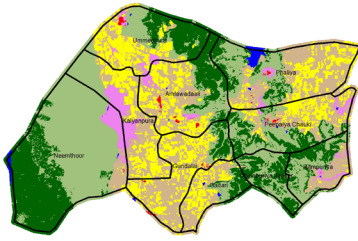
S.no.	Class Name	2015	2018	2021
1	Agriculture Crop	428.07	424.02	347.79
2	Agriculture Fallow	993.02	989.78	1065.91
3	Builtup	24.97	25.37	26.28
4	Dense Scrub	137.36	119	161.13
5	Open scrub	398.41	420.66	374.72
<b>Total</b>		<b>3996.83</b>	<b>3996.83</b>	<b>3996.83</b>



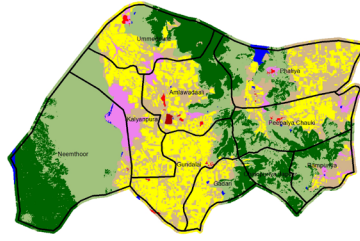
\*Area given in the table is in hectare.



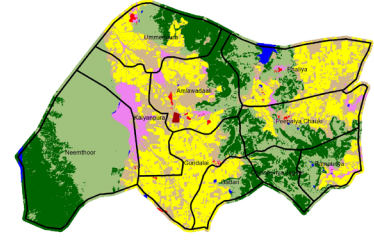
### Landuse/Landcover Map of Amlawadaali Panchayat Chhipabarod, Baran, Rajasthan



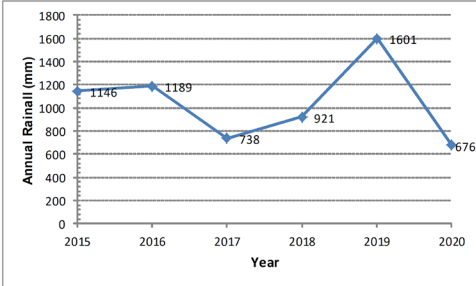
Data Source: Sentinel - 2, 6th January 2016,  
Spatial Resolution 10 Meter



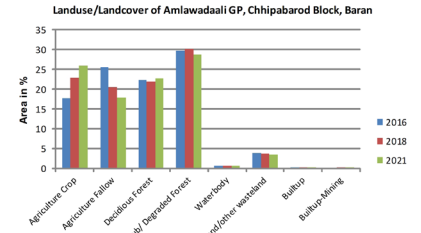
Data Source: Sentinel - 2, 15th January 2018,  
Spatial Resolution 10 Meter



Data Source: Sentinel - 2, 14th January 2021,  
Spatial Resolution 10 Meter



- Legend**
- Village
  - Agriculture Crop
  - Agriculture Fallow
  - Builtup
  - Deciduous Forest
  - Scrub/ Degraded Forest
  - Scrubland/other wasteland
  - Waterbody
  - Builtup-Mining

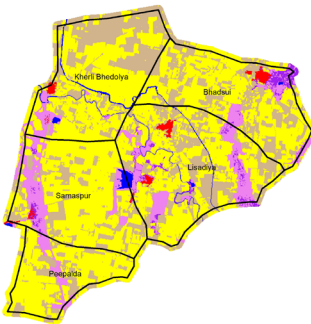


S.no	Class Name	2016	2018	2021
1	Agriculture Crop	1234.3	1598.4	1806.7
2	Agriculture Fallow	1781.4	1428.3	1253.9
3	Deciduous Forest	1556.4	1527.3	1582.7
4	Scrub/ Degraded Forest	2078.6	2105.0	2011.9
5	Waterbody	48.1	47.1	51.3
6	Scrubland/other wasteland	265.9	251.8	251.0
7	Builtup	21.4	21.2	21.5
8	Builtup-Mining	0.0	7.8	7.8

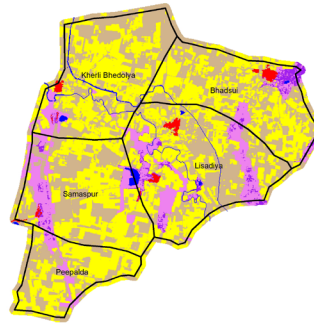


\*Area given in the table is in hectare.

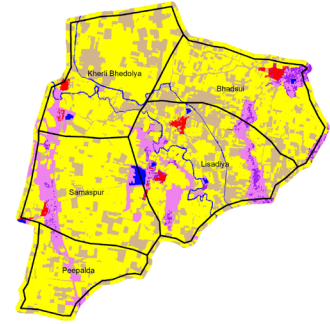
### Landuse/Landcover Map of Lisariya Panchayat Baran, Baran, Rajasthan



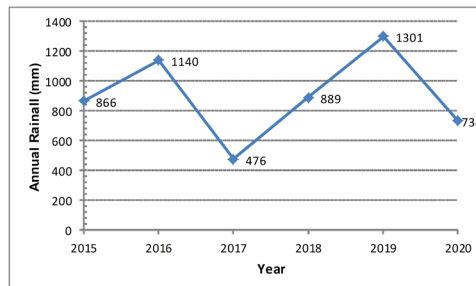
Data Source: Sentinel - 2, 6th January 2016,  
Spatial Resolution 10 Meter



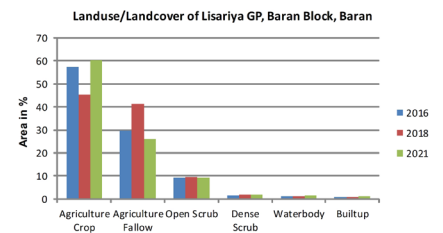
Data Source: Sentinel - 2, 15th January 2018,  
Spatial Resolution 10 Meter



Data Source: Sentinel - 2, 14th January 2021,  
Spatial Resolution 10 Meter



- Legend**
- Village
  - Agriculture Crop
  - Agriculture Fallow
  - Builtup
  - Dense Scrub
  - Open Scrub
  - Waterbody

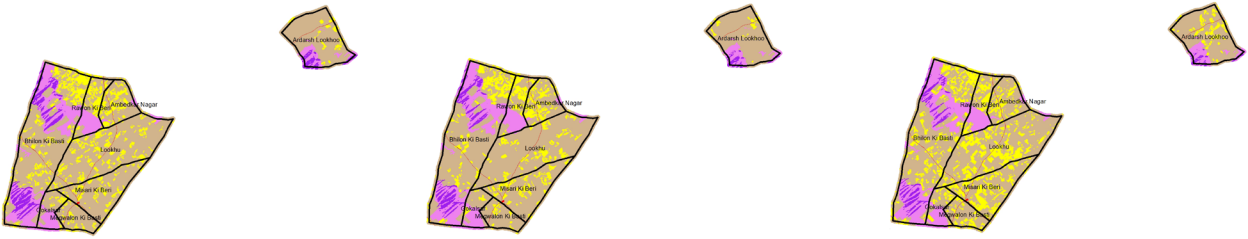


S.no	Class Name	2016	2018	2021
1	Agriculture Crop	1618.6	1275.2	1698.0
2	Agriculture Fallow	834.6	1164.2	734.8
3	Open Scrub	262.4	274.4	264.7
4	Dense Scrub	43.9	50.8	52.4
5	Waterbody	33.9	29.9	40.1
6	Builtup	26.3	25.3	29.7



\*Area given in the table is in hectare.

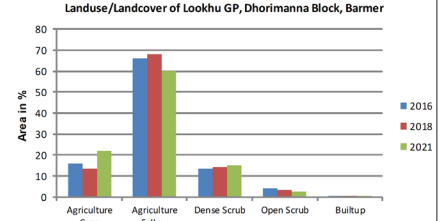
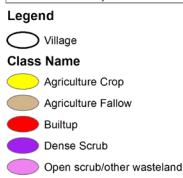
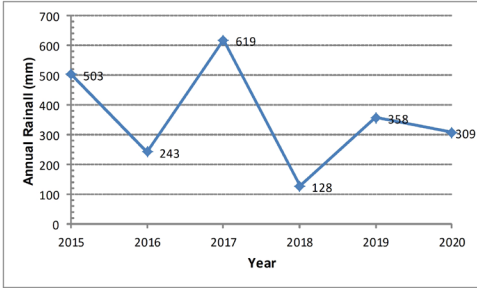
### Landuse/Landcover Map of Lookhu Panchayat Dhorimanna, Barmer, Rajasthan



Data Source: Sentinel - 2, 29th January 2016,  
Spatial Resolution 10 Meter

Data Source: Sentinel - 2, 21st January 2018,  
Spatial Resolution 10 Meter

Data Source: Sentinel - 2, 30th January 2021,  
Spatial Resolution 10 Meter

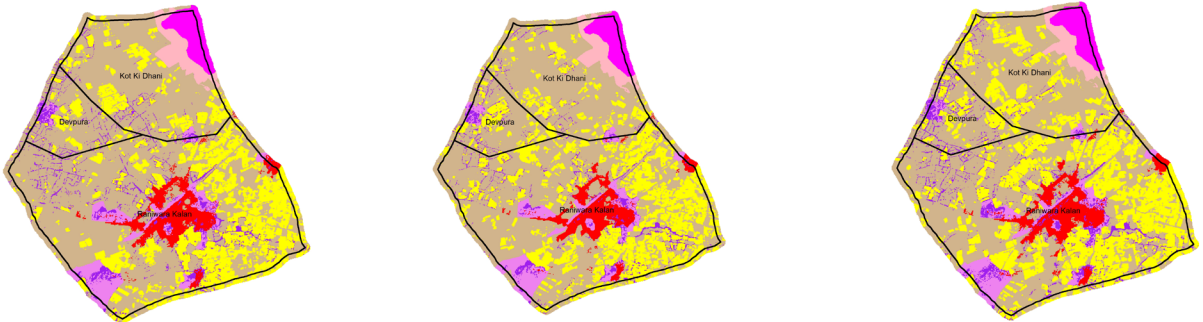


S.no	Class Name	2016	2018	2021
1	Agriculture Crop	675.8	578.0	937.9
2	Agriculture Fallow	2828.0	2925.6	2572.2
3	Open scrub/other wasteland	581.2	622.7	643.5
4	Dense Scrub	185.9	144.6	117.2
5	Builtup	14.9	14.9	15.0



\*Area given in the table is in hectare.

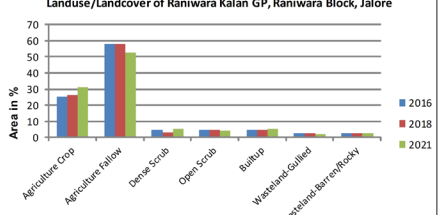
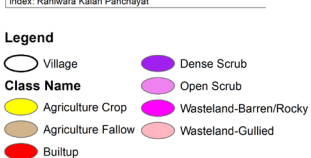
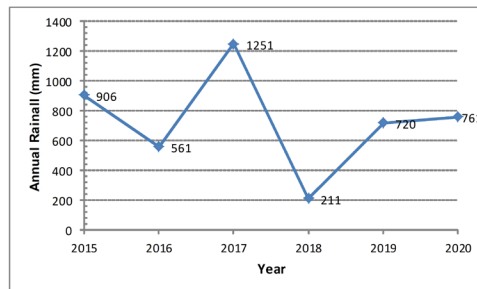
### Landuse/Landcover Map of Raniwara Kalan Panchayat Raniwara, Jalore, Rajasthan



Data Source: Sentinel - 2, 29th January 2016,  
Spatial Resolution 10 Meter

Data Source: Sentinel - 2, 23rd January 2018,  
Spatial Resolution 10 Meter

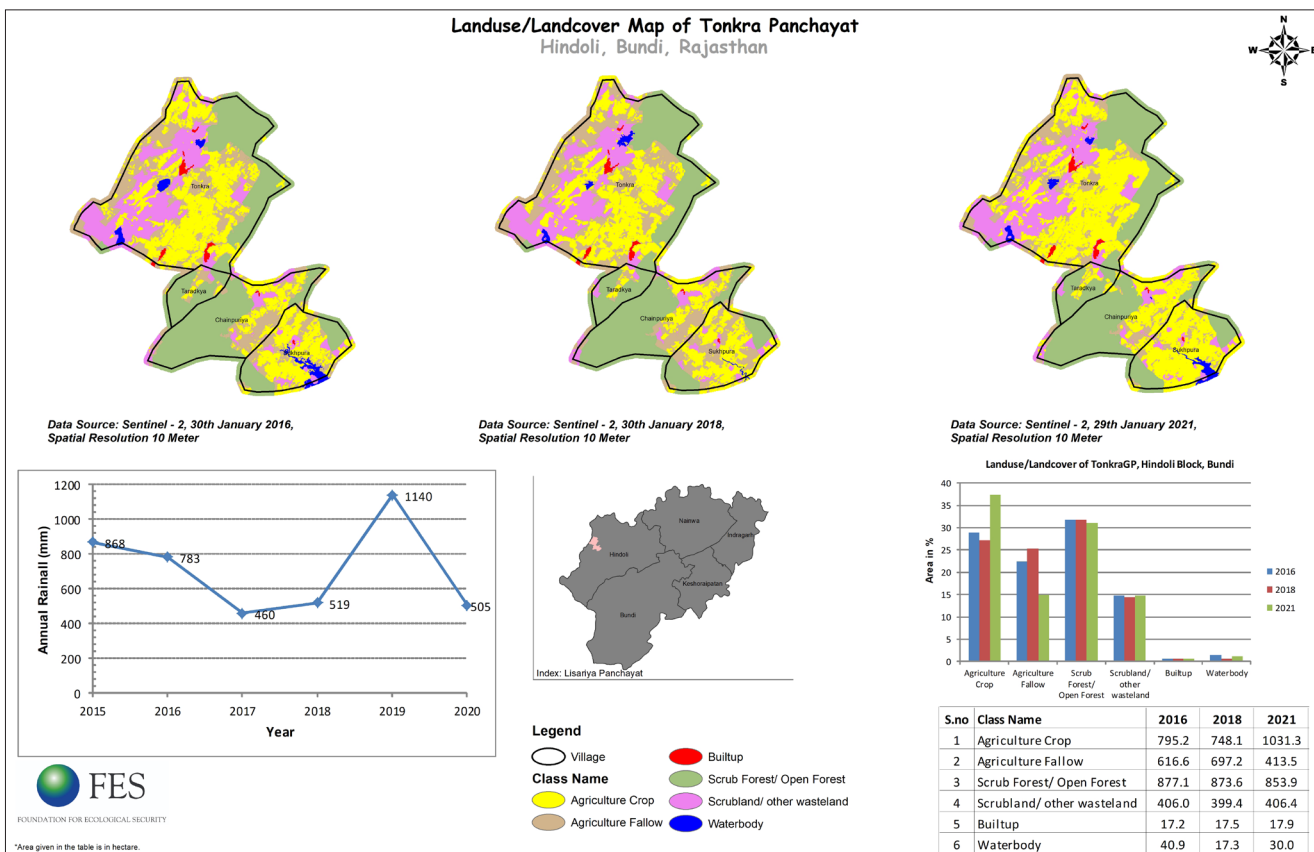
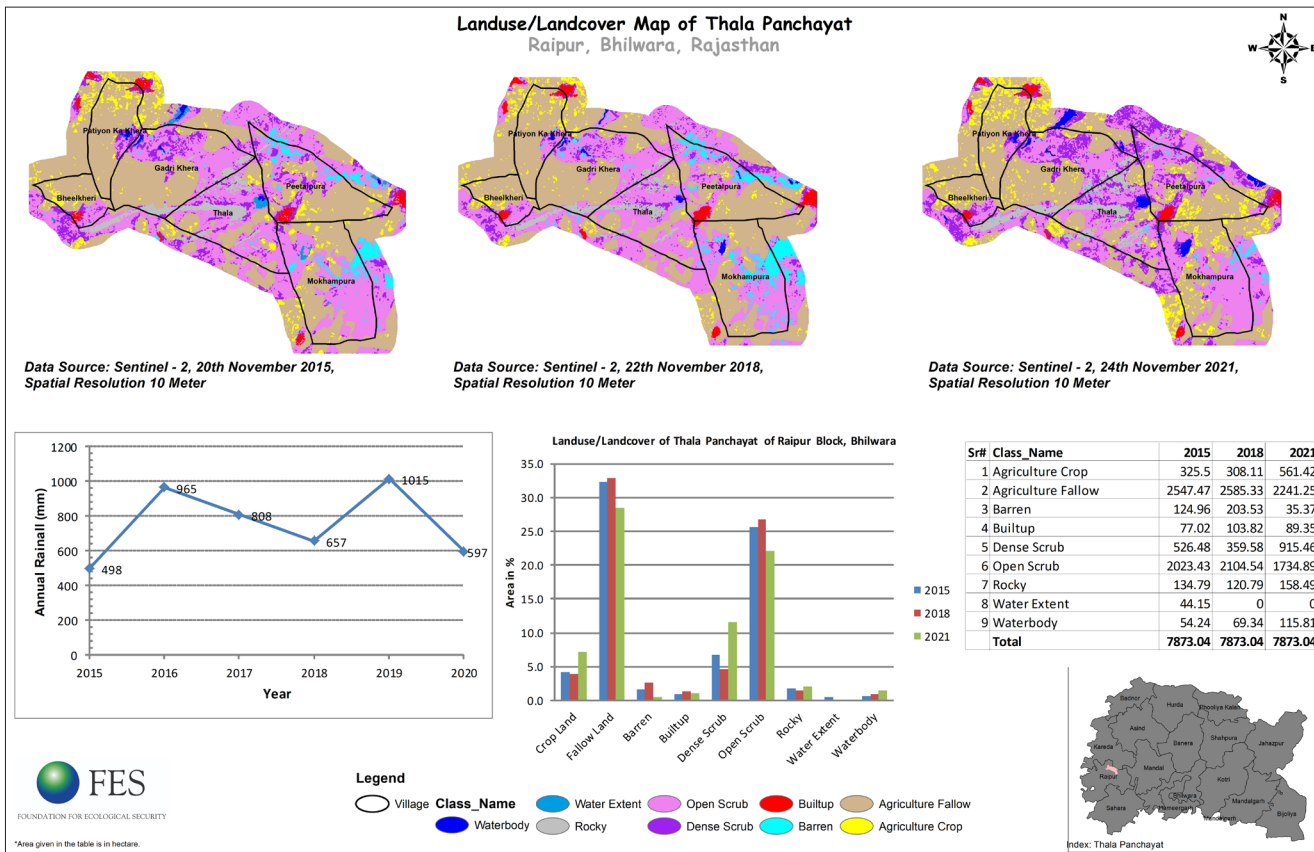
Data Source: Sentinel - 2, 27th January 2021,  
Spatial Resolution 10 Meter



S.no	Class Name	2016	2018	2021
1	Agriculture Crop	581.8	611.4	719.4
2	Agriculture Fallow	1355.2	1355.8	1218.1
3	Dense Scrub	111.8	79.9	120.4
4	Open Scrub	106.9	117.0	97.9
5	Builtup	111.6	107.2	119.4
6	Wasteland-Gullied	57.9	56.3	49.9
7	Wasteland-Barren/Rocky	60.9	60.7	61.0



\*Area given in the table is in hectare.



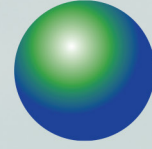




सत्यमेव जयते

Government of Rajasthan

Rajasthan Secretariat  
Additional Commissioner, EGS, Room No. 8011,  
SSO Building, Secretariat, Jaipur 302005  
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