PARTICIPATORY RURAL APPRAISAL OF MODEL PEANUT VILLAGE "MITHAPUR"

ICAR-Indian Institute of Groundnut Research,
At & Post: Ivnagar Road, Junagadh 362 015,
Gujarat, India

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CITATION:

Citation:

Shanmuka Adupa, Manjunath P. Paled, Aaradhana Chilwal, MV Nataraja, CS Praharaj, Jayshree D. Lakhanotra and Jay Gajera (2025). Participatory Rural Appraisal of Model Peanut Village "Mithapur". Technical Bulletin/07-2025. ICAR-Indian Institute of Groundnut Research, Junagadh-362 015. Pp.20

Published by:

Director,
ICAR-Indian Institute of Groundnut Research,
At & Post: Ivnagar Road, Junagadh 362 015, Gujarat
Phone: 091-285-2672550 Fax: 091-285-2672550
Email: director.groundnut@gmail.com

Printed at:

Art India Offset
College Road, Junagadh-362 001.
Gujarat, India
Mo. 98795 41275

PREFACE

Participatory Rural Appraisal (PRA) has emerged as an important methodology in agricultural extension for facilitating community-led planning, problem identification, and resource management. It shifts the role of researchers from being mere evaluators to active facilitators of rural development by engaging local stakeholders in analyzing their own socio-economic conditions, agricultural practices, and developmental needs. On 12th July 2023, the ICAR-Indian Institute of Groundnut Research, Junagadh inaugurated Mithapur as a Model Peanut Village, Junagadh district, Gujarat. The event was graced by Dr. Sanjeev Gupta, Hon'ble ADG (O&P), ICAR. The initiative aims to enhance groundnut production and productivity by encouraging farmers to adopt advanced technologies developed by ICAR-DGR, SAUs, and AICRPG, demonstrated directly in the village for participatory learning and replication. The village has long been recognized for its predominance in groundnut-based farming systems, making it an ideal site for introducing improved varieties, modern technologies, and sustainable production practices. The adoption initiative seeks to integrate research outputs with farmers' knowledge systems, ensuring wider dissemination and faster adoption of innovations in groundnut cultivation and allied activities. Conducting PRA in Mithapur was a critical step toward developing a comprehensive understanding of the village's resources, livelihood patterns, constraints, and opportunities. Through tools such as resource mapping, social mapping, transect walks, seasonal calendars, and technology adoption charts, the PRA exercise enabled active participation of farmers and other stakeholders in diagnosing their challenges and identifying priority areas for intervention. This participatory approach not only enhances the relevance of technological recommendations but also strengthens community ownership of developmental initiatives. The insights generated from PRA in Mithapur will serve as a valuable foundation for formulating need-based extension strategies, strengthening farmer–scientist linkages, and guiding future interventions under the Model Peanut Village programme. By capturing the ground realities and aligning them with institutional support, the PRA exercise paves the way for inclusive, sustainable, and farmer-centric rural development in the groundnut-growing belt of Saurashtra.

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1. Introduction of Participatory Rural Appraisal (PRA) :

Participatory Rural Appraisal (PRA) is an approach that enables local communities-both rural and urban-to actively analyze their own living conditions, identify challenges, and plan solutions. Unlike traditional project appraisals led by external experts, PRA focuses on empowering local people to take ownership of development processes, with outsiders acting as facilitators rather than decision-makers. It incorporates participatory methods such as community mapping, resource analysis, and social impact assessments, making it a powerful tool for inclusive and sustainable development.

The principles of Participatory Rural Appraisal (PRA) :

PRA have evolved through practice and experience. Key principles include listening and learning, where facilitators engage with local people to understand their knowledge, culture, and priorities. Offsetting biases ensures diverse participation, including marginalized groups, while utilization of precious community time emphasizes efficient and respectful engagement. Seeking diversity values multiple perspectives rather than representativeness, and triangulation/ cross-checking enhances data reliability by using varied sources and methods. Optimal ignorance and appropriate imprecision help streamline data collection by focusing only on essential information. Lastly, a multi-disciplinary team with diverse expertise, including female scientists, ensures inclusive and effective appraisal. These principles guide PRA in fostering participatory, iterative, and impactful community development.

Implementation of PRA guidelines in Mithapur village :

The participatory rural appraisal (PRA) conducted in Mithapur village followed a structured approach to ensure accurate and inclusive data collection. Preparation was carried out by reviewing secondary data on the locality, selecting representative villages, and collaborating with knowledgeable local partners. Facilitation was led by external professionals who empowered villagers to participate in mapping, ranking, and analysis while ensuring that information remained with the community. A team of facilitators was deployed to observe interactions and document insights. Behaviour and attitudes played a crucial role, with facilitators prioritizing listening over lecturing, fostering an environment where villagers became the primary analysts. Longevity was ensured by conducting the PRA over an extended period, allowing facilitators to immerse themselves in community life, build trust, and capture deeper, informal insights. By adhering to these guidelines, the PRA in Mithapur successfully facilitated community-driven learning and decision-making.

Key PRA tools and techniques used in Mithapur village :

In the PRA conducted in Mithapur village, various tools and techniques were utilized to facilitate information sharing, analysis, and evaluation of local livelihoods. These methods helped stakeholders engage in meaningful discussions, cross-learn from one another, and assess their living conditions. Through participatory mapping, transect walks, seasonal calendars, and ranking exercises, villagers actively contributed to identifying key issues and resources in their community. Focus group discussions and interviews enabled diverse perspectives to be captured, ensuring an inclusive approach. These tools not only helped in gathering valuable insights but also empowered the local people to take ownership of the process.

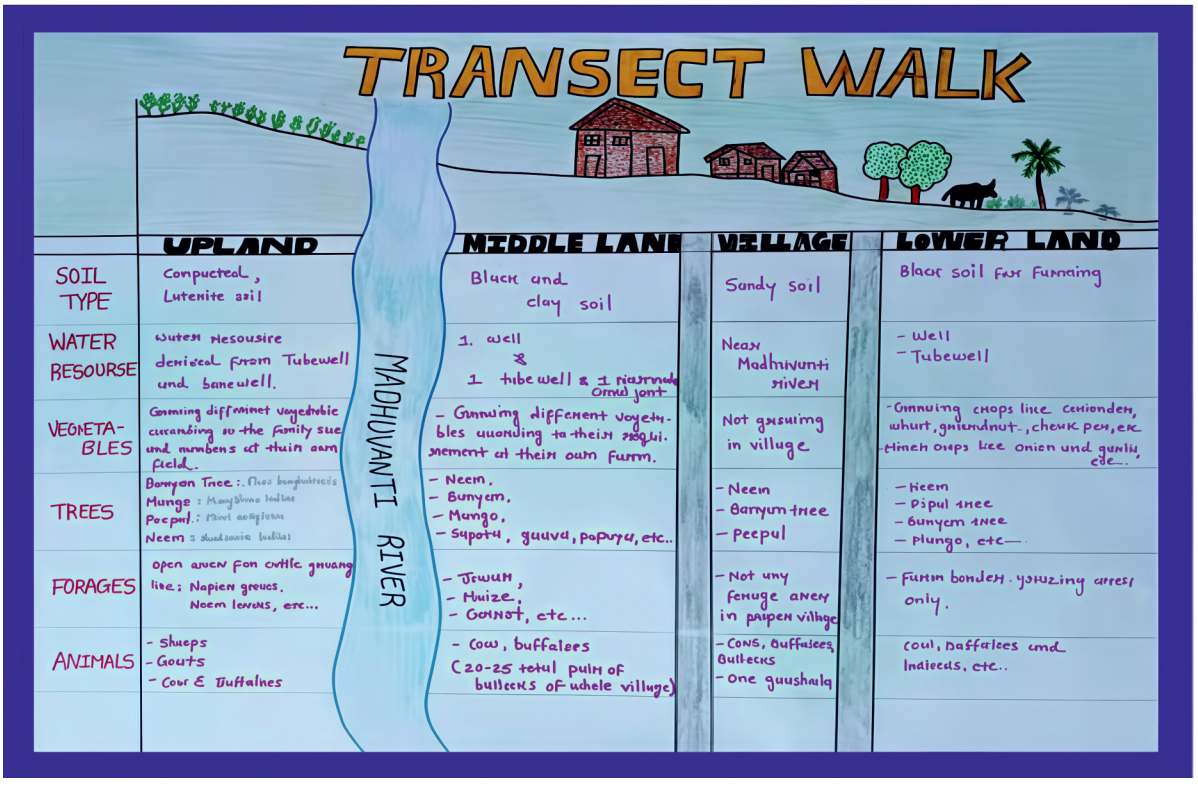
By integrating these PRA techniques, the assessment in Mithapur became a collaborative and insightful exercise, leading to better understanding and community-driven solutions.

Semi-Structured interviews for village porofiling in Mithapur :

As part of the PRA in Mithapur village, semi-structured interviews were conducted with 8-10 key informants, including village officials, leaders, and representatives from various occupational and gender groups. These interviews helped gather comprehensive information on geography, demographics, farming systems, and socio-economic conditions. Conducted in multiple rounds, the data was verified through triangulation with secondary sources to ensure accuracy. This process established a baseline for future development interventions and village adoption initiatives.

2. Village transect :

The village transect method was utilized in Mithapur to explore the spatial dimensions of local realities, particularly for natural resource management. This method provided a cross-sectional representation of agro-ecological zones, analyzing parameters such as topography, land use, soil type, vegetation, and resource availability. A transect walk was conducted along three varied routes-two along the village boundaries and one through the center-ensuring participation from key informants. Observations included soil types, water resources, crops, livestock, and socio-economic aspects like caste and gender-related access to resources. Data was recorded in a transect matrix, aiding in comparative analysis and problem identification. Unlike a resource map, which offers a bird's-eye view, the transect provides a sectional view, supporting triangulation and informed planning for sustainable resource development.



The transect walk conducted in Mithapur village as part of the PRA exercise provided valuable spatial insights into the village's natural resources, land use, infrastructure, and socio-economic distribution. By analyzing the village's topography through Google Maps and on-ground observations, key trends and challenges were identified.

Topography & Land Use :

The village is characterized by agricultural fields interspersed with patches of common land and water bodies. The land is primarily flat with fertile black soil, making it suitable for multiple cropping cycles. Land fragmentation is evident, posing challenges for large-scale mechanized farming.

Natural Resources & Water Availability :

The Madhuvanti river is a crucial water source, supplemented by underground water reserves. Availability of ponds and check dams supports irrigation, though water conservation measures need improvement. Vegetation is largely agricultural, with limited forest cover or natural green zones.

Infrastructure & Connectivity :

The village is connected to district headquarters by rural roads, but poor road conditions affect transportation and market access. Lack of proper street lighting and unorganized road networks in interior parts hinder mobility. No major railway or highway infrastructure directly connects Mithapur, limiting external trade opportunities.

Settlements & Social Layout :

Residential clusters are concentrated near main roads and water sources, while agricultural lands occupy the outer zones. Key public facilities, such as schools and health centers, are limited or absent, leading to social and economic constraints. Migration trends show movement towards urban areas due to limited employment opportunities.

Agriculture & Livelihoods :

The village primarily depends on groundnut, wheat, and soybean cultivation, supported by traditional irrigation and some modern techniques (drip/sprinkler). Mechanization is present but incomplete, with advanced tools like rotavators and processing mills absent. Middlemen exploitation in market transactions is a significant challenge, affecting farmer incomes.

Objectives of transect walk

- Assess the status, challenges, and potential of natural resources.
- Validate findings from other PRA exercises like social and resource mapping.
- Plan and assess the relevance of proposed interventions.
- Monitor and evaluate on-going projects and development initiatives.

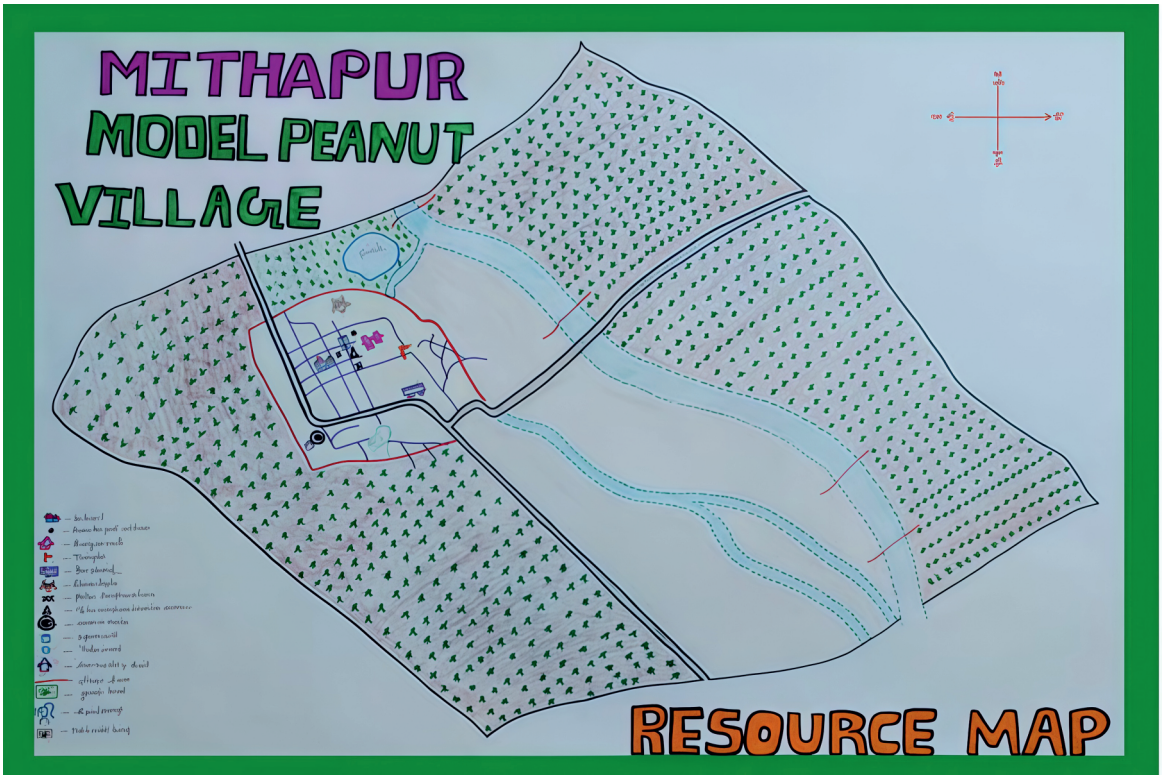
3. Resource map:

Resource mapping, a key PRA method, was conducted in Mithapur to assess local natural resources. Unlike social maps that highlight habitation and infrastructure, resource maps focus on land, water bodies, vegetation, and agricultural fields. Created by villagers themselves, these maps capture their in-depth knowledge of the area, ensuring accuracy in reflecting local perceptions rather than precise measurements. This participatory approach helps identify resource availability, usage patterns, and potential development opportunities, making it a crucial tool for planning and sustainable management.

Objectives of resource map

- **Geomorphology & terrain:**
  Landform characteristics, slope gradients, and elevation variations.
- **Flora & vegetation:**
  Forest cover, plant biodiversity, and dominant tree species.

- **Soil properties:**
  Soil classification, fertility levels, erosion susceptibility, and depth profiles.
- **Land use & tenure:**
  Land classification, ownership patterns, boundary demarcation, and command areas.
- **Hydrology & water resources:**
  Surface water bodies, irrigation sources, river systems, and drainage networks.
- **Watershed & conservation measures:**
  Soil and water conservation strategies, watershed management, and degraded land rehabilitation.
- **Agricultural systems:**
  Cropping patterns, productivity trends, and land suitability for cultivation.



The following information is elicited from resource map:

- **Transport & communication:**
  Availability of roads, public transport, and connectivity.
- **Health & welfare services:**
  Medical facilities, welfare organizations, and support agencies.
- **Agriculture & livestock:**
  Farming tools, draft animals, grazing lands, and breeding services.
- **Market & processing units:**
  Local markets, storage, processing industries, and financial services.
- **Labor & advisory support:**
  Workforce availability, expert guidance, and agricultural extension services.

The resource mapping exercise of Mithapur Village, conducted as part of the PRA survey, provided a detailed spatial understanding of the village's natural resources, infrastructure, and agricultural

potential. By integrating analysis with on-ground observations, the following key insights were derived.

Land & soil resources

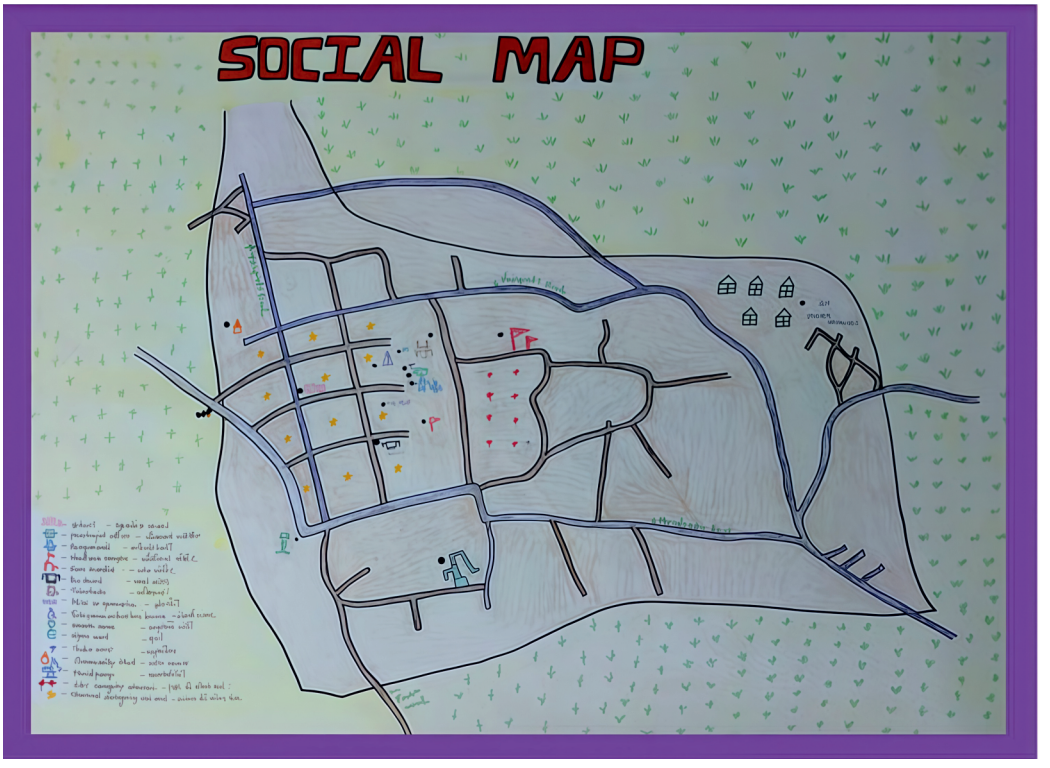
Mithapur has fertile black soil, making it highly suitable for groundnut, wheat, and soybean cultivation. However, signs of soil degradation and declining fertility due to excessive chemical fertilizer use were noted. Land fragmentation is a major issue, limiting large-scale mechanization and efficient farm operations.

Infrastructure & public facilities:

Road connectivity: The village has a mix of paved and unpaved roads, with poor internal road conditions affecting transport and market access. No primary healthcare center (PHC) exists within the village, forcing residents to travel for medical services. The village has basic electricity access, but frequent power fluctuations hinder farming and household activities.

4. Social map:

Social mapping is a widely used PRA method that visually represents habitation patterns and social infrastructure such as roads, drainage, schools, and water facilities. Unlike conventional maps, it is created by local people rather than experts and is not drawn to scale. It accurately reflects community perceptions of their living environment. While social maps focus on human settlements and infrastructure, resource maps depict natural resources like land and water bodies. In some cases, especially in dispersed settlements, both aspects are combined into a comprehensive village map.



Objectives of social map :

- Gaining insights into the village's physical and social aspects.
- Gathering household-level demographic data.

- Facilitating discussions on social dynamics.
- Guiding intervention planning.
- Assisting in monitoring and evaluation.

The social map helps gather key information about village demographics and community structure including:

- Caste distribution and spatial organization.
- Neighbourhood and community characteristics.
- Social and family structures.
- Religious affiliations and economic conditions.
- Presence of government institutions and educational background of villagers.
- Social groups and leadership dynamics.
- Cultural values, social norms, and interactions.
- Cooperation, competition, conflicts, and social integration.
- Communication channels and media.
- Prevalence of social issues like dowry, alcoholism, child labor, and other societal challenges.

The social mapping of Mithapur Village reveals a clustered settlement pattern with cooperative community interactions but significant infrastructural and socio-economic challenges. Youth migration, limited education, poor healthcare access, and inadequate roads hinder development. The absence of self-help groups (SHGs) and financial institutions restricts economic opportunities, while weak local governance slows progress. Improving infrastructure, expanding education, enhancing healthcare, and fostering community initiatives can drive sustainable growth, empowering the village for long-term resilience.

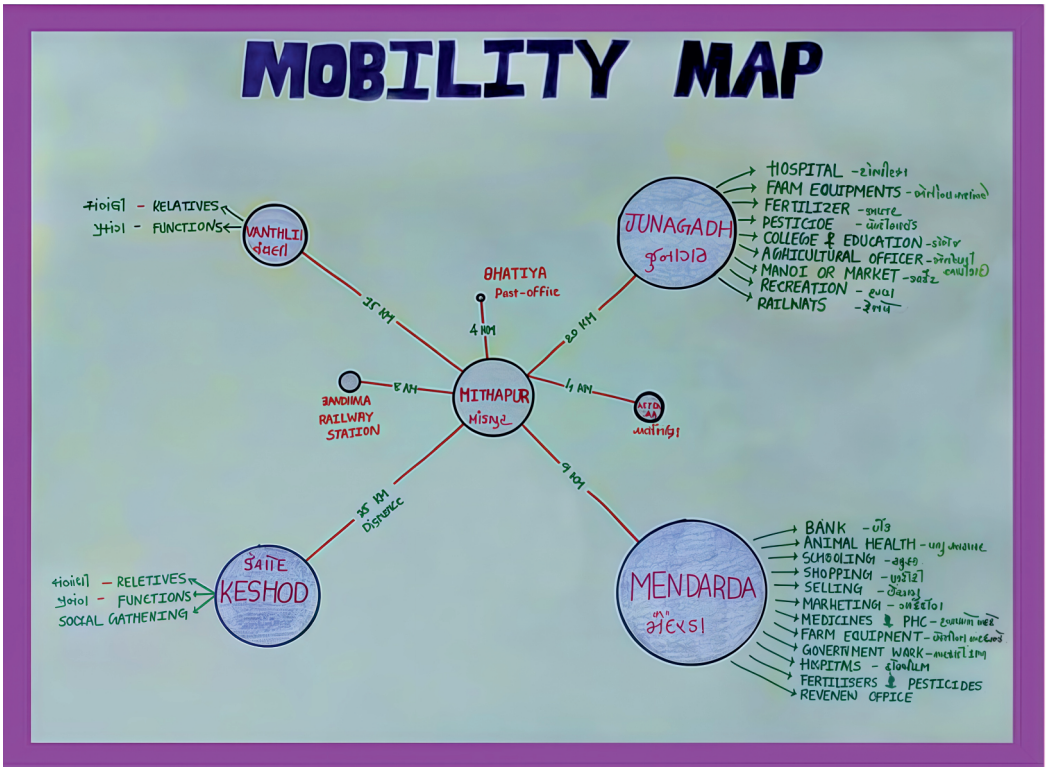
5. Mobility map:

Mobility mapping is a participatory tool in PRA used to analyze the movement patterns of individuals, groups, or entire communities. It helps in understanding where people travel, the purpose of their visits, the frequency of movement, and the significance of different destinations. This method is particularly useful in evaluating access to essential services such as markets, healthcare, education, and employment opportunities. It also provides insights into gender-specific mobility patterns, identifying potential constraints faced by different groups. Additionally, mobility mapping helps assess the impact of various development interventions on movement patterns, enabling better planning of future projects to enhance accessibility and reduce barriers to mobility.

A mobility map includes:

- Visit frequency: Ranges from daily travel to occasional visits within six months.
- Distance: Measures the gap between the village and frequently visited locations.
- Mode of transport: Includes options such as walking, public transport, or other means.
- Purpose of travel: Covers activities like agricultural work, trade, wage labor, healthcare, and other necessities.
- Accessibility: Evaluates ease of access, with larger and well-connected locations being more accessible.

The mobility map of Mithapur village highlights the key movement patterns of its residents concerning agriculture and livelihood activities. Based on the participatory rural appraisal (PRA), it is evident that villagers frequently travel to nearby towns and cities for various essential purposes:



- **Junagadh (20-22 km)**:

  Serves as a major hub for agricultural markets, government services, higher education, and healthcare facilities. Farmers visit Junagadh for selling produce, purchasing farming equipment, and accessing specialized agricultural training and for recreation purpose.

- **Keshod (25 km):**

  Primarily a centre for transportation and trade, with access to railway services and markets for agricultural goods. Many villagers also travel here for employment opportunities and business transactions.

- **Vanthli (15-20 km):**

  A key local market town where villagers procure essential farming inputs such as seeds, fertilizers, and pesticides. It is also an accessible location for medical and daily household needs.

- **Mendarda (10-12 km):**

  Villagers of Mithapur travel to Mendarda for various purposes, including banking, animal health services, schooling, shopping, selling and marketing of agricultural produce, purchasing medicines, accessing the primary health center (PHC), buying farm equipment, completing government work, visiting hospitals, procuring fertilizers and pesticides, and dealing with matters at the revenue office.

The analysis of the mobility map underscores the dependency of Mithapur's residents on these nearby urban centers for their agricultural and livelihood needs. Improved transportation infrastructure and market linkages can enhance economic opportunities and accessibility, ultimately supporting the sustainable development of the village.

6. Timeline chart:

A timeline is a widely used in PRA method that helps explore the temporal dimension of a community, institution, or individual's history from the perspective of local people. This tool captures the chronology of significant events as remembered and narrated by the community members. Rather than presenting a formal historical account, a timeline represents the people's collective memory, highlighting key historical landmarks, social or economic changes, natural calamities, development initiatives, or other critical incidents that have shaped the community over time. By mapping out past events in sequential order, it provides insights into patterns of change, progress, and challenges, allowing for a deeper understanding of historical influences on the present situation.

Timeline chart	
1955	Establishment of first school
1959	First Sarpanch appointed
1971	First radio intervention in village
1972	First time electricity came, First time several drought occurred
1974	First cycle purchased
1975	Imposed emergency, First time inorganic fertilizer application stared, First bus service started
1977	First time pesticide sprayer was introduced
1980	First bike was purchased
1982	Well was built
1983	Severe flood happened
1985	Banking started by villagers
1987-88	Drought occurred
1989	First tube well purchased and installed
1995	First TV purchased, First hand pump installed
1996	First telephone connection implemented
1998	First tractor purchased
2002	First water tank constructed, Drip irrigation installed, First woman sarpanch appointed
2003	First mobile purchased
2004	First car purchased
2005	Gram panchayat building constructed, Gaushala construction,
2007	Road constructed, Khodiyar mandir established, First time Jyoti Gram implemented (24 hr electricity)
2008	Check dams constructed
2021	Temple renovated

The timeline of Mithapur village reflects a steady progression in infrastructure, governance, agriculture, and technology. Over the years, significant advancements have improved the quality of life, modernized farming practices, and enhanced connectivity. The village has successfully integrated development initiatives, showcasing a balanced transition from tradition to modernity.

7. Trend analysis:

Trend analysis is a PRA method that examines changes over time, offering a historical perspective on various aspects of village life. Local people provide insights into shifts in variables such as crop yields, population, livestock, land use, and rainfall. This method highlights broad patterns rather than precise data, helping to understand growth or decline in key areas. Additionally, discussions following trend analysis can reveal the underlying causes of these changes, providing deeper insight into community dynamics.

Objectives of trend analysis:

- **Understanding community perceptions:**
  Gain insights into how community members perceive changes over time in various aspects of their lives.
- **Incorporating changes into village profiles:**
  Update village profiles to reflect significant historical and current changes.
- **Identifying and assessing village issues:**
  Facilitate discussions on the evolution of village problems, observing trends in

Trend analysis

Indicator	Past (1990-2010)	Present (2010-present)	Reason of change
Crop diversity	Desi cotton Groundnut Wheat	Groundnut, soybean, pigeon pea, coriander	Due to pink boll worm infestation in cotton
Yield per acre	Groundnut: 5410 kg/acre Wheat:1250 kg/acre	Groundnut: 1080 kg/acre Wheat: 2500 kg/acre	Varietal technology with high yielding variety
Use of fertilizer	Groundnut : No use	Groundnut : 40-50 kg/acre	increases the yield by decrease in soil fertility
Water availability	Pumpset and oil engine	Submersible pump, drip and sprinkler	Technology
Soil fertility	Black and more clay	Black, less clay and hard	Decrease in soil fertility
Income levels	10,000-12,000 acre/year	25,000-30,000 acre/year	Increase in soil fertility
Migration trend	1,050 migrated	750 migrated	Mostly migrate to Junagadh and Rajkot
Employment	Farming	Farming	No change
Malnutrition disease	Many	2 children	Decrease
Disease	-	Covid	-

their severity without relying on direct questioning.

- **Evaluating past interventions:** Analyse previous initiatives to determine their success or failure and understand the underlying reasons.
- **Anticipating future developments:** Explore community perspectives on potential future scenarios, considering both the presence and absence of interventions.
- **Creating a foundation for planning:** Establish a conductive environment for planning effective interventions by discussing the root causes of the current situation.

Mithapur village has witnessed significant changes in agriculture, economy, and livelihoods. Crop diversity has expanded, yield patterns have shifted, and fertilizer use has increased, impacting soil fertility. Water management has improved with modern irrigation systems. Rising income levels and reduced migration indicate better local opportunities. Malnutrition has declined, though new health challenges like COVID-19 have emerged. Overall, technological advancements and economic progress have shaped the village's development.

This kind of information can be gathered from trend analysis:

- Crop yield trends
- Market prices of key farm products
- Demographic shifts
- Livestock population changes

8. Seasonal diagram:

A seasonal diagram, also known as a seasonal calendar or seasonal analysis, is a PRA method used for temporal analysis across annual cycles, with months or seasons as key reference points. It captures local perceptions of seasonal variations affecting various aspects of life. While not based on statistical data, the findings can be validated through secondary or primary sources.

Objectives of seasonal analysis:

- Identifies workload variations, food security issues, credit shortages, diseases, and wage availability.

Seasonal diagram

Month	Rainfall	Labour demand	Festivals	livestock	Income
January	Dry	Low	Makar sankrant	Normal feeding	Moderate
February	Dry	High	-	Calving season	Low
March	Dry	High	Holi	Scarcity of fodder	High
April	Dry	Low	Ramnavmi	Water scarcity	High
May	First	Medium	-	Scarcity of fodder	Low
June	Heavy	High	Beej	Disease	Low
July	Heavy	Medium	-	Good food breeding	Moderate
August	Medium	Medium	Janmashtami	Normal health	Low
September	Medium	High	Ganeshutsav	Normal feeding	Low
October	Light	High	Navratri	Normal	Low
November	Cool and dry	Low	Diwali	Normal	Moderate
December	Cool and dry	Low	-	Normal	High

- Aids in project planning by determining the best time for interventions.
- Helps recognize stress periods, enabling timely support and resource allocation.
- Analyses livelihood patterns throughout the year, providing insights into seasonal challenges and opportunities.

The seasonal analysis of Mithapur village highlights key agricultural and livelihood patterns throughout the year. Labour demand fluctuates, peaking in June, March, and September, aligning with sowing and harvesting activities. Rainfall variations impact water availability and fodder scarcity, particularly in April and May, affecting livestock health. Income levels remain low during peak agricultural months but stabilize in March and December due to harvest-related earnings. Festivals such as Diwali, Navratri, and Makar-sankranti influence socio-economic activities. The study provides critical insights for planning interventions, ensuring optimal resource allocation during stress periods to enhance productivity and sustainability in the village.

9. Technology map:

Technology mapping is a participatory rural appraisal (PRA) technique used to analyze farmers' behavioural patterns toward technology adoption. It helps classify adoption behaviours into categories such as early adoption, discontinuation, rejection, and over-adoption of agricultural innovations. This method records the types and frequency of technology adoption, tracing the role of various extension agencies, research institutions, and developmental programs in technology dissemination.\

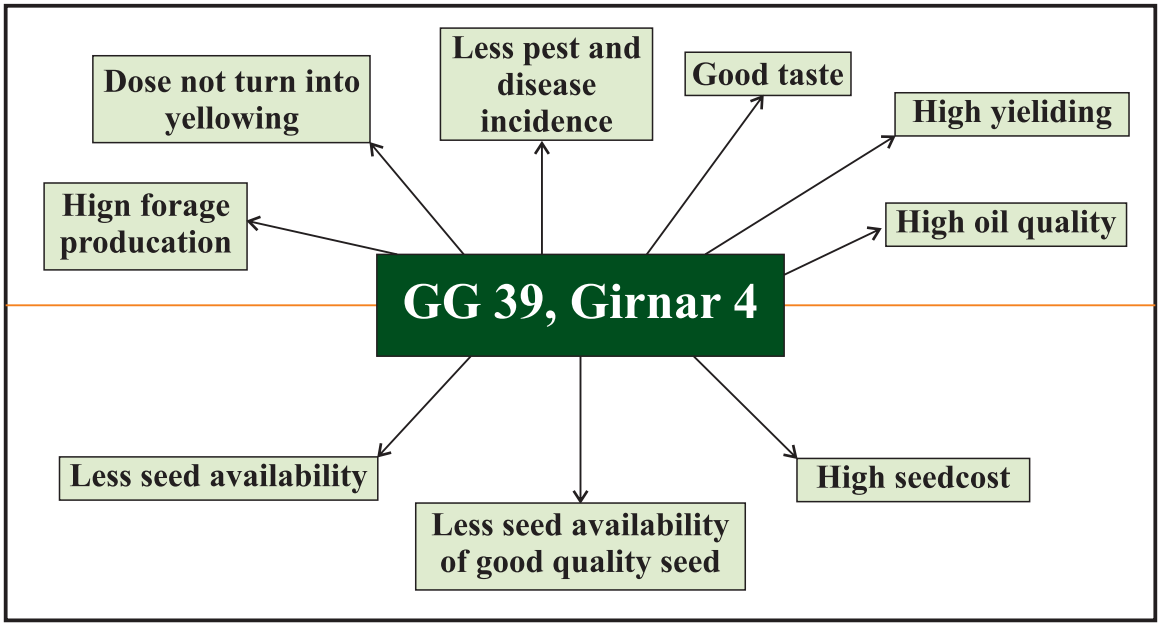
Technology mapping is a crucial tool for agricultural scientists and extension workers, enabling them to identify barriers to adoption, reasons for rejection, and farmers' preferences through participatory feedback mechanisms. By understanding adoption trends, extension professionals can tailor interventions, improve technology transfer strategies, and ensure that innovations align with local farming needs, ultimately enhancing productivity and sustainability in rural areas.

Technology map			
Crop	**Varieties**	**Status**	**Reasons**
Groundnut	GG-11	Discontinued	Long duration, low yield, labour cost increase due to spreading type of variety
	GJ-2	Discontinued	Low dormancy, lower marketing value
	GG-20	Overadoption	Good quality, higher shelling %, oil content high, good market value, export quality
	GJG-22	Adopted	Good quality, higher shelling %, oil content high, good market value, export quality
	TG-37-A	Adopted	Short duration, required less spacing due to bunch type, suitable for intercropping, no need machine for harvesting machinery
	TG-66	Discontinued	High pest and disease attack, low shelling %
	TG-45	Overadoption	Short duration, low cost of cultivation, suitable for intercropping
	TG-39	Adopted	Short duration, low cost of cultivation, suitable for intercropping
	GJG-32	Adopted	High yielding, high haulm and pod yield, low pest and disease attack
	Girnar-4	Adopted	Good taste, high yielding, low pest and disease attack, high oil%, good for cattle feeding
	GG-23	Adopted	Semi-spreading, low pest and disease attack
	G-441	Discontinued	Due to lower market price
Pigeon Pea	GJP-1	Overadoption	High yielding, low pest and disease attack
	BDN-2	Discontinued	Low yield, high pest and disease attack
	Japan	Discontinued	High pest and disease attack
Wheat	Lok-1	Adopted	High yielding, low pest and disease attack
	GW-496	Adopted	High yielding, low pest and disease attack
Coriander	GC-2	Discontinued	High pest and disease attack
	GC-3	Adopted	High yielding, low pest and disease attack
Soyabean	JS-335	Adopted	High yielding
	Phule sangam	Adopted	High yielding
Chick pea	GC-3	Discontinued	Low yield, wilting problem, yellowing problem
	GC-5	Adopted	High yield, low wilt
White chick-pea	B-2	Adopted	High market value

The technology mapping of Mithapur village reveals a dynamic trend in crop variety adoption, influenced by factors such as yield potential, pest resistance, market value, and input costs. While high-yielding and pest-resistant varieties like GG-20 (groundnut), GJP-1 (pigeon pea), GW-496 (wheat), and GC-5 (chickpea) have seen widespread adoption, several varieties were discontinued due to low yield, pest susceptibility, or poor market price. Over-adoption of certain varieties, such as GG-20 and TG-45 (groundnut), highlights farmers' preference for high-quality and economically viable options. This analysis underscores the need for targeted extension efforts, ensuring that farmers receive updated recommendations on disease-resistant, high-yielding varieties while addressing challenges related to market fluctuations and input costs for sustainable agricultural growth.

10. Consequence diagram:

The adoption or rejection of a technology brings significant individual and social consequences, which need to be assessed through technology impact diagrams or consequence mapping. This approach helps visualize the positive and negative effects of a technology, enabling better decision-making.



The GG 39 and Girnar 4 groundnut varieties have strong potential for adoption in Mithapur village due to their high yield, superior oil quality, and pest resistance. However, seed availability and cost remain significant barriers. To enhance adoption, efforts should focus on improving seed accessibility through farmer cooperatives, seed banks, or government support programs. Additionally, extension services should promote awareness and facilitate access to quality seeds to maximize the benefits of these promising groundnut varieties.

Purpose of Consequence diagram:

- Identifies potential changes a technology may bring to farmers and communities.
- Helps in predicting outcomes of similar technologies for proactive planning.
- Supports extension workers in designing effective strategies to maximize benefits

and minimize risks.

- Guides researchers in developing technologies that enhance positive impacts while addressing potential drawbacks.

11. Participatory problem identification and prioritization:

Participatory needs assessment is an essential tool within participatory rural appraisal (PRA), enabling a systematic approach to identifying and prioritizing problems at the grassroots level. This approach fosters active involvement of the community, treating them as equal partners in the appraisal process. It is a time-efficient method that allows researchers to design problem-oriented research programs tailored to real-world challenges. By integrating local knowledge and perspectives, this method ensures the formulation of practical and achievable development programs within a specified timeframe.

PARTICIPATORY PROBLEM IDENTIFICATION AND PRIORITIZATION

Sr. No.	Problems	Less-Medium-High Severity (1-3)	Less-Medium-High Urgency (1-3)
1.	No pakka roads	High	High
2.	Drinking water distribution	High	High
3.	PHC centre not available	Less	Less
4.	No proper space for woman gathering	Medium	Medium
5.	No proper road and lighting from Junagadh	High	High
6.	Not getting MSP	High	High
7.	White grub infestation	High	High
8.	Wire worm infestation	Medium	Medium
9.	Wilt infestation	High	High
10.	No implementation of IPM practices	High	High
11.	No higher schooling availability/ only primary education upto 5th class	Less	Less
12.	Lack of timely seed availability	Less	High
13.	No higher price for good quality produce	High	High
14.	Labour shortage	High	High

The participatory problem identification and prioritization in Mithapur village highlights key challenges, including poor road infrastructure, inadequate drinking water distribution, lack of MSP, pest infestations (white grub, wilt), and labor shortages, all of which are highly severe and urgent. Medium-priority issues include wireworm infestation and lack of proper spaces for women's gatherings, while concerns like limited higher schooling and absence of a PHC are less pressing. Addressing infrastructure gaps, implementing integrated pest management (IPM), ensuring fair pricing for produce, and improving seed and labour availability should be the primary focus for sustainable rural development.

12. Farm machinery possession:

The participatory rural appraisal (PRA) of Mithapur village reveals significant insights into farm machinery possession, indicating a high level of mechanization in certain areas while highlighting gaps in advanced agricultural technology.

Farm machinery possession by Mithapur village	
Harrow	90-100%
Rotavator	5-10%
Seed drill	50-60%
Sheller/decorticator	1-2%
Intercultivation	100%
Sprayer	100%
Sprinkler	100%
Blade harrow	100%
Thresher	30%
Tractor	100%
Drone	0%
Oil Mill	0%
Drip	5%

Well-Adopted Machinery (High Possession Rate: 90-100%) :

Farmers in Mithapur extensively use essential implements such as harrow (90-100%), intercultivation tools (100%), sprayers (100%), sprinklers (100%), blade harrows (100%), and tractors (100%). This indicates that basic land preparation, crop care, and irrigation activities are well mechanized, ensuring efficient farming operations.

Moderately Available Machinery (30-60%) :

Machinery like seed drills (50-60%) and threshers (30%) have moderate adoption, reflecting that some farmers still rely on traditional methods or face challenges in accessing these machines. Expanding access to threshers could significantly improve post-harvest efficiency.

Low Adoption Machinery (0-10%) :

Advanced mechanization tools like rotavators (5-10%), shellers/decorticators (1-2%), and drip irrigation systems (5%) have limited presence, indicating the need for greater awareness, affordability, and accessibility. Drones (0%) and oil mills (0%) are entirely absent, suggesting that modern precision farming and value addition through local processing remain untapped opportunities.

PRA-based Recommendations:

- Promote modern machinery like rotavators and shellers through government subsidies and cooperative models.
- Enhance post-harvest mechanization by improving access to threshers and decorticators.

- Encourage precision farming tools like drones for better crop monitoring.
- Expand drip irrigation adoption for better water management and sustainability.
- Develop local oil mills to enable value addition and increase farmer profits.

13. Crop calendar:

For each crop, and for every variety cultivated by the farming community, provide the following details:

(a) The standard planting period when the crop is typically sown.

(b) The possible planting window, including the earliest and latest dates within which farmers still find it feasible to plant the crop or variety.

PARTICIPATORY PROBLEM IDENTIFICATION AND PRIORITIZATION

Sr. No.	Crop	APR-MAY-JUN	JULY	AUG	SEP	OCT	NOV
1	Groundnut	Land preparation : 15th April-15th May Sowing: 15th May-15th June	Pesticide Weeding Intercultivation White grub	Fertilizer Pesticide Weeding Inter-cultivation	Pesticide Roor rot	Tikka Rust Weeding	15 Oct-30 Nov Harvesting
2	Soybean	**MAY-JUN-JULY**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**
		Land preparation : 15th May-15th June Sowing: 5th June-15th July	Weeding Herbicide Spodoptera	Pesticide	15 Oct-30 Nov Harvesting		-
3	Pigeon pea	**JAN**	**FEB**	**MAR**	**AUG**	**NOV**	**DEC**
		Pesticide spray, Irrigation, Helicoverpa	Pesticide, Irrigation	Harvesting	Sowing as relay crop in groundnut	After GN Harvesting Fertilizer Water	Irrigation Wilt
4	Rabi Chick pea	**JAN**	**FEB**	**MAR**	**OCT**	**NOV**	**DEC**
		Helicoverpa Pesticide Irrigation Intercultivation	Helicoverpa Pesticide, Last irrigation	Harvesting	-	Irrigation basal fertilizer Groundnut land preparation sowing	Irrigation Wilt
5	Wheat	**JAN**	**FEB**	**MAR**	**OCT**	**NOV**	**DEC**
		Fertilizer Herbicide Irrigation	Fertilizer Irrigation	Irrigation Harvesting	-	-	Harvesting Sowing Land preparation Fertilizer

6	Coriander	JAN	FEB	MAR	OCT	NOV	DEC
		Powdety mildew Pesticide irrigation	Powdery mildew Fungicide Irrigation	Powdery mildew Catterpiller Harvesting	-	Land preparation Sowing 50% fertilizer Herbicide Irrigation	Irrigation Sucking pest
7	Summer Sesame	JAN	FEB	MAR	APR	NOV	DEC
		Herbicide Irrigation Fertilizer Land preparation Sowing	Irrigation Pesticide Sucking pest	Irrigation Pesticide Fertilizer Phyllody disease	Irrigation Harvesting	-	-
8	Green gram	FEB	MAR	APR	MAY	NOV	DEC
			Herbicide Land preparation Sowing Fertilizer Irrigation	Irrigation Pesticide Sucking pest	Irrigation Harvesting	-	-

- The cropping calendar of Mithapur village demonstrates a well-organized and seasonally adjusted farming system. The main crops cultivated include groundnut, soybean, pigeon pea, chickpea, wheat, coriander, sesame, and green gram, each adhering to specific sowing and harvesting periods.
- Groundnut plays a vital role in the agricultural cycle, with land preparation commencing in April-May and harvesting taking place between October and November. The crop management involves routine applications of fertilizers, pesticides, and weed control practices.
- Soybean is planted between June and July, with key agronomic activities such as pest control and weeding, leading up to harvesting in October-November.
- Pigeon pea is grown as a relay crop alongside groundnut, optimizing land utilization. Its cultivation demands intensive pest control and irrigation.
- Rabi crops, including chickpea and wheat, are sown post-monsoon (October-November), requiring proper irrigation and pest management, with harvesting occurring between March and April.
- Coriander, sesame, and green gram are grown in different seasons, each needing targeted interventions such as herbicide use, irrigation, and pest control to ensure optimal growth and yield.

14. SWOT analysis:

SWOT analysis is a structured method for assessing the environment. The term SWOT stands for strengths, weaknesses, opportunities, and threats. Opportunities refer to favorable external conditions that help an organization strengthen its position, such as increasing market demand. In contrast, threats are unfavourable external factors that pose risks, like rising competition. Strengths are internal capabilities that provide a competitive edge, such as advanced research and development facilities that allow a company to innovate. On the other hand, weaknesses are internal limitations that create strategic challenges, such as relying too much on a single product, which can be risky.

SWOT analysis helps businesses align their strengths and weaknesses with external opportunities and threats. It guides strategy by leveraging strengths to seize opportunities and reducing weaknesses to counter threats. Used in early planning, it aids decision-making by considering internal and external factors to maximize benefits and minimize risks

SWOT analysis of Mithapur village:

- The SWOT analysis of Mithapur Village highlights key internal strengths, weaknesses, external opportunities, and threats that influence its agricultural and socio-economic landscape. The village benefits from access to essential resources such as water availability, multiple cropping cycles, and proximity to research institutions like ICAR-IIGR and JAU. Social harmony and the presence of modern irrigation systems further strengthen its agricultural potential.
- However, limitations such as inadequate healthcare, banking, and educational facilities, along with poor infrastructure and lack of entrepreneurial initiatives, present significant challenges. The absence of youth-led development efforts and formal farmer organizations weakens community-driven progress.
- Despite these challenges, Mithapur village has promising opportunities, particularly in advancing farming technology, adopting improved crop varieties, and leveraging government programs. The demand for groundnuts offers export potential, and proximity to markets enables competitive pricing.
- The village also faces serious threats, including exploitation by middlemen, land fragmentation, pest infestations, and volatile agricultural prices. Migration of youth and lack of local governance further exacerbate socio-economic vulnerabilities.
- Addressing infrastructural and administrative weaknesses while capitalizing on agricultural advancements and market access can enhance the village's overall development. Implementing support mechanisms for farmers and fostering entrepreneurship will be crucial for sustainable growth.

15. Conclusion:

The participatory rural appraisal (PRA) conducted in Mithapur village by ICAR-IIGR scientists provided an in-depth analysis of the village's socio-economic, agricultural, and infrastructural conditions. This study adopted a community-driven approach, ensuring that local knowledge and perspectives guided the assessment and decision-making processes.

Key findings and implications:

Natural resources & agriculture:

Mithapur has abundant water resources, fertile land, and favorable climatic conditions, allowing multiple cropping cycles. The adoption of modern irrigation techniques like drip and sprinkler systems has improved water management. However, soil fertility degradation and pest infestations pose significant challenges to long-term sustainability.

Infrastructure & services:

The study highlighted critical gaps in infrastructure, including poor road conditions, lack of higher education institutions, limited banking services, and inadequate healthcare facilities. The absence of a minimum support price (MSP) system further impacts farmers' income stability.

Market access & livelihoods:

Farmers in Mithapur primarily depend on agriculture, with groundnut being a major crop. However, issues like middlemen exploitation, lack of organized market spaces, and volatile crop prices create financial uncertainties. There is potential for value addition through local processing units and improved market linkages.

Technology adoption & mechanization:

The study revealed a high level of mechanization for basic agricultural activities, with widespread use of tractors, sprayers, and irrigation tools. However, advanced technologies like drones, oil mills, and decorticators remain largely absent, limiting productivity and value chain expansion.

Social & economic dynamics:

The village exhibits strong social harmony and traditional community networks. However, youth migration, lack of entrepreneurial spirit, and absence of self-help groups (SHGs) restrict economic diversification and innovation.

Major Challenges Identified:

Agricultural Constraints:

Pest and disease infestations (white grub, wilt, wireworms), lack of IPM practices, and declining soil fertility.

Economic Barriers:

Unstable prices, absence of MSP, lack of formal farmer organizations, and financial exclusion.

Infrastructure deficiencies:

Poor roads, no local PHC, inadequate drinking water distribution, and limited education facilities.

Social & Governance Gaps:

Youth migration, lack of local governance support, and absence of SHGs.

Opportunities for Growth

- Strengthening agricultural extension services to enhance knowledge on improved seed varieties and sustainable practices.
- Establishing farmer cooperatives to mitigate middlemen exploitation and enhance market access.
- Encouraging government intervention in infrastructure, education, and healthcare to improve overall living conditions.
- Promoting entrepreneurship and skill development programs to create alternative livelihood opportunities and reduce migration.

The PRA findings emphasize the need for integrated development strategies focusing on infrastructure, market accessibility, technological interventions, and social

empowerment. Addressing key constraints while leveraging the village's strengths can create a sustainable and prosperous future for Mithapur. The study serves as a foundation for policymakers, researchers, and local stakeholders to formulate targeted interventions that align with the community's needs and aspirations.

16. Photographs of PRA survey at Mithapur