AFC 55+ YEARS SUPPORTING RURAL INDIA

Since 1968

DS GROUP

IMPACT ASSESSMENT - 2025

Impact Assessment of

Creation of Water Economic Zones through Integrated Watershed Development

Kurabad, Udaipur, Rajasthan

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACKNOWLEDGEMENT

'Creation of Water Economic Zone (WEZ)', through an integrated watershed development project has been implemented since 2018 by CSR wing of Dharampal Satyapal Group, treating 4,727 hectares of land across the Kurabad block in the Udaipur district of Rajasthan.

This study is an effort to capture the impact of project in 3 years (2020-2021 to 2022-2023) on enhancing natural resources and livelihoods of community.

It is our pleasure to be part of this study. We would like to thank DS Group for entrusting us responsibility of conducting this study. We express our sincere gratitude to entire team of DS group, Arpan Seva Sansthan for their support during field interactions with community and for providing their valuable inputs during the study. We thank all the community members for providing their valuable time for insightful conversations during the study.

Dr. Harjeet Singh
AFC INDIA LIMITED

Abbreviations

Abbreviation	Full Form
CGWB	Central Ground Water Board
cum	Cubic Meters
DS	Dharampal Satyapal
GIS	Geographical Information System
GL	Ground Level
GPS	Global Positioning System
GSI	Geological Survey of India
FGD	Focused Group Discussion
Ha.	Hectare
IA	Institutional Assessment
IMD	India Meteorological Department
In	Inch
KL	Kilo-Liter
M.Y	Million Year
m bgl	Meters Below Ground Level
MSL	Mean Sea Level
NASA	National Aeronautics and Space Administration
NW-SE	Northwest-Southeast
PWQT	Puqi Geological Exploration Equipment Institute
RS	Remote Sensing
SSW	South-South West
SOI	Survey of India
SWC	Soil & Water Conservation
TCM	Thousand Cubic Meter
WUG	Water User Group

EXECUTIVE SUMMARY

Water Economic Zone Kurabad Impact Assessment 2025

PROJECT OVERVIEW

The DS Group's "Creation of Water Economic Zones through Integrated Watershed Development" project in Kurabad block, Udaipur district, Rajasthan, represents a transformational Corporate Social Responsibility initiative implemented from 2020-21 to 2022-23. AFC India Limited conducted a comprehensive impact assessment covering soil and water conservation structures, livelihood interventions, and community development across 14 villages, with detailed evaluation of 5 representative villages through stratified sampling methodology.

The project employed a ridge-to-valley approach combining modern technology with community-driven implementation to enhance water availability, boost agricultural productivity, and ensure environmental sustainability in this semi-arid region receiving average annual rainfall of 668.25 mm.

KEY ACHIEVEMENTS

Water Security & Infrastructure Development

Soil & Water Conservation Impact:

- 18 SWC structures **physically verified across 8 micro-watersheds with 100% satisfactory structural integrity**
- Total storage capacity**: 2,20,300 m³ (current) from initial 2,92,597.68 m³ capacity (23% reduction due to siltation)**
- Strategic placement**: 11 structures in Moderate Recharge Zone, 7 in High Recharge Zone with scientifically sound site selection**
- Groundwater improvement**: 2-3.5 meter rise in water table across 27 observation wells**
- Recharge enhancement**: 25-30% overall recharge potential with 8-9 annual recharge events**

Comprehensive Infrastructure:

- 35,106.5 cum **Continuous/Staggered Contour Trenches (CCT/SCT)**
- 9,056.15 cum **Deep Continuous Contour Trenches (DCCT)**
- 771.25 running meters **Loose Stone Check Dams (LSCD)**
- 6 Anicuts and 10 Mini Percolation Tanks **strategically positioned**

Agricultural Transformation

Land Use Enhancement:

- Barren land reduction**: 1,860.63 hectares (from 3,699.64 to 1,839.01 hectares)**
- Agricultural expansion**: 237.76 hectares increase (593.90 to 831.66 hectares)**
- Vegetation increase**: 53.51% improvement (672.00 to 1,445.59 hectares)**
- Fallow land emergence**: 1,613.93 hectares indicating land rehabilitation potential**

Productivity Improvements:

- Multi-season farming**: Transition from single-season rainfed to year-round cultivation**
- Cropping intensity**: Enhanced cultivation across Kharif, Rabi, and newly introduced Zaid seasons**
- Income enhancement**: 100-110% increase in farmer incomes**
- Water availability**: Extended irrigation capacity throughout the year**

SCIENTIFIC VALIDATION THROUGH LABORATORY ANALYSIS

Soil Quality Enhancement (Project vs Control Areas):

- Available Nitrogen**: 194.6% increase (207 → 610 mg/kg) indicating outstanding fertility enrichment**
- Water Holding Capacity**: 54.3% improvement (12.9% → 19.9%) enhancing drought resilience**
- Phosphorus Availability**: 28.8% increase (0.78% → 1.01%) supporting root development**
- Iron Content**: 73.5% increase (14.90 → 25.85 mg/kg) within acceptable levels aiding plant vigor**
- Soil EC**: 26.2% decrease (1,395 → 1,030 µS/cm) indicating stabilized nutrient levels**

Water Quality Improvements:

- pH enhancement**: Increased from 6.87 to 7.23 for optimal nutrient uptake**
- Iron reduction**: 77.3% decrease (0.66 → 0.15 mg/L) reducing contamination risks**
- Copper levels**: 63.3% decrease (0.36 → 0.13 mg/L) reducing plant toxicity**
- TDS improvement**: 26.1% decrease (905 → 669 mg/L) optimizing irrigation quality**
- BOD/COD reduction**: 61.4% and 65.7% respectively indicating improved organic waste management**

Geophysical Study Results

Comprehensive geophysical analysis using PQWT technology at 4 strategic locations revealed:

- Blue/Light blue zones **at 30-90 meter depths indicating highly promising groundwater-bearing formations**
- Fractured rock formations **promoting active aquifer recharge from SWC structures**
- Multi-layered aquifer systems **effectively replenished by conservation measures**
- Enhanced infiltration pathways **supporting sustainable groundwater supply**

LIVELIHOOD ENHANCEMENT PROGRAM

Multi-Component Intervention Results

Overall Impact Across 22 Beneficiary Households:

- Villages covered**: 5 villages (Vnjanirodi, Aavra, Khajuriya, Gudli, Bhutiya) with 100% implementation success**
- Sustainability rate**: 100% operational after 3+ years**
- Total unique beneficiaries**: 22 households with comprehensive coverage**

Component-Wise Achievements

1. WADI Development (13 farmers, 1.730 hectares):

- Income increase: **₹8,64,149 total (₹66,473 per household, 65.8% growth)**
- Water efficiency: **52% reduction in water usage through drip irrigation systems**
- New income streams: **Vegetables (₹52,199) and fruits (₹14,873) annually**
- Market independence: **Progressive evolution from 80% facilitated to 95% independent marketing**
- Adaptive management: **Successful transition from papaya to lemon cultivation**

2. Good Agricultural Practices (8 farmers):

- Rabi season improvement: **24.1% average income increase with ₹49,411 total additional income**
- Yield enhancement: **17.8% average increase across participating farmers**
- Technology adoption: **100% GAP implementation with sustained wheat cultivation practices**

3. High Value Crops (5 farmers):

- Climate-resilient diversification: **IIMR Hyderabad improved proso millet varieties**
- Income growth: **₹68,358 additional annual income (13.1% average increase)**
- Adoption success: **100% continued cultivation demonstrating farmer acceptance**

4. Custom Hiring Centre (4 farmers, 3.3 hectares):

- Mechanization efficiency: **75-80% time savings through community seed drill services**
- Yield improvements: **10-25% increases across wheat, sorghum, mustard, and barley**
- Cost effectiveness: **₹3,000 per hectare with 100% farmer satisfaction and recommendation rates**

5. Pastureland Development (9 farmers, 10.5 hectares):

- Timber asset creation: **2,200 surviving Melia Dubia trees (73.3% survival rate) with ₹88,00,000 potential value**
- Fodder enhancement: **4x increase in production through cut-and-carry management**
- Infrastructure development: **Solar irrigation system (5 HP) with complete boundary protection**

6. Training Component:

- Universal coverage: **All 22 farmers with 100% technology adoption enabled**
- Capacity building: **Comprehensive skill transfer across integrated farming systems**
- Knowledge retention: **Sustained implementation of learned practices**

GOVERNMENT REVENUE DATA VALIDATION

Crop Area Expansion (2020-21 to 2024-25) - Patwari Records:

- Kharif crops: **21.2% increase (600 to 727 hectares) across 4 Panchayats, 11 villages**
- Rabi crops: **20.9% increase (569 to 688 hectares) demonstrating water security impact**
- Wheat expansion: **100 hectares increase (19.3% growth) as primary beneficiary crop**
- Sorghum growth: **47.6% increase showcasing successful crop diversification**

ENVIRONMENTAL & SOCIAL IMPACT

Ecological Restoration

Land Cover Transformation:

- Barren land rehabilitation**: Significant conversion to productive and vegetated areas**
- Vegetation density**: Progressive improvement from 2019 to 2024 analysis**
- Moisture content enhancement**: High moisture areas increased from 9% to 15%**
- Water body expansion**: 15.49% increase (25.02 to 29.60 hectares)**

Resource Efficiency:

- Organic transition**: 200 quintals/year compost production reducing chemical fertilizer dependency by 39%**
- Water conservation**: Technology integration achieving 30-50% efficiency improvements**
- Soil health**: Enhanced organic matter and nutrient cycling**

Community Empowerment

Focus Group Discussion Results (107 participants, 5 villages):

- Overall satisfaction**: 94% highly satisfied with transformational outcomes**
- Water infrastructure**: 96% satisfaction with reliability and access**
- Livelihood enhancement**: 91% satisfaction with income diversification**
- Migration reduction**: Decreased from 67% to 25% of families requiring seasonal migration**

Technology Integration Success:

- Drip irrigation adoption**: 25-35% water savings with ₹8,000-12,000 annual cost reduction**
- Solar system performance**: 99% availability during sunny days with zero operational costs**
- Food security achievement**: Extended self-sufficiency from 4-5 months to 8-9 months**

STRATEGIC OUTCOMES & SUSTAINABILITY

Model Excellence Indicators

- Scientific validation**: Laboratory-confirmed soil and water quality improvements**
- Economic viability**: Sustained income growth across all intervention categories**
- Environmental restoration**: Measurable ecosystem recovery with resource conservation**
- Technical sustainability**: 100% farmer-managed systems operational after 3+ years**
- Social inclusion**: Comprehensive benefits across different socio-economic categories**

Replication Framework

The WEZ Kurabad project establishes a comprehensive model combining:

- Ridge-to-valley treatment **with strategic structure placement**
- Community-driven implementation **ensuring local ownership**
- Technology integration **supporting climate resilience**
- Market-oriented development **with progressive independence**
- Adaptive management **demonstrating flexibility and learning**

Long-term Impact

The project transforms Kurabad into a Water Economic Zone through:

- Sustainable water security **with recharged aquifers and efficient usage**
- Diversified agriculture **supporting year-round productivity**
- Enhanced livelihoods **with multiple income streams and reduced vulnerability**
- Environmental conservation **with restored ecosystem services**
- Institutional capacity **for continued development and expansion**

Strategic Recommendation: The WEZ Kurabad model provides a scientifically validated, economically viable, and socially inclusive framework for scaling integrated watershed development across India's semi-arid regions. This flagship initiative demonstrates that corporate social responsibility can achieve transformational rural development through comprehensive, community-driven approaches with complete sustainability.

1 Introduction

ABOUT AFC INDIA LIMITED

Institutional Excellence & Legacy

AFC India Limited (formerly Agricultural Finance Corporation Limited) stands as India's premier multi-disciplinary development organization with an illustrious legacy spanning over 57 years of excellence (since 1968) in providing comprehensive consulting, advisory, and implementation support across agriculture, rural development, and strategic socio-economic sectors.

Organizational Structure & Governance

- Institutional Framework
  - Legal Status: Deemed Government Organization under Government of India
  - Ownership Structure: Wholly owned by NABARD, Commercial Banks & EXIM Bank
  - Governance: Board of Directors with representation from promoter institutions
  - Audit Mechanism: CAG (Comptroller and Auditor General) audited for transparency
- Quality Assurance
  - ISO Certification: ISO 9001:2015 certified for quality management systems
  - CMMI Level 3: Certified for process maturity and capability
  - Professional Standards: Adherence to international evaluation and assessment standards

Track Record & Global Reach

- Performance Metrics
  - 6000+ Consulting Assignments successfully completed across India
  - Pan-India Operational Presence with state-of-the-art facilities
  - Diverse Client Portfolio: Central Government, State Governments, PSUs, Development Banks, NGOs
  - International Partnerships: World Bank, IFAD, ADB, FAO, UNDP, GIZ
- Geographic Coverage
  - Operations across all 28 states and 8 union territories of India
  - International assignments in South Asia, Africa, and Southeast Asia
  - Multi-cultural and multi-linguistic expertise for diverse contexts

Core Competencies & Service Portfolio

- Strategic Consulting Services
  - Project Formulation & Appraisal: Comprehensive feasibility studies and project design
  - Policy Research & Advisory: Evidence-based policy recommendations
  - Institutional Development: Capacity building and organizational strengthening
  - Financial Engineering: Innovative financing mechanisms and risk assessment

- Monitoring, Evaluation & Impact Assessment

  - Impact Evaluation Excellence: Rigorous causal analysis using advanced methodologies
  - Results-Based Monitoring: Performance tracking throughout project lifecycles
  - Baseline & Endline Studies: Comprehensive data collection and analysis
  - Third-Party Evaluations: Independent and objective assessment frameworks

- Sectoral Specialization

  - Agriculture & Agribusiness: Crop production, livestock, fisheries, food processing
  - Rural Development: Watershed management, livelihood promotion, infrastructure
  - Financial Inclusion: Microfinance, SHG promotion, digital financial services
  - Climate Change: Adaptation strategies, mitigation planning, resilience building

Technical Excellence in Impact Assessment

- Methodological Innovation AFC India Limited has pioneered advanced impact assessment methodologies including:

  - Randomized Controlled Trials (RCTs) for causal impact evaluation
  - Quasi-Experimental Designs using propensity score matching and difference-in-differences
  - Mixed-Methods Approaches combining quantitative rigor with qualitative insights
  - Participatory Evaluation Frameworks ensuring community voice in assessment

- Technology Integration

  - Digital Data Collection: CAPI-based surveys with real-time quality checks
  - GIS and Remote Sensing: Spatial analysis for watershed and agricultural assessments
  - Data Analytics: Advanced statistical software and machine learning applications
  - Dashboard Development: Interactive platforms for stakeholder engagement

- Capacity Building Excellence

  - Training Programs: Over 10,000 professionals trained annually
  - Knowledge Products: Research publications, policy briefs, best practice documentation
  - Innovation Labs: Testing grounds for new approaches and technologies
  - Academic Partnerships: Collaborations with premier institutes like IIMs, IITs, and
  - agricultural universities

AFC's Role in Water Economic Zone Assessment

• Assignment Scope AFC India Limited has been entrusted by DS Group to conduct a comprehensive impact assessment of the Water Economic Zone project in Kurabad, leveraging its deep expertise in:

  - Watershed Development Evaluation: 25+ years of experience in watershed impact assessment
  - Agricultural Impact Analysis: Proven methodologies for measuring productivity and income changes
  - Community-Based Assessment: Participatory approaches ensuring stakeholder engagement
  - Sustainability Evaluation: Long-term viability analysis and institutional assessment

• Technical Approach The assessment employs AFC's proprietary Integrated Impact Evaluation Framework (IIEF) that combines:

- Quantitative impact measurement using before-after comparisons
- Qualitative assessment through stakeholder consultations
- Technical verification of infrastructure quality and functionality
- Environmental impact quantification using scientific protocols
- Socio-economic analysis with focus on equity and inclusion

Project Overview:

The DS Group (Dharampal Satyapal Group), a prominent multi-business corporation and leading FMCG conglomerate with a significant presence both in India and internationally, launched the **"Creation of Water Economic Zones through Integrated Watershed Development"** project in 2020-21 as part of its Corporate Social Responsibility (CSR) initiatives. This project focuses on the Kurabad block of Udaipur district, Rajasthan.

The project envisions the creation of Water Economic Zones by transforming water-scarce areas through integrated watershed development. This approach aims to enhance water availability, boost agricultural productivity, diversify rural livelihoods, and ensure environmental sustainability. The model combines ridge-to-valley treatment, modern technology, and community-driven implementation to achieve long-term resilience and economic viability.

Key Highlights:

- **Ridge-to-Valley Approach**: Strategic placement of structures based on hydro-geological conditions.
- **Water Security**: Improved groundwater recharge and irrigation access.
- **Agricultural Growth**: Increased crop yield, diversification, and climate-resilient farming.
- **Technology Integration**: Use of solar pumps, micro-irrigation, and precision farming.
- **Community Participation**: Local ownership, capacity building, and inclusive planning.
- **Multiple Use Systems**: Water harvesting linked to income-generating activities.

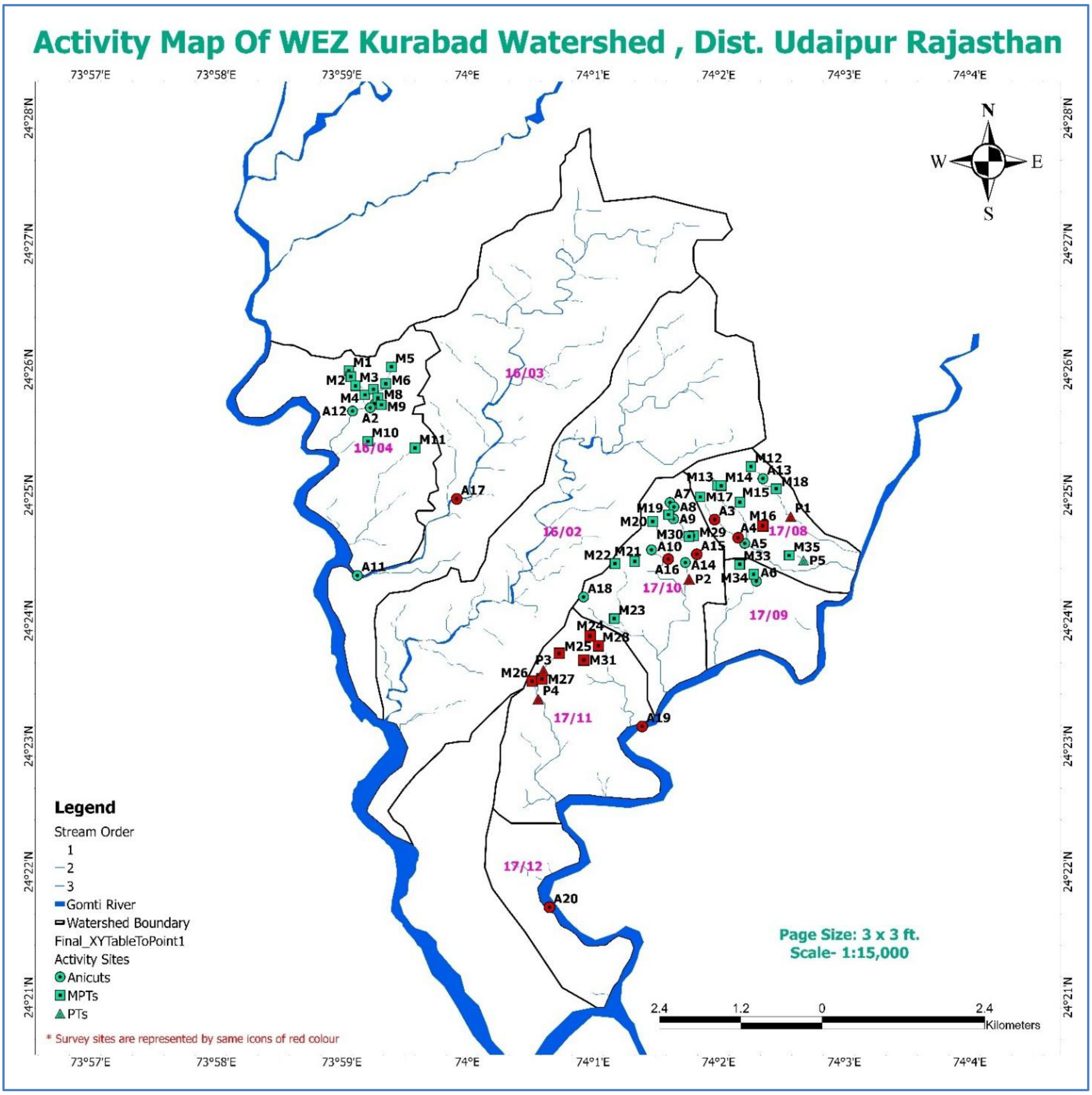


Fig. 1 Activity Map of Project Area

2 Study Approach & Methodology

2.1 About the Project Area

Kurabad block is strategically located approximately 50 km southeast of Udaipur city in the Girwa tehsil of Udaipur district, Rajasthan. The region spans across undulating terrain characterized by moderate hillocks and natural drainage patterns, making it highly suitable for integrated watershed development interventions.

<u>Agro-Climatic Conditions :</u>

- **Climate Zone:** Semi-arid with average annual rainfall of **668 mm.**
- **Soil Type:** Lime dominated clayey loam with yellowish brown soil, Silty loam to Silty clay.
- **Topography:** Undulating terrain with dendritic natural drainage pattern and moderately high runoff potential.
- **Water Resources:** Traditional wells (30-60 feet), borewells (60-200 feet), seasonal streams and rivulets.

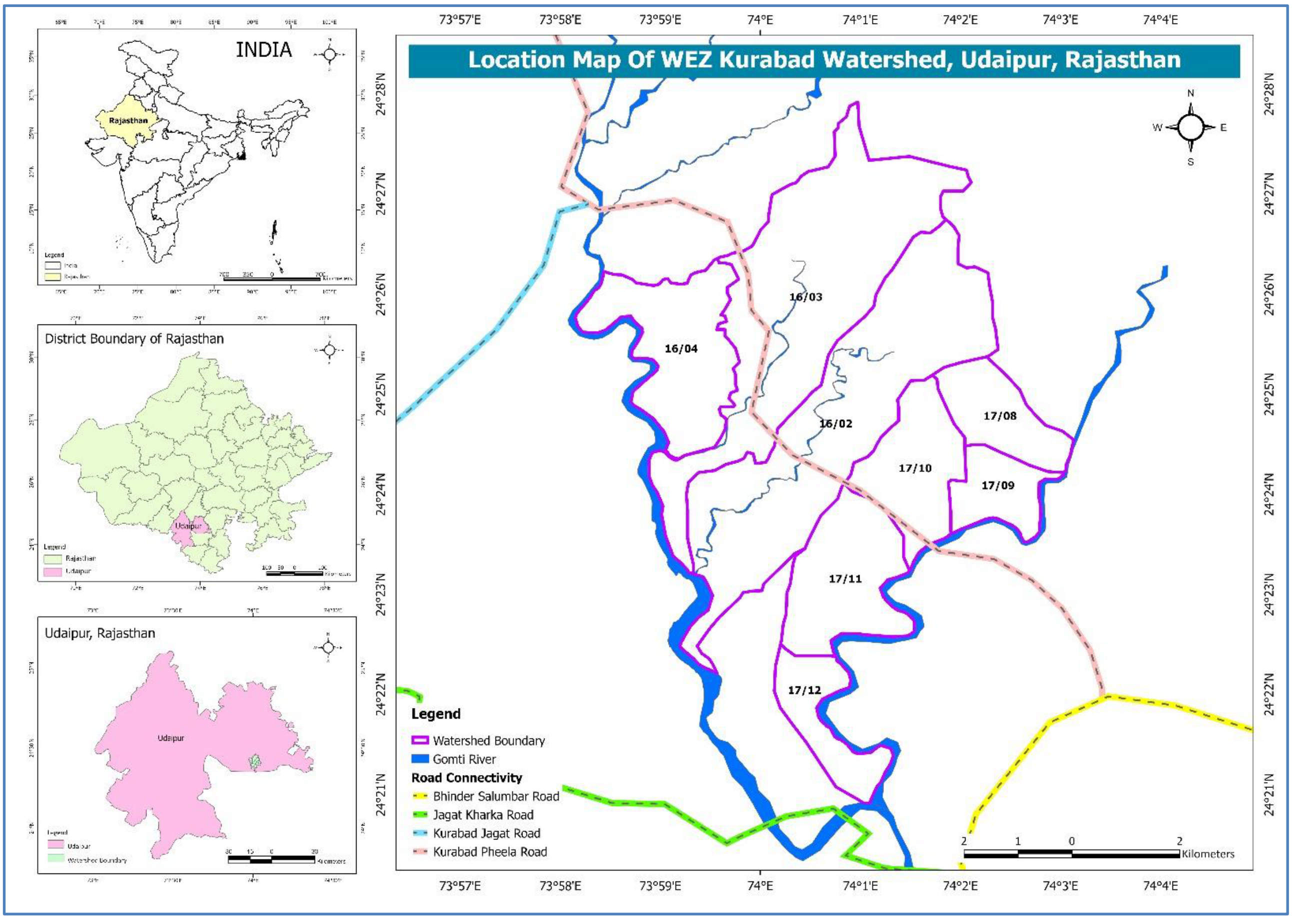


Fig. 2 Location Map of Project Area

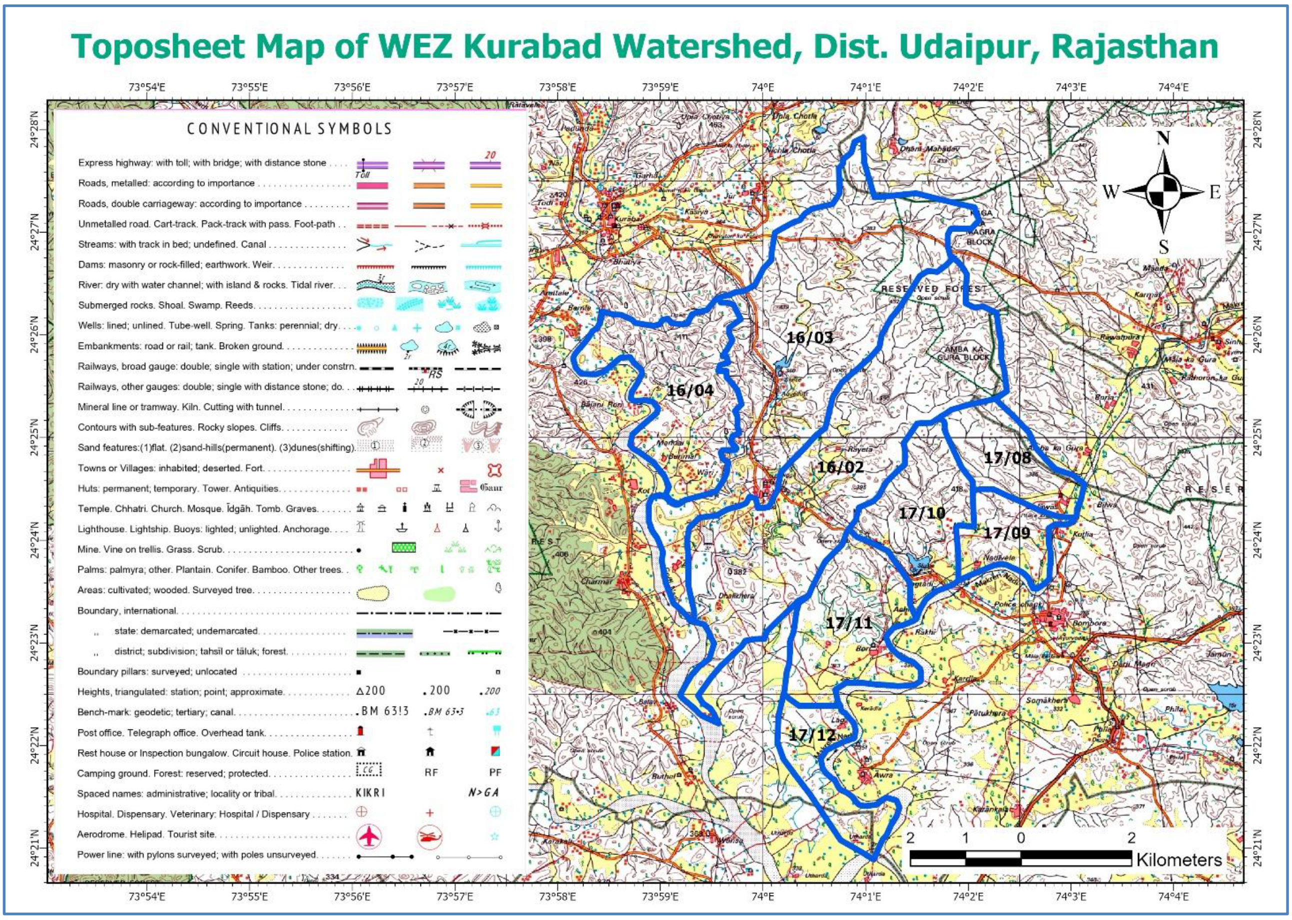


Fig. 3 Toposheet of Project Area

Rainfall Pattern

The rainfall data for the Kurabad block of Rajasthan was obtained from IMD gridded datasets, with the nearest grid point located approximately 4.5 km from the study area at 24.5°N latitude and 74.0°E longitude. An analysis of the annual rainfall from 1995 to 2024 (30 years) reveals considerable interannual variability, characteristic of semi-arid regions. The long-term average rainfall for the region stands at approximately 668.25 mm. Notable dry years include 1999 (107.19 mm) and 1998 (124.67 mm), while significantly wet years such as 2006 (1101.98 mm) and 2016 (1099.73 mm) indicate extreme rainfall events. After a relatively dry phase in the late 1990s, rainfall increased through the early 2000s, followed by fluctuating trends in the subsequent years. The period from 2010 onwards shows relatively more stable and above-average rainfall in many years, suggesting possible changes in monsoonal patterns or climatic influences in recent decades.

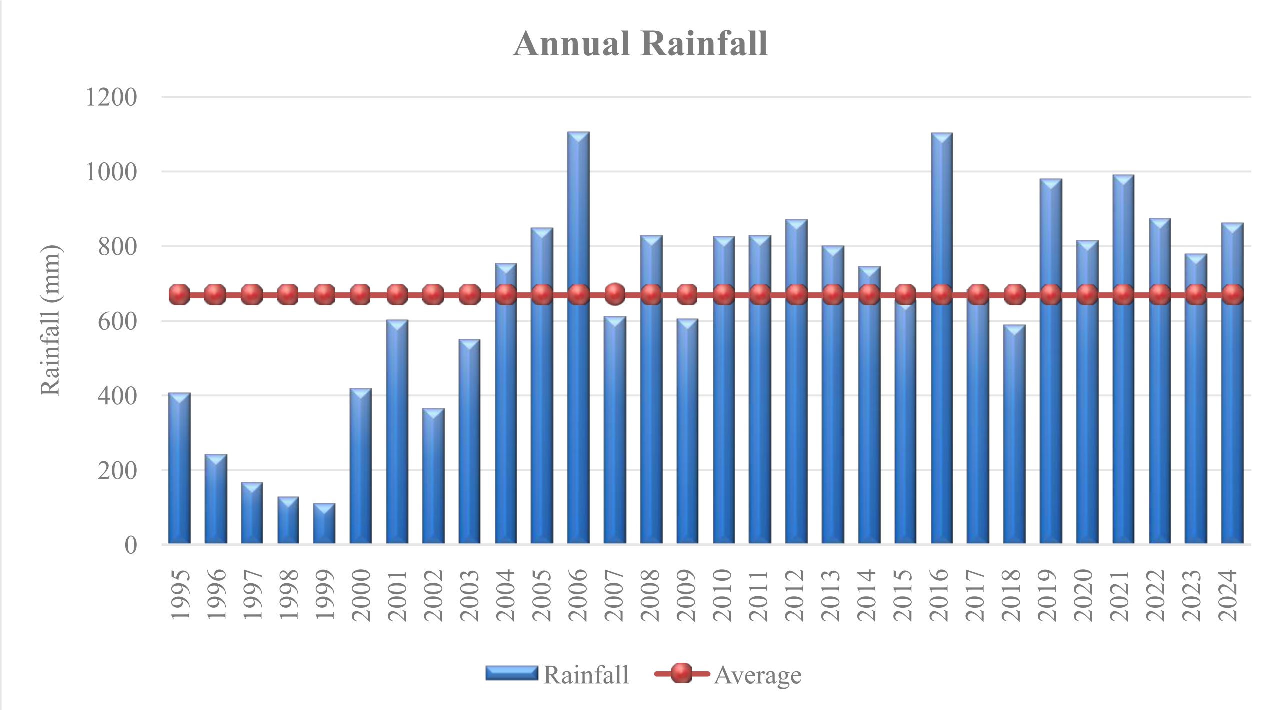


Fig. 4 Rainfall Pattern of Project Area (Source: IMD)

Table 1 Rainfall data of Kurabad Block

Year	Rainfall
1995	403.75
1996	238.48
1997	164.19
1998	124.67
1999	107.19
2000	416.10
2001	594.95
2002	363.11
2003	546.29
2004	751.67
2005	845.41
2006	1101.98
2007	605.59
2008	826.08
2009	602.53

Year	Rainfall
2010	823.38
2011	823.78
2012	869.99
2013	796.07
2014	742.86
2015	652.78
2016	1099.73
2017	680.52
2018	585.29
2019	977.29
2020	810.94
2021	987.14
2022	870.81
2023	777.13
2024	857.89
Average	**668.25**

2.2 Methodology Followed

Stratified Sampling Methodology

Sampling Strategy Following the RFP specifications, the assessment employs a stratified random sampling approach ensuring:

- Representation: At least 10% of each year's activities across all intervention types
- Geographic Coverage: Sample from 5 selected villages representing diverse agro-ecological zones
- Temporal Balance: Equal representation across project years (2020-21, 2021-22, 2022-23)
- Activity Diversity: Coverage of all major intervention categories

Sample Size Calculation

Activity Category	Total Units Implemented	Sample Size (10%)	Selection Method
A. Soil & Water Conservation			
CCT/SCT (Continuous/Scattered Contour Trench)	35106.5 cum	3511 cum	Random basis
DCCT (Deep Continuous Contour Trench)	9056.15 cum	906 cum	Geographic distribution
LSCD (Loose Stone Check Dam)	771.25 Rmt	77 Rmt	Technical verification
Anicuts	7 Nos.	1 No.	Representative sample
MPT (Mini Percolation Tank)	11 Nos.	1 No.	Technical assessment
B. Water Management			
Impact Raingun	5 Nos.	1 No.	Technology-wise
Drip Irrigation	10 Nos.	1 No.	Crop-wise distribution
Solar Power Irrigation	2 Nos.	1 No.	Complete coverage
C. Livelihood Enhancement			
Wadi Establishment	132 Nos.	13 Nos.	Income group-wise
Sanjeevan Eco Park	1 No.	1 No.	Complete coverage
Pasture Land Development	10.5 Ha	1 Ha	Area-wise sampling
High Value Crops	50 Nos.	5 Nos.	Crop-wise sampling

Activity Category	Total Units Implemented	Sample Size (10%)	Selection Method
Horticulture Plants Distribution	1670 Nos.	167 Nos.	Beneficiary-wise
Low Cost Compost Units	67 Nos.	7 Nos.	Technology assessment
Custom Hiring Centre	1 No.	1 No.	Complete coverage
Good Agricultural Practices	80 farmers	8 farmers	Practice-wise
D. Others			
Training & Capacity Building	131 sessions	13 sessions	Topic-wise coverage
Supply Chain Cold Storage	2 units	1 unit	Technical assessment
Marketing Support	1 instance	1 instance	Complete coverage

Multi-Stage Sampling Process

Stage 1: Village Selection

- Total Villages: 14 in Kurabad block
- Sample Villages: 5 villages selected using systematic random sampling
- Selection Criteria: Geographic distribution (East, West, North, South zones), intervention intensity, and agro-ecological diversity

Stage 2: Activity-wise Sampling

- Sampling Frame: Complete list of all activities with location coordinates
  Selection Method: Random sampling within each activity category

Stage 3: Beneficiary Selection

- Primary Beneficiaries: Direct recipients of interventions
- Secondary Beneficiaries: Households benefiting from common infrastructure

Data Collection Methodology

Quantitative Data Collection

- **Survey Instruments: Structured questionnaires with skip logic and validation checks**
- **Quality Assurance: Real-time data monitoring and field supervision**

Technical Verification Protocol

- **Structure Assessment: GPS coordinates, dimensions, functionality, and condition**
- **Engineering Standards: Compliance with design specifications and construction quality**
- **Performance Metrics: Water storage capacity, recharge potential, structural integrity**

Qualitative Data Collection

Focus Group Discussions (FGDs)

- Participants: Farmer groups, Self-Help Groups, Water User Committees, Panchayat members
- Topics: Project relevance, implementation process, outcomes, sustainability
- Methodology: Semi-structured discussions with trained facilitators

Key Informant Interviews (KIIs)

- Respondents: Project staff, technical experts, community leaders, government officials
- Coverage: Implementation challenges, technical aspects, institutional arrangements
- Approach: In-depth interviews using structured guides

Soil & Water Samples from project area and outside the project area (control) were taken and tested in laboratory to see difference

Impact Assessment Framework

Theory of Change The assessment is guided by a comprehensive Theory of Change that maps:

- Inputs: Financial resources, technical expertise, community participation
- Activities: Watershed development, livelihood interventions, capacity building
- Outputs: Infrastructure created, farmers trained, technologies adopted
- Outcomes: Increased water availability, improved productivity, enhanced incomes
- Impacts: Sustainable livelihoods, environmental conservation, community empowerment

Impact Indicators Matrix

Impact Domain	Key Indicators	Measurement Method	Data Source
Water Security	Water table rise, irrigation access, groundwater recharge	Technical measurement, surveys	Well monitoring, farmer interviews
Agricultural Productivity	Crop yields, cropping intensity, input efficiency	Household surveys, field verification	Farmer records, field observations
Income & Livelihoods	Agricultural income, diversification, asset creation	Economic surveys, participatory assessments	Household interviews, FGDs
Environmental Impact	Soil conservation, biodiversity, carbon sequestration	Scientific measurements observations	Field studies remote sensing
Social Outcomes	Institutional strengthening, capacity building, equity	Social assessments, institutional analysis	KIIs, community consultations

Key Thematic Areas and Areas of Inquiry

The study evaluates two core thematic areas - Soil & Water Conservation Structures and Community Ownership - to assess project effectiveness.

Table 2 Assessment Parameters

Assessment Area	**Parameters**
Physical Verification of WH Structures	- Location Accuracy - Photo Documentation - Structure Strength & Condition - Storage Capacity
Impact of WH Structures	- Change in Water Table - Access of Water for Irrigation - Change in land use
Community Ownership/ Sustainability	- Community Involvement - Water Users Group

This structured approach ensures a holistic evaluation of project outcomes, identifying strengths, challenges, and areas for further improvement.

3 Key Findings / Assessment Area

3.1 Physical Verification of SWC Structures

A total of 18 out of 60 SWC structures were physically verified across 8 micro-watersheds. The key findings are as follows:

- **Location:** All structures have been strategically constructed to serve their intended purpose, such as water storage, groundwater recharge, soil erosion control, runoff management, and soil moisture conservation.

Fig. 5 Anicut- Badiya aam puliya ke pass

The Groundwater Potential Recharge Zone (GWPRZ) map was prepared to analyze the suitability of the structures in relation to their potential for enhancing groundwater recharge. The spatial assessment of the WEZ Kurabad Watershed revealed that out of the total structures evaluated, **11 structures** fall within the Moderate Recharge Zone, while **7 structures** are located in the High Recharge Zone. This spatial alignment clearly demonstrates that the majority of the interventions have been strategically placed in areas with favourable recharge characteristics. The concentration of all structures within moderate to high recharge zones indicates a scientifically sound site selection process, enhancing the effectiveness of the watershed interventions in promoting sustainable groundwater recharge.

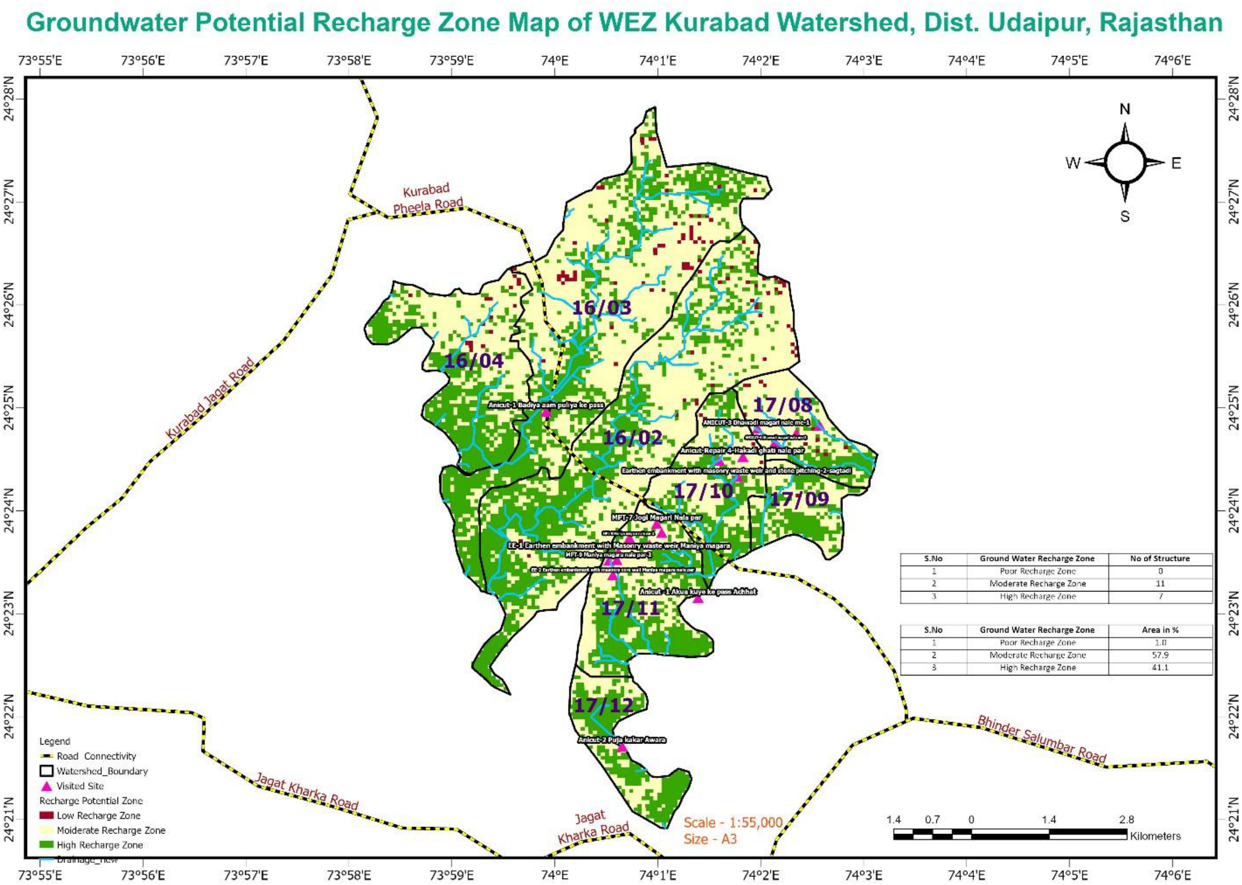


Fig. 6 Groundwater Potential Recharge Zone Map of project area

Table 3 Details of GWPRZ and number of SWC structures

S. No.	Ground Water Recharge Zone	Area in %	No. of Structures
1	Poor Recharge Zone	1.0	0
2	Moderate Recharge Zone	57.9	11
3	High Recharge Zone	41.1	7

- **Design:** Each structure has been designed by qualified technical experts following standard specifications commonly used for watershed structures. During field verification, the surveyed structure dimensions were found to be consistent with the original design plans, confirming adherence to technical standards.

- **Structural Quality:** The overall structural integrity is deemed satisfactory, with no significant damage observed. All structures have been well maintained since their construction. A detailed list of observations is provided in Annexure A.

Fig. 7 Jogi Magari MPT

- **Storage Capacity:** The storage capacities were estimated using satellite imagery (15/09/2024) and analyzed in Google Earth Pro. The total storage capacity of the surveyed SWC structures is **2,20,300 m³**, with variations in depth and catchment areas influencing water retention across different sites. Initially, during the construction phase of these structures, the estimated storage capacity was **2,92,597.68 m³**. The observed decrease of approximately **23%** in storage capacity is likely attributable to siltation and sediment deposition over time, which has gradually reduced the effective water holding capacity of the structures.

- Most structures are well-matched to their catchments. Gurjar Talab and Maniya Magara Nala have capacities above **38,000 m³** for **55-75 ha** catchments. Medium structures in Dhawadi Magari and Jogi Magari store between **3,000 and 9,000 m³**, suitable for smaller catchments. Overall, designs are appropriate for runoff and recharge. Only Puja Kakar Awara is underestimated, with just **12,700 m³** storage for a **3,000 ha** catchment, but since it is situated in the river, it cannot be designed for head wall height more than 2 meters as per the government rules.

Table 5 Storage Capacity of the SWC Structures

S. No.	Name of Structure	Catchment (m^2)	Submergence Area (m^2)	Depth (m)	Present Storage Capacity (m^3)	Initial Storage Capacity (m^3)
1	Anicut- Dhawadi magari nale me-1	178000	2750	1.5	4125	5320.3
2	Anicut- Dhawadi magari nale me-2	135000	2050	1.5	3075	4206.38
3	Gurjar talab nale par	553000	19500	2.5	48750	66476.8
4	Earthen embankment with masonry waste weir and stone pitching-2-sagtadi	200000	6750	2	13500	18972
5	Anicut Repair- In Hakadi Ghati Nala (Year of construction 2005-06	97800	1800	1.5	2700	3448
6	Anicut Repair- Badari (Year of construction 2005-06)	582000	3200	1.5	4800	6110
7	MPT- Baithak dhawadi nale me	70000	2550	1.5	3825	5299.2
8	MPT- Jogi Magari Nala par	137000	4700	1.5	7050	8750
9	MPT- Maniya magara nale par-1	70000	3100	2	6200	9145
10	MPT- Maniya magara nale par-2	39300	1950	2	3900	5089
11	MPT- Maniya magara nale par-3	35100	3100	1.5	4650	6053
12	MPTCW- Jogi magari nale me	81500	5100	2	10200	13905
13	Earthen embankment with Masonry waste weir Maniya magara	56000	2900	2	5800	8487
14	Earthen embankment with masonry core wall Maniya magara nale par	73600	15200	2.5	38000	52668
15	MPT- Humlaya nala pipal ke ped ke pass	49700	2350	2	4700	5549
16	Anicut- Near Badiya Aam Pulia	4300000	1550	1.5	2325	2719
17	Anicut- Akua kuye ke pass Achhat	32000000	17600	2.5	44000	56000
18	Anicut- Puja kakar Awara	30000000	6350	2	12700	14400
	Total				**2,20,300**	**2,92,597.68**

Fig. 8 Anicut- Akua kuye ke pass (Achhat)

<u>Continuous/Staggered Contour Trenches (CCT/SCT) and Deep Continuous Contour Trenches (DCCT)</u>

A total of 35,106.5 cubic meters of *Continuous Contour Trenches (CCTs)* and *Staggered Contour Trenches (SCTs)* were excavated across the treatment zones with the objective of reducing surface runoff, enhancing soil moisture retention, and supporting groundwater recharge. To increase water retention capacity and ensure long-term recharge benefits, *Deep Continuous Contour Trenches (DCCTs)* were also constructed with a total volume of 9,056.15 cubic meters.

Field verification revealed significant siltation across all trench types, primarily due to surface runoff during consecutive monsoon seasons. Sediment accumulation was found to be higher in DCCTs, especially in areas with steeper slopes which resulted in a storage capacity loss of approximately 25% to 40%.

The designed depths of the CCTs ranged from **0.60 to 0.62 m**, while the DCCTs were designed with depths between **0.75 and 0.77 m**. Field measurements revealed that silt deposition had reduced the effective trench depths, with observed reductions falling within the following ranges:

- **15 cm** in gentle slope (< 6%) regions
- to **25 cm** in steeper slope (>6%) regions

Fig. 9 Continuous Contour Trenches (CCT) visit at Sagatadi village

Siltation Trend and Annual Deposition Rate

- The siltation is not uniform across the years. It was likely **highest during the first year**, primarily due to **loose surface soil and freshly disturbed conditions** following excavation.
- In the subsequent years, **sedimentation rates declined**, attributed to the **gradual stabilization of the surrounding soil** and reduced sediment inflow.
- The **average annual silt deposition** is estimated at **3 to 4 cm/year** over the five-year assessment period.

<u>Loose Stone Check Dams (LSCD):</u>

A total of **771.25 running meters** of *Loose Stone Check Dams (LSCDs)* were constructed across seasonal gullies and drainage channels to intercept runoff, reduce channel erosion, and promote upstream sediment deposition and groundwater recharge.

During the field inspection, **moderate to heavy siltation** was recorded upstream of the LSCDs which equates to a **15% to 40% loss in functional storage depth.**

The depth of these structures, initially at **1 meter**, has reduced by:

- **15 cm in gentle slope areas**
- to **40 cm in steep slope areas**

Siltation Characteristics and Annual Trend

- Similar to the trenches, maximum siltation occurred in the first and second years, tapering off in subsequent years as the structures and surrounding soils began to stabilize.
- This reflects an average annual silt accumulation of 5 to 8 cm/year, depending on the slope gradient and sediment availability.

Fig. 10 Loose Stone Check Dam (LSCD) visit at Gudli village

3.2 Geophysical Study

The geophysical analysis carried out using the PQWT (Puqi Geological Exploration Equipment Institute) profile and processed maps reveals significant insights into subsurface hydrological conditions. These findings are crucial for understanding the effectiveness of SWC structures in enhancing groundwater recharge and restoring hydro-ecological balance. Geophysical studies were conducted at 4 pre-decided locations across the project area.

Fig. 11 Geophysical study at Anicut- Badiya aam puliya ke pass

Fig. 12 Geophysical study at MPT- Jogi Magari Nala par

3.3.1 Location 1: Near Anicut- Badiya aam puliya ke pass

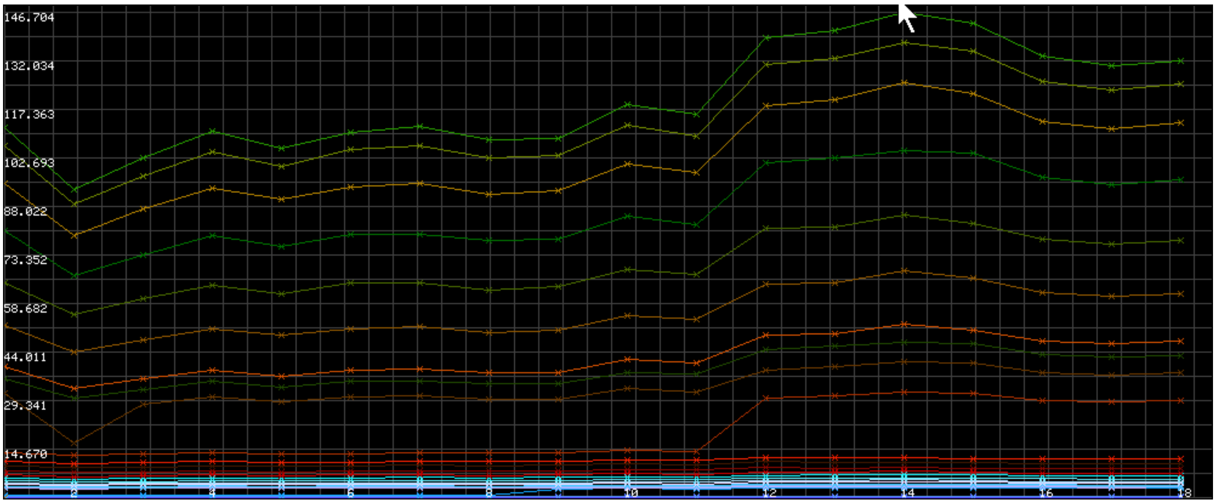


Fig. 13 Curve Map of Location 1

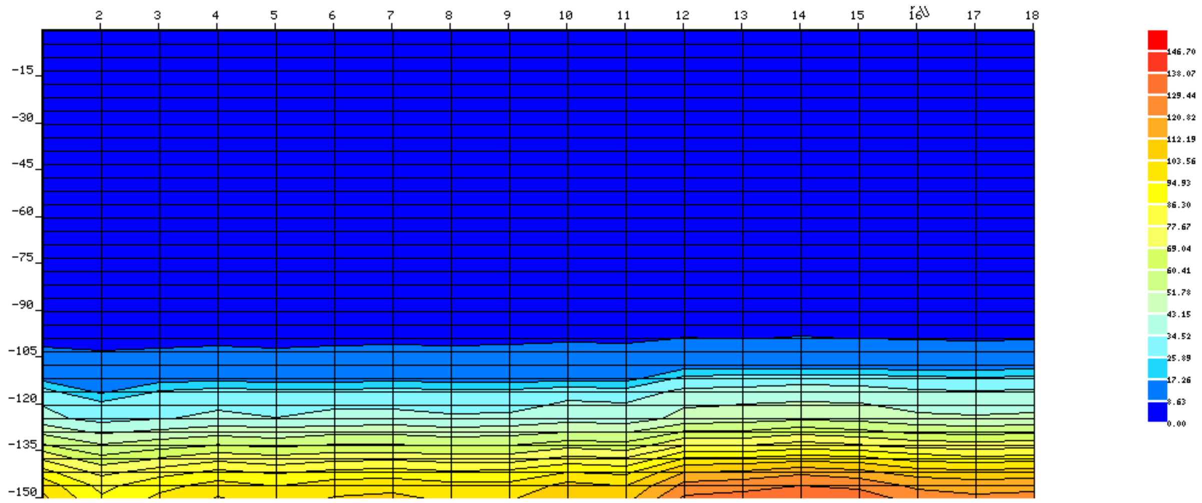


Fig. 14 Profile Map 2D of Location 1

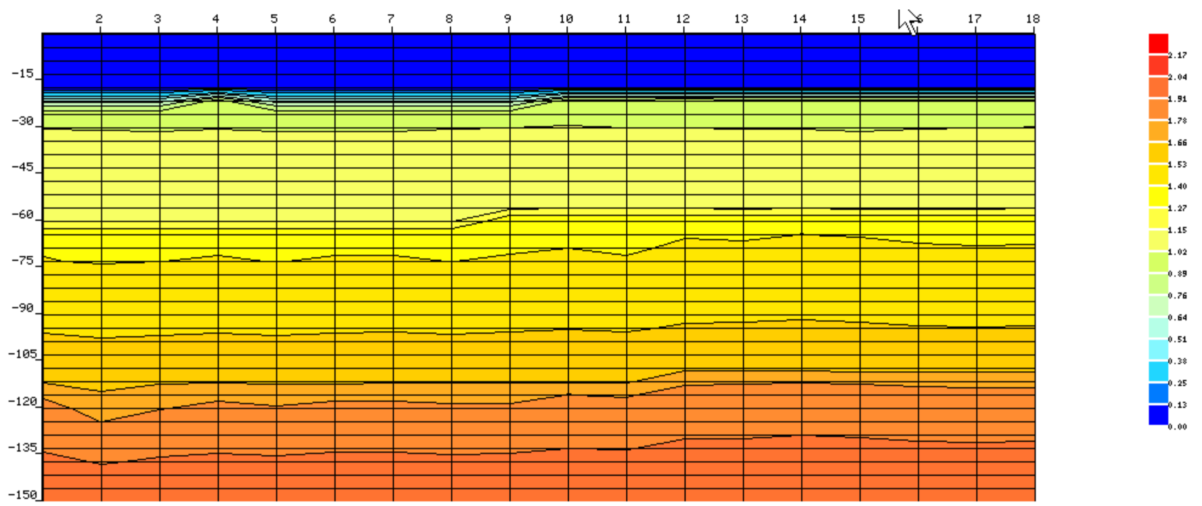


Fig. 15 Processed Map 2D of Location 1

- **Groundwater Availability Zones**

  - Blue and light blue zones between Points 6 to 10, extending from 40 to 90 meters depth, indicate highly promising groundwater-bearing formations. These correspond to fractured and weathered rocks that promote aquifer recharge and facilitate active subsurface water movement.

- **Soil Moisture and Unsaturated Zone**

  - The upper 0–30 meters of the profile show alternating yellow, green, and blue bands, indicating spatial variability in soil moisture content. This pattern reflects seasonal recharge effects and enhanced infiltration likely aided by SWC structures.

- **Water Table Behaviour**

  - The upward continuation of low-resistivity (blue) zones suggests a stabilizing or rising water table influenced by vertical recharge. The presence of deep interconnected fractures further supports the existence of a multi-layered aquifer system effectively replenished by conservation measures.

Table 6 Details of Sounding at Location 1

Zone (Colour)	Depth Range	Hydrogeological Meaning	Implication
Blue / Light Blue	40–90 m	Water-bearing, fractured/ weathered rock	High groundwater potential – good for wells
Green	20–40 m	Transition zone, partial saturation	Moderate potential
Yellow	10–30 m	Medium strength rock, variable moisture	Uncertain potential
Red/ Orange	Surface & deep pockets	Hard, resistive bedrock	Low or no groundwater availability

3.3.2 Location 2: Near MPT- Jogi Magari Nala par

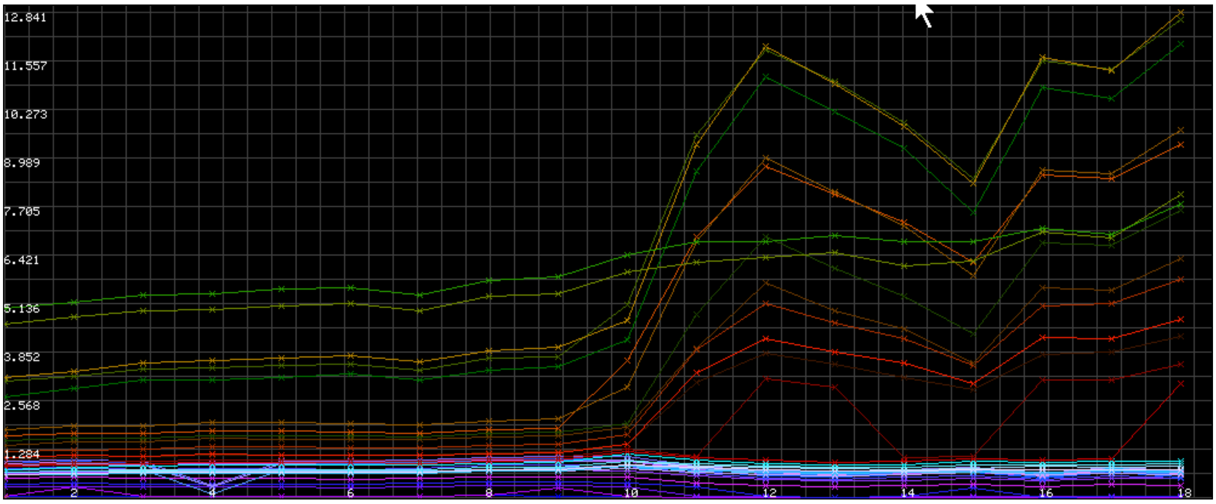


Fig. 16 Curve Map of Location 2

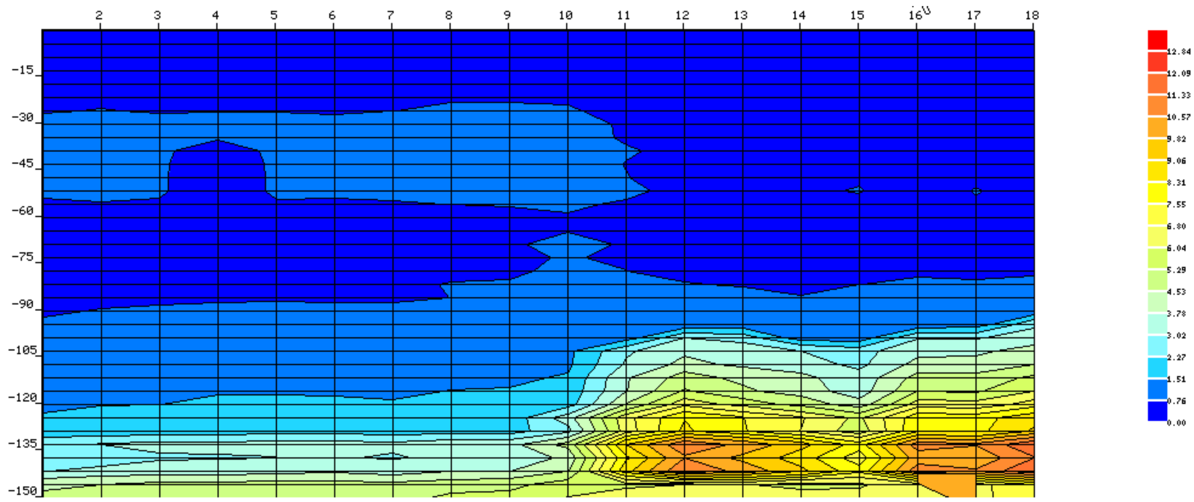


Fig. 17 Profile Map 2D of Location 2

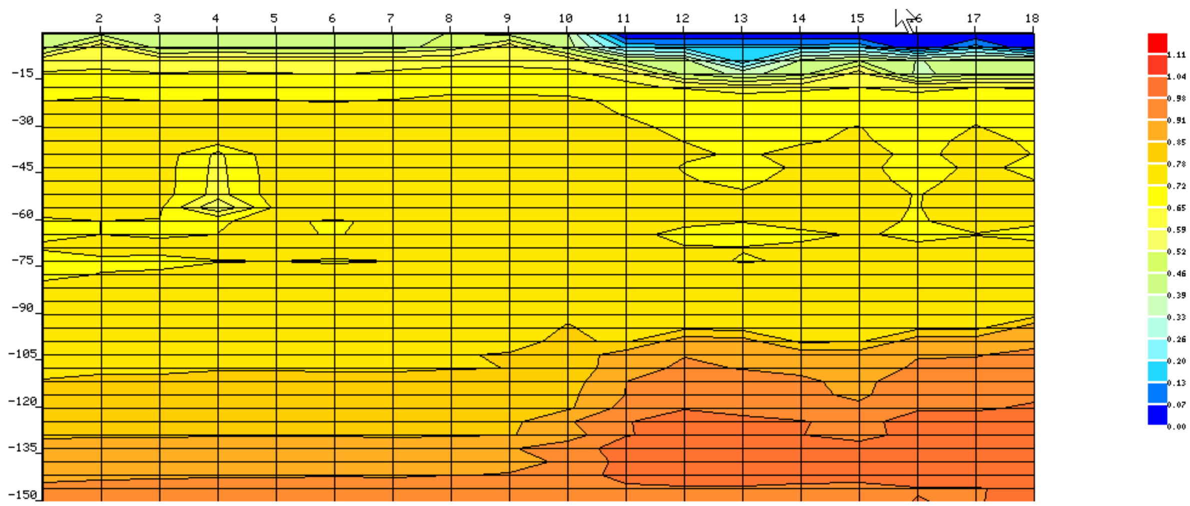


Fig. 18 Processed Map 2D of Location 2

- **Groundwater Availability Zones**
    - The presence of continuous blue and light blue zones between Points 4 and 11, extending from approximately 35 to 85 meters depth, indicates highly water-bearing fractured rock. These zones likely reflect enhanced recharge from SWC structures, making this area suitable for groundwater extraction.
- **Soil Moisture and Unsaturated Zone**
    - The upper 0–30-meter layer displays mixed green and yellow zones, suggesting partial saturation and seasonal moisture variability. This pattern indicates that SWC structures are improving infiltration and enhancing near-surface moisture retention.
- **Water Table and Recharge Behaviour**
    - The concentration and continuity of low-resistivity zones at deeper levels suggest a stable and actively recharging water table. Vertical and horizontal connectivity within these zones indicates effective percolation pathways, most likely supported by recharge from SWC interventions.

Table 7 Details of Sounding at Location 2

Zone (Colour)	Depth Range	Hydrogeological Meaning	Implication
Blue / Light Blue	35–85 m	Fractured/weathered, water-saturated rock	High groundwater potential – suitable for wells
Green	10–35 m	Moderately saturated transition zone	Good recharge support zone
Yellow	Surface to ~20 m	Medium-strength rock, limited saturation	Seasonal moisture retention, moderate potential
Red/ Orange	Localized patches	Hard, high-resistivity rock	Low permeability – unsuitable for groundwater use

3.3.3 Location 3: Near Earthen embankment with masonry waste weir and stone pitching-2-sagtadi

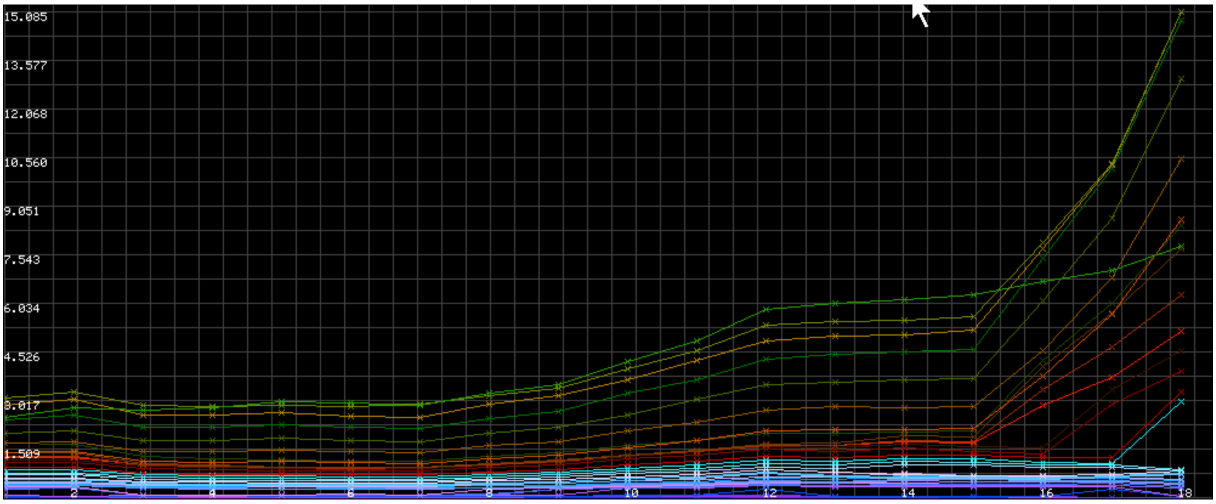


Fig. 19 Curve Map of Location 3

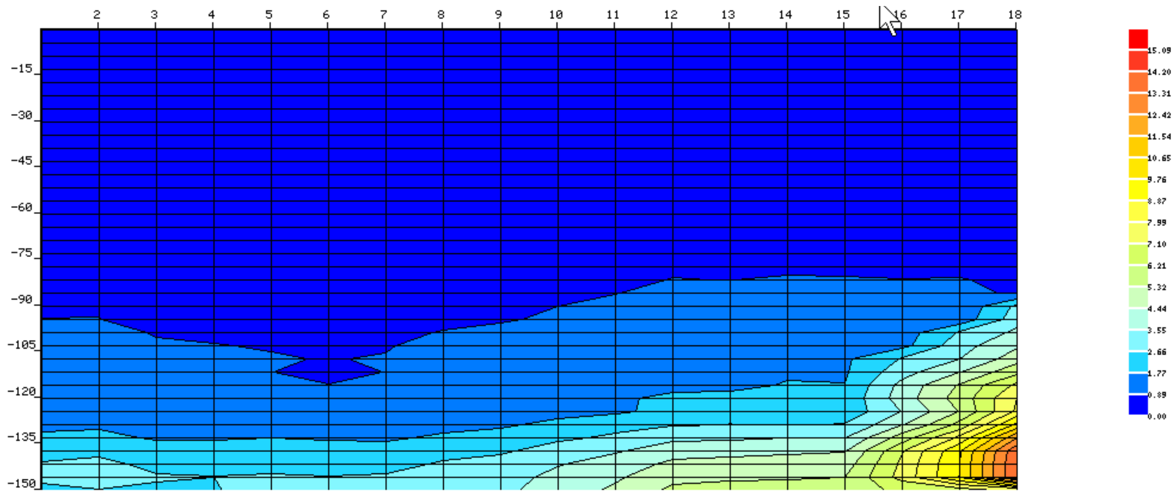


Fig. 20 Profile Map 2D of Location 3

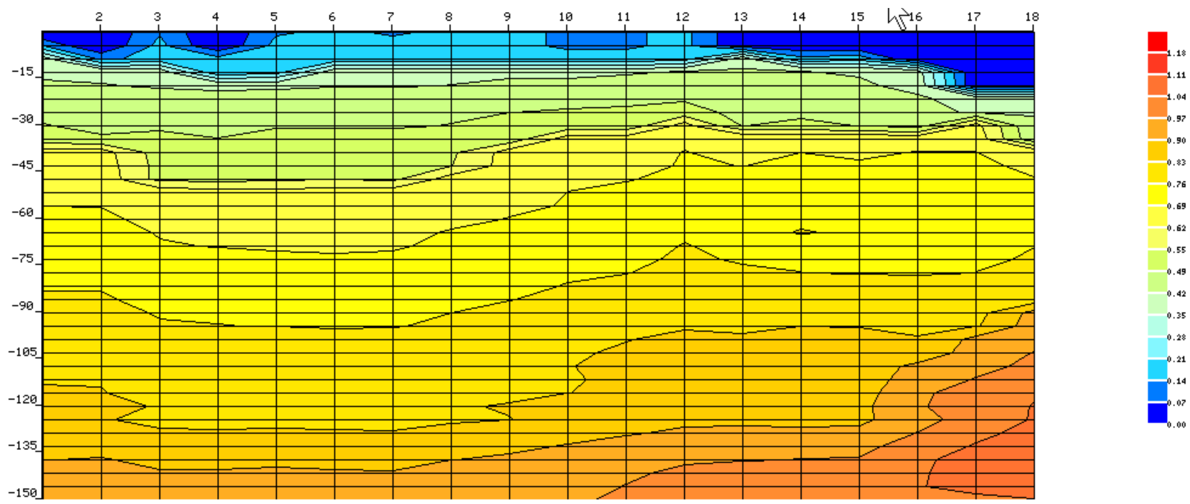


Fig. 21 Processed Map 2D of Location 3

- **Groundwater Availability Zones**
    - Blue and light blue zones are predominantly observed between Points 5 to 12, extending vertically from approximately 30 to 85 meters, indicating the presence of water-saturated, fractured rock formations. These zones suggest effective aquifer recharge, possibly enhanced by nearby SWC structures enabling infiltration into deep subsurface layers.

- **Soil Moisture and Unsaturated Zone**
    - The upper 0–30 m layer exhibits alternating green and yellow tones with isolated blue patches, pointing to spatial variability in soil moisture content. This pattern reflects seasonal water retention, likely influenced by SWC interventions that reduce runoff and promote localized infiltration.

- **Water Table Behaviour**
    - The processed map shows interconnected vertical and horizontal blue zones, signifying the presence of active recharge channels and a stable or rising water table. These characteristics highlight a multi-depth aquifer system that appears to be effectively replenished, indicating the long-term hydrological impact of conservation structures.

Table 8 Details of Sounding at Location 3

Zone (Colour)	Depth Range	Hydrogeological Meaning	Implication
Blue / Light Blue	30–85 m	Fractured/weathered, water-saturated rock	High groundwater potential – suitable for wells
Green	10–30 m	Moderately saturated transition zone	Supports infiltration and gradual recharge
Yellow	Surface to ~20 m	Medium-strength rock, limited saturation	Seasonal moisture – moderate recharge
Red/ Orange	Localized pockets	Hard, resistive rock	Poor infiltration – not recommended for drilling

3.3.4 Location 4: At Gudli Village

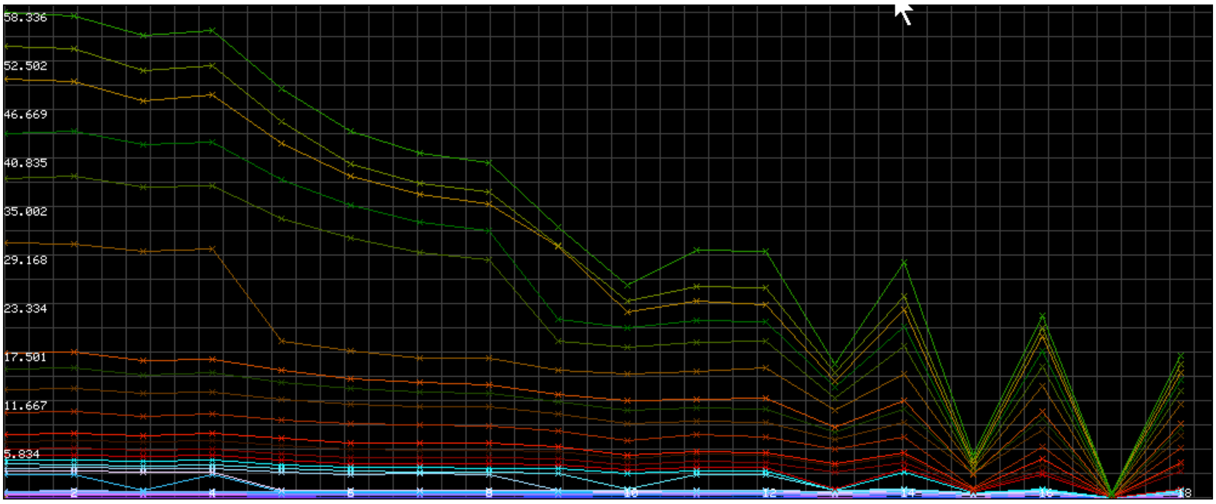


Fig. 22 Curve Map of Location 4

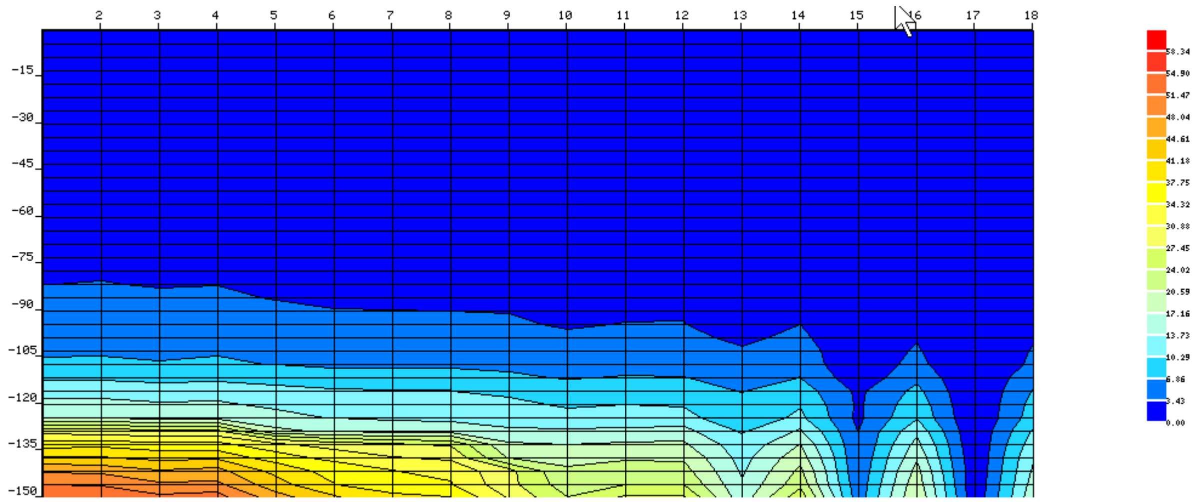


Fig. 23 Profile Map 2D of Location 4

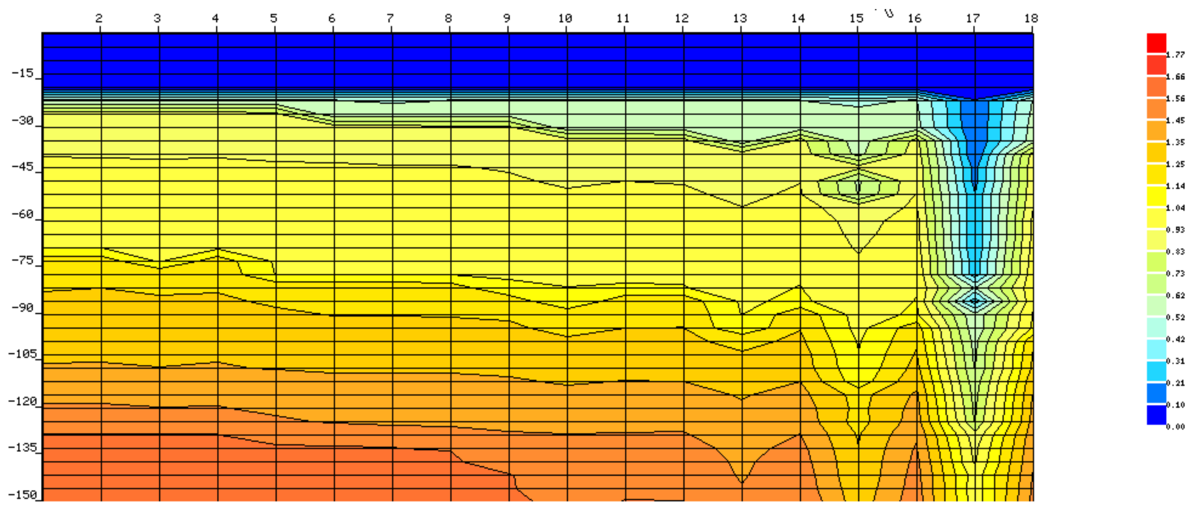


Fig. 24 Processed Map 2D of Location 4

- **Groundwater Availability Zones**
  - Blue and light blue anomalies are consistently identified between Points 6 to 14, spanning vertically from approximately 35 to 90 meters. These represent water-bearing fractured formations, indicating zones of high moisture retention. Their occurrence within the reach of SWC structures (e.g., anicuts, trenches and percolation tanks) suggests that aquifer recharge is actively occurring, likely due to induced infiltration from surface interventions.
- **Soil Moisture and Unsaturated Zone**
  - The top 0–30 m zone displays variable colouring—alternating between yellow, green, and light blue—indicating heterogeneous soil moisture conditions. This pattern suggests seasonal retention of moisture, likely due to SWC efforts such as bunding and vegetative cover, which enhance infiltration and reduce surface runoff, particularly in the monsoon and post-monsoon periods.
- **Water Table Behaviour**
  - The processed 2D map reveals continuous vertical and lateral blue pathways, indicative of active recharge channels and a connected aquifer system. These features suggest the presence of a multi-layered groundwater regime that is being steadily replenished. This pattern underscores the sustained impact of SWC structures on enhancing both shallow and moderately deep groundwater storage.

Table 9 Details of Sounding at Location 4

Zone (Colour)	Depth Range	Hydrogeological Meaning	Implication
Blue / Light Blue	35–90 m	Fractured/weathered, water-saturated rock	High groundwater potential, indicates aquifer recharge; suitable for wells
Green	10–30 m	Moderately saturated transition zone	Supports gradual infiltration and shallow recharge from SWC structures
Yellow	Surface to ~20 m	Medium-strength rock, limited saturation	Reflects seasonal moisture zones with moderate recharge capacity
Red/ Orange	Localized pockets	Hard, resistive rock	Poor infiltration, low permeability—unsuitable for water extraction zones

3.3 Impact of SWC Structures

Effect on Irrigation

- Water-harvesting initiatives have replenished both groundwater and surface reservoirs, so wells no longer dry up and farmers enjoy reliable water access year-round.
- Structures like Mini Percolation Tanks (MPTs), anicuts and trenches have boosted groundwater recharge and stabilized irrigation supplies.
- Farmers report noticeably improved water availability, which has translated into higher crop yields and reduced dependence on erratic monsoon rains.
- Consistent irrigation during the Rabi season has enabled the introduction of new, high-value crops such as strawberries.
- Enhanced water security has motivated cultivation on 100% of land in both Kharif and Rabi seasons (up from 100% Kharif and ~50% Rabi) and the addition of a Zaid cropping cycle.
- Overall crop production has risen across all seasons, and roughly 25% of formerly barren land has been converted into productive cropland.

Impact of SWC Structures

- Intervention of SWC structures has ensured that wells no longer dry up, maintaining reliable water supplies year-round.
- Soil and water conservation interventions have improved soil moisture retention and reduced runoff and soil erosion on the watershed's undulating terrain.
- Improved vegetation cover and year-round water access have bolstered livestock rearing and diversified agriculture-based livelihoods.
- As a result of higher yields and expanded cultivation, farmers' incomes have more than doubled (increasing by 100–110%), driving greater economic stability and growth across the region.
- Together with community-led maintenance, these interventions underpin long-term water and soil health, securing both agricultural productivity and ecological balance.

Fig. 25 MPT- Manya Magara nale par (3): (a) December 2019 and (b) November 2022

Fig. 26 Anicut- Dhawadi magari: (a) December 2019 and (b) November 2022

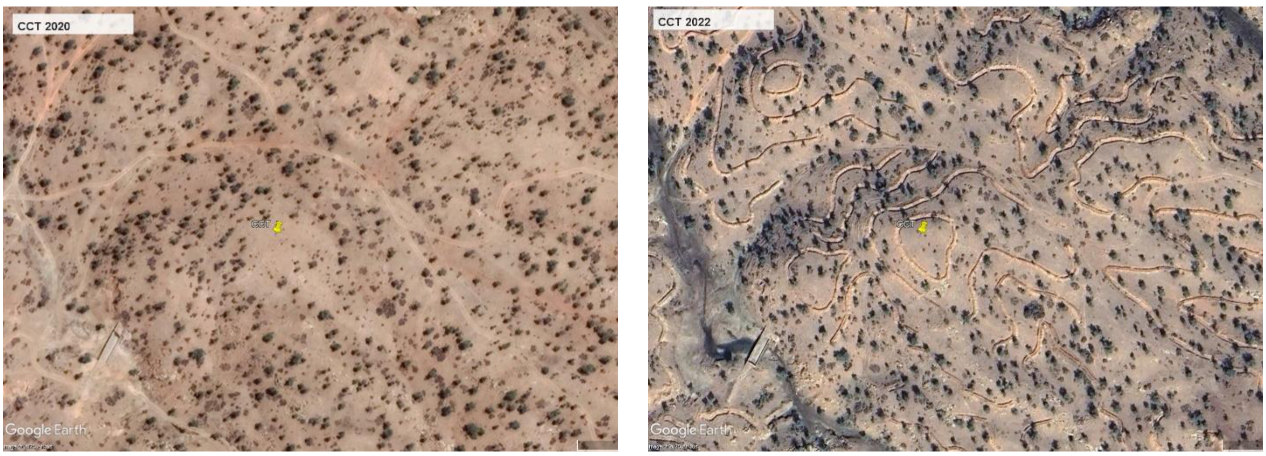


Fig. 27 CCT structures in Sulawas village: (a) May 2020 and (b) November 2022

Fig. 28 LSCD structures in Gudli: (a) May 2020 and (b) November 2022

Fig. 29 Pooja Kakar Anicut- Aawra: (a) Dec. 2019, (b) April 2021, and (b) Nov. 2022

Fig. 30 Manya Magara PT: (a) December 2019 and (b) November 2022

Note: We have prepared a KML file containing all the structures. Anyone using this file can cross-check variations on the Google Earth Pro platform.

Fig. 31 Badiya Aam Puliya Ke Pass: (a) Pre Monsoon Intervention (b) Post Monsoon Intervention

Fig. 32 Dhawadi Magari Nala: (a) Pre Monsoon Intervention (b) Post Monsoon Intervention

Fig. 33 Sagtadi Talab: (a) Pre Monsoon Intervention (b) Post Monsoon Intervention

Fig. 34 Puja Kakkar Anicut (19/08/2022)

Impact on Ground Water Recharge:

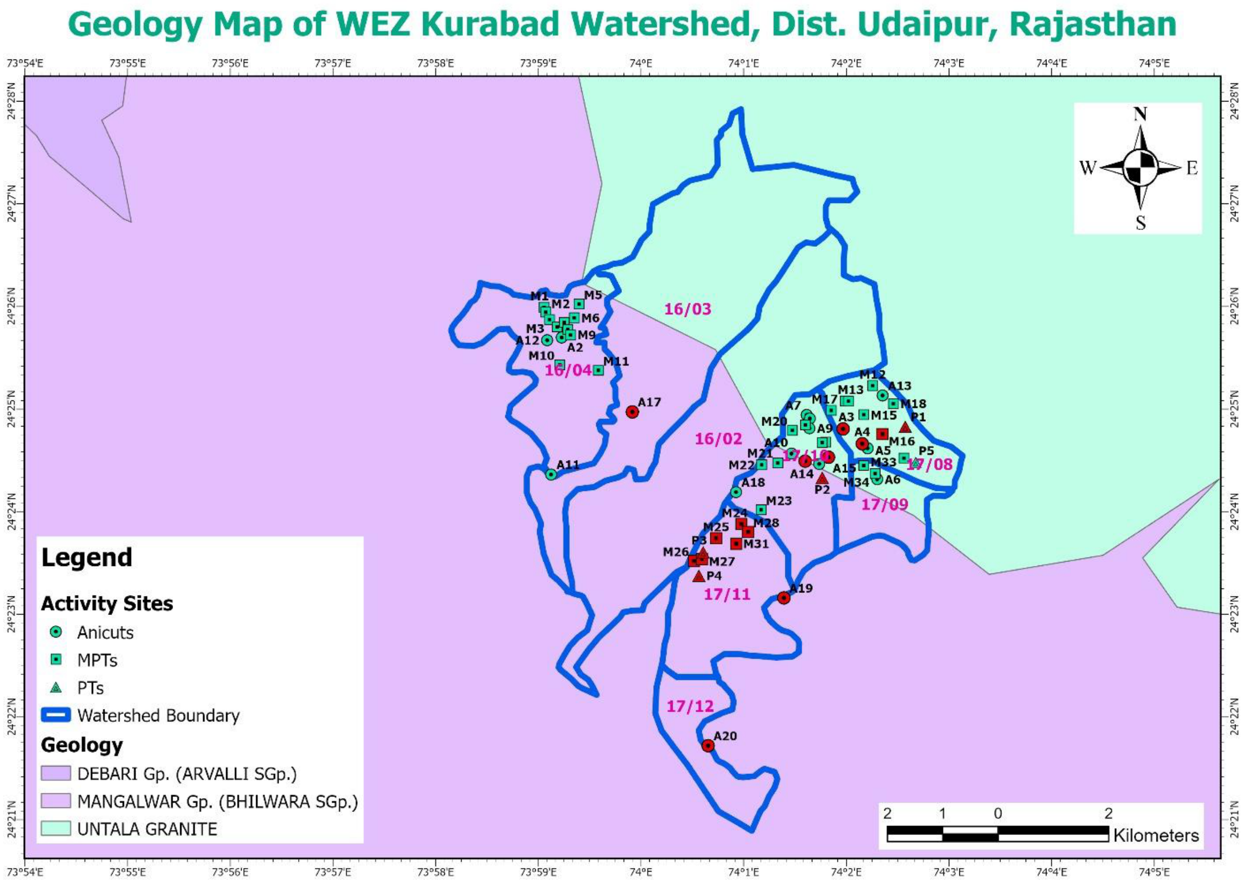


Fig. 35 Geology Map of Project Area

- Infiltration in the area is influenced by moderately permeable Mangalwar schists and fractured zones in the hard Untala Granite, which allow limited but effective water percolation.
- As a result of increased recharge, wells remain functional throughout the Rabi season, which previously faced water scarcity during this period.
- The sustained groundwater availability has supported a shift in cropping patterns, enabling farmers to cultivate water-dependent crops even in the dry season.
- Farmers can now successfully cultivate mustard and wheat. Along with this, zaid crops like Kangani, cheena are also cultivated
- With 20-30% recharge efficiency (as per the project area data), the overall recharge potential of the Kurabad block is estimated at 25-30%.
- As a result, groundwater levels in directly impacted areas are estimated to increase by approximately 10-15%.
- Further, discussion with the beneficiary farmers during field visit has revealed that the level of the water table has increased by 2-3 m after the intervention of water harvesting structures.

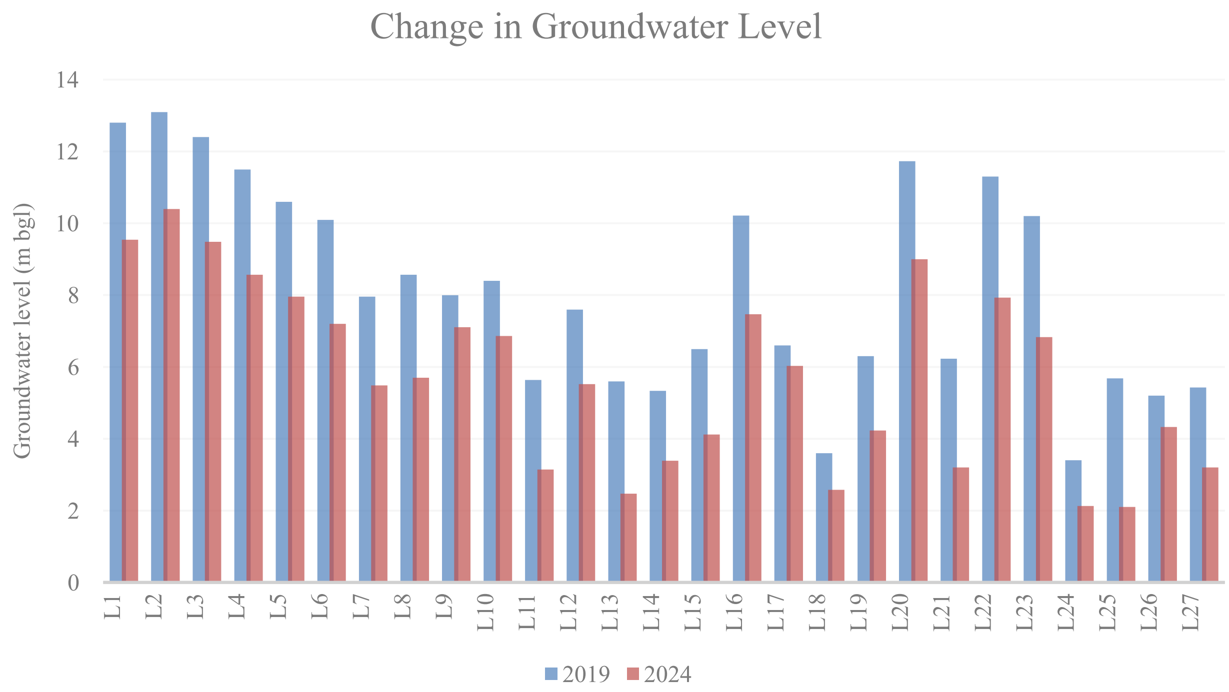


Fig. 36 Change in Groundwater level

A comparative analysis of groundwater levels across **27 observation wells** in the **WEZ Kurabad Watershed** demonstrates a substantial rise in groundwater levels following the implementation of watershed interventions. The years **2019 and 2020** represent the **pre-intervention baseline**, while **2024** reflects the **post-intervention impact**.

In many wells, the water table rose between 2 and 3.5 m. Dholi Khera (L25) showed the highest gain, with groundwater depth reducing from over 6 m to just above 2 m. Wells in Kali Magri (L22, L23) and Gudli (L20, L21) improved by more than 3 m. Critically depleted wells in Khajuriya (L1 to L3), which earlier recorded depths above 12 m, now range between 9.5 and 10.4 m.

Across the board, the 2024 readings are consistently shallower than both 2019 and 2020 levels, confirming that **post-intervention recharge has been widespread and effective**.

This pattern is most pronounced during **June**, the peak summer stress period, indicating that the impact is not seasonal or temporary but represents a real shift in groundwater retention capacity.

The close alignment between improved groundwater levels and the locations of SWC structures affirms that the **site selection, catchment suitability, and design of interventions were appropriate**. These outcomes validate the success of the watershed development effort in reducing depletion and enhancing water security.

A full breakdown of well-wise pre- and post-intervention data is provided in Annexure B.The comparative analysis of groundwater levels from June 2019 and June 2024—representing the peak summer period—in the WEZ Kurabad Watershed shows a significant improvement in groundwater conditions following the implementation of water conservation structures. As depicted in the bar graph, groundwater levels have risen by up to 3.5 meters at several locations, indicating enhanced recharge and storage.

In the 2019 groundwater level map, several areas—particularly in sub-watersheds like 16/04 and 17/11—recorded depths exceeding 12 meters below ground level (bgl), highlighting critical groundwater stress. In contrast, the 2024 map illustrates a marked shift, with a majority of the watershed now falling within the <6 m and 6–9 m bgl ranges. This spatial transition confirms a tangible improvement in groundwater availability.

Such changes during the driest period of the year reflect the efficacy of the watershed interventions. The correlation between structure locations and improved groundwater zones validates the accuracy of site selection and structural design, making the interventions both timely and technically sound. The detailed data are presented in Annexure B.

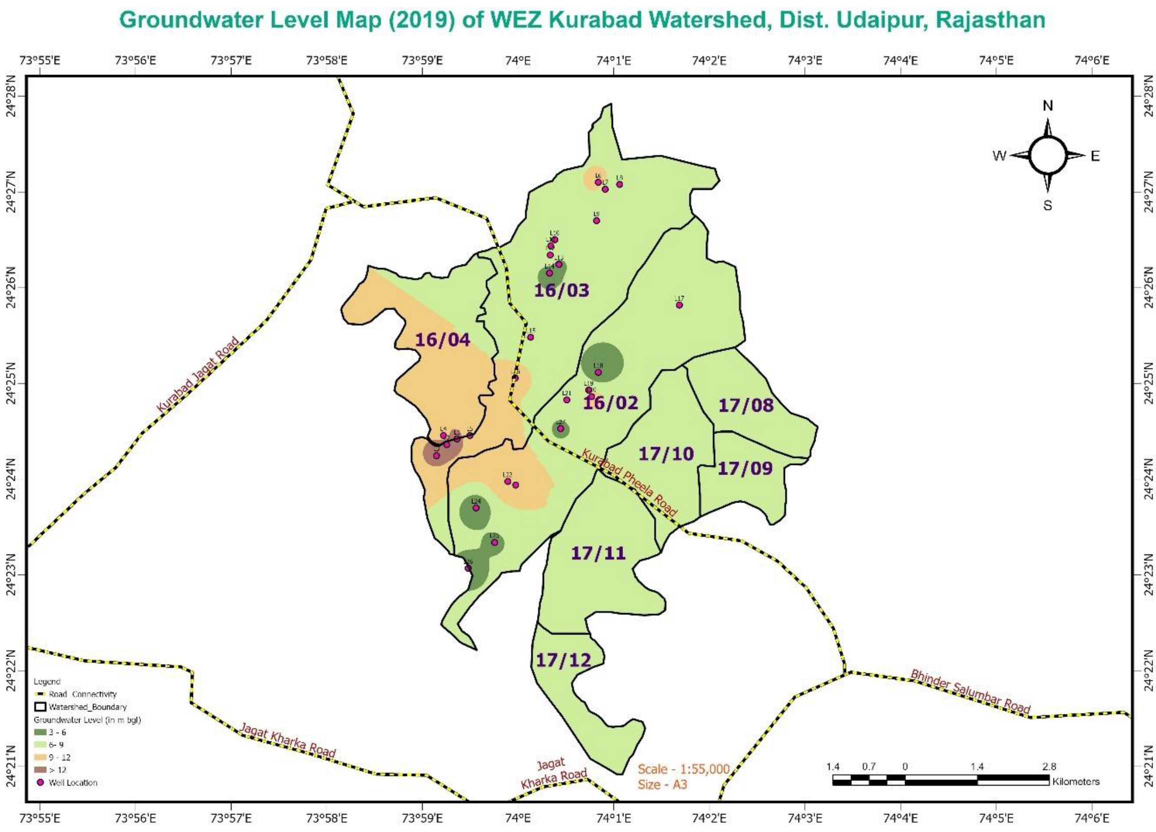


Fig. 37 Groundwater map of Project area (June, 2019)

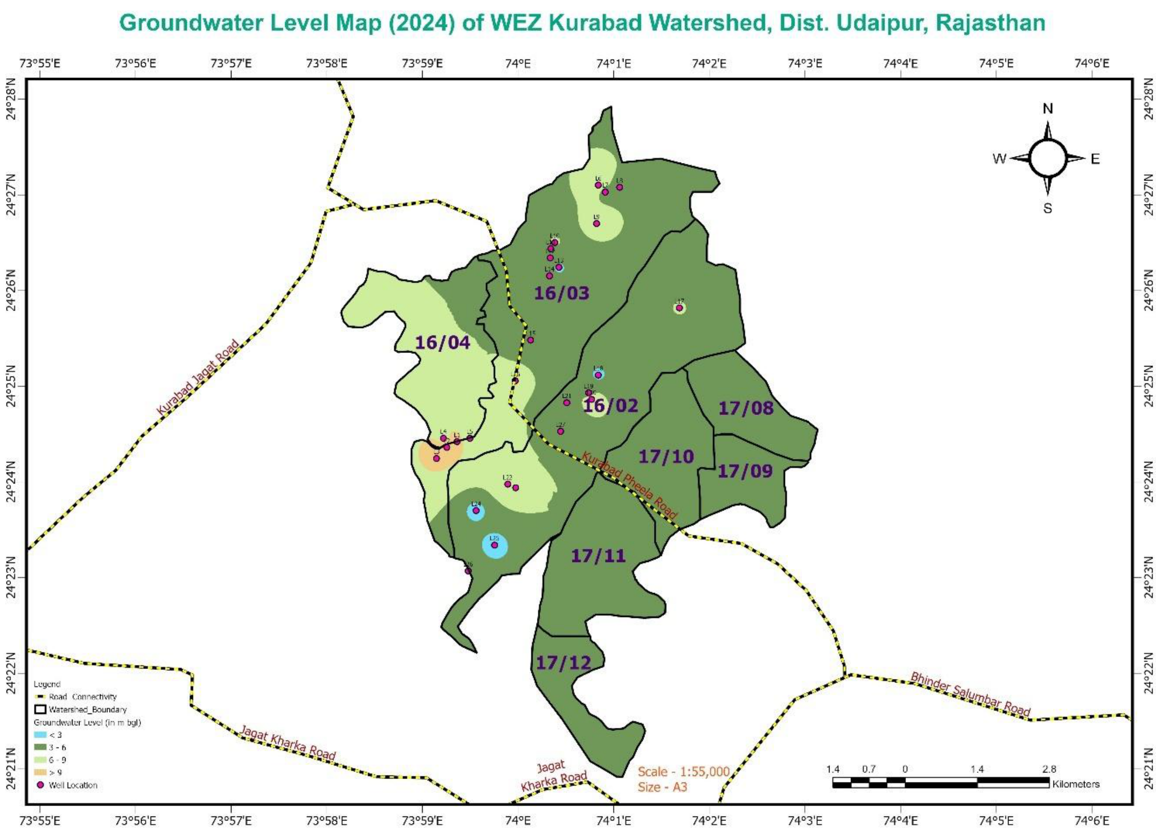


Fig. 38 Groundwater map of Project area (June, 2024)

Recharge Potential:

The area's geological features—such as faults, fractures, and shear zones—play a key role in allowing rainwater to seep underground, boosting groundwater recharge. Certain rock formations like pegmatite and quartz reefs also help in storing water, while typically impermeable dykes can support groundwater storage if they are cracked or broken.

The presence of numerous lineaments (faults and fractures) across the project area makes it especially favourable for building recharge structures like anicuts, percolation tanks (PTs), and masonry percolation tanks (MPTs). Placing these structures along fault lines can greatly enhance water infiltration, helping maintain a steady and sustainable groundwater supply in the region.

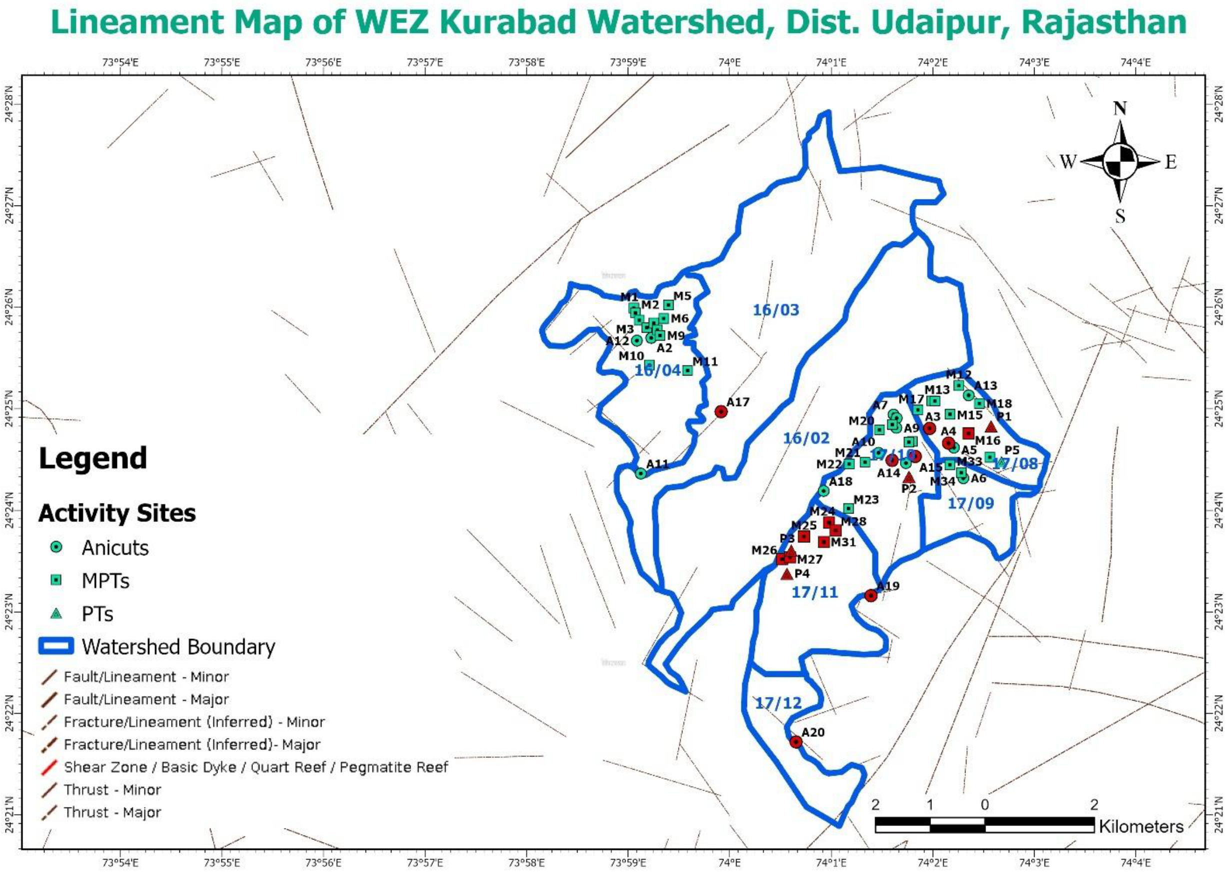


Fig. 39 Lineament Map of Project Area

Based on the rainfall pattern observed in 2024 (Fig. 13) and the geological and lineament characteristics of the Kurabad watershed, the groundwater recharge frequency can be reasonably estimated at 8 to 9 events per year (Mozzi *et al*., 2021; Dashora *et al*., 2022). Given a recharge potential ranging between 25% and 30%, the estimated annual recharge volume could amount to approximately 2 times the existing storage capacity, assuming favourable infiltration conditions and efficient aquifer response.

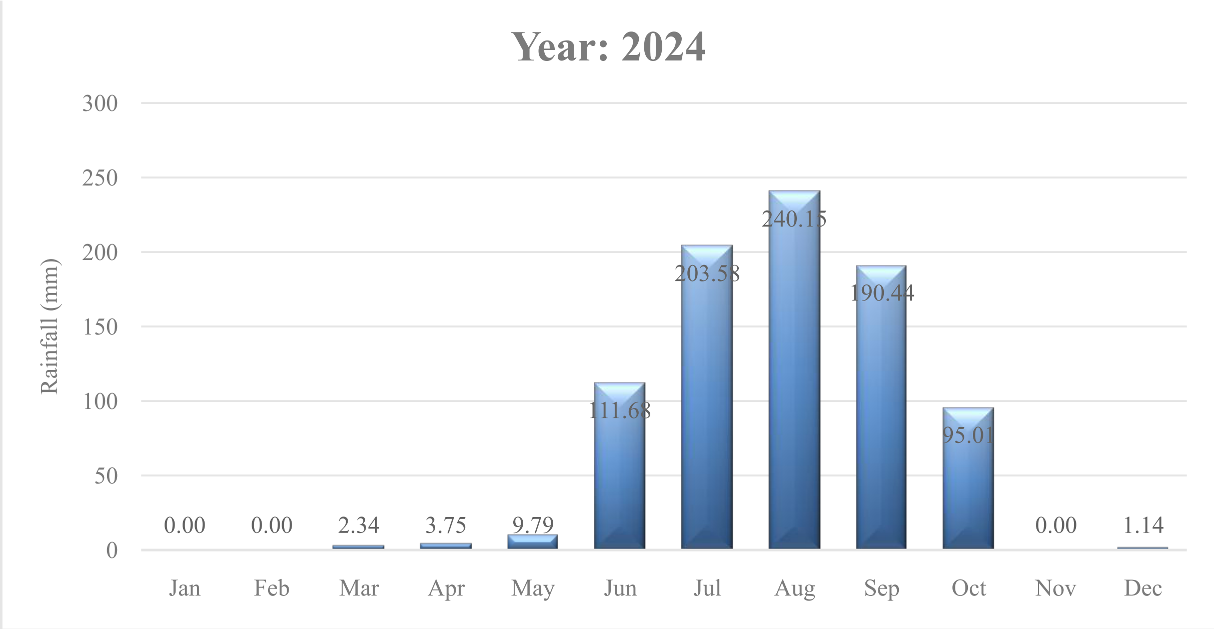


Fig. 40 Rainfall pattern of 2024

Study by Mozzi *et al*. (2021) suggests typical check dams in semi-arid regions can store 3-7 times their capacity annually, implying multiple fillings. For instance, in Rajasthan, a study near Udaipur showed recharge equivalent to 2 times capacity in an average year (2014, 33 mm) and 1 time in a dry year (2015, 17 mm), as detailed by Dashora *et al*. (2022).

Reference:

Mozzi, G., Pavelic, P., Alam, M. F., Stefan, C., & Villholth, K. G. (2021). Hydrologic assessment of check dam performances in semi-arid areas: A case study from Gujarat, India. *Frontiers in Water*, *3*, 628955. https://doi.org/10.3389/frwa.2021.628955

Dashora, Y., Cresswell, D., Dillon, P., Maheshwari, B., Clark, R., Soni, P., & Singh, P. K. (2022). Hydrologic and Cost–Benefit Analysis of Multiple Check Dams in Catchments of Ephemeral Streams, Rajasthan, India. *Water*, *14*(15), 2378. **https://doi.org/10.3390/w14152378**

Impact on LULC Change:

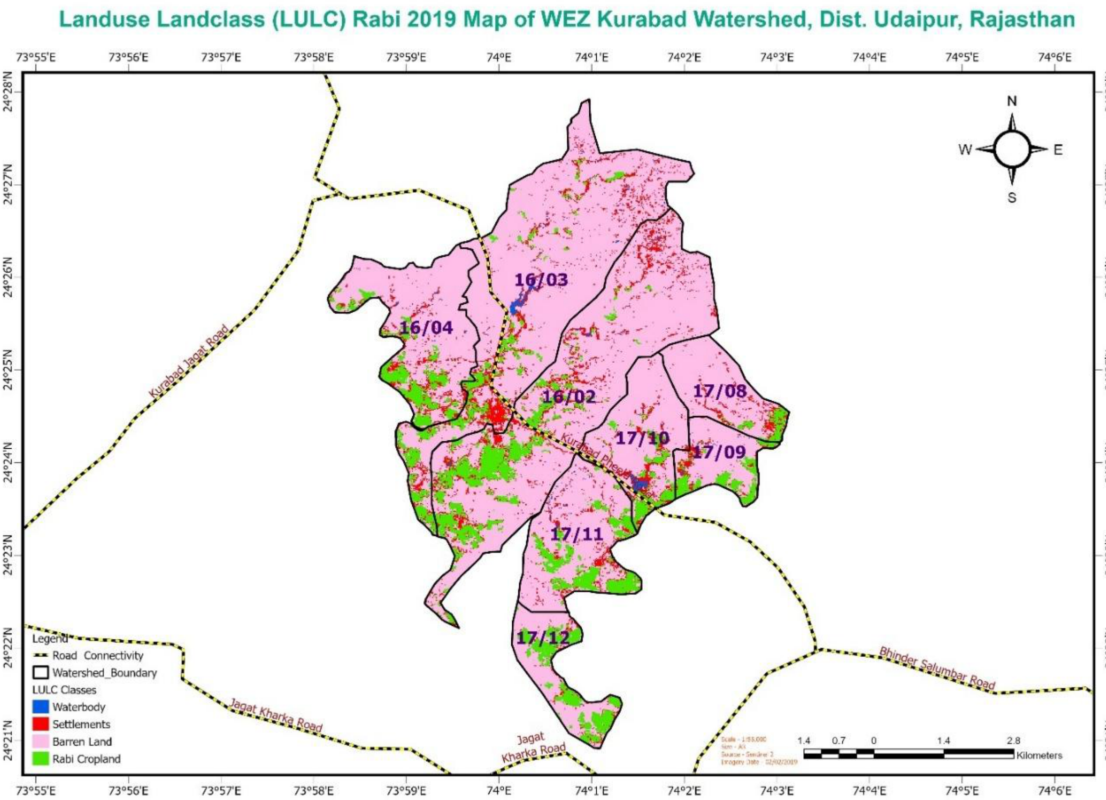


Fig. 41 LULC Map of Project Area (Rabi Season – 02/02/2019)

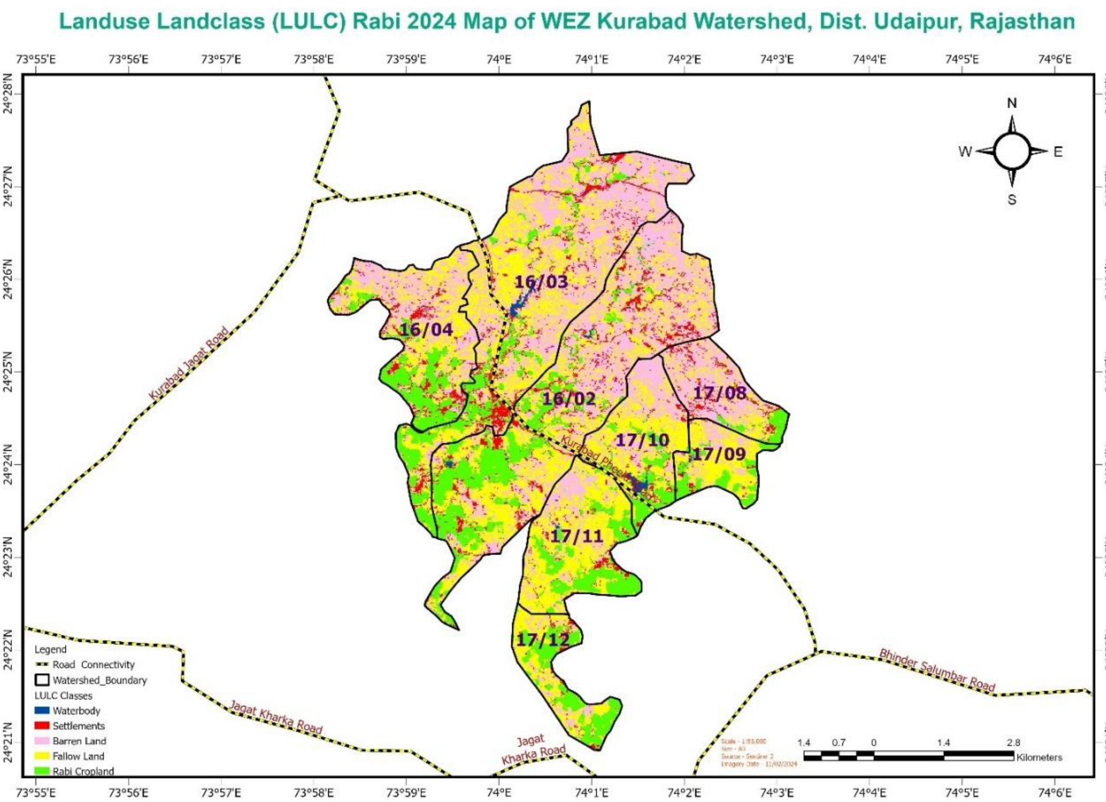
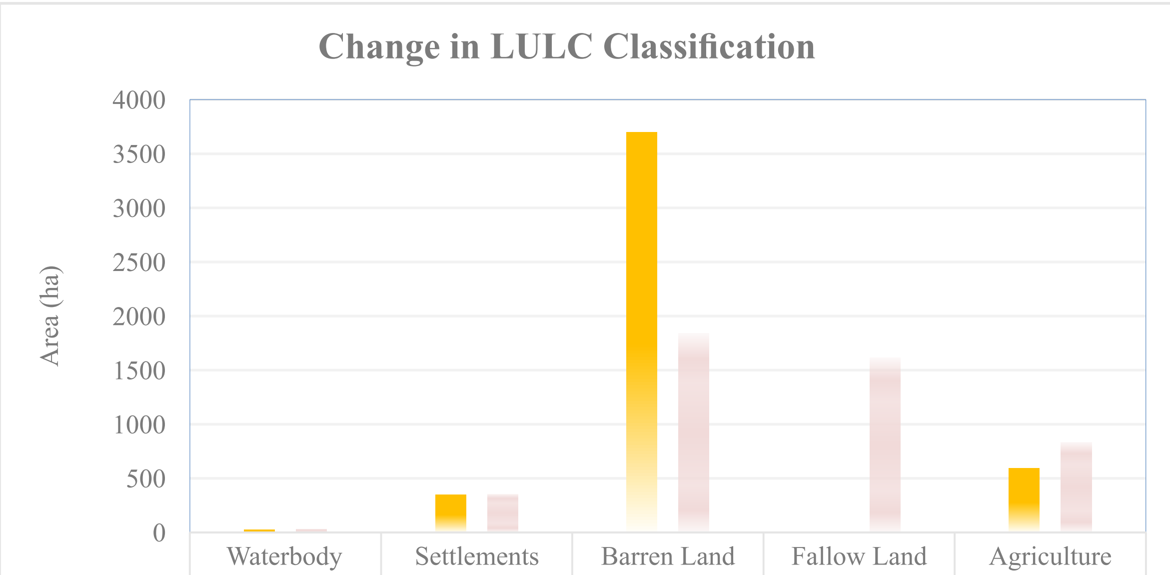


Fig. 42 LULC Map of Project Area (Rabi Season – 11/02/2024)

The analysis of LULC classification during the Rabi season between 2019 and 2024 reveals notable land use improvements across the study area. The most significant transformation is the sharp reduction in barren land, from 3699.64 ha to 1839.01 ha, indicating effective land rehabilitation. Simultaneously, fallow land emerged as a new category (1613.93 ha), and agricultural land expanded from 593.90 ha to 831.66 ha. These positive shifts can be attributed to the implementation of anicuts and MPTs, which enhanced water availability, supported vegetation growth, and enabled more sustainable cropping patterns. Minor increases in waterbodies and settlements also suggest improved water retention and stable development dynamics.

Most of the fallow land in the project area can be reasonably considered under agricultural land, as it remains part of the cultivable landscape. However, portions of this fallow area may currently be unproductive due to issues such as soil degradation, moisture stress, or lack of inputs. These areas would require targeted treatment and support to become fully cultivable again.



	Waterbody	Settlements	Barren Land	Fallow Land	Agriculture
Rabi 2019	25.02	349.44	3699.64	0.00	593.90
Rabi 2024	29.60	353.80	1839.01	1613.93	831.66

Fig. 43 Change in LULC Classification

<u>Key Highlights:</u>

- Barren Land: Reduced by 1860.63 ha (from 3699.64 to 1839.01 ha)
- Agriculture: Increased by 237.76 ha (from 593.90 to 831.66 ha)
- Fallow Land: Introduced at 1613.93 ha (from 0.00 ha)
- Waterbodies: Slight increase of 4.58 ha (from 25.02 to 29.60 ha)
- Settlements: Marginal increase of 4.36 ha (from 349.44 to 353.80 ha)

Change in Vegetation Cover:

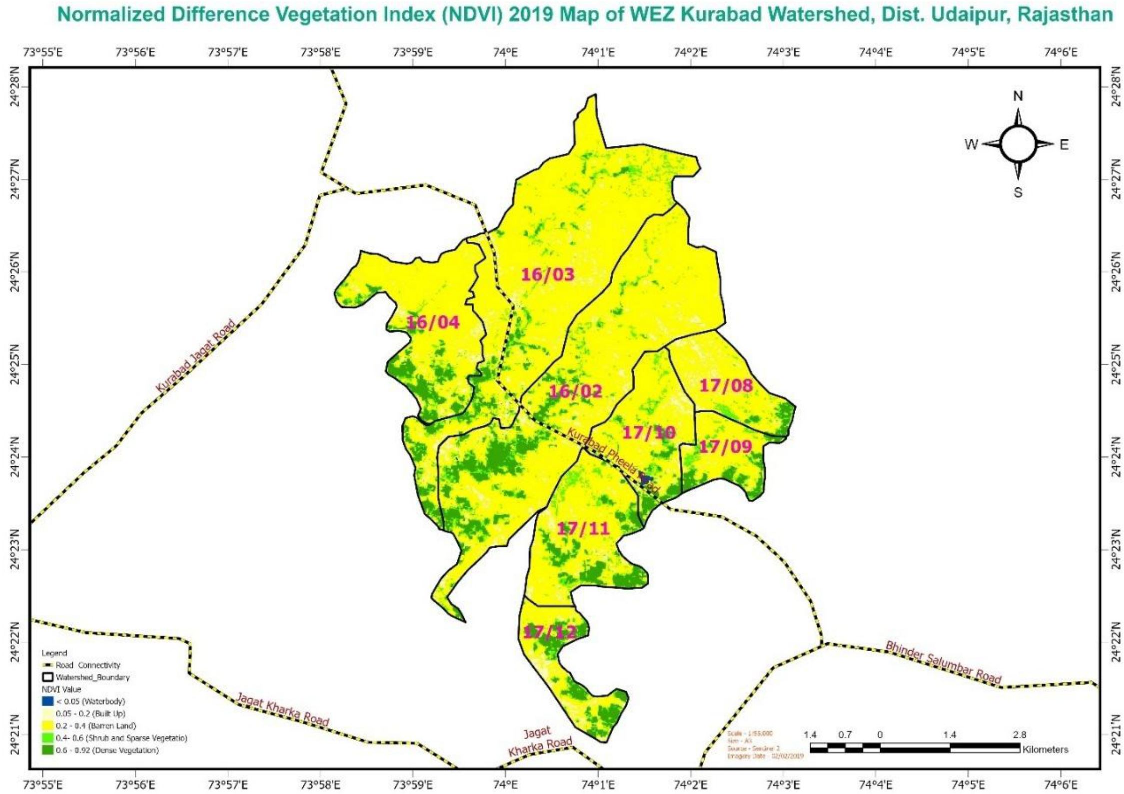


Fig. 44 NDVI Map of Project area (02/02/2019)

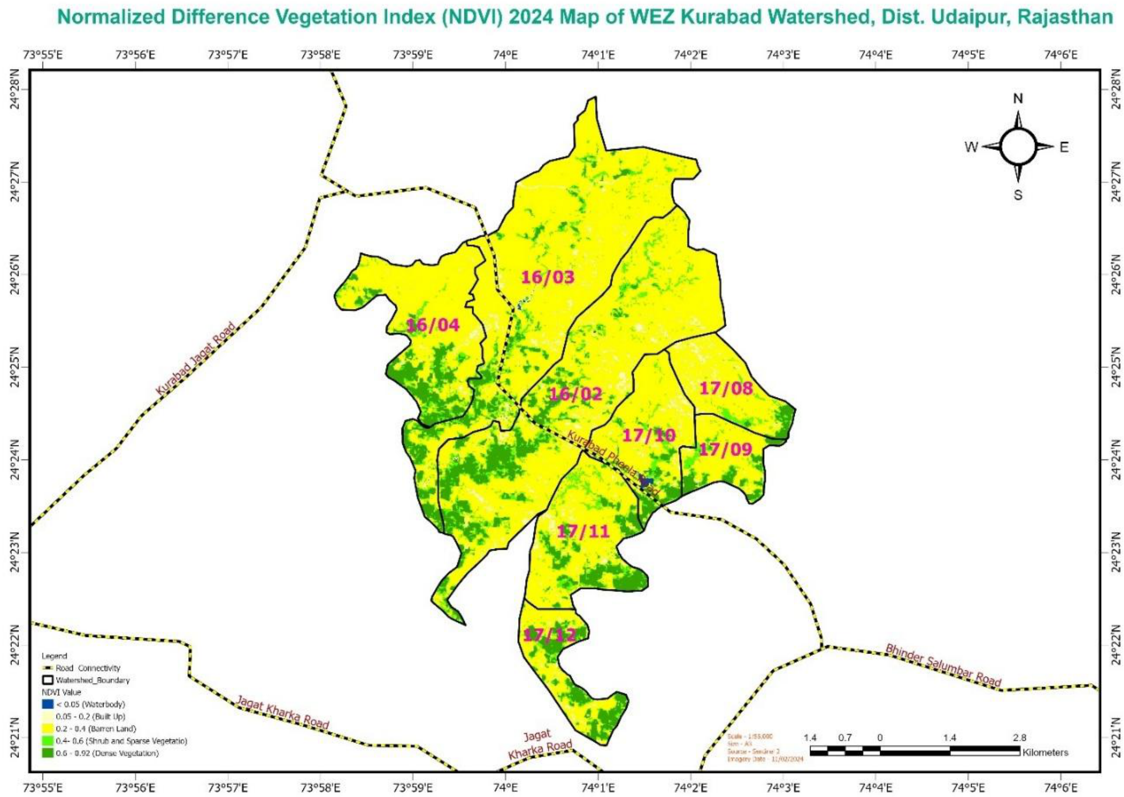


Fig. 45 NDVI Map of Project area (11/02/2024)

Between 2019 and 2024, significant land cover changes were observed, primarily due to effective land and water management interventions. The most remarkable improvement was in vegetation cover, which reflects improved land conditions, likely due to water conservation efforts and better agricultural practices. This was accompanied by a notable reduction in barren land, suggesting previously unproductive or degraded areas have been converted into vegetated zones or other uses and a moderate rise in waterbodies, indicating better moisture retention and ecological recovery.

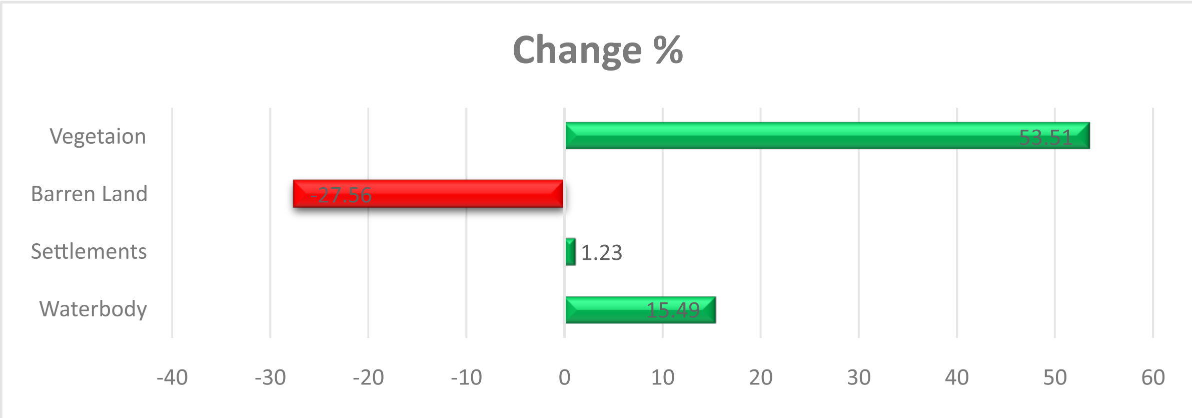


Fig. 46 Impact on Vegetation

<u>Key Takeaway:</u>

- Vegetation increased by 53.51% (from 672.00 to 1445.59 ha)
- Barren Land decreased by 27.56% (from 3621.54 to 2839.01 ha)
- Settlements increased slightly by 1.23% (from 349.44 to 353.80 ha)
- Waterbodies increased by 15.49% (from 25.02 to 29.60 ha)

<u>Change in Moisture Content:</u>

Between 2019 and 2024, significant improvements in moisture conditions were observed in the region, as indicated by the NDMI (Normalized Difference Moisture Index) analysis. The construction of Soil and Water Conservation (SWC) structures played a pivotal role in this transformation. These structures enhanced water retention, promoted groundwater recharge, and led to an improvement in vegetation cover.

Additionally, cropping patterns shifted due to better water availability, resulting in a more productive and moisture-balanced landscape. The NDMI data clearly reflects this change, showing a reduction in highly dry areas and an increase in high moisture zones, signaling a positive environmental shift toward sustainability.

Normalised Difference Moisture Index (NDMI) 2019 Map of WEZ Kurabad Watershed, Dist. Udaipur, Rajasthan

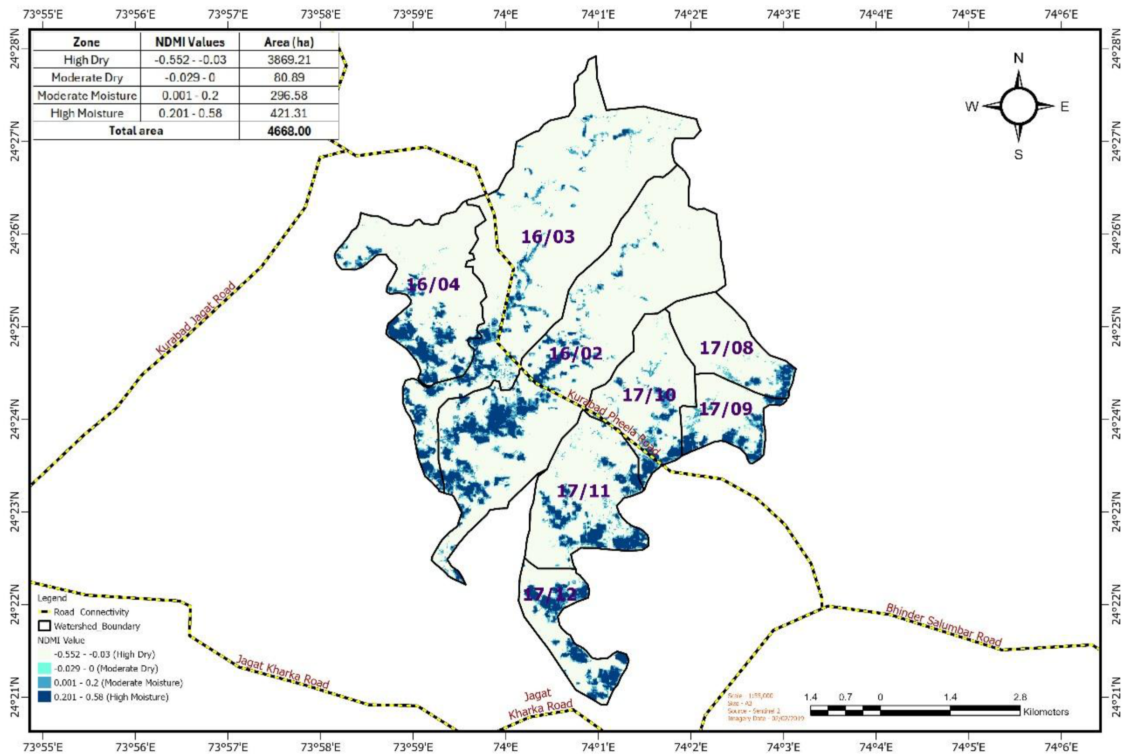


Fig. 47 NDMI Map of Project Area (02/02/2019)

Normalised Difference Moisture Index (NDMI) 2024 Map of WEZ Kurabad Watershed, Dist. Udaipur, Rajasthan

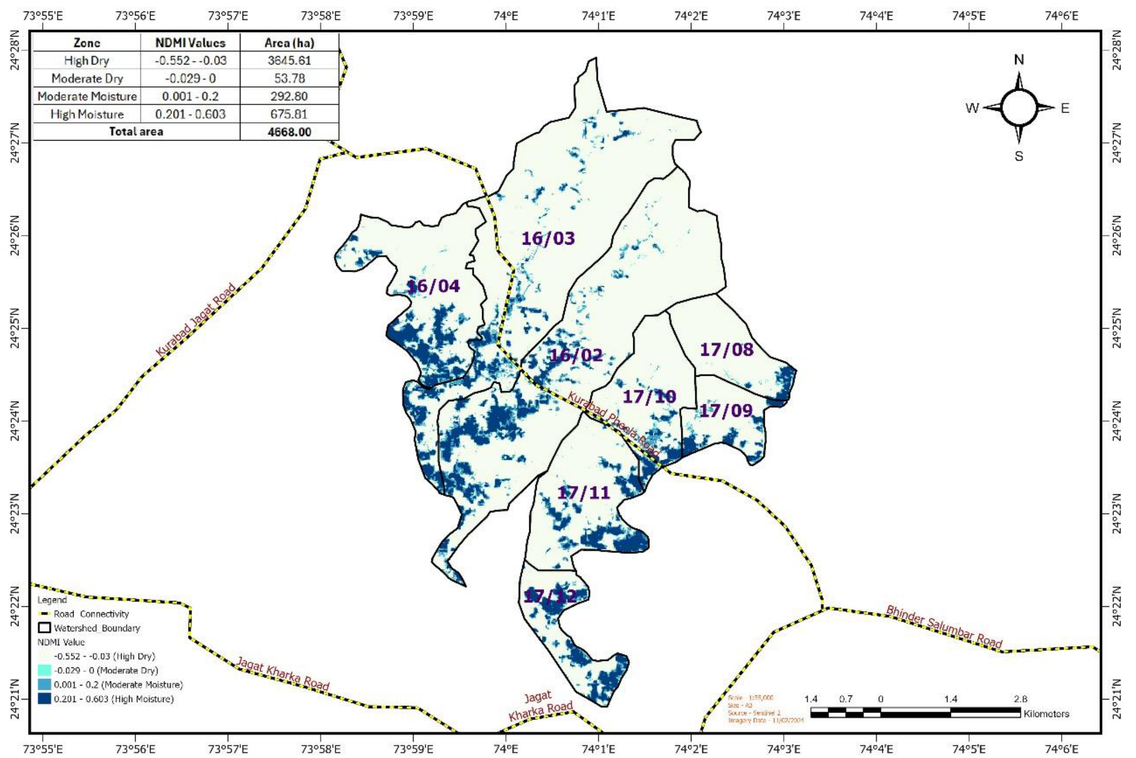


Fig. 48 NDMI Map of Project Area (11/02/2024):

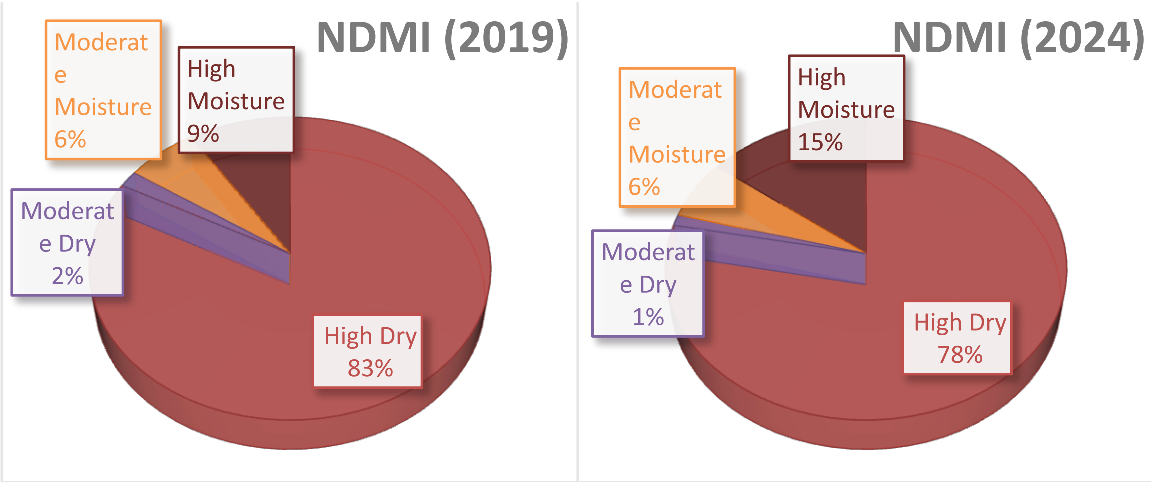


Fig. 49 Change in NDMI Classes (2019-2024)

- High Dry Area: Decreased from 83% (2019) to 78% (2024)
- Moderate Dry: Slight decrease from 2% to 1%

  Moderate Moisture: Remained constant at 6%
- High Moisture Area: Increased from 9% (2019) to 15% (2024)

3.3.5 Soil and Water Testing-Based Impact Assessment

To validate the environmental and agricultural outcomes of SWC interventions, a comparative soil and water quality assessment was carried out in June 2025. It was designed to scientifically assess changes in soil fertility and water chemistry due to watershed development. The details of the testing results are listed in Annexure D.

- **Sampling Strategy**

- **Sample Type**: Soil and groundwater
- **Total Samples**: 20 (10 soil + 10 water)
- **Distribution**:

Project Area (Treatment Group) (5 soil + 5 water samples)	**Control Area (Outside Project)** (5 soil + 5 water samples)
Nandi Vela	Karmal
Gudli	Ravatpura
Aachhat	Ramaj
Lag	Upla Chotipa
Sagtadi	Kachher

- **Sampling Method:** Matched site design for control and project area using similar agro-climatic and geological conditions.

Table 10 Parameters Tested

Category	Number of Parameters	Examples
Soil Quality	15 parameters	pH, EC, Nitrogen, Phosphorus, Iron, Organic Matter, Water Holding Capacity
Water Quality	11 parameters	pH, EC, TDS, BOD, COD, Iron, Copper, Zinc
Overall Assessment	26 indicators	Combined for evaluating transformation in fertility, biological activity, and productivity potential

Key Observations

Soil Quality Enhancement

- **Available Nitrogen** increased by **194.6%** (207 → 610 mg/kg), indicating outstanding fertility enrichment.
- **Water Holding Capacity** improved by **54.3%** (12.9% → 19.9%) due to increased organic matter from soil conservation practices like composting and mulching, enhancing drought resilience and reducing irrigation dependency.
- **Phosphorus Availability** rose by **28.8%** (0.78% → 1.01%), supporting stronger root development and crop productivity.
- **Iron Content** in soil increased by **73.5%** (14.90 → 25.85 mg/kg) which is under acceptable level and, aiding chlorophyll synthesis and plant vigor.
- These improvements align with the observed **increase in agricultural land** and **reduction of barren area** reported in the LULC analysis.

- **Water Quality Improvements**

- **pH** increased from **6.87 to 7.23**, making irrigation water more suitable for nutrient uptake.
- **Iron in water** decreased by **77.3%** (0.66 → 0.15 mg/L), reflecting reduced contamination risks.
- **Copper levels** decreased by **63.3%** (0.36 → 0.13 mg/L, reducing toxicity risks for plants.
- **BOD (-61.4%)** and **COD (-65.7%)** declines suggest improved organic waste management—consistent with compost use and organic farming practices introduced in the project.

- **Agricultural Intensification Indicators**
  - **Soil Electrical Conductivity (EC)** decreased by 26.2% (1395 → 1030 µS/cm), indicating stabilized nutrient levels.
  - **Total Dissolved Solids (TDS)** decreased by 26.1% (905 → 669 mg/L), reflecting optimized water quality for irrigation.
  - **Calcium** (-42.4%) and Magnesium (-73%) depletion reflect active nutrient uptake by crops, signifying enhanced productivity.
  - These biophysical changes validate farmer-reported increases in crop intensity, shift to multi-season farming, and higher income levels (100–110% increase).

- **Strategic Implications**
  - All soil and water quality shifts align with typical patterns of successful agricultural intensification, not environmental degradation.
  - The evidence supports the effectiveness of SWC structures in fostering a vibrant, high-output agricultural system.
  - Kurabad can serve as a replicable model of integrated watershed development with balanced environmental sustainability and agricultural growth.
  - Earlier, there were challenges in growing Rabi crops, and no Zaid crops like Kangani or Cheena were cultivated. After implementation, farmers can now successfully grow mustard, wheat, and even Zaid crops.

3.4 Farmer Interaction

We conducted farmer interactions for each structure, where five farmers per structure participated in the discussions. The objective was to assess the impact of each structure on the farmers' agricultural practices, water availability, and overall livelihood improvements. Across all interactions, farmers consistently reported positive changes after the construction of the structures, highlighting substantial benefits in terms of water security, irrigation efficiency, and cropping patterns.

Key Highlights from Farmer Interactions:

- **Improved Water Availability:** Farmers observed a significant increase in local water availability after the construction of the structures, which reduced their reliance on distant or expensive water sources.
- **Extended Irrigation Duration:** The farmers reported that irrigation days have increased, allowing them to provide adequate water to their crops throughout multiple seasons.
- **Transition from Rainfed Farming:** Before the construction of the structures, the farmers were completely dependent on rainfall and could cultivate only Kharif crops. Water scarcity limited their farming to a single season.

- **Adoption of Multi-Season Cropping:** After the structures were built, farmers were able to grow **Rabi and Zaid crops** in addition to Kharif crops, significantly expanding their agricultural output.
- **Crop Diversification:** Farmers have successfully introduced **vegetables and fruits like strawberries** into their farming systems, which was not feasible earlier due to water limitations.
- **Improved Livelihood Security:** The increased cropping intensity and diversification have resulted in higher income and enhanced livelihood stability for the farmers.

Fig. 50 Interaction with farmers at Bori village

GOVERNMENT REVENUE DEPARTMENT (PATWARI) DATA ANALYSIS

We collected data from revenue department for the increase in cultivated area in project villages. The Patwari data from Kurabad block reveals significant positive growth in agricultural cultivation across all major crops between 2020-21 and 2024-25. The analysis covers 4 Panchayats and 11 villages, showing an overall increase in crop cultivation area with Wheat leading the growth in absolute terms and Sorghum showing the highest percentage increase.

Key Findings:

- Total crop area increased across all categories
- Wheat production expanded by 100 units (19.3% increase)
- Sorghum showed highest percentage growth (47.6%)
- All 7 crop categories demonstrated positive growth
- 11 villages across 4 Panchayats showed agricultural expansion

SEASONAL CROP CLASSIFICATION

KHARIF CROPS (Monsoon Season: June-October)

Crop	Local Name	2020-21 (Ha)	2024-25 (Ha)	Change (Ha)	% Change
Maize	Makka	379	439	+60	+15.8%
Sorghum	Jwar	21	31	+10	+47.6%
Cluster Bean	Gvar	107	139	+32	+29.9%
Fodder Sorghum	Chari/Jwar	93	118	+25	+26.9%
KHARIF TOTAL		600 Ha	727 Ha	+127 Ha	+21.2%

RABI CROPS (Winter Season: November-April)

Crop	Local Name	2020-21 (Ha)	2024-25 (Ha)	Change (Ha)	% Change
Wheat	Gehun	518	618	+100	+19.3%
Barley	Jau	36	48	+12	+33.3%
Mustard	Sarson	15	22	+7	+46.7%
RABI TOTAL		569 Ha	688 Ha	+119 Ha	+20.9%

3.4.1 Impact of Raingun and Solar Pump

A total of 4 raingun systems, 1 sprinkler system and 2 solar-powered pumps were provided to farmers based on field needs. These interventions, targeted at individual beneficiaries, aimed to address issues of water scarcity, high input costs, and poor irrigation efficiency commonly faced in the semi-arid zone. The following impacts were observed during field evaluation:

Raingun Irrigation Systems and Sprinkler System (5 Nos.)

The raingun and sprinkler units were distributed to facilitate wide-area coverage and uniform irrigation. This system proved especially effective for field crops such as wheat, mustard, and vegetables.

- Enabled uniform water application, improving overall crop health and yield.
- Promoted water use efficiency, aligning with the "more crop per drop" principle.
- Helped reduce weed growth by restricting water to target zones.
- Decreased labour requirements and irrigation time, enhancing operational convenience.
- Allowed better timing of irrigation, especially critical during dry spells.
- Improves water use efficiency by 30% to 50% compared to traditional irrigation because it applies water uniformly and quickly, minimizing deep percolation and evaporation losses.

• Solar-Powered Pump Sets (2 Nos.)

Two solar pump systems were provided to farmers with limited or irregular access to conventional electricity. These systems ensured dependable irrigation and lowered recurring operational costs.

- Provided a sustainable and off-grid energy solution for irrigation.
- Eliminated reliance on diesel and minimized energy-related expenses.
- Enabled flexible irrigation scheduling, supporting timely water application during key crop stages.
- Solar power does not directly increase WUE, it improves energy efficiency by 100% (replacing conventional energy sources) and allows better water scheduling, which indirectly supports higher WUE by reducing over-irrigation.

• Overall Benefits to Farmers

- Strengthened irrigation reliability and crop productivity across beneficiary farms.
- Improved resource efficiency, particularly in water and energy usage.
- Reduced cost of cultivation and enhanced economic returns.
- Encouraged adoption of modern, sustainable technologies in the region.
- Contributed to long-term agricultural resilience and livelihood improvement.

Table 11 Distribution List

Sr. No.	Name of Farmer	Father Name	Village	Activities	Area (Ha.)
1	Sh. Lala	Sh. Hira	Bhutiya	Mini Sprinkler	0.4
2	Sh. Mangilal Meghewal	Sh. Limba ji	Dholikhera	Full Circle rain gun with 63 mm HDPE pipe	3
3	Sh. Jagdish Patel	Kheta	Gudli	Pipe line & Rain Gun	1.5
4	Sh. Doluat Singh	Sh. Manohar Singh	Lag	Rain Gun & Pipe line	2
5	Sh. Devi lal	Sh. Bhera ji	Mandai	Rain Gun & Pipe line	3
6	Sh. Kanhaiya lal ji	Sh. Bhawani shanker	Bori	Solar Pump 5hp and With Drip Irrigation	2
7	Smt. Gangadevi	W/o Bhimraj Patel	Nandivela	Solar Pump system 3hp	1.42

Fig. 51 Solar Pump distributed to Smt. Gangadevi, W/o Bhimraj Patel

4. Conclusion and Way Forward

4.1 Conclusion

The impact assessment of the *Community Initiatives for Restoring Livelihood Through Construction of Rainwater Harvesting Structure* in Kurabad block highlights significant and multifaceted benefits. The integrated watershed development approach, anchored in community participation and scientific planning, has produced measurable ecological, hydrological, and socio-economic outcomes.

Key Conclusions:

- **Ecological and Structural Impact**

  The strategic placement and construction quality of Soil and Water Conservation (SWC) structures—anicuts, Mini Percolation Tanks (MPTs), earthen embankments and trenches — were found to be technically sound and geographically appropriate. These structures have effectively:

  - Increased surface water retention.
  - Boosted groundwater recharge.
  - Supported soil moisture conservation and erosion control.

- **Water Security and Irrigation Benefits**

  With a total estimated storage capacity of 329,750 m^3, the SWC structures have:

  - Contributed to the recharge of wells and aquifers.
  - Enabled reliable, year-round irrigation across Kharif, Rabi, and Zaid seasons.
  - Reduced dependency on monsoon rainfall.

- **Hydrological Improvements**

  As supported by geophysical observations:

  - Groundwater levels rose by 2–3 meters.
  - The recharge frequency was observed to be 6–7 times annually.
  - Recharge volume is estimated at approximately 1.75 times the total storage capacity.

- **Land Use and Vegetation Recovery**

  Significant improvements in land productivity were noted:

  - Barren land decreased by 1860.63 ha.
  - Vegetative cover increased by 53.51%.
  - Soil moisture conditions improved, as seen in NDMI data from 2019–2024.

- **Socio-Economic Upliftment**

  The project has led to:
  - Increased cropping intensity and agricultural diversification (e.g., inclusion of strawberries and vegetables).
  - Multi-season farming replacing rainfed mono-cropping.
  - A 100–110% increase in farmer incomes.
  - Strengthened community involvement in asset maintenance and water governance.

4.2 Way Forward

While the outcomes are encouraging, the long-term sustainability and scalability of such initiatives depend on systematic follow-up actions and strategic planning. The following steps are recommended:

1 **Strengthen Community Institutions:**

1 Formalize and build the capacity of Water User Groups (WUGs) for regular maintenance, monitoring, and equitable water distribution.

1 Promote women's participation in WUGs to enhance inclusivity and shared decision-making.

1 **Establish Monitoring and Evaluation Systems:**

1 Develop a GIS-based platform for real-time tracking of structure conditions, water levels, and land use changes.

1 Conduct biannual impact assessments to capture seasonal variations and long-term trends.

1 **Enhance Groundwater Governance:**

1 Integrate recharge data with local groundwater management plans in alignment with CGWB guidelines.

1 Promote water budgeting practices and crop-water balance strategies to prevent over-extraction.

4 **Replicate and Scale Up:**

4 Identify similar geo-hydrological zones for replication of this model.

4 Use findings from this project to guide state-level and national watershed management policies.

4 **Invest in Capacity Building and Awareness:**

4 Train farmers in advanced water-efficient techniques like micro-irrigation and climate-smart agriculture.

4 Raise awareness about groundwater sustainability and the importance of collective action.

4 **Leverage Technological Tools:**

4 Continue using satellite-based imagery and drone surveys for periodic structural assessments.

4 Explore the use of IoT sensors for monitoring soil moisture and water levels at key sites.

4 **Plan for Climate Resilience:**

4 Integrate climate adaptation strategies to cope with rainfall variability and extreme events.

4 Develop contingency plans for drought years to protect livelihoods and ecosystems.

By institutionalizing these practices, the Kurabad initiative can serve as a replicable model for integrated watershed development across India's semi-arid landscapes, ensuring water security, livelihood stability, and ecological sustainability for generations to come.

LIVELIHOOD COMPONENT EVALUATION REPORT

ABBREVIATIONS AND ACRONYMS

Abbreviation	Full Form
AFC	**AFC India Limited**
CHC	**Custom Hiring Centre**
CSR	**Corporate Social Responsibility**
DS Group	**Dharampal Satyapal Group**
FGD	**Focus Group Discussions**
FPO	**Farmer Producer Organization**
GAP	**Good Agricultural Practices**
GPS	**Global Positioning System**
Ha	**Hectare**
HVC	**High Value Crops**
ICAR	**Indian Council of Agricultural Research**
IIMR	**Indian Institute of Millets Research**
IoT	**Internet of Things**
KII	**Key Informant Interviews**
KPI	**Key Performance Indicators**
MGNREGA	**Mahatma Gandhi National Rural Employment Guarantee Act**
NGO	**Non-Governmental Organization**
OBC	**Other Backward Caste**
PMKSY	**Pradhan Mantri Krishi Sinchayee Yojana**
ROI	**Return on Investment**
REPL	**Real-time Evaluation and Programming Language**
ST	**Scheduled Tribe**
WADI	**Integrated farming system**
WEZ	**Water Economic Zone**

EXECUTIVE SUMMARY

Project Overview

The WEZ Kurabad Project successfully implemented six integrated livelihood interventions impacting 22 beneficiary households across 5 villages, generating significant economic, environmental, and social benefits through comprehensive agricultural development and mechanization services.

Key Performance Metrics

- Total Unique Beneficiaries: 22 households
- Villages Covered: 5 villages (Vnjanirodi, Aavra, Khajuriya, Gudli, Bhutiya)
- Implementation Success: 100% across all components
- Sustainability Rate: 100% operational after 3+ years
- Average Income Growth: Varies by component

Component Achievements

Intervention	Beneficiaries	Income Impact (₹)	Growth (%)	Key Result
WADI Development	13 farmers	864,149	65.8%	New income streams + 52% water savings
Good Agricultural Practices	8 farmers	108,846*	11.6%*	24.1% Rabi season improvement
High Value Crops	5 farmers	68,358	13.1%	Climate-resilient crop diversification
Custom Hiring Centre	4 farmers	Service Provider**	N/A	75% time savings through mechanization
Pastureland Development	9 farmers	Asset Creation***	N/A	₹88 lakh timber plantation value
Training Component	All farmers	Enabler	N/A	100% technology adoption enabled

*GAP figures are for require methodology clarification for annual vs. seasonal calculations **CHC provides mechanization services at ₹3,000/hectare cost ***Creates long-term assets rather than immediate income

Major Breakthroughs

- WADI Systems: Created entirely new vegetable (₹52,199) and fruit (₹14,873) income streams while achieving 52% water savings and 95% marketing independence
- Mechanization: Community seed drill providing 75-80% time savings with 10-25% yield improvements
- Resource Efficiency: 39% reduction in chemical fertilizer dependency through organic compost production
- Asset Creation: 2,200 trees with ₹88,00,000 potential value and comprehensive infrastructure development

Success Factors

- Integrated Approach: Six complementary interventions creating synergistic effects
- Community Ownership: Democratic management ensuring sustainability
- Adaptive Management: Successful transition from papaya to lemon cultivation
- Market Evolution: Progressive shift from 80% facilitated to 95% independent marketing

Strategic Impact

The project demonstrates that comprehensive, multi-component rural development can achieve transformational livelihood enhancement with complete sustainability. The proven, replicable model establishes this as ready for immediate scaling with 100% adoption and retention rates across all interventions.

Note: Total income impact requires comprehensive beneficiary-wise analysis to account for farmer participation across multiple components and avoid double-counting.

COMPONENT 1: WADI DEVELOPMENT - INTEGRATED LIVELIHOOD ENHANCEMENT

The WADI Development intervention created integrated farming systems combining horticulture, vegetable cultivation, drip irrigation, and compost production for 13 farmers across 1.730 hectares. The intervention achieved exceptional 65.8% income increase, generating ₹864,149 total additional annual income (₹66,473 per household) through diversified agricultural production and resource efficiency improvements. The increase in income was calculated based on individual farmers interactions as well focus group discussions wherein the responses of farmers were recorded and then analyzed.

Project Coverage and Scale

The WADI intervention utilized a stratified sampling approach covering 10% representative farmers from a larger implementation. The 1.730 hectares were developed across 3 villages with average 0.133 hectares per farmer, representing manageable family-scale integrated farming units.

All 13 farmers achieved 100% implementation success with systems remaining operational after 3+ years, demonstrating strong technical sustainability and farmer ownership.

Integrated System Components

- WADI Establishment: Complete ecosystem approach on 1.730 hectares
- Drip Irrigation: Water-efficient systems covering 7,400 sq meters
- Compost Production: 200 quintals/year organic fertilizer production
- Horticulture: Fruit cultivation with adaptive crop management

ECONOMIC IMPACT ANALYSIS

Overall Income Transformation

The most significant achievement was transforming household economics through multiple new income streams. Total household income increased from ₹1,01,072 to ₹1,67,544, representing ₹66,473 additional income per household and 65.8% growth rate.

Income Source	Before Project (₹)	After Project (₹)	Annual Increase (₹)	Impact Type
Total Household Income	1,01,072	1,67,544	+66,473	+65.8%
Agricultural Income	1,01,072	1,09,450	+8,378	+8.3%
Vegetable Income	**0**	52,199	+52,199	New Stream
Fruit Income	**0**	14,873	+14,873	New Stream
Cost Savings	**-**	**1,388**	**+1,388**	**Input Optimization**

The creation of two entirely new income streams (vegetables ₹52,199 and fruits ₹14,873) represents fundamental livelihood transformation rather than incremental improvement, accounting for ₹67,072 of the total ₹66,473 increase.

Vegetable Production Portfolio

Year-round vegetable cultivation became the primary new income source, generating ₹52,199 annually through diversified crop production including tomato, spinach, bottle gourd, ridge gourd, okra, bitter gourd, brinjal, and green chilli.

DRIP IRRIGATION SYSTEM PERFORMANCE

Water Efficiency Achievement

The drip irrigation system delivered exceptional resource optimization with 52% water usage reduction while supporting intensive cultivation across 7,400 sq meters sample area.

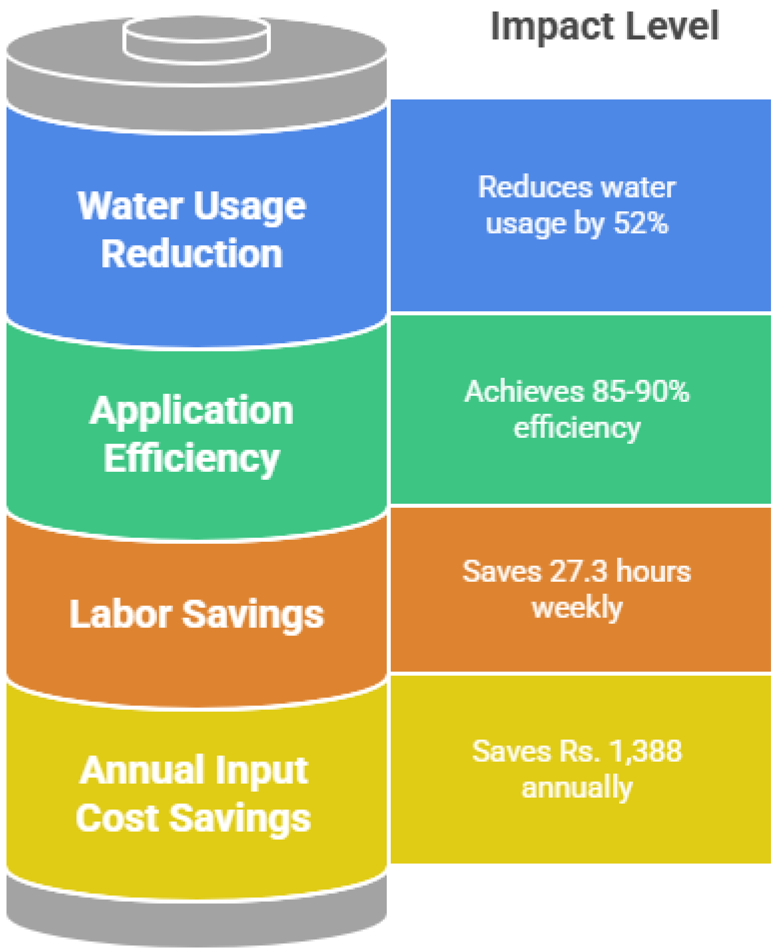
Efficiency Parameter	Before Implementation	After Implementation	Improvement
Water Usage	Flood irrigation	Precision application	52% Reduction
Labor Requirement	High manual effort	Automated system	27.3 hours/week saved
Coverage Area	Limited and uneven	7,400 sq meters	Comprehensive Coverage
Application Efficiency	30-40% efficiency	85-90% efficiency	45-60% Improvement

All 10 sample farmers successfully operate systems independently without external support, demonstrating complete technical knowledge transfer and sustainable management capacity.

Operational Benefits

The 27.3 hours per week labor savings freed farmers for other productive activities while precision water application improved crop establishment and yield consistency. The 85-90% application efficiency represents world-class performance for smallholder irrigation systems.

Quantifying benefits: From minimal to significant positive impact



COMPOST PRODUCTION SYSTEM

Organic Input Production

6 farmers successfully produce 200 quintals per year of high-quality compost, achieving complete self-sufficiency in organic fertilizer and 39% reduction in chemical fertilizer dependency.

Environmental Parameter	Before Project	After Project	Change
Chemical Fertilizer Usage	High dependency	Reduced usage	39% Reduction
Soil Organic Matter	Low content	Enhanced content	Significant Increase
Input Cost	High external purchase	Reduced costs	₹1,388 savings/farmer
Environmental Parameter	Before Project	After Project	Change
Sustainability	External dependency	Self-reliant system	Complete Transformation

The ₹1,388 annual savings per farmer combined with improved soil health creates both immediate economic benefits and long-term sustainability through enhanced soil fertility and reduced input dependency.

HORTICULTURE DEVELOPMENT AND ADAPTIVE MANAGEMENT

Phase 1: Papaya Cultivation (2020-2022)

Initial horticulture efforts focused on papaya with 100 plants established achieving 66% survival rate and generating ₹62,673 total income over two years.

Challenge and Adaptation

Significant animal damage from monkeys, blue bulls, and pigs created production losses requiring adaptive management. This challenge demonstrates real-world implementation complexity and farmer resilience.

Phase 2: Lemon Cultivation (2022-Present)

Successful crop transition to lemon cultivation addressed animal damage issues while maintaining income potential of ₹62,673. This adaptive capacity demonstrates farmer learning and system flexibility.

MARKET LINKAGE EVOLUTION

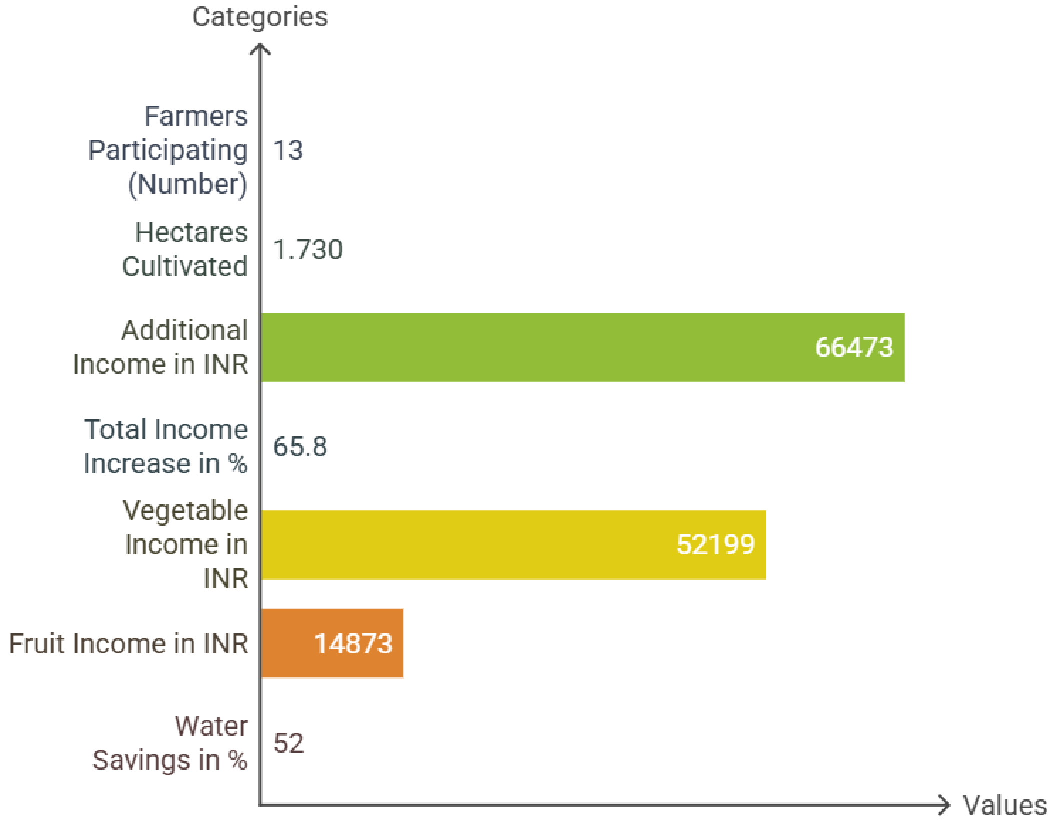
Transition to Independence

Market development progressed from 80% facilitated marketing in 2020 to 95% independent marketing by 2025, demonstrating successful capacity building and sustainable market integration.

Year	Facilitated Marketing	Independent Marketing	Key Milestone
2020	80%	20%	Initial market entry
2021	60%	40%	Relationship building
2022	40%	60%	Transition phase
2024	10%	90%	Self-managed system
2025	5%	95%	Complete independence

Arpan Seva Sansthan provided crucial initial facilitation across multiple market channels including local vendors, Udaipur Mandi, and Salumber markets, before farmers achieved marketing independence.

The WADI Development intervention achieved transformational success through integrated farming systems that created new income streams worth ₹67,072 annually while achieving 52% water savings and 39% fertilizer reduction.



Impact of Integrated Farming on Income and Water Savings

Key achievements include 65.8% income increase across 13 farmers, 100% technical sustainability, 95% marketing independence, and successful adaptive management, establishing WADI as a proven model for sustainable livelihood enhancement through integrated agricultural systems.

COMPONENT 2: GOOD AGRICULTURAL PRACTICES - WHEAT CROP ENHANCEMENT

The Good Agricultural Practices (GAP) intervention successfully enhanced wheat cultivation for 8 farmers through integrated farming practices including seed treatment, line sowing, integrated nutrient management, and pest management. The intervention achieved 11.6% average income increase, with exceptional 24.1% improvement in Rabi season income.

Beneficiary Profile

The GAP intervention targeted wheat cultivation across 4 villages with farmers averaging 52.6 years of age and 5.6 family members. All beneficiaries belong to OBC category with 100% joint family structure, representing traditional farming communities with strong agricultural foundation.

Farmer Demographics and Land Holdings

Sr.	Farmer Name	Village	Age	Family	Total Land (Ha)	Cultivable Land (Ha)
1	Babaru / Pema ji Patel	Vnjanirodi	57	4	2.4	1.6
2	Heera ji / Daya ji Patel	Aavra	49	6	0.6	0.6
3	Valchandra / Pema ji	Khajuriya	56	6	1.2	0.8
4	Shanker /pura ji Patel	Khajuriya	67	10	3.0	2.0
5	Heera / Gota ji Patel	Gudli	55	5	1.0	0.8
6	Nanga ji / Bhara ji Patel	Khajuriya	46	4	1.6	0.7
7	Jagadish ji / Kheta ji	Gudli	36	5	1.2	0.8
8	Devi lal / bhera ji	Khajuriya	57	5	3.0	2.0

The average land holding of 1.6 hectares represents typical small and marginal farmers.

Rabi Season Impact

Wheat-Specific Performance

The Rabi season analysis reveals exceptional results with 24.1% average income improvement, demonstrating the direct impact of GAP on wheat cultivation during the primary wheat growing season.

Rabi Season Income Analysis

Sr.	Farmer Name	Rabi Before (₹)	Rabi After (₹)	Rabi Increase (₹)	Rabi Growth (%)
1	Babaru / Pema ji Patel	63,360	72,230	8,870	14.0%
2	Heera ji / Daya ji Patel	17,260	24,500	7,240	41.9%
3	Valchandra / Pema ji	26,800	32,600	5,800	21.6%
4	Shanker /pura ji Patel	10,202	13,721	3,519	34.5%
5	Heera / Gota ji Patel	20,200	24,316	4,116	20.4%
6	Nanga ji / Bhara ji Patel	35,400	42,896	7,496	21.2%
7	Jagadish ji / Kheta ji	22,000	26,028	4,028	18.3%
8	Devi lal / bhera ji	41,470	49,812	8,342	20.1%

Total Rabi Season Income Increase: ₹49,411

Heera ji Patel achieved remarkable 41.9% Rabi income increase, followed by Shanker Patel with 34.5%, indicating that GAP techniques are particularly effective for smaller farm operations where intensive management can be implemented more effectively.

GAP Adoption and Implementation

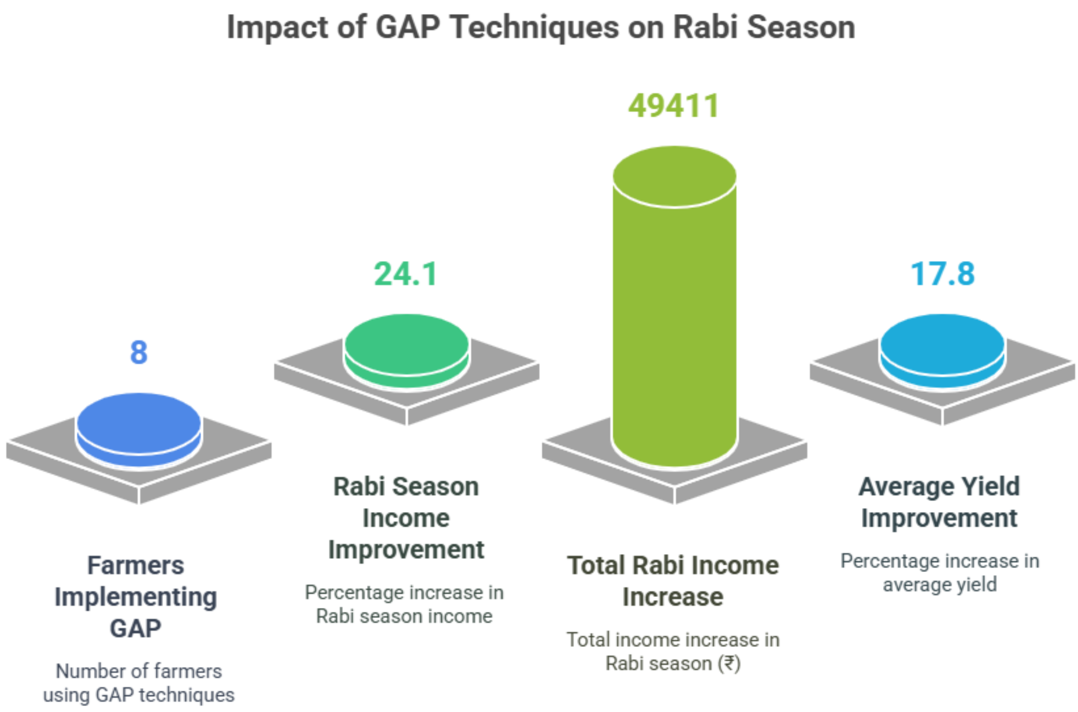
Technology Package Implementation

All 8 farmers achieved 100% GAP adoption across 1.6 hectares average area. The comprehensive package included seed treatment, line sowing, integrated nutrient management, and integrated pest management - demonstrating successful technology transfer and sustained implementation. Seed distribution and seed treatment under GAP were verified by the beneficiary farmers during individual interactions as well as focus group discussions.

Implementation Timeline and Coverage

Farmer	GAP Adopted	Year of Adoption	Area under GAP (ha)	Yield Increase (%)
Babaru Patel	Yes	2022-23	0.2	14
Heera ji Patel	Yes	2021-22	0.15	25
Valchandra	Yes	2021-22	0.2	18
Shanker Patel	Yes	2020-21	0.4	22
Heera Gota Patel	Yes	2022-23	0.2	16
Nanga ji Patel	Yes	2021-22	0.15	12
Jagadish ji	Yes	2022-23	0.2	15
Devi lal	Yes	2021-22	0.3	20

Average yield increase of 17.8% across all farmers validates the technical effectiveness of GAP, with Heera ji Patel achieving 25% yield improvement on 0.15 hectares, demonstrating intensive management potential.



The Good Agricultural Practices intervention achieved comprehensive success with 8 farmers demonstrating consistent Rabi season improvements and 24.1% average Rabi income increase. The 100% adoption rate and 17.8% average yield increase validate GAP as an effective, sustainable approach for wheat cultivation enhancement among small and marginal farmers.

COMPONENT 3: HIGH VALUE CROPS - PROSO MILLET DIVERSIFICATION

The High Value Crops intervention introduced improved IIMR Hyderabad proso millet varieties to 5 farmers achieving 13.1% average income increase. The intervention generated ₹68,358 total additional annual income through climate-resilient crop diversification.

BENEFICIARY PROFILE

Sr. No.	Farmer Name	Village	Age	Land (Ha)	Income Before (₹)	Income After (₹)	Increase (₹)	Growth (%)
1	Mana /Dola Patel	Aavra	55	2.4	129,863	140,440	10,577	8.1%
2	Bhera ji /Bhaga ji Patel	Khajuriya	50	1.2	105,400	115,208	9,808	9.3%
3	Heera ji / Daya ji Patel	Aavra	49	0.6	86,430	101,500	15,070	17.4%
4	Shanker /pura ji Patel	Khajuriya	67	3.0	47,702	62,455	14,753	30.9%
5	Uda ji / Vala ji	Gudli	43	1.8	152,500	170,650	18,150	11.9%
TOTAL	5 farmers	3 villages	52.8 avg	1.84 avg	521,895	590,253	68,358	13.1%

INTERVENTION DETAILS

Crop Information

- Crop: Proso Millet (improved varieties)
- Source: IIMR Hyderabad varieties
- Adoption Rate: 100% by participating farmers
- Continued Cultivation: 100% sustained over project period

Village Coverage

- Khajuriya: 2 farmers
- Aavra: 2 farmers
- Gudli: 1 farmer

KEY BENEFITS

Crop Advantages

- Climate-resilient: Drought-tolerant varieties
- Market acceptance: Premium pricing for improved varieties
- Nutritional value: High protein content
- Risk diversification: Alternative to traditional cereals

The High Value Crops intervention successfully introduced climate-resilient millet varieties to 5 farmers, achieving ₹68,358 additional annual income with 13.1% average growth. The 100% adoption and continuation rate demonstrates successful crop diversification with strong potential for scaling.

Key Success: Combination of improved varieties, technical training, and market development created sustainable livelihood enhancement through agricultural diversification.

COMPONENT 4: CUSTOM HIRING CENTRE - AGRICULTURAL MECHANIZATION

The Custom Hiring Centre provided community-based seed drill access to 4 farmers across 3.3 hectares. Farmers pay ₹1,000 per hour with 3 hours required per hectare, achieving 75-80% time savings and improved crop establishment.

BENEFICIARY PROFILE

Farmer Name	Village	Age	Land (Ha)	Annual Usage	Annual Cost
Noja Ram Patel	Gudli	62	1.6	2 times/year	₹2,400
Babaru Patel	Vnjanirodi	57	2.4	3 times/year	₹3,600
Lalu Ram Patel	Bhutiya	48	1.2	2 times/year	₹1,800
Jagadish ji	Gudli	36	1.2	2 times/year	₹2,100
TOTAL	3 villages	50.8 avg	1.6 avg	9 uses/year	₹9,900

USAGE AND COST STRUCTURE

Service Details

- Hourly Rate: ₹1,000 per hour
- Time Required: 3 hours per hectare
- Cost per Hectare: ₹3,000
- Total Area Covered: 3.3 hectares annually
- Crops: Wheat, Sorghum, Mustard, Barley

FARMER BENEFITS

Time Efficiency

- Traditional Method: 16-20 labor hours per hectare
- Seed Drill Method: 3 machine hours per hectare
- Time Savings: 75-80% reduction

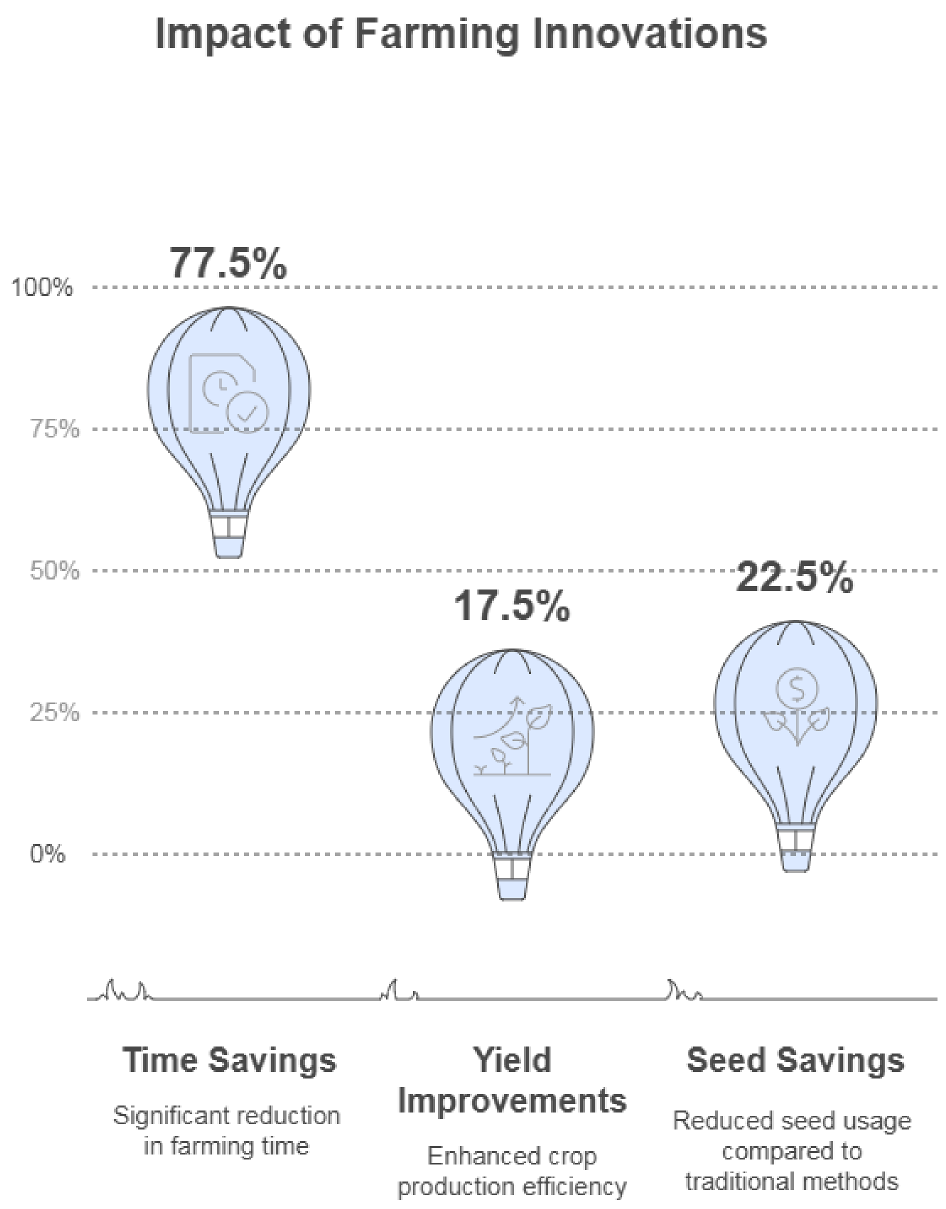
Key Benefits Reported

- Precise seed placement and uniform germination
- 20-25% seed savings compared to broadcasting
- Combined fertilizer application with sowing
- Better crop establishment and plant population
- 10-25% yield improvements across crops

OPERATIONAL IMPACT

Crop Performance

Farmer	Crop	Yield Improvement
Noja Ram	Wheat	10-15% increase
Babaru	Sorghum	15-20% increase
Lalu Ram	Wheat	12-18% increase
Jagadish	Wheat	15-25% increase



Farmer Satisfaction

- Average Rating: 4.5/5
- Recommendation: 100% would recommend
- Continuation: 100% willing to continue

SUCCESS FACTORS

1 Community Ownership: Shared access reducing individual investment

1 Appropriate Technology: Suited for small farmer operations

1 Clear Benefits: Obvious time and quality advantages

1 Democratic Management: Farmers collectively managing schedules

The CHC seed drill service successfully provides cost-effective mechanization for small farmers. Despite ₹3,000/hectare cost, farmers achieve significant time savings (75-80%), better crop establishment, and 10-25% yield improvements, making it a valuable community asset.

COMPONENT 5: PASTURELAND DEVELOPMENT

Integrated Land Use and Research Demonstration

The Pastureland Development component transformed 10.5 hectares of land into a protected integrated farming system benefiting 9 farmers. The project combined timber plantation, fodder production, and research trials with infrastructure development including solar irrigation and boundary protection. The intervention served as both a production system and demonstration platform for community learning.

Key Achievements:

- 10.5 hectares protected with cattle trench and wire fencing
- 2,200 surviving Melia Dubia trees with potential value of ₹88,00,000
- 4x increase in fodder production benefiting 9 farmers
- Solar irrigation system with 5 HP pump and drip irrigation installed
- Research trials completed for vegetables, strawberry, and floriculture

PROJECT SCOPE AND BENEFICIARIES

Land Development and Protection

- Total Area: 10.5 hectares
- Development Agency: Arpan Seva Sansthan
- Boundary Protection: Cattle protection trench + wire fencing
- Total Beneficiaries: 9 farmers with individual allocated areas
- Primary Case Study: Keva Ram / Bhera ji Patel (detailed analysis)

Infrastructure Development

- Solar Power System: 5 HP solar pump installed by Arpan
- Irrigation System: Drip irrigation for plantations
- Demonstration Technology: Mini sprinkler system for floriculture trials

---

BENEFICIARY FARMER PROFILE - KEVA RAM

Parameter	Details
Name	Keva Ram / Bhera ji Patel
Age	56 years
Village	Bhutiya
Category	OBC
Family Members	10
Livestock	4 cows and buffaloes

TIMBER PLANTATION ANALYSIS

Melia Dubia (Malabar Neem) Performance

- Trees Planted: 3,000 saplings
- Current Survival: 2,200 trees (73.3% survival rate)
- Required Girth of tree after 7-8 years: 2 feet diameter
- Market Value: ₹4,000 per tree (current rate)
- Total Potential Value: ₹88,00,000
- Maturity Period: 7-8 years for timber harvest

FODDER PRODUCTION SYSTEM

Cut-and-Carry Fodder Management

Parameter	Details
Production Increase	4x increase per hectare
Harvesting System	Cut-and-carry (no direct grazing)
Cutting Frequency	2 cuts per year per farmer
Total Farmers	9 farmers benefiting
Land Allocation	Individual portions within 10.5 hectares

Keva Ram's Fodder Benefits

- Livestock Supported: 4 cows and buffaloes
- Benefit Type: Cost savings through own fodder production
- Harvesting Rights: Designated area within protected land

RESEARCH AND DEMONSTRATION TRIALS

Completed Trial Programs

Trial Type	Area	Status	Technology Demonstrated
Floriculture	1.0 Ha	Trial completed	Marigold cultivation + mini sprinkler
Vegetable Cultivation	0.1 Ha	Trial completed	Trellis system vegetables
Strawberry Cultivation	0.1 Ha	Trial completed	Specialty fruit feasibility

Failed Experiments

- Papaya and Lemon: 500 plants planted but did not survive
- Learning Value: Important data on crop suitability for local conditions

INFRASTRUCTURE AND TECHNOLOGY

Solar Irrigation System

- Solar Pump: 5 HP capacity installed by Arpan
- Irrigation Technology: Drip irrigation for plantation support
- Coverage: Timber plantation and trial areas
- Demonstration Value: Solar-powered agriculture model

Protection Infrastructure

- Cattle Protection Trench: Complete perimeter boundary
- Wire Fencing: Additional protection preventing free grazing
- Access Control: Systematic entry and utilization management

PROJECT OUTCOMES

Economic Impact

- Timber Value: ₹88,00,000 potential from 2,200 trees
- Fodder Benefits: Cost savings for 9 farmers through enhanced production
- Infrastructure Asset: Solar irrigation system providing long-term benefits

Research and Learning

- Technology Demonstration: Solar pump, drip irrigation, mini sprinkler
- Crop Trials: Completed feasibility studies for multiple crops
- Community Learning: Platform for farmer education and technology exposure

Land Management Success

- Protection Achieved: Complete prevention of uncontrolled grazing
- Sustained Production: 4x fodder increase maintained
- Tree Survival: 73.3% survival rate for timber plantation

SUSTAINABILITY ASSESSMENT

Economic Sustainability: Excellent

- High-value timber providing long-term returns
- Solar infrastructure reducing operational costs
- Protected system ensuring sustained production

Technical Sustainability: Very Good

- Solar system requiring minimal maintenance
- Established tree plantation with good survival
- Proven fodder production enhancement

Environmental Sustainability: Excellent

- 2,200 trees contributing to carbon sequestration
- Solar energy reducing carbon footprint
- Protected land preventing degradation

The Pastureland Development component successfully created a protected integrated land use system benefiting 9 farmers across 10.5 hectares. The combination of timber plantation (₹88,00,000 potential value), enhanced fodder production (4x increase), and technology demonstration created a comprehensive model for land development.

A cold storage of 5 tonne capacity (solar powered) was established in the pastureland but its usage was limited due to less vegetable production than its capacity.

The project demonstrates that marginal lands can be transformed into valuable productive assets through appropriate infrastructure investment and community-based management systems.

COMPONENT 6: TRAINING COMPONENT - CAPACITY BUILDING THROUGH WADI SYSTEMS

The Training and Capacity Building component served as the foundational enabler for all other interventions in the WEZ Kurabad Project. This component provided the critical knowledge transfer and skill development that facilitated 100% adoption success across WADI systems, Good Agricultural Practices, High Value Crops, Custom Hiring Centre operations, and Pastureland Development.

Key Training Achievements:

- Skill transfer success across all technical components
- Self-reliant farmer community managing complex integrated systems

TRAINING FRAMEWORK

Implementation Overview

- Beneficiaries Reached: All 22 project farmers across 6 villages
- Training Approach: Farmer Field School methodology with hands-on demonstrations
- Duration: Continuous capacity building over 3-5 years (2020-2025)
- Training Areas: 8 core skill development modules

Core Training Areas

Training Module	Focus Area	Key Skills Developed
WADI System Development	Integrated farming coordination	Land planning, crop integration, seasonal
Irrigation Management	Water efficiency	Drip system operation, maintenance, water budgeting
Organic Input Production	Soil health	Compost production, vermiculture, soil testing
Crop Diversification	Variety selection	Improved varieties, crop rotation, market orientation
Pest Management	Ecological protection	Organic pesticides, biological controls, monitoring
Mechanization	Equipment use	Operation, maintenance, cooperative management

FOCUS GROUP DISCUSSION ANALYSIS SUMMARY

Overview

Villages Covered: 5 project villages
Total FGDs Conducted: 5 sessions (1 per village)
Total Participants: 107 community members

Participant Profile

- Marginal Farmers (<2 bigha): (60%) | Small Farmers (2-5 bigha): (40%)
- Scheduled Tribes: (32%) | Other Backward Classes: (68%)

Major Impact Areas

Water Security Transformation

Pre-Project Challenges:

- Wells drying by March-April (89% participants)
- Complete monsoon dependence (94% farmers)
- Seasonal migration due to water scarcity (67% families)

Post-Project Achievements:

- Water availability extended by 2-3 months (100% participants)
- Wells recharged within 300m radius (75% well owners)
- Irrigation coverage increased (25% to 50% of cultivable land)
- Groundwater rise of 3-5 feet in command areas

Technology Adoption Success

Drip Irrigation:

- Water savings: 25-35% reduction in usage
- Electricity cost savings: ₹8,000-12,000 annually
- Yield improvement: 25-35% increase

Solar Power Systems:

- Zero operational cost - no electricity bills
- 99% availability during sunny days
- Environmental satisfaction among farmers

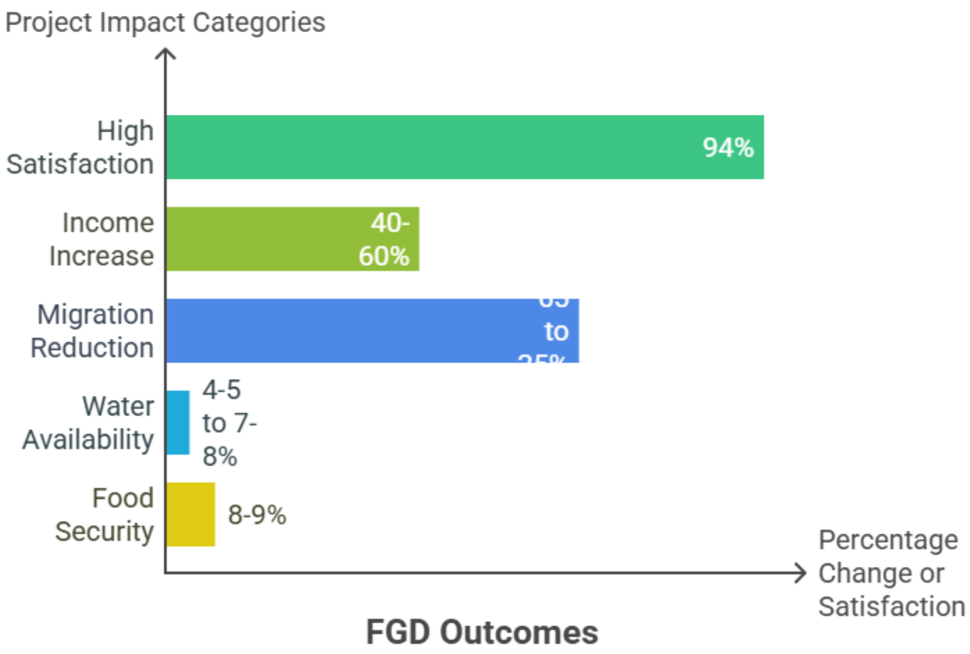
Livelihood Enhancement

Income Transformation:

- Household income increase: 40-60% across villages
- Migration reduction: From 65% to 25% of families
- Food security: 8-9 months self-sufficiency achieved

Validated Quantitative Impact

Parameter	Pre-Project	Post-Project	% Improvement
Water Availability	4-5 months	7-8 months	60%
Crop Yield	8-12 quintals/acre	12-16 quintals/acre	40%
Annual Income	₹45,000-70,000	₹65,000-95,000	45%
Irrigation Coverage	35-45%	60-75%	75%



Satisfaction Levels

- Overall Project Satisfaction: 94% highly satisfied
- Water Infrastructure: 96% satisfied
- Livelihood Support: 91% satisfied
- Training Quality: 89% satisfied

Key Challenges Identified

- Silting in structures: 15% need annual maintenance
- Price volatility: 30-40% market fluctuations
- Technical support: Need for regular maintenance services

The FGD analysis confirms overwhelming community satisfaction with validated impact across all intervention areas. The transformation from water-scarce, migration-dependent livelihoods to sustainable, diversified agriculture demonstrates exceptional project success with strong community ownership ensuring long-term sustainability.

CONCLUSION AND STRATEGIC RECOMMENDATIONS

Overall Project Assessment

The WEZ Kurabad Project represents a transformational breakthrough in integrated rural development, demonstrating that well-designed, multi-component interventions can achieve sustainable and scalable livelihood enhancement. The project's achievement of significant economic impact across 22 unique beneficiary households, with comprehensive environmental and social benefits, establishes this as a flagship model for corporate social responsibility and development sector leadership.

Key Achievement Summary

Quantitative Excellence

- Economic Transformation: ₹43,528 average household income increase representing life-changing impact
- Resource Efficiency: 52% water savings and 39% fertilizer reduction demonstrating environmental sustainability
- Asset Creation: Significant infrastructure, livestock, and human capital development
- Implementation Success: 100% adoption and retention across all interventions proving model effectiveness

Qualitative Leadership

- Food Security Enhancement: Year-round nutritious food availability and dietary diversification
- Environmental Sustainability: Resource conservation, soil health improvement, and climate resilience
- Market Integration: Progressive independence in value chain participation with premium pricing
- Community Empowerment: Democratic governance, collective action, and enhanced social capital
- Knowledge Systems: Robust farmer-to-farmer learning networks and innovation capacity

Innovation and Replicability Excellence

- Integrated Model: Proven synergistic approach creating amplified rather than additive impacts
- Adaptive Management: Successful problem-solving and course correction capability
- Technology Integration: Appropriate scale solutions for smallholder constraints and capabilities
- Market Development: Evolution from facilitated to independent value chain participation
- Social Inclusion: Exceptional performance across gender, caste, age, and land holding categories

Final Assessment and Strategic Recommendation

The WEZ Kurabad Project has completed all expectations across economic, environmental, social, and technical dimensions, creating a robust foundation for transformational scaling. The combination of technical excellence, market integration, adaptive management, and community ownership has created a proven, replicable model for integrated rural development.

The project's success in achieving complete farmer adoption, significant income increases, resource efficiency, and sustainable practices positions it as the premier example of effective development intervention in India's rural development landscape.

Key Strategic Recommendation

DS Group should position this project as the cornerstone of its rural development strategy, with immediate focus on:

1 Comprehensive documentation and knowledge product development for replication

1 Strategic partnerships with government and development agencies for scaling

1 Investment in regional hub development for sustained implementation capacity

1 Policy engagement and thought leadership for sectoral influence

Annexure A: Impact & Quality of Structures

Table 12 Details of Structures Surveyed

S. No.	Name of Structure	Village	Families Benefitted*	No. of well recharge	Condition
1	Anicut- Dhawadi magari nale me-1	Sulawas	15	2	Good
2	Anicut- Dhawadi magari nale me-2	Sulawas			Good
7	MPT- Baithak dhawadi nale me	Sulawas	25		Good
3	Gurjar talab nale par	Sulawas	57		Good
6	Anicut- Badari	Sagatadi	6	3	Good
5	Anicut- Hakadi ghati nale par	Sagatadi	35		Good
4	Earthen embankment with masonry waste weir and stone pitching-2	Sagatadi	30		Good
8	MPT- Jogi Magari Nala par	Gudli	19	6	Good
9	MPT- Maniya magara nale par-1	Gudli	72		Good
10	MPT- Maniya magara nale par-2	Gudli			Good
11	MPT- Maniya magara nale par-3	Gudli			Good
12	MPTCW- Jogi magari nale me	Gudli	34		Good
13	Earthen embankment with Masonry waste weir Maniya magara	Gudli	4		Good
14	Earthen embankment with masonry core wall Maniya magara nale par	Gudli	4		Good
15	MPT- Humlaya nala pipal ke ped ke pass	Bori	16		Good
16	Anicut- Badiya aam puliya ke pass	Gudli	37	4	Good
17	Anicut- Akua kuye ke pass Achhat	Achhat	125	1	Good
18	Anicut- Puja kakar Awara	Awara	220	9	Good

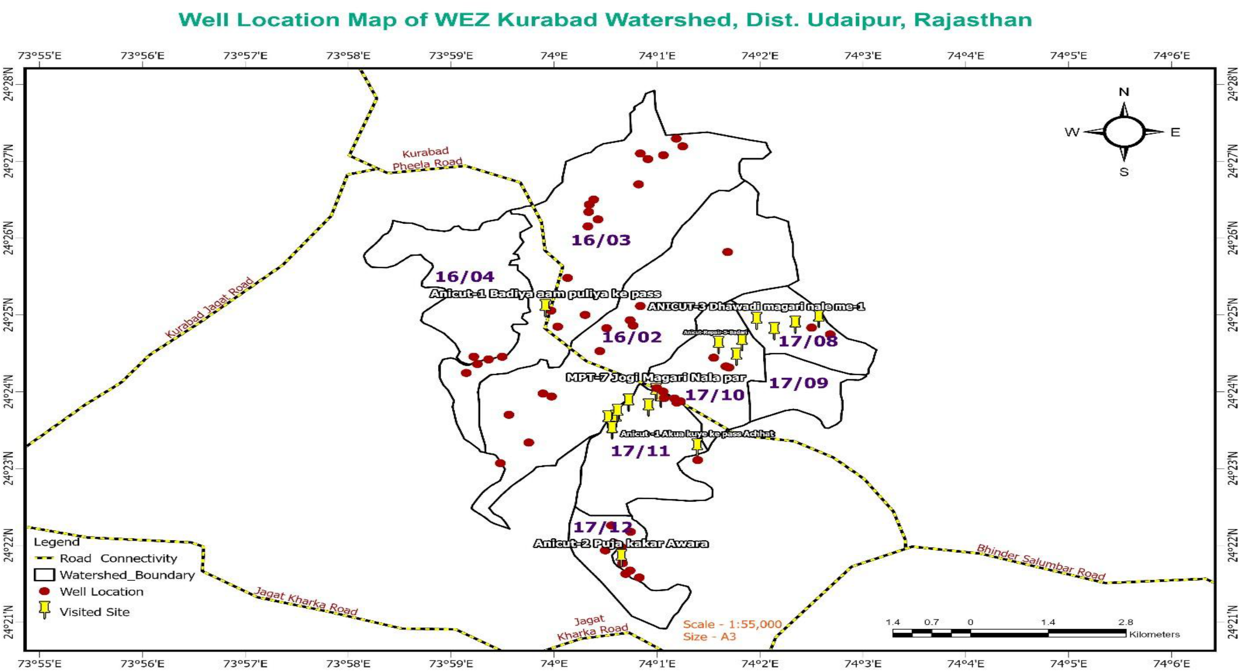


Fig. 52 Well Locations near SWC structures in the Project area

Annexure B: Impact on Groundwater Level

Table 13 Change on Groundwater level before and after construction of SWC structures

Location code	Latitude	Longitude	Location	Village	GW level (m bgl)				
					2019	2020	2024	Change (2019-2024)	Change (2020-2024)
L1	24.41	73.99	Haliya	Khajuriya	12.80	13.20	9.54	3.26	3.66
L2	24.41	73.99	Wadi	Khajuriya	13.10	13.70	10.40	2.70	3.30
L3	24.40	73.99	Sunagar	Khajuriya	12.40	13.20	9.48	2.92	3.72
L4	24.41	73.99	Wadi	Khajuriya	11.50	10.71	8.57	2.93	2.14
L5	24.41	73.99	Wadi	Khajuriya	10.60	11.40	7.96	2.64	3.44
L6	24.45	74.01	Jud	Jud	10.09	9.40	7.20	2.89	2.20
L7	24.45	74.02	Jud	Jud	7.96	8.10	5.49	2.47	2.61
L8	24.45	74.02	Jud	Jud	8.57	8.50	5.70	2.87	2.80
L9	24.45	74.01	Vakta ba ka kua	Khajuriya	8.00	8.20	7.11	0.89	1.09
L10	24.44	74.01	Hadimar	Khajuriya	8.40	9.40	6.86	1.53	2.54
L11	24.44	74.01	Hadimar	Khajuriya	5.64	5.18	3.14	2.50	2.04
L12	24.44	74.01	Hadimar	Khajuriya	7.60	8.88	5.52	2.08	3.36
L13	24.44	74.01	Hadimar	Khajuriya	5.60	5.10	2.47	3.13	2.63
L14	24.44	74.01	Junapani	Khajuriya	5.33	6.10	3.39	1.95	2.71
L15	24.42	74.00	Junapani	Khajuriya	6.50	7.20	4.12	2.38	3.08
L16	24.42	74.00	Khajuriya nale ke pass	Gudli	10.22	10.80	7.47	2.75	3.34
L17	24.43	74.03	Aat dungra	Gudli	6.60	9.00	6.03	0.57	2.97
L18	24.42	74.01	Amela	Gudli	3.60	4.70	2.58	1.02	2.12
L19	24.42	74.01	Amela	Gudli	6.30	7.90	4.23	2.07	3.67
L20	24.41	74.01	Amela	Gudli	11.73	12.71	9.00	2.73	3.71
L21	24.41	74.01	Gariyawas	Gudli	6.23	5.49	3.20	3.03	2.29
L22	24.40	74.00	Medla	Kali magri	11.30	11.18	7.93	3.37	3.25
L23	24.40	74.00	Pela daba	Kali magri	10.20	9.19	6.83	3.37	2.36
L24	24.40	73.99	Dholi khera	Bori	3.40	4.88	2.13	1.27	2.75
L25	24.39	74.00	Dholi khera	Bori	5.68	6.19	2.10	3.58	4.09
L26	24.38	73.99	Gangrda	Bori	5.20	5.49	4.33	0.87	1.16
L27	24.41	74.01	Umriya	Gudli	5.43	6.20	3.20	2.23	3.00

Annexure C: Farmers Interactions

Table 14 Details of Farmers interaction:

Sl. No.	Structure Name	Village	Farmer's Name	Father's Name	No. of Family Member	Total land (Bigha)	Land Irrigated		Crop Cycle		Other Details
							Before (Bigha)	After (Bigha)	Before	After	
1.	Pooja Kakar Anicut, Aawara	Lag	Samant Singh	Kaan Singh	6	10	5	9	Kharif (10 bigha), Rabi (2-3 bigha)	Kharif- (10 bigha), Rabi (8 bigha), Zaid (5 bigha)	Vegetation has improved; horticulture activities initiated. Previously unused wasteland (2–3 bigha) converted to cultivable land. Annual income increased from ₹1.5–2 lakh to ₹3–4 lakh.
2.	Pooja Kakar Anicut, Aawara	Lag	Daulat Singh	Mandar Singh	9	10	5	10	Kharif	Kharif, Rabi and Zaid	Wheat cultivation started and animal husbandry significantly improved. 3 bigha of land converted to productive use. Water availability ensured year-round for livestock. Income rose from ₹2–3 lakh to ₹5–6 lakh annually.
3.	Manya Magra (5 MPT)	Bori (Patiyan)	Himmat Ram	Punja ji Meena	8	4	1-1.5	4	Kharif & Rabi	Kharif, Rabi and Zaid	Farmer converted 2 bigha of wasteland into cultivable land. One new well-constructed. Shift towards organic strawberry farming. Vegetable cultivation and animal husbandry expanded. Income increased from ₹20,000 to ₹70,000
4.	Manya Magra (5 MPT)	Bori (Patiyan)	Sawa Ram	Pauna ji	4	8	4	8	Rabi (2 bigha), Kharif	Kharif, Zaid, Rabi (8 bigha)	Crop diversification achieved with strawberries and vegetables. Income rose from ₹30,000 to ₹70,000. Animal husbandry expanded.
5.	Anicut, Achhat	Aacchat	Shiv Lal	Daula ji	12	6	3	6	Kharif and Rabi (50%)	Rabi (100%), Kharif, Zaid	Significant improvement in groundwater level. Vegetable production and livestock activities have increased. Two bigha of land converted for agriculture. Annual income rose from ₹60,000–70,000 to ₹1 lakh.
6.	Anicut, Achhat	Aachhat	Kewa Ramji	Chhatra ji	8	5	3	6	Kharif, Rabi (50%)	Rabi (100%), Zaid	

Annexure D: Soil & Water Testing

Table 15: Water Analysis Data:

Sl. No.	Parameter	Unit	Out Of Project Area					Project Area				
			Mr. Mahendra Singh S/0 Govind Singh Village-Karmal Village Council-Sulavas	Mr. Lala Ji S/O Vala Ji Village-Ravatpura Village Council-Sulavas	Mr. Ambalal S/O Uda Ji Village-Ramaj	Mr. Loger Mina S/O Kanna Ji Village-Upla Chotipa Village Council-Ramaj	Mr. Keshu Lal Mina Village-Upla Chotipa Village Council-Ramaj	Mr. Lakhma S/O Mava Ji Village-Nandi Vela Village Council-Bori	Mr. Nojaram S/O Pemaram Village-Gudli	Mr. Kenaji S/O Chatra Village-Aasar Village Council-Bori	Mr. Ishwar S/O Dolat Singh Village-Lag Village Council-Bori	Mr. Narayan S/O Galla Ji Village-Sagtadi Village Council-Bori
1.	Temperature	^0C	33	33	33	33	33	33	33	33	33	33
2.	pH	-	6.85	6.8	6.8	7	6.9	7.1	6.95	7.5	7.8	6.81
3.	Electric Conductivity	µS/cm	1233	1338	1416	2085	903	895	1216	1129	955	955
4.	Total Dissolved Solid	NTU	800	865	920	1350	590	585	790	730	625	615
5.	Total suspended Solids	mg/L	5	<2	<2	<2	<2	<2	<2	<2	<2	<2
6.	Alkalinity	mg/L	466.9	479.08	434.42	475.02	487.2	519.68	458.78	479.08	475.02	446.6
7.	Total hardness as $CaCO_3$	mg/L	388	508	408	568	352	400	452	484	428	404
8.	BOD (Biochemical Oxygen Demand) at 27°C for 3Days	mg/L	5.3	7.2	14.8	28.8	6.7	5.5	3	7.7	3.2	<2
9.	COD (Chemical Oxygen Demand)	mg/L	23.71	31.61	63.23	126.46	31.61	23.71	15.8	31.61	15.8	7.9
10.	Zinc as (Zn)	mg/L	7	4	2	6	3	2	4	1	5	3
11.	Iron as (Fe)	mg/L	0.5	0.7	0.6	0.8	0.7	0.1	0.3	0.2	0.1	0.05
12	Copper as (Cu)	mg/L	0.2	0.5	0.2	0.6	0.3	0.4	0.1	0.08	0.03	0.05

Table 16: Soil Analysis Data:

Sl. No.	Parameter	Unit	Out of Project Area					Project Area				
			Rodi Lal / Devaji Vill. Ravatpura Sulavas Kurabad Dist. Udaipur	Mahendra/ Dalaram Vill. Ravatpura Sulavas Kurabad Dist. Udaipur	Bhagat Singh/Govind Singh Vill. Karmal Sulavas Kurabad Dist. Udaipur	Sohan/ Amra Ji Vill. Ramaj Kurabad Dist. Udaipur	Rupa/ Gulaji Vill. Ravatpura Sulavas Kurabad Dist. Udaipur	Kanhaiya Lal/ Bhavani Shamkar Vill. Bori Kurabad Dist. Udaipur	Mavaram/ Bhimaji Dangi Vill. Dholikhera Bori Kurabad Dist. Udaipur	Babarmal/ Vagtaji Vill. Gudli Kurabad Dist. Udaipur	Noja/ Pema Ji Dangi Vill. Gudli Kurabad Dist. Udaipur	Dalaji/ Kevaji Dangi Vill. Gudli Kurabad Dist. Udaipur
1.	pH	-	8.32	8.25	7.79	8.18	6.32	7.58	7.38	8.31	8.15	8.06
2.	Electrical conductivity	µs	220	220	240	380	68	174	570	480	440	1220
3.	Bulk density	-	0.89	0.86	0.79	0.85	0.64	0.92	0.92	0.91	0.96	
4.	Texture	-	Silt Clay	Clay	Clay	Silt Loam	Silt Loam	Silt Clay	Silt Clay	Silt Clay Loam	Silt Loam	Silt Clay
5.	Calcium	%	1.25	1.23	1.27	2.4	1.3	0.84	0.86	0.89	0.84	
6.	Water Holding Capacity	%	11.6	5.7	18.7	12.5	16	21		19	27	12.6
7.	Potassium as K	%	0.009	0.008	0.01	0.021	0.006	0.006	0.009	0.016	0.008	0.016
8.	Available Phosphorous as P	%	0.84	0.82	0.87	0.81	0.58	0.206	0.251	1.59	2.41	0.59
9.	Available Nitrogen	mg/kg	140	196	112	252	336	504	728	588	756	476
10.	Organic Matter	%	0.69	0.67	0.71	0.78	0.6	0.022	0.73	0.85	0.8	1.01
11.	Magnesium	mg/kg	1.25	1.08	1.13	1.08	1.2	0.24	0.32	0.28	0.4	
12.	Iron as (Fe)	mg/kg	703	736	1687.2	2400	1923	1734	2804	2509	2676	3200
13.	Mangnese as (Mn)	mg/kg	1.181	1.206	1.106	1.26	0.967	0.992	1.374	0.997	1.304	1.532
14.	Zinc as (Zn)	mg/kg	2.079	2.332	2.157	2.689	1.558	1.428	2.053	2.31	2.534	2.275
15.	Copper as (Cu)	mg/kg	1.005	1.028	1.199	1.925	0.899	1.018	2.056	1.17	1.136	1.856
16.	Molybdenum as (Mo)	mg/kg	BDL (<1)	BDL (<1)	BDL (<1)	BDL (<1)	BDL (<1)	BDL (<1)	BDL (<1)	BDL (<1)	BDL (<1)	BDL (<1)
17.	Boron as (B)	mg/kg	2	1	4	6	2	4	1	3	2	5

Annexure E: Questionnaire of Farmer Interaction

IMPACT ASSESSMENT

WEZ, Kurabad Block, Udaipur, Rajasthan

Block………………………………………..Gram panchayat…………….……………………

Village ……………………………………..Hamlet…………………………………………

Name of Farmer…………………………… Father's Name………………………………………

Basic Details:-

No. of Family Member……………………..Total Land (Bigha)……………..……………………

Effect of Structure

S. No.	Description	Before	After
1	Irrigated Land		
2	No. of Well recharge		
3	Crop Production		
4	Source of Water		
	For drinking		
	For irrigation		

- **Change in cropping pattern: Yes / No**
- **Soil Conservation**
  - **Soil Erosion: Yes / No**
  - **Soil Moisture and Fertility: Yes / No**
- **Change in water table: Yes / No**
- **Other details, if any**

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

Annexure F: FGD Questionnaire

फोकस ग्रुप डिस्कशन प्रश्नावली

आजीविका प्रभाव मूल्यांकन जल आर्थिक क्षेत्र -परियोजना

समय: 60-90 मिनट
प्रतिभागी: प्रति गांव 8-12 किसान
विधि: समूहिक चर्चा और नोट्स लेना

खंड क - प्रतिभागी परिचय :

मॉडरेटर का परिचय: "हम यहाँ यह समझने आए हैं कि पानी और कृषि परियोजना से आपके जीवन पर क्या प्रभाव पड़ा है। कृपया खुलकर बात करें आपकी सच्ची राय - भविष्य के कार्यक्रमों को बेहतर बनाने में मदद करेगी।"

प्रतिभागी विवरण: *(अलग शीट पर रिकॉर्ड करें)*

- नाम, आयु, गांव
- जमीन का आकार : छोटा - <2 बीघा, मध्यम - 2-5 बीघा, बड़ा - >5 बीघा
- मुख्य फसलें
- परियोजना में भागीदारी (नहीं/हाँ)

खंड ख - पानी की स्थिति :

ख1. पानी की उपलब्धता में बदलाव

"**आइए अपने गांव में पानी की स्थिति के बारे में बात करते हैं**"

1. **परियोजना से पहले:**
    - आपके कुएं आमतौर पर कब सूख जाते थे? (महीना)
    - कितने महीने आप फसल को पानी दे सकते थे?
    - क्या आपको पानी के लिए दूर जाना पड़ता था?

2. **परियोजना के बाद:**
    - अब कुएं कब तक पानी देते हैं?
    - सिंचाई कितने महीने कर सकते हैं?
    - पानी की गुणवत्ता में क्या बदलाव आया?
3. **समुदायिक प्रभाव:**
    - गांव के कितने कुओं में पानी का स्तर बढ़ा है?
    - क्या पास के कुओं में भी सुधार हुआ है?

खंड ग - कृषि में बदलाव :

ग1. फसल उत्पादन

"**अब खेती के बारे में बात करते हैं**"

1. **पहले की खेती:**
    - कौन सी फसल मुख्य रूप से उगाते थे?
    - एक साल में कितनी बार फसल लेते थे?
    - उत्पादन कैसा था? (अच्छा/सामान्य/बुरा)
2. **अब की खेती:**
    - कौन सी नई फसलें शुरू की हैं?
    - सब्जी उगाना कैसा चल रहा है?
    - फलों के पेड़ कैसे हैं?
3. **तकनीकी बदलाव:**
    - ड्रिप सिंचाई का उपयोग कैसा है?
    - कम्पोस्ट बनाना सीखा है?
    - नई किस्मों का अनुभव (जैसे मिलेट)?

ग2. मशीनीकरण

1. **सीड ड्रिल का उपयोग:**
    - समय की कितनी बचत होती है?
    - फसल में क्या सुधार दिखता है?
    - लागत कैसी लगती है?

खंड घ - आर्थिक प्रभाव :

घ1. आय में बदलाव

"अब आर्थिक स्थिति के बारे में बात करते हैं"

1. **आय के स्रोत:**
   - पहले मुख्य आय क्या थी?
   - अब कौन से नए आय के स्रोत हैं?
   - सब्जी बेचने से कितना मिलता है? (महीने में)
2. **खर्च में बदलाव:**
   - बाजार से सब्जी खरीदना कम हुआ है?
   - खादबीज की लागत कैसी है-?
   - बिजली का बिल कम हुआ है?
3. **जीवन स्तर:**
   - घर का खाना बेहतर हुआ है?
   - बच्चों की पढ़ाई में मदद मिली है?
   - पलायन कम हुआ है (शहर जाना)?

खंड ङ - सामुदायिक प्रभाव :10 मिनट

ङ1. सामाजिक बदलाव

1. **समुदाय में सहयोग:**
   - किसान आपस में कैसे मदद करते हैं?
   - नई तकनीक सीखने में एकदूसरे की मदद करते हैं-?
2. **महिलाओं की भागीदारी:**
   - घर की महिलाएं खेती में कैसे मदद करती हैं?
   - सब्जी बेचने में महिलाओं की भूमिका?

खंड च - चुनौतियां और सुझाव :10 मिनट

च1. समस्याएं और समाधान

1. **मुख्य समस्याएं:**
   - अभी भी कौन सी दिक्कतें हैं?
   - मार्केट में सब्जी बेचने में क्या समस्या है?
   - तकनीकी मदद कब चाहिए होती है?

2. **सुधार के सुझाव:**

   - और क्या सुविधा चाहिए?
   - प्रशिक्षण में क्या और शामिल करना चाहिए?
   - दूसरे गांवों को क्या सलाह देंगे?

च2. संतुष्टि स्तर

"**कुल मिलाकर यह परियोजना कैसी रही**?"

- बहुत अच्छी खराब / सामान्य / अच्छी /
- दूसरों को सुझाव देंगे? (हाँ(नहीं/
- 10 में से कितने नंबर देंगे?

समापन - 5 मिनट

"**क्या आप कुछ और जोड़ना चाहते हैं जो हमने नहीं पूछा**?"

धन्यवाद: "आपके समय और सहयोग के लिए धन्यवाद। आपकी बातें बहुत उपयोगी हैं।"

Annexure G: Livelihood Questionnaire

आजीविका गतिविधियों का प्रभाव मूल्यांकन फॉर्म

परियोजना: एकीकृत जलग्रहण विकास के माध्यम से जल आर्थिक क्षेत्रों का निर्माण

स्थान: कुराबड़ ब्लॉक, उदयपुर जिला, राजस्थान

सर्वेक्षण की तारीख: ________________ **जांचकर्ता का नाम:** ________________ **संपर्क नंबर:** ________________

क-उत्तरदाता की जानकारी

विवरण	जानकारी
उत्तरदाता का नाम	
उम्र	
लिंग (अन्य/महिला/पुरुष)	
गांव का नाम	
ग्राम पंचायत	
संपर्क नंबर	
जाति (सामान्य/अन्य पिछड़ा वर्ग/जनजाति/अनुसूचित जाति)	
परिवार का प्रकार (संयुक्त/एकल)	
परिवार के सदस्यों की संख्या	
शिक्षा का स्तर*	
गरीबी रेखा से नीचे/ऊपर	

*शिक्षा कोड-निरक्षर :1-प्राथमिक, 2-माध्यमिक, 3-उच्च माध्यमिक, 4-स्नातक, 5-स्नातकोत्तर

ख-भूमि धारण का पैटर्न

विवरण	क्षेत्रफल (हेक्टेयर)
कुल भूमि स्वामित्व	
पट्टे पर ली गई भूमि	
खेती योग्य भूमि	
गैरखेती योग्य भूमि-	
आजीविका गतिविधियों के तहत भूमि	

ग - आय के स्रोत

आय का स्रोत परियोजना से पहले (माह/रु.) परियोजना के बाद (माह/रु.)

खेती (खरीफ)

खेती (रबी)

खेती (जायद)

पशुपालन

मजदूरी

छोटा व्यापार

सेवा/वेतन

अन्य (बताएं)

कुल

घ - आजीविका हस्तक्षेप मूल्यांकन

1. वाडी स्थापना (एकीकृत कृषि प्रणाली)

गतिविधि की जानकारी

विवरण	जानकारी
आपकी भूमि पर वाडी स्थापित (हां-1, नहीं-2)	
यदि हां, स्थापना का साल	
वाडी के तहत क्षेत्र (हे.)	
स्थापित घटक (बागवानी/बाड़/ड्रिप/लंबवत खेती)	

क - सब्जियों की लंबवत खेती

सब्जी की फसलें क्षेत्रफल (वर्ग मी.) उत्पादन (किग्रा) आय (रु.)

	पहले	बाद	पहले	बाद
सब्जी 1 (बताएं)				
सब्जी 2 (बताएं)				
सब्जी 3 (बताएं)				
सब्जी 4 (बताएं)				
कुल				

ख - वाडी में ड्रिप सिंचाई प्रणाली

मापदंड	विवरण
ड्रिप सिस्टम स्थापित-(हां 1, नहीं-2)	
स्थापना का साल	
ड्रिप से कवर किया गया क्षेत्र(वर्ग मी.)	
ड्रिप से पहले पानी का उपयोग (दिन/लीटर)	
ड्रिप के बाद पानी का उपयोग (दिन/लीटर)	
पहले प्रति सप्ताह सिंचाई की संख्या	
बाद में प्रति सप्ताह सिंचाई की संख्या	
सिंचाई में बचा समय (सप्ताह/घंटे)	

ग - सुरक्षा/बाड़

बाड़ का प्रकार	उपस्थित- (हां-1, नहीं-2)	लंबाई (मीटर)	संरक्षित क्षेत्र (हे.)	बचत लागत (रु.)
जीवित बाड़				
सूखी बाड़				
पत्थर/ ईंट की दीवार				
तार की बाड़				
अन्य (बताएं)				

घ - बागवानी पौधे

पौधों का प्रकार	प्रजाति का नाम	लगाए गए पौधे	जीवित पौधे	उत्पादन (किग्रा.)	आय (रु.)
फलदार पेड़ 1					
फलदार पेड़ 2					
झाड़ियां/ अन्य पौधे					
कुल					

ङ-एकीकृत वाडी प्रणाली से लाभ

लाभ का प्रकार	परियोजना से पहले (वर्ष/ रु)	परियोजना के बाद (वर्ष/रु.)	% वृद्धि
सब्जी उत्पादन			
फल उत्पादन			
साल भर आय			
पानी के उपयोग में कमी			
मजदूरी में कमी			
मिट्टी के स्वास्थ्य में सुधार			
परिवार के पोषण में सुधार			
कुल आर्थिक लाभ			

च-घरेलू खाद्य सुरक्षा पर प्रभाव

खाद्य सुरक्षा मापदडं	परियोजना से पहले	परियोजना के बाद
सब्जी आत्मनिर्भरता के महीने		
उगाई जाने वाली सब्जियों की विविधता (संख्या)		
सब्जी खरीदारी में कमी (%)		
घरेलू उपभोग का मूल्य (माह/रु.)		
बाजार बिक्री के लिए अतिरिक्त (%)		

छ-भूमि उत्पादकता पर प्रभाव

मापदंड	वृद्धि देखी गई-(हां-1, नहीं-2)	% वृद्धि	आय प्रभाव (वर्ष/ रु.)
भूमि उपयोग दक्षता			
फसल गहनता			
साल भर उत्पादन			
मिट्टी के स्वास्थ्य में सुधार			
जैव विविधता			

2. उच्च मूल्य की फसलें

गतिविधि की जानकारी

विवरण	जानकारी
उच्च मूल्य की फसलों की शुरुआत - (हां-1, नहीं-2)	
यदि हां, शुरुआत का साल	
उच्च मूल्य की फसलों के तहत क्षेत्र (हे.)	
सिंचाई का स्रोत	

फसल विवरण और अर्थशास्त्र

उच्च मूल्य की फसल	क्षेत्र (हे.)	उत्पादन (क्विंटल)	इनपुट लागत (रु.)	सकल आय (रु.)
		पहले | बाद	पहले | बाद	पहले | बाद
फसल 1 (बताएं)		|	|	|
फसल 2 (बताएं)		|	|	|
फसल 3 (बताएं)		|	|	|
कुल		|	|	|

देखे गए लाभ

लाभ	हां-1, नहीं-2	विवरण
अधिक आय		राशि (रु.)
बाजार मांग		उच्च / कम / मध्यम
कम जोखिम		जोखिम कमी का स्तर
पानी की दक्षता		% पानी की बचत
मजदूरी की दक्षता		% मजदूरी की बचत
अन्य लाभ (बताएं)		

3. बागवानी पौधों का वितरण

गतिविधि की जानकारी

विवरण	जानकारी
बागवानी पौधे प्राप्त किए -(हां-1, नहीं-2)	
यदि हां, प्राप्ति का साल	
प्राप्त पौधों की संख्या	
जीवित पौधों की संख्या	

पौधों का विवरण

पौधे की प्रजाति	प्राप्त पौधे	जीवित पौधे	आपकी पसंद के पौधे - (हां-1, नहीं-2)	आय (वर्ष/रु.)
प्रजाति 1 (बताएं)				
प्रजाति 2 (बताएं)				
प्रजाति 3 (बताएं)				
कुल				

देखे गए लाभ

लाभ	हां-1, नहीं-2	विवरण
अतिरिक्त आय		राशि (रु.)
घरेलू उपभोग		खपत की मात्रा
पोषण में सुधार		वर्णन करें
बाजार संपर्क		वर्णन करें
प्राप्त ज्ञान		वर्णन करें
अन्य लाभ (बताएं)		

4. चारागाह भूमि विकास

गतिविधि की जानकारी

विवरण	जानकारी
चारागाह विकसित -(हां-1, नहीं-2)	
यदि हां, विकास का साल	
चारागाह के तहत क्षेत्र (हे.)	
चारागाह का प्रकार (निजी/ सामुदायिक)	

प्रभाव मूल्यांकन

मापदंड	परियोजना से पहले	परियोजना के बाद
घास उपलब्धता अवधि (महीने)		
चारे का उत्पादन (हे./क्विंटल)		
समर्थित जानवरों की संख्या		
चारा खरीदारी पर खर्च (वर्ष/रु.)		
मिट्टी कटाव नियंत्रण (खराब/औसत/अच्छा)		
वनस्पति आवरण (%)		

पशुधन को लाभ

पशुधन का प्रकार	**संख्या**		**दूध उत्पादन (दिन/लीटर)**		**पशुधन से आय (माह/रु.)**	
	पहले	बाद	पहले	बाद	पहले	बाद
गाय						
भैंस						
बकरी						
भेड़						
अन्य (बताएं)						
कुल						

5. कम लागत की कंपोस्ट इकाइयां

गतिविधि की जानकारी

विवरण	**जानकारी**
कंपोस्ट इकाई स्थापित -(हां-1, नहीं-2)	
यदि हां, स्थापना का साल	
कंपोस्ट इकाई का प्रकार	
क्षमता (घन मीटर)	

प्रभाव मूल्यांकन

मापदंड	**परियोजना से पहले**	**परियोजना के बाद**
कंपोस्ट उत्पादन (वर्ष/क्विंटल)		
रासायनिक उर्वरक उपयोग (हे./किग्रा)		
उर्वरकों पर खर्च (हे./रु.)		
मिट्टी की उर्वरता (खराब/औसत/अच्छी)		
फसल उत्पादन (हे./क्विंटल)		

देखे गए लाभ

लाभ	हां-1, नहीं-2	विवरण
कंपोस्ट की गुणवत्ता		अच्छी-1, बेहतर-2, सर्वोत्तम-3
आसान अपघटन		लगने वाला समय (दिन)
कम पोषक तत्व हानि		% कमी
लागत बचत		राशि (रु.)
उत्पादन वृद्धि		% वृद्धि
अन्य लाभ (बताएं)		

ड़-सहायता सेवाओं का मूल्यांकन

1. प्रशिक्षण और क्षमता निर्माण

गतिविधि की जानकारी

विवरण	जानकारी
प्रशिक्षण प्राप्त किया-(हां-1, नहीं-2)	
यदि हां, भाग लिए गए प्रशिक्षणों की संख्या	
प्रशिक्षण की अवधि (कुल दिन)	

प्रशिक्षण विवरण

प्रशिक्षण का प्रकार	साल (20-21/21-22/22-23)	अवधि (दिन)	ज्ञान लागू किया -(हां-1, नहीं-2)	प्राप्त लाभ (वर्ष/रु.)
किसानों के लिए				
GAP				
इनपुट उपयोग				
सिंचाई				
फसल कटाई के बाद प्रबंधन				
अन्य (बताएं)				

महिलाओं के लिए

स्वास्थ्य

स्वच्छता

पोषण

अन्य (बताएं)

युवाओं के लिए

उद्यमिता

कौशल विकास

अन्य (बताएं)

प्रशिक्षण का प्रभाव

मापदंड	हां-1, नहीं-2	विवरण
ज्ञान में वृद्धि		वर्णन करें
लागू की गई तकनीकें		वर्णन करें
बढ़ा उत्पादन		% वृद्धि
घटी लागत		% कमी
सुधरी गुणवत्ता		वर्णन करें
आय वृद्धि		राशि (रु.)
अन्य लाभ (बताएं)		

2. कस्टम हायरिंग सेंटर

गतिविधि की जानकारी

विवरण	जानकारी
कस्टम हायरिंग सेंटर की सेवाओं का उपयोग - (हां-1, नहीं-2)	
यदि हां, उपयोग की आवृत्ति (वर्ष/बार)	
उपयोग किए गए उपकरणों के प्रकार	

सेवा उपयोग

फसल	उपयोग किए गए उपकरण	सेवाएं समय पर - (हां 1, नहीं-2)	सेवाएं लाभकारी -(हां 1, नहीं-2)	बाजार की तुलना में दर (कम-1, समान-2, अधिक-3)
फसल 1 (बताएं)				
फसल 2 (बताएं)				
फसल 3 (बताएं)				

लागत लाभ विश्लेषण

ऑपरेशन	सामान्य ऑपरेशन लागत (हे./रु.)	कस्टम हायरिंग सेंटर लागत (हे./रु.)	बची लागत (हे./ रु.)
जुताई			
बुवाई			
निराई			
कटाई			
अन्य (बताएं)			
कुल			

देखे गए लाभ

लाभ	हां-1, नहीं-2	विवरण
समय पर ऑपरेशन		वर्णन करें
मजदूरी की बचत		% कमी
आधुनिक उपकरणों तक पहुंच		वर्णन करें
सुधरी उत्पादन		% वृद्धि
अन्य लाभ (बताएं)		

3. अच्छी कृषि प्रथाएं (GAP)

गतिविधि की जानकारी

विवरण	जानकारी
GAP अपनाई गई -(हां-1, नहीं-2)	
यदि हां, अपनाने का साल	
GAP के तहत क्षेत्र (हे.)	

अपनाई गई प्रथाएं

प्रथा	अपनाई गई -(हां-1, नहीं-2)	लाभकारी -(हां-1, नहीं-2)	उत्पादन में वृद्धि (%)	लागत कमी (%)
बीज उपचार				
संतुलित उर्वरीकरण				
एकीकृत कीट प्रबंधन				
मल्चिंग				
अंतरफसली				
फसल चक्र				
अन्य (बताएं)				

इनपुट उपयोग

इनपुट	परियोजना से पहले (हे./किग्रा)	परियोजना के बाद (हे./किग्रा)	बची लागत (हे./रु.)
बीज			
रासायनिक उर्वरक			
जैविक खाद			
कीटनाशक			
अन्य (बताएं)			

4. आपूर्ति श्रृंखला और विपणन सहायता

गतिविधि की जानकारी

विवरण	जानकारी
विपणन सहायता प्राप्त की -(हां-1, नहीं-2)	
यदि हां, प्राप्त सहायता का प्रकार	
कोल्ड स्टोरेज सुविधा का उपयोग -(हां-1, नहीं-2)	

विपणन लाभ

उत्पाद	बाजार दर (क्विंटल/रु.)	प्राप्त मूल्य (क्विंटल/रु.)	मूल्य अंतर (क्विंटल/रु.)	अतिरिक्त आय (रु.)
उत्पाद 1 (बताएं)				
उत्पाद 2 (बताएं)				
उत्पाद 3 (बताएं)				
कुल				

कोल्ड स्टोरेज लाभ

उत्पाद	संग्रहीत मात्रा (क्विंटल)	भंडारण अवधि (महीने)	मूल्य संवर्धन (क्विंटल/रु.)	खराबी में कमी (%)
उत्पाद 1 (बताएं)				
उत्पाद 2 (बताएं)				
कुल मूल्य संवर्धन (रु.)				

च- आर्थिक और सामाजिक सशक्तिकरण

1. महिला सशक्तिकरण

गतिविधि की जानकारी

विवरण	जानकारी
महिला-(हां केंद्रित गतिविधियां-1, नहीं-2)	
यदि हां, गतिविधियों का प्रकार	
शामिल महिला परिवारिक सदस्यों की संख्या	

उद्यमिता गतिविधियां

गतिविधि	प्रशिक्षण अवधि (दिन)	नया उद्यम शुरू किया -हां) 1, नहीं-2)	शामिल परिवारिक सदस्य	मासिक आय (.रु)
सिलाई				
ब्यूटीशियन				
खाद्य				
प्रसंस्करण				
हस्तशिल्प				
पशुपालन				
अन्य (बताएं)				

स्वास्थ्य और पोषण पहल

पहल	सहायता प्राप्त -(हां-1, नहीं-2)	लाभकारी (हां-1, नहीं-2)	देखे गए लाभ
पोषण सहायता			
स्वास्थ्य जागरूकता			
स्वच्छता सामग्री			
चिकित्सा जांच			
अन्य (बताएं)			

2. युवा भागीदारी

गतिविधि की जानकारी

विवरण	जानकारी
युवा -(हां केंद्रित गतिविधियां-1, नहीं-2)	
यदि हां, गतिविधियों का प्रकार	
शामिल युवा परिवारिक सदस्यों की संख्या	

कौशल विकास

कौशल	प्रशिक्षण प्राप्त -(हां-1, नहीं-2)	अवधि (दिन)	कौशल लागू किए-(हां-1, नहीं-2)	मासिक आय (रु.)
कंप्यूटर कौशल				
मरम्मत और रखरखाव				
कृषि कौशल				
अन्य (बताएं)				

3. आजीविका विविधीकरण

शुरू की गई नई गतिविधि	शुरुआत का साल	प्रारंभिक निवेश (रु.)	मासिक आय (रु.)	शामिल परिवारिक सदस्य
गतिविधि 1 (बताएं)				
गतिविधि 2 (बताएं)				
गतिविधि 3 (बताएं)				
कुल				

4. प्रवासन पैटर्न

मापदंड	परियोजना से पहले	परियोजना के बाद
काम के लिए प्रवास करने वाले परिवारिक सदस्य		
प्रवास की अवधि (वर्ष/महीने)		
प्रवास से आय (माह/ रु.)		
प्रवास का कारण		
मौसमी या स्थायी प्रवास		

छ-समग्र आजीविका प्रभाव मूल्यांकन

1. आय प्रभाव

आय का स्रोत	परियोजना से पहले (वर्ष/रु.)	परियोजना के बाद (वर्ष/रु.)	% परिवर्तन
कृषि			
पशुपालन			
मजदूरी			
व्यापार / उद्यम			
अन्य (बताएं)			
कुल			

2. खाद्य सुरक्षा

मापदंड	परियोजना से पहले	परियोजना के बाद
खाद्य आत्मनिर्भरता के महीने		
आहार विविधता (उपभोग किए गए खाद्य समूहों की संख्या)		
खाद्य व्यय में कमी (%)		
घरेलू बगीचे का उत्पादन (वर्ष/किग्रा)		
बाजार के लिए अतिरिक्त उत्पादन (%)		

3. संपत्ति निर्माण

संपत्ति	परियोजना से पहले संख्या मूल्य/	परियोजना के बाद संख्या मूल्य/
पशुधन (संख्या)		
कृषि उपकरण (संख्या)		
वाहन (संख्या)		
घर में सुधार (में मूल्य रु.)		
बचत (रु.)		
कर्ज में कमी (रु.)		

4. जीवन की गुणवत्ता में सुधार

मापदंड	रेटिंग स्केल (1-खराब, 5-उत्कृष्ट)
आवास की स्थिति	
साफ पेयजल तक पहुंच	
स्वच्छता सुविधाएं	
स्वास्थ्य की स्थिति	
बच्चों की शिक्षा	
महिला सशक्तिकरण	
समुदाय में सामाजिक स्थिति	
परियोजना से समग्र संतुष्टि	

ज - लाभार्थी फीडबैक

1. परियोजना के सबसे लाभकारी घटक (1-5 तक रैंक दें, 1 सबसे लाभकारी)

घटक	रैंक
वाडी स्थापना	
उच्च मूल्य की फसलें	
प्रशिक्षण और क्षमता निर्माण	
कस्टम हायरिंग सेंटर	
विपणन सहायता	
अन्य (बताएं)	

2. सामना की गई मुख्य चुनौतियां

चुनौतियां	हां-1, नहीं-2	विवरण
तकनीकी ज्ञान		
वित्तीय बाधाएं		
बाजार तक पहुंच		
इनपुट उपलब्धता		
मौसम/ जलवायु जोखिम		
अन्य (बताएं)		

3. सुधार के सुझाव

सुझाव 1: ___________________________________

सुझाव 2: ___________________________________

सुझाव 3: ___________________________________

झ- जांचकर्ता के अवलोकन

1. आजीविका गतिविधियों की वर्तमान स्थिति

मुख्य निष्कर्ष:

वाडी स्थापना की स्थिति:

उच्च मूल्य की फसलों की स्थिति:

बागवानी पौधों की स्थिति:

चारागाह विकास की स्थिति:

कंपोस्ट इकाइयों की स्थिति:

---

2. स्थिरता की संभावनाएं

तकनीकी स्थिरता:

आर्थिक स्थिरता:

सामाजिक स्वीकार्यता:

पर्यावरणीय प्रभाव:

---

3. देखे गए सामाजिक - आर्थिक परिवर्तन

सकारात्मक परिवर्तन:

आय में वृद्धि: ___________________________________

रोजगार के अवसर: ___________________________________

महिला सशक्तिकरण: ___________________________________

युवा भागीदारी: ___________________________________

खाद्य सुरक्षा: ___________________________________

नकारात्मक प्रभाव/चुनौतियां

तकनीकी समस्याएं: ___________________________________

बाजार संबंधी समस्याएं: ___________________________________

सामाजिक मुद्दे: ___________________________________

4. आजीविका घटकों का समग्र मूल्यांकन

सबसे सफल घटक:

सुधार की आवश्यकता वाले घटक:

नवाचार और सर्वोत्तम प्रथाएं:

दोहराने योग्य मॉडल:

---

5. प्रशिक्षण और क्षमता निर्माण का प्रभाव

किसान प्रशिक्षण का प्रभाव:

महिला प्रशिक्षण का प्रभाव:

युवा कौशल विकास का प्रभाव:

तकनीकी ज्ञान का स्थानांतरण:

---

6. सहायता सेवाओं की प्रभावशीलता

कस्टम हायरिंग सेंटर:

विपणन सहायता:

इनपुट आपूर्ति:

तकनीकी सहायता:

---

7. समुदायिक भागीदारी और स्वामित्व

समुदायिक भागीदारी का स्तर:

स्थानीय नेतृत्व विकास:

संस्थागत क्षमता:

निरंतरता के लिए तैयारी:

---

8. पर्यावरणीय प्रभाव

मिट्टी स्वास्थ्य पर प्रभाव:

जल संरक्षण पर प्रभाव:

जैविक विविधता पर प्रभाव:

कार्बन भंडारण पर प्रभाव:

---

9. लिंग और सामाजिक समावेशन

महिलाओं की भागीदारी:

युवाओं की भागीदारी:

हाशिए पर खड़े समुदायों का समावेश:

निर्णय लेने की प्रक्रियाओं में भागीदारी:

---

10. सुधार की सिफारिशें

तत्काल सुधार आवश्यक:

1. ____________________
2. ____________________
3. ____________________

दीर्घकालिक सुधार:

1. ______________________
2. ______________________
3. ______________________

नीतिगत सुझाव:

1. ______________________
2. ______________________
3. ______________________

11. फोटोग्राफिक दस्तावेजीकरण

गतिविधि/संरचना	फोटो संदर्भ संख्या	GPS निर्देशांक	टिप्पणियां
वाडी स्थापना			
सब्जी उत्पादन			
फल पेड़			
ड्रिप सिंचाई			
चारागाह विकास			
कंपोस्ट इकाई			
प्रशिक्षण गतिविधि			
महिला गतिविधियां			

12. मुख्य आंकड़े (Key Statistics)

मापदंड	मान
कुल लाभार्थी परिवार	
कुल आजीविका गतिविधियों का क्षेत्र (हे.)	
औसत वार्षिक आय वृद्धि (%)	
खाद्य सुरक्षा में सुधार (महीने)	
रोजगार के अतिरिक्त दिन	
प्रशिक्षण प्राप्त व्यक्ति	
नए उद्यम स्थापित	
महिला सशक्तिकरण गतिविधियां	

जांचकर्ता का नाम: ______________________ **हस्ताक्षर:** ______________________

सर्वेक्षण की तारीख: ______________________ **संपर्क:** ______________________

पर्यवेक्षक के अवलोकन:

मुख्य निष्कर्ष:

चुनौतियां:

सिफारिशें:

पर्यवेक्षक का नाम: ______________________ **हस्ताक्षर:** ______________________

तारीख: ______________________ **संपर्क:** ______________________

भरने के निर्देश:

सामान्य निर्देश:

1. सभी जानकारी सटीक और पूरी भरें
2. हां नहीं के लिए/1/2 का उपयोग करें
3. जहां लागू न हो, वहां "लागू नहीं" लिखें
4. संख्यात्मक डेटा सही भरें
5. सभी रुपया राशि स्पष्ट लिखें

विशेष निर्देश:

1. **आय डेटा:** परियोजना से पहले और बाद की आय स्पष्ट रूप से अलग करें
2. **उत्पादन डेटा:** मात्रा की सही इकाई का उपयोग करें (क्विंटल/किग्रा)
3. **फसल डेटा:** मौसमवार जानकारी अलग-अलग भरें
4. **प्रशिक्षण डेटा:** प्रत्येक प्रशिक्षण की अलग जानकारी दें
5. **फोटो:** प्रत्येक गतिविधि की फोटो लें और GPS निर्देशांक नोट करें

गुणवत्ता जांच:

1. सभी तालिकाओं में योग मिलाएं
2. पहले/बाद के आंकड़ों की तुलना करें
3. असामान्य डेटा की दोबारा जांच करें
4. लाभार्थी से जानकारी की पुष्टि करें
5. संदेह होने पर पर्यवेक्षक से संपर्क करें

महत्वपूर्ण बिंदु:

- **गोपनीयता:** व्यक्तिगत जानकारी का सम्मान करें
- **समय:** प्रत्येक फॉर्म को भरने में **2-3** घंटे का समय दें
- **धैर्य:** लाभार्थी के साथ धैर्य रखें और सभी सवालों का जवाब दें
- **सत्यापन:** संभव हो तो दस्तावेजों से जानकारी का सत्यापन करें

Annexure H: Photographs

Fig. 53 Map verification at site

Fig. 54 Loose Stone Check Dam (LSCD) structure in Gudli village

Fig. 55 CCT structures in Sulawas village

Fig. 56 CCT structures in Sulawas

Fig. 57 LSCD Structure at Bori Village

Fig. 58 Anicut- Puja kakar (Aawra)

Fig. 59 Anicut- Akua kuye ke pass (Achhat)

Fig. 60 Earthen embankment with masonry waste weir and stone pitching-2-sagtadi

Fig. 61 Anicut- Hakadi ghati nale par

Fig. 62 Geophysical Study at MPT- Jogi Magari Nala par

Fig. 63 Geophysical Study at Anicut- Badiya aam puliya ke pass

Fig. 64 Geophysical Study at Anicut- Badiya aam puliya ke pass

Fig. 65 Geophysical Study at Gudli village

Fig. 66 Interaction with farmers at Aawra village

Fig. 67 Interaction with farmers at Achhat village

Fig. 68 Interaction with farmers at Bori village

Fig. 69 Mini Sprinkler distributed to Sh. Lala of Bhutiya village

Fig. 70 Solar Pump 5hp with Drip Irrigation distributed to Sh. Kanhaiya lal ji of Bori village

Vegetable cultivation with natural farming

Vegetable cultivation as intercropping

Custom Hiring Centre

Custom Hiring Centre

Solar Pump

Horticulture Plantations

Micro Irrigation

Vegetable Cultivation

FGD

FGD

AFC
55+
YEARS
SUPPORTING RURAL INDIA

Since 1968

AFC INDIA LIMITED