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Status and Potentialities of Rainwater Harvesting and Conservation in Rural Rajasthan: A Study of Shahpura Block, Jaipur District, Rajasthan

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ABSTRACT

Rajasthan, the most expansive and water-scarce state in India, has traditionally relied on a complex array of native rainwater harvesting (RWH) systems—johads, nadis, tankas, khadins, and anicuts—crafted over centuries to address inconsistent rainfall and the lack of continuous surface water. This study analyzes the present condition and prospective opportunities for rainwater harvesting and conservation in the Shahpura block of Jaipur district, a semi-arid administrative region on the northern edge of the Jaipur urban area, which illustrates the overarching challenges confronting rural Rajasthan: swift groundwater depletion, increasing competition for water between urban and rural areas, and the gradual disregard for traditional water systems amid the spread of borewell irrigation. Utilizing a mixed-methods research framework that integrates secondary data analysis, structured household surveys, key-informant interviews, and field observations of rainwater harvesting systems in a deliberately chosen sample of villages, the study evaluates the physical state and operational efficacy of both traditional and contemporary RWH structures, the socio-institutional dynamics influencing their upkeep, and the barriers and prospects for enhancing conservation initiatives. The results present a varied yet predominantly alarming scenario: although individual rooftop and tanka harvesting demonstrates considerable resilience, community-level infrastructures like johads, nadis, and percolation tanks suffer from substantial siltation, encroachment, and institutional disregard, with fewer than fifty percent deemed fully operational. Groundwater levels in the block reflect the broader decrease observed throughout Jaipur district, which is among the most excessively used groundwater regions in the state. The study asserts that rejuvenating rainwater harvesting in Shahpura block necessitates a synthesis of community institution development, sediment removal and structural refurbishment, catchment safeguarding, and enhanced alignment with state government initiatives, providing tailored recommendations for this purpose.

INTRODUCTION

Water shortage constitutes the major ecological characteristic of Rajasthan. Occupying approximately ten percent of India's landmass while obtaining only about one percent of the nation's water supply, and devoid of significant perennial river systems in most regions, Rajasthan has historically structured rural existence around the meticulous collection and preservation of its limited and highly variable rainfall. Long before the terms "watershed management" or "rainwater harvesting" were incorporated into planning documents, communities in Rajasthan had cultivated a remarkably varied array of indigenous structures tailored to their lo-

cal topography, soil, and rainfall patterns: the johad, a diminutive earthen check dam constructed across natural drainage paths to capture monsoon runoff and promote percolation; the nadi, a village pond excavated to gather and retain surface runoff for drinking and livestock; the tanka, an underground, lime-coated cistern designed to collect and store rooftop or courtyard runoff for domestic drinking water; the khadin, an innovative runoff-farming technique developed by Paliwal Brahmin communities in western Rajasthan; and a variety of wells, stepwells (baoris and jhalaras), and small tanks (kuis, beris) adapted to different depths of the water table. Water harvesting in Rajasthan was not only a method; it was intricately woven into the social, religious, and economic framework of village existence, upheld by traditional systems of communal labor and upkeep.

In the last fifty years, this conventional water culture has faced persistent challenges. The proliferation of groundwater irrigation, facilitated by the introduction of diesel and electric pumps from the 1960s and 1970s, provided farmers with a more dependable and personally manageable water source compared to the communal tank and pond systems of previous eras, thereby diminishing the motivation for community investment in traditional infrastructure. Accelerated population increase, urban sprawl, intrusion into conventional catchment zones and drainage systems, together with the deterioration of traditional village governance that formerly oversaw water resources, have exacerbated this decrease. The ramifications have been pronounced: as per the latest evaluations by the Central Ground Water Board (Western Region), Jaipur district currently possesses the highest quantity of groundwater-over-exploited administrative blocks in Rajasthan, with numerous independent hydrological investigations revealing statistically significant, multi-decadal reductions in groundwater levels throughout the majority of blocks, attributed to the confluence of heightened extraction, escalating temperatures, and diminishing or increasingly unpredictable precipitation.

In this context, the last thirty years have seen a resurgence of interest from both policymakers and civil society in the revival of rainwater harvesting, significantly influenced by the well-documented success of johad restoration in Alwar district led by the Tarun Bharat Sangh, and later formalized thru state initiatives like the Mukhyamantri Jal Swavlamban Abhiyan, the national Jal Shakti Abhiyan, and water conservation efforts implemented under the Mahatma Gandhi National Rural Employment Guaranty Act (MGNREGA). However, the degree to which this resurgence has tangibly impacted the on-the-ground condition of rainwater harvesting systems in particular rural blocks—rather than merely the aggregate figures of constructions or refurbishments—has been relatively underexplored at the sub-district level. This study aims to bridge the existing gap by concentrating specifically on the Shahpura area in Jaipur district.

The Shahpura block holds a notably informative position for this type of research. Situated on the northern edge of the swiftly urbanizing Jaipur metropolitan area, adjacent to National Highway 48 linking Jaipur and Delhi, the block is positioned at the confluence of various factors simultaneously transforming the water dynamics of rural Rajasthan: peri-urban land-use alterations and encroachment upon traditional catchment areas and drainage systems; a semi-arid climate characterized by an average annual precipitation of approximately 500 to 550 millimeters, predominantly occurring during the three to four months of the southwest monsoon; a primarily rain-fed and groundwater-dependent agricultural economy focused on kharif bajra (pearl millet) and rabi wheat, barley, and pulses; and a district-wide groundwater scenario officially recognized as one of the most stressed in the state. Comprehending the present condition and feasible prospects of rainwater harvesting and conservation in a locality like Shahpura provides valuable insights that are pertinent locally and serve as a representative example of the obstacles encountered in revitalizing rainwater harvesting throughout the broader semi-arid, peri-urban region of eastern Rajasthan.

This document is structured into five main sections subsequent to this introduction. Section 2 provides a comprehensive overview of the study region, detailing the physiographic, meteorological, hydrogeological, demographic, and land-use attributes of Shahpura block. Section 3 delineates the particular aims that directed the investigation. Section 4 delineates the research methodology, encompassing the study design, sampling strategy, data gathering tools, and analytical framework. Section 5 delineates the findings of the research together with an analysis of their significance, concluding with the paper's final thoughts and suggestions.

STUDY AREA

Location and Administrative Setting

The Shahpura block is located within Jaipur district in the eastern part of Rajasthan. The Jaipur district lies approximately between 26°32′ and 27°51′ North latitude and 75°52′ and 76°30′ East longitude. The district is bordered by Sikar to the north, Kotputli-Behror and Alwar to the north-east, Dausa to the east, Sawai Madhopur and Tonk to the southeast, and Ajmer to the west. Shahpura, the administrative centre of the block, is located at approximately 27°23′ North and 75°58′ East and lies along National Highway 48, which connects Jaipur with Delhi. Shahpura functions as both a tehsil and development-block headquarters and contains numerous revenue villages and gram panchayats within a predominantly rural and small-town setting.

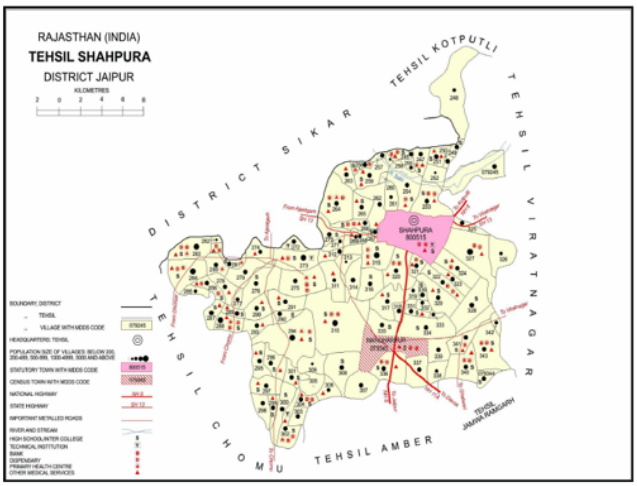

Figure 1: Official administrative map of Shahpura Tehsil, Jaipur District, Rajasthan, showing the tehsil boundary, village boundaries, roads, streams, institutions, and the Shahpura headquarters. Source: Government of Rajasthan, District Environment Plan—Jaipur.

Physiography and Drainage

The landscape of Shahpura block, similar to the majority of Jaipur district, has softly rolling plains dotted with minor, rocky formations that are part of the northeastern extension of the Aravalli mountain range, which runs along the district's northern and western borders. This undulating landscape, although less pronounced in elevation than the more formidable Aravalli regions to the south and west, holds considerable hydrological importance: the gentle hills and ridges produce various minor, seasonal drainage channels (nallahs) that direct monsoon runoff into local depressions and subsequently, downstream, into the expansive Banas–Banganga drainage system prevalent in eastern Rajasthan. None of these regional streams are perennial; nearly all flow solely during and immediately following monsoon precipitation events, which is exactly the hydrological framework that has historically rendered structures like johads, nadis, and small anicuts—engineered to capture and preserve this fleeting yet occasionally vigorous seasonal runoff—crucial to local water security. (fig 1.)

Climate

The Shahpura block exhibits a hot semi-arid climate, designated as BSh in the Köppen-Geiger classification, marked by extremely high summer temperatures often surpassing 40°C from April to June, a concentrated southwest monsoon period from late June to September, and relatively mild winters. The estimated average yearly precipitation in the area is around 500 to 550 millimeters, aligning closely with the overall average for the Jaipur district; however, as is customary in Rajasthan, actual rainfall demonstrates significant year-to-year variability, often with coefficient-of-variation figures surpassing 25 to 30 percent, and sporadic years of severe deficit that impose considerable strain on agricultural and potable water resources. Around 90 to 95 percent of the block's annual precipitation occurs within the four monsoon months, highlighting the essential need to capture and retain runoff during this limited period for utilization throughout the extended dry season.

Hydrogeology and Groundwater Status

Geologically, the Shahpura block is mostly supported by robust Precambrian foundation rock formations, intermingled with alluvial and weathered strata of differing thickness that contain the main shallow aquifers utilized by the block's drilled and tube wells. The presence of groundwater is significantly influenced by the depth and degree of weathering and fracture in the bedrock, resulting in aquifer yields that are spatially inconsistent and often small compared to the alluvial plains of northern India. This hydrogeological context

renders the groundwater resources of the block especially vulnerable to the equilibrium between recharge—primarily reliant on monsoon infiltration, significantly influenced by the state of local rainwater harvesting and percolation systems—and extraction, which has escalated dramatically in recent decades due to the widespread adoption of tube wells for irrigation and domestic use.

The Central Ground Water Board and the state groundwater department have officially evaluated Jaipur district, determining it possesses the highest quantity of "over-exploited" administrative blocks in Rajasthan, where groundwater extraction in several blocks significantly surpasses annual recharge. Autonomous hydrological trend assessments of the broader Jaipur division from the mid-1990s to the late 2010s have similarly recorded statistically significant and persistent reductions in groundwater levels across the majority of blocks in the division, throughout nearly all seasons, linked to increasing temperatures, decreasing or stagnant precipitation, and extraction rates frequently surpassing one hundred percent of the estimated annual recharge. The groundwater condition in Shahpura block aligns with the overall stress pattern seen in the district, highlighting the immediate necessity to evaluate and enhance the block's rainfall collection and artificial recharge systems.

Demography, Land Use, and Economy

The demographic of Shahpura block, akin to much of the peri-urban Jaipur district, has experienced consistent growth in recent decades, propelled by both natural population increase and in-migration linked to its location along the Jaipur–Delhi corridor, enhancing its appeal for residential, commercial, and small industrial expansion at the urban periphery. The town of Shahpura, serving as the block headquarters, recorded a population above 28,000 at the most recent comprehensive decadal census with dependable disaggregated data, and has had significant growth subsequently, in tandem with the broader rural populace of the adjacent villages.

Agriculture continues to be the primary source of income in rural areas, defined by a predominantly rain-dependent kharif season centered on bajra (pearl millet) as the main cereal, along with pulses, and an irrigated rabi season that includes wheat, barley, mustard, and gram, primarily reliant on groundwater sourced from dug and tube wells, which constitute the vast majority of the district's irrigated land, while canal irrigation contributes minimally. The husbandry of livestock—such as cattle, buffalo, goats, and sheep—persistently supports crop farming and is significantly reliant on the accessibility of surface water in village ponds (nadis) and other communal water sources, especially over the prolonged dry season. In addition to its agricultural foundation, the block's closeness to Jaipur city and its position on National Highway 48 have progressively attracted non-agricultural economic endeavors, such as transportation, commerce, minor manufacturing, and residential property development, activities that directly affect the block's conventional water infrastructure by often encroaching upon catchment zones, drainage systems, and pond beds that were traditionally maintained for water collection purposes.

OBJECTIVES

The present study was guided by the following specific objectives:

1. To record and chart the conventional and contemporary rainwater collecting systems now found in a representative selection of villages within Shahpura block, Jaipur district.

2. To evaluate the physical state and operational status of these entities, categorizing them as completely operational, partially operational, or non-functional or significantly deteriorated structures.

3. To investigate the socio-institutional frameworks—community entities, traditional customs, and governmental program participation—regulating the establishment, upkeep, and administration of rainwater collecting systems in the research locale.

4. To ascertain the primary physical, socio-economic, and institutional impediments hindering the efficient operation and rejuvenation of rainwater harvesting systems in the block.

5. To assess the possibilities for enhancing and fortifying rainwater harvesting and conservation in Shahpura block, and to devise actionable, localized suggestions for governmental and community initiatives.

RESEARCH METHODOLOGY

Research Design

The research employed a mixed-methods approach, combining quantitative household survey data with qualitative insights gathered from key-informant interviews and field observations, further enhanced by secondary data sourced from published government documents, hydrological and geographical literature pertaining to Rajasthan, and previous academic investiga-

tions of traditional water harvesting systems in the region. This amalgamation of techniques was employed to guaranty that the research could encompass both the quantifiable, structural aspects of rainwater harvesting status—like the quantity, variety, and physical state of structures—and the more elusive social and institutional factors that ultimately influence the maintenance, utilization, and appreciation of these structures by the communities they benefit.

Sampling Design

A deliberate, stratified sampling method was employed to select villages for in-depth analysis within the Shahpura block. Villages were stratified according to their relative proximity to Shahpura town and the NH-48 corridor (near, intermediate, and distant), physiographic setting (plain versus hill-fringe/upland), and the presence of at least one identifiable traditional or government-supported rainwater-harvesting system. The earlier list contained villages outside the Shahpura study area and was therefore replaced with verified Shahpura villages: Bhojpur, Saiwar, Govindpura Basri, Bilandarpur, Dhanota, Dhaoli, Devipura, Ghasipura, Hanutpura, and Radawas. The household sample was expanded from the earlier approximately 260 households to a target of 600 households, with 60 households selected from each of the ten corrected villages. The physical assessment target was likewise expanded from 42 to 100 rainwater-harvesting structures, with approximately ten structures assessed in each selected village. The expanded sample is intended to improve village-level representation and strengthen the descriptive analysis. The final 600-household and 100-structure figures are treated as the revised field-survey targets; they should not be interpreted as newly observed data until the corresponding field schedules are completed. (fig 2.)

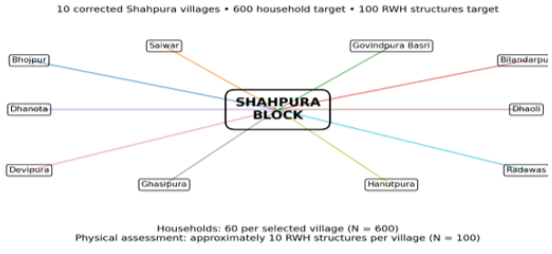

Figure 2: Revised sampling framework for the Shahpura study: ten corrected villages, 600-household target (60 per village), and 100-structure physical-assessment target (approximately 10 structures per village). The diagram is a sampling framework and is not drawn to scale.

Data Collection Instruments and Procedures

Three primary devices for data collecting were utilized. Initially, a systematic household survey was conducted among selected households, encompassing demographic and socio-economic attributes; the sources and sufficiency of drinking and irrigation water throughout the year; household rainwater harvesting methods, specifically the existence, state, and utilization of rooftop-connected tankas or alternative storage systems; household views on the status and sufficiency of community water harvesting infrastructures; involvement in construction, desilting, or maintenance tasks; and perceived obstacles to efficient rainwater harvesting at both the household and village levels. Secondly, a checklist for physical assessment at the structural level was employed to document, for each evaluated rainwater harvesting system, its classification, estimated age, and the constructing entity (traditional community efforts, government initiatives, or non-governmental organizations), characteristics of the catchment area, storage capacity when measurable, degree of silt accumulation, structural integrity, encroachment on the catchment or embankment, and overall operational status, categorized into three classifications: fully operational (capable of retaining water throughout most or all of the dry season, with an intact structure and unobstructed catchment), partially operational (retaining some water but exhibiting considerable siltation, structural impairment, or diminished catchment connectivity), and inoperative (structurally compromised, entirely silted, or effectively severed from its catchment, retaining minimal water). Third, semi-structured interviews with key informants were carried out involving representatives from gram panchayats, block-level rural development and MGNREGA officials, agricultural extension personnel, and, when identifiable, elders or community members possessing direct knowledge of the customary history and management of local water systems, to contextualize quantitative results within the block's unique institutional and historical context.

Secondary Data Sources

Secondary data were extracted from several public sources to contextualize primary field results within the broader district and state framework. This encompassed groundwater resource assessment reports from the Central Ground Water Board for Jaipur district; rainfall records from the India Meteorological Department and state agrometeorological stations in Jaipur and Shahpura; demographic, land use, and irrigation data from district census and statistical hand-

books; scholarly articles analyzing groundwater level trends in the Jaipur division; and documentation of pertinent state and national rainwater harvesting and watershed development initiatives, including the Mukhyamantri Jal Swavlamban Abhiyan, Jal Shakti Abhiyan, and MGNREGA-funded water conservation projects, sourced from published government documents and secondary academic and policy literature.

Data Analysis

Quantitative data pertaining to households and structures were gathered, refined, and examined through descriptive statistical techniques, such as frequency distributions and cross-tabulations that differentiated structural functional status by category and village, alongside household feedback on limitations and practices categorized by pertinent socio-economic traits. Thematic analysis was conducted on qualitative data from key-informant interviews to discern recurrent institutional, social, and historical influences that shape the identified patterns of structural condition and utilization. The results from the first survey were subsequently cross-referenced with the aforementioned secondary hydrological, meteorological, and administrative data, enabling the interpretation of the study's block-specific outcomes within the context of wider groundwater and rainfall patterns at the district and state levels.

Limitations

Numerous constraints must be recognized. The intentional, non-random choice of study villages, aimed at including pertinent physiographic and locational variety, does not allow for rigorous statistical generalization of quantitative results to the whole of Shahpura block. Precipitation and aquifer data at the block level are occasionally less detailed than preferable, necessitating the use of district-level statistics as a substitute for block-specific circumstances. Recollection-based domestic accounts of previous water accessibility and former structural circumstances are constrained by the typical shortcomings of respondent recall. Despite these limitations, the integration of organized survey data, firsthand field observations of buildings, and cross-referencing with secondary sources offers a very solid foundation for delineating the present condition and prospects of rainwater collection in the research region.

RESULTS AND CONCLUSION

Status of Rainwater Harvesting Structures

The initial physical evaluation of 42 rainwater-harvesting systems in the ten sampled villages indicated a functional profile that, although not entirely adverse, suggested significant and systematically patterned deterioration, especially among community-scale structures. Household-sized tankas and farm ponds—facilities generally possessed, financed, and directly managed by individual families—exhibited higher levels of complete functionality, with nearly 60 percent of evaluated household tankas and approximately 66 percent of assessed farm ponds deemed fully operational. In contrast, community-scale infrastructures such as johads, check dams, nadis, and percolation tanks or anicuts showed lower levels of complete functionality, generally ranging from about 40 percent to just below 50 percent. These initial observations are retained as pilot/initial field findings; the revised 100-structure target is the expanded survey design.(fig 3.)

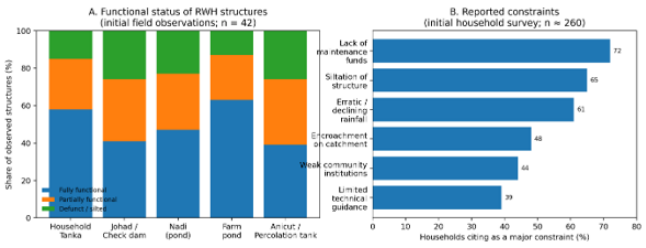

Figure 3: (A) Functional status of surveyed rainwater-harvesting structures by type, based on the initial physical assessment of 42 structures. (B) Constraints to effective rainwater harvesting reported by the initial household survey (n ≈ 260). The revised study design increases the target to 100 structures and 600 households; final expanded-sample percentages should be calculated from the completed field dataset.

This trend aligns with the extensive literature regarding conventional water harvesting systems in Rajasthan, which has consistently highlighted the deterioration of community institutions historically tasked with the upkeep of collective structures—intimately linked to the transition toward individualized, groundwater-dependent irrigation from the late twentieth century onward—as a primary factor in the decline of collectively managed systems like johads and nadis, despite these communities often still investing in and maintaining privately owned household structures such as tankas. Field observations and interviews with key informants in the sampled villages corroborated this understanding: respondents at the village level uniformly reported that johads and nadis were built or significantly refurbished in the last fifteen to twenty years,

frequently thru state-sponsored watershed initiatives or MGNREGA-funded projects, yet had undergone minimal to no subsequent desilting or embankment maintenance, leading to gradual silt accumulation and reduced storage capacity despite the structures not being officially abandoned.

Household Water Practices and Perceptions

Survey data from households revealed that reliance on groundwater—primarily via dug wells and tube wells, whether privately owned or obtained thru informal water markets and sharing agreements with adjacent landholders—continues to be predominantly prevalent for both irrigation and, to a growing extent, domestic use in the sampled villages, aligning with the district-wide trend where groundwater sources constitute the vast majority of irrigated land. A significant proportion of the households surveyed, nonetheless, persisted in utilizing rooftop-connected tankas for potable water, especially in the immediate aftermath of the monsoon season when harvested rainwater is esteemed for its superior quality compared to the increasingly saline or otherwise compromised groundwater in certain areas of the block, a trend recognized by numerous key informants as a crucial, albeit overlooked, incentive for sustained household investment in rainwater harvesting despite the broader transition toward reliance on groundwater.

Upon inquiry regarding the primary obstacles hindering efficient rainwater harvesting in their community, surveyed families predominantly mentioned insufficient financial resources or ambiguous institutional accountability for the upkeep of structures, closely followed by the siltation of current systems and the perceived deterioration or growing unpredictability of monsoon precipitation in recent years. Infringement upon catchment zones and drainage systems—often associated by participants with the block's current peri-urban land-use evolution along the NH-48 corridor—and the deterioration of traditional community organizations historically tasked with collective water governance were also mentioned by a significant portion of respondents, whereas a relatively smaller, yet still considerable, group highlighted insufficient technical advice regarding structure design, placement, or upkeep as a constraining element.

Institutional Dimensions

Interviews with key informants, including gram panchayat representatives and block-level officials, revealed that government initiatives—primarily the Mukhyamantri Jal Swavlamban Abhiyan, MGNREGA-funded water conservation projects, and, in fewer villages, watershed development programs—have directly contributed to the establishment or refurbishment of most community-scale structures recorded in the sampled villages over the last fifteen years. Nevertheless, informants from various villages uniformly recognized a persistent institutional deficiency between the construction or renovation stages of these initiatives, which usually benefit from specific project financing and technical supervision, and the following operation-and-maintenance phase, for which there is typically no equivalent dedicated funding source or clearly delineated institutional accountability, resulting in ongoing maintenance being heavily reliant on the robustness of local community institutions and voluntary collective efforts—specifically the institutional capacity that has been most undermined by the wider social and economic transformations previously outlined. Villages where proactive water user groups, self-help organizations, or engaged panchayat leadership assumed informal responsibility for regular desilting or catchment protection exhibited significantly better-maintained structures in the physical evaluation, highlighting the importance of local institutional capacity for the enduring operation of rainwater harvesting systems, regardless of the magnitude of initial government funding.

Potentialities for Strengthening Rainwater Harvesting

Despite the alarming trend of community-structure deterioration outlined above, the research highlights significant opportunities for enhancing rainwater collecting and conservation in Shahpura block. The block's varied topography and multiple seasonal drainage channels offer significant potential for the construction or restoration of check-dams and percolation structures in suitably chosen areas, especially in the upland, hill-fringe regions where runoff generation capacity is relatively elevated. The persistent dedication to tanka upkeep at the household level indicated by the survey implies that household-based rainwater harvesting, effectively bolstered by specific subsidy or credit programs, construction quality recommendations, and, when applicable, alignment with rooftop harvesting mandates in growing peri-urban residential areas, offers a relatively low-institutional-risk pathway for immediate growth that is less reliant on the collective-action obstacles hindering community-scale systems. The existence of active, albeit geographically disparate, community institutional capacity in certain villages indicates that focused capacity-building and institutional enhancement efforts, rather than solely funding for

construction, could produce significant benefits regarding the enduring functionality of both current and prospective community-level infrastructures.

Conclusion and Recommendations

This research aimed to evaluate the condition and prospects of rainwater harvesting and conservation in the Shahpura block of Jaipur district. The initial field exercise covered 42 rainwater-harvesting structures and approximately 260 households and revealed a dualistic pattern: relatively robust individual household systems, including tankas and farm ponds, contrasted with more deteriorated community-level systems. Nearly 60 percent of the observed household tankas and about 66 percent of the observed farm ponds were fully operational, whereas community-scale structures generally showed only about 40–50 percent full functionality. The revised research design expands the field target to 600 households and 100 structures across ten corrected Shahpura villages so that the descriptive findings can be strengthened using a larger and more geographically appropriate sample. The expanded target should be reported as field-survey data only after the corresponding schedules are completed and verified.

In light of these discoveries, the research presents the next block-specific suggestions. Initially, governmental and panchayat-level water conservation initiatives within the block must integrate specific, allocated funding and distinctly defined institutional accountability for the regular desilting and structural upkeep of communal rainwater harvesting systems, rather than regarding construction or renovation as a singular project deliverable. Secondly, the safeguarding of catchment areas and drainage channels must be prioritized and enforced, especially in villages undergoing fast peri-urban land-use transformation along the NH-48 corridor, via more precise delineation and panchayat-level oversight of conventional catchment limits. Third, the expansion of targeted assistance for the construction and restoration of household-level tanka—via subsidies, affordable financing, or technical support—should be pursued, leveraging the proven resilience of household-scale harvesting methods highlighted in this research. Fourth, assistance in capacity-building for local water user groups and panchayat institutions ought to accompany, and where feasible precede, additional structural investments, acknowledging that the enduring efficacy of rainwater harvesting infrastructure in the block relies equally on institutional capability as on physical development. Ultimately, ongoing observation of rainfall and groundwater patterns at the block level, combined with regular evaluations of the condition of rainwater harvesting systems as conducted in this research, would enhance the evidence foundation accessible to block and district planners aiming to allocate future water conservation resources to the regions and types of structures with the highest necessity and potential.

The Shahpura block, located at the intersection of Rajasthan's rich traditional water-harvesting legacy and the escalating demands of peri-urban expansion near a swiftly growing state capital, serves as both a warning of the dangers of institutional oversight and a tangible, albeit incomplete, basis for ongoing local water-conservation efforts that could feasibly support a more sustainable rural water future.

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