International Journal of Social Science and Economic Research

ISSN: 2455-8834

Volume:06, Issue:12 "December 2021"

Assessing the Effectiveness of Rural Drinking Water Supply Schemes under the National Rural Drinking Water Programme (NRDWP)

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DOI: 10.46609/IJSSER.2021.v06i12.043 URL: https://doi.org/10.46609/IJSSER.2021.v06i12.043

Received: 14 Nov. 2021 / Accepted: 16 Dec. 2021 / Published: 30 Dec. 2021

ABSTRACT

Access to safe and adequate drinking water is a fundamental human right and a critical component of rural development. In India, the National Rural Drinking Water Programme (NRDWP) was introduced to address disparities in rural water supply through decentralized planning, sustainability, and service-level benchmarks. Despite substantial investments, several districts continue to face challenges related to water quality, groundwater depletion, infrastructure sustainability, and governance. Drawing upon existing policy documents, audit reports, and scholarly literature, the study develops a conceptual framework for evaluating rural drinking water schemes. The paper aims to synthesize key implementation issues and assess how institutional, technical, and community-level factors influence programme outcomes. The findings underscore the importance of outcome-oriented evaluation, strengthened governance mechanisms, and sustainable water resource management to improve rural drinking water security.

Keywords: NRDWP, Rural Drinking Water, Water Governance, Programme Evaluation, Assess, Effectiveness, Water Supply Schemes

1. Introduction

Safe drinking water is globally recognized as a fundamental human right and a crucial prerequisite for health, dignity, and socioeconomic development (United Nations, 2010; World Health Organization [WHO], 2017). In developing countries such as India, ensuring equitable access to potable water in rural areas remains a persistent challenge due to population pressure, groundwater over-extraction, institutional fragmentation, and infrastructural deficits (World Bank, 2010; Mukherjee & Singh, 2020). India's rural drinking water sector has evolved through several policy interventions, culminating in the launch of the National Rural Drinking Water

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Programme (NRDWP) in 2009 as part of the Eleventh Five-Year Plan (Government of India, 2010). The NRDWP aimed to move beyond mere infrastructure creation towards service delivery, sustainability, water quality assurance, and decentralized governance (Batchelor et al., 2018; Smits et al., 2016). As a key component of Bharat Nirman, the programme sought to ensure adequate, safe, and reliable drinking water to all rural habitations (Planning Commission, 2011).

Despite increased financial allocations, several evaluations and audits have pointed out significant gaps between policy objectives and ground-level outcomes (Comptroller and Auditor General of India [CAG], 2018; PRS Legislative Research, 2021). Issues such as partial habitation coverage, declining groundwater levels, poor operation and maintenance, and weak community participation continue to undermine programme effectiveness (Aiyar & Banerji, 2019; Kumar et al., 2019). Haryana presents a critical case for evaluating NRDWP due to its high groundwater stress and uneven rural water access (Central Ground Water Board [CGWB], 2019). Districts like Jhajjar and Mahendergarh are characterized by semi-arid conditions, over-exploited aquifers, and dependence on groundwater-based supply schemes (Haryana Public Health Engineering Department [PHED], 2020). Understanding the conceptual dimensions of programme evaluation in such contexts is vital for improving policy design and implementation. Against this backdrop, the present study undertakes a conceptual examination of NRDWP implementation, focusing on governance, sustainability, and service delivery dimensions.

2. Review of Literature

The literature on rural drinking water in India broadly spans policy evolution, institutional arrangements, sustainability challenges, and programme performance evaluation. Early studies emphasized infrastructure expansion as the primary strategy for improving rural water access (Planning Commission, 2011). However, subsequent research highlighted that infrastructure-centric approaches often failed due to neglect of operation, maintenance, and local capacity (Smits et al., 2016; Batchelor et al., 2018). Several scholars have examined the institutional and governance dimensions of rural water supply. Saleth and Dinar (2014) argued that weak institutional coordination and unclear accountability structures impede effective water management in India. Aiyar and Banerji (2019) further noted that fragmented responsibilities between central, state, and local bodies lead to inefficiencies in programme delivery. Groundwater dependency has emerged as a major concern in rural water sustainability. Studies by the World Bank (2010, 2018) and Mukherjee and Singh (2020) documented severe groundwater depletion in northern Indian states, including Haryana, affecting drinking water security. CGWB (2019) reported that a majority of blocks in Haryana fall under over-exploited or critical categories. Programme-specific evaluations of NRDWP have revealed mixed outcomes. The CAG (2018) identified deficiencies in planning, water quality monitoring, and

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sustainability measures. Lalitha et al. (2021) found that while coverage indicators improved on paper, actual service levels often remained inadequate. PRS Legislative Research (2021) similarly highlighted gaps between reported achievements and field realities. Decentralized governance and community participation have been recognized as critical success factors. NIRDPR (2017) emphasized the role of Gram Panchayats and Village Water and Sanitation Committees (VWSCs) in ensuring scheme sustainability. UNICEF (2019) underscored the importance of behavioral change, local ownership, and capacity building in rural water programmes. The transition from NRDWP to the Jal Jeevan Mission reflects policy learning from past limitations (Government of India, 2019). However, understanding the conceptual strengths and weaknesses of NRDWP remains important for informing future interventions, particularly in water-stressed regions. Overall, the literature suggests that effective evaluation of rural drinking water schemes must go beyond physical coverage to include governance quality, resource sustainability, institutional capacity, and community engagement.

Table 1: Drinking Water Supply Schemes in Haryana – Physical & Financial Status

Component / Scheme	Financial Year	Approved / Allocated Amount	Revised Allocation	Expenditure Incurred	Remarks / Purpose
Overall Drinking Water & Sewerage (Rural + Urban)	2020–21	₹1,500.51 crore	₹1,982.76 crore	₹552.47 crore (till 30.11.2020)	Capital outlay under the State & Central Plan
Augmentation of Rural Water Supply Programme	2019–20	₹380 crore	₹397 crore	₹368.70 crore	Improvement to achieve 55–70 LPCD
Augmentation of Rural Water Supply Programme	2020–21	₹380 crore	—	₹148.08 crore (till 30.11.2020)	Strengthening rural drinking water systems
NABARD-Funded Rural Drinking Water Projects	Ongoing (since 2000-01)	₹1,259.39 crore (31 projects)	—	₹750.77 crore (cumulative)	Large-scale rural water supply augmentation
NABARD Programme (All Water Supply Projects)	2019–20	₹300 crore	—	₹258.66 crore	Includes drinking water schemes
NABARD Programme	2020–21	₹345 crore	—	₹82.92 crore (till 30.11.2020)	Ongoing rural infrastructure funding

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Jal Jeevan Mission – Coverage Component	2019–20	₹200 crore	₹241.40 crore	₹133.61 crore	Household tap connections
Jal Jeevan Mission – Coverage Component	2020–21	₹241.80 crore	₹716.94 crore	₹154.60 crore (till 30.11.2020)	Functional Household Tap Connections (FHTCs)
Mahagram Yojana – Water Supply	2019–20	₹50 crore	₹23 crore	₹20.22 crore	Augmentation in large villages
Mahagram Yojana – Water Supply	2020–21	₹25 crore	—	₹13.40 crore (till 30.11.2020)	High-population villages
SCSP – Rural Drinking Water (SC habitations)	2019–20	₹15 crore	—	₹10.80 crore	Equity-focused water supply
SCSP – Rural Drinking Water	2020–21	₹17.25 crore	—	₹1.29 crore (till 30.11.2020)	Upgradation in SC-dominated villages

Source: Economic Survey of Haryana (2021-22)

3. Objectives of the Study

This conceptual paper is guided by the following two objectives:

1. To critically review the existing literature for identifying the concepts and challenges influencing the implementation of the National Rural Drinking Water Programme (NRDWP)
2. To develop a conceptual evaluation framework identifying key factors influencing the effectiveness and sustainability of NRDWP-supported water supply schemes.

4. Research Methodology

The study adopts a conceptual and qualitative research design, relying exclusively on secondary sources. Data have been drawn from government policy documents, audit reports, planning commission reports, peer-reviewed journal articles, and publications by international organizations such as the World Bank, WHO, etc. A thematic analysis approach is employed to synthesize insights from the literature. Key themes such as governance, infrastructure sustainability, groundwater management, community participation, and service delivery outcomes are identified and integrated to develop a conceptual evaluation framework. No primary data collection is undertaken, making the study exploratory and analytical in nature.

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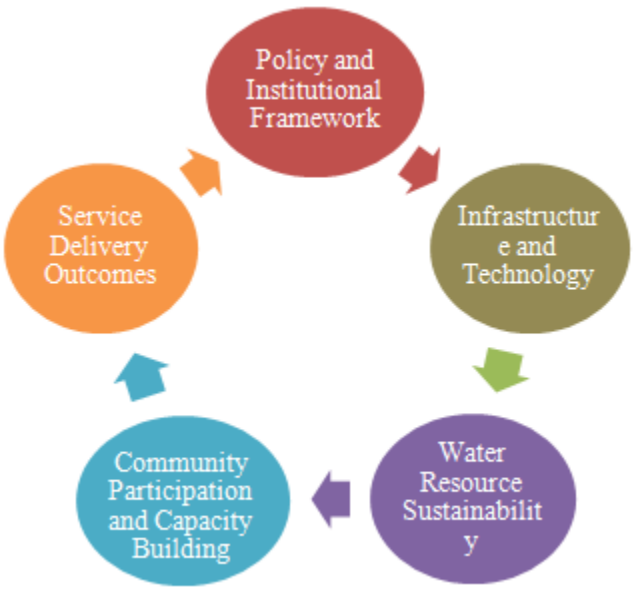
5. Conceptual Framework for Evaluation of NRDWP

Based on the literature, the effectiveness of NRDWP-supported water supply schemes can be understood through the interaction of five key dimensions:

- **Policy and Institutional Framework (Guidelines, funding mechanisms, and inter-departmental coordination):** The process begins with the formulation of national and state-level policies and guidelines, allocation of financial resources, and definition of institutional roles and responsibilities among departments such as PHED, Panchayati Raj Institutions, and line agencies.
- **Infrastructure and Technology (Source sustainability, treatment facilities, distribution networks):** Based on policy directives and funding provisions, drinking water infrastructure is planned and created, including identification of water sources, construction of treatment plants, and development of distribution systems to ensure physical access.
- **Water Resource Sustainability (Groundwater availability, aquifer management, water quality):** The viability of infrastructure depends on the sustainable management of water resources. This step involves assessment of groundwater status, implementation of aquifer management practices, and continuous monitoring of water quality.

Fig. 1: Conceptual Diagram



Source: Literature review

ISSN: 2455-8834

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- **Community Participation and Capacity Building (Role of Panchayats, VWSCs, and user ownership):** Local institutions and community members are engaged to manage, operate, and maintain water supply systems. Capacity building of Panchayats and VWSCs ensures ownership, accountability, and long-term sustainability.
- **Service Delivery Outcomes (Quantity, quality, reliability, and equity of water supply):** The combined effect of effective policy design, robust infrastructure, sustainable resource management, and active community participation results in improved drinking water service outcomes for rural households. These dimensions collectively influence the overall performance and sustainability of rural drinking water schemes.

6. Discussion

The conceptual analysis of the National Rural Drinking Water Programme (NRDWP) indicates that the performance of rural drinking water schemes is shaped by the combined influence of policy design, institutional capacity, infrastructure development, water resource sustainability, and community participation. While NRDWP represented a significant shift from earlier supply-driven approaches to a service-oriented framework, its implementation outcomes varied considerably across regions due to structural and environmental constraints. From a policy and institutional perspective, NRDWP provided comprehensive guidelines emphasizing sustainability, decentralization, and water quality assurance (Government of India, 2010; Ministry of Drinking Water and Sanitation, 2013). However, several studies and audit reports point to persistent challenges such as fragmented inter-departmental coordination and limited decentralization, which diluted the effectiveness of policy implementation (CAG, 2018; PRS Legislative Research, 2021). The continued dominance of state-level engineering departments in implementation restricted the functional role of local self-governments, thereby affecting accountability and responsiveness (NIRDPR, 2017).

Infrastructure and technology development under NRDWP improved physical access to drinking water in many rural areas. Nevertheless, the literature emphasizes that infrastructure expansion without adequate attention to operation, maintenance, and source sustainability often results in unreliable service delivery (Batchelor et al., 2018; Smits et al., 2016). Heavy dependence on groundwater-based schemes further increased vulnerability to seasonal variability and long-term depletion (World Bank, 2010; Mukherjee & Singh, 2020). Water resource sustainability emerges as a critical determinant of programme success. Multiple studies highlight that declining groundwater levels and inadequate aquifer management pose serious risks to the long-term viability of rural drinking water schemes (CGWB, 2019; World Bank, 2018). Although NRDWP

ISSN: 2455-8834

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guidelines recognized sustainability as a core principle, its operational integration into planning and implementation remained limited, leading to recurring supply disruptions and quality concerns. Community participation and capacity building were central to NRDWP's design philosophy. However, empirical evidence suggests that Village Water and Sanitation Committees (VWSCs) often lacked technical capacity, financial autonomy, and sustained institutional support (UNICEF, 2019; Aiyar & Banerji, 2019). Where community engagement was stronger, schemes demonstrated improved maintenance and service reliability, reinforcing the importance of decentralized governance and local ownership (Saleth & Dinar, 2014).

Overall, service delivery outcomes under NRDWP reflected uneven performance. While official data reported improvements in coverage, independent assessments revealed persistent gaps in adequacy, reliability, and water quality at the household level (Lalitha et al., 2021; WHO & UNICEF, 2021). This divergence underscores the need for outcome-oriented evaluation frameworks that move beyond infrastructure creation toward service-level performance assessment.

7. Conclusion

This conceptual study highlights that rural drinking water challenges under the National Rural Drinking Water Programme are multidimensional, extending beyond technical infrastructure to include governance, sustainability, and institutional capacity. While NRDWP marked a progressive step toward universal access to safe drinking water, its effectiveness was constrained by groundwater stress, limited decentralization, and insufficient integration of sustainability measures. The analysis demonstrates that policy intent must be supported by strong institutional coordination, effective water resource management, and empowered community institutions to achieve sustainable outcomes. Over-reliance on groundwater without comprehensive aquifer management has emerged as a critical vulnerability in rural drinking water systems (World Bank, 2018; Mukherjee & Singh, 2020). Additionally, the limited operational role of Panchayats and community-based institutions weakened local ownership and long-term scheme sustainability (NIRDPR, 2017; UNICEF, 2019). By addressing its two conceptual objectives, the study contributes a holistic evaluation framework that links policy design to service delivery outcomes through intermediary dimensions such as infrastructure quality, resource sustainability, and community participation. This framework offers valuable insights for policymakers and practitioners seeking to strengthen rural drinking water programmes.

The findings remain highly relevant for informing contemporary initiatives such as the Jal Jeevan Mission, emphasizing the need for integrated planning, continuous monitoring, and capacity building to ensure long-term drinking water security in rural India.

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References

Aiyar, Y., & Banerji, P. (2019). Institutional challenges in India's rural water supply. *Economic and Political Weekly*, 54(12), 45–52.

Batchelor, C., Smits, S., & James, A. J. (2018). From infrastructure to services: Trends in rural water supply. *Water International*, 43(5), 661–679. https://doi.org/10.1080/02508060.2018.1480722

Central Ground Water Board. (2019). *Ground water year book: Haryana (2018–19)*. Ministry of Jal Shakti, Government of India.

Comptroller and Auditor General of India. (2018). *Performance audit of National Rural Drinking Water Programme*. Government of India.

Government of India. (2010). *National Rural Drinking Water Programme: Framework for implementation*. Ministry of Drinking Water and Sanitation.

Government of India. (2013). *Twelfth Five Year Plan (2012–2017), Volume I*. Planning Commission.

Government of India. (2019). *Jal Jeevan Mission: Operational guidelines*. Ministry of Jal Shakti.

Haryana Public Health Engineering Department. (2020). *Annual administrative report*. Government of Haryana.

Kumar, M. D., Singh, O. P., & Sharma, S. (2019). Water governance and rural drinking water security in India. *International Journal of Water Resources Development*, 35(2), 243–260. https://doi.org/10.1080/07900627.2018.1483426

Lalitha, N. D., Manipal, S., Prabu, D., & Bharathwaj, V. V. (2021). An analysis of habitation coverage under the National Rural Drinking Water Programme in India. *International Journal of Research and Review*, 8(12), 182–188.

Ministry of Drinking Water and Sanitation. (2013). *Guidelines for implementation of National Rural Drinking Water Programme*. Government of India.

Mukherjee, A., & Singh, C. (2020). Groundwater governance and drinking water security in India. *Environmental Development*, 34, 100498. https://doi.org/10.1016/j.envdev.2020.100498

National Institute of Rural Development and Panchayati Raj. (2017). *Decentralized governance and rural water supply*. NIRDPR.

ISSN: 2455-8834

Volume:06, Issue:12 "December 2021"

Planning Commission. (2011). *Report of the working group on rural domestic water and sanitation*. Government of India.

PRS Legislative Research. (2021). *Evaluation of rural drinking water programmes in India*. PRS India.

Saleth, R. M., & Dinar, A. (2014). *Institutional economics of water management in India*. World Bank.

Smits, S., Lockwood, H., Mansour, G., & Butterworth, J. (2016). Community-based rural water supply: A comparative analysis. *Water Policy*, 18(2), 336–352.

United Nations. (2010). *The human right to water and sanitation*. United Nations General Assembly Resolution A/RES/64/292.

UNICEF. (2019). *Drinking water, sanitation and hygiene in rural India*. UNICEF India.

World Bank. (2010). *Deep wells and prudence: Towards pragmatic action for addressing groundwater overexploitation in India*. World Bank.

World Bank. (2018). *Rural water supply and sanitation services in India*. World Bank.

World Health Organization. (2017). *Guidelines for drinking-water quality* (4th ed.). WHO.

World Health Organization & UNICEF. (2021). *Progress on household drinking water, sanitation and hygiene 2000–2020*. WHO/UNICEF Joint Monitoring Programme.

