

Enhancing Agricultural Productivity through Pradhan Mantri Krishi Sinchai Yojana: A SWOT Analysis

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Abstract

This study examines the role of the Pradhan Mantri Krishi Sinchai Yojana (PMKSY) in enhancing agricultural productivity and water-use efficiency in India through a comprehensive SWOT analysis. Agriculture in India continues to face structural challenges, particularly its heavy dependence on erratic monsoon rainfall and limited irrigation coverage, which constrain stable productivity. PMKSY was introduced to address these issues by expanding irrigation infrastructure under the vision of “Har Khet Ko Pani” and promoting efficient water utilisation through “Per Drop More Crop.” The research adopts a descriptive and analytical approach based on secondary data drawn from government reports, policy documents, and existing literature. The findings suggest that PMKSY has contributed to increased irrigation coverage, improved water-use efficiency through the adoption of micro-irrigation technologies, and enhanced crop productivity. However, the impact of the scheme remains uneven across regions due to persistent challenges such as administrative delays, limited farmer awareness, financial constraints, and coordination gaps among implementing agencies. The SWOT analysis indicates that while PMKSY possesses a strong institutional framework and significant potential for promoting sustainable agriculture, its overall effectiveness is hindered by implementation inefficiencies and regional disparities. The study concludes that although PMKSY is strategically sound, its full potential can only be realised through improved execution, greater awareness, better inter-departmental coordination, and region-specific policy interventions, along with the integration of advanced irrigation technologies for long-term sustainability.

Keywords: Pradhan Mantri Krishi Sinchai Yojana (PMKSY), Agricultural Productivity, Irrigation, Water-Use Efficiency, Micro-Irrigation, Sustainable Agriculture, SWOT Analysis.

Introduction

Agriculture remains a cornerstone of the Indian economy, contributing significantly to employment, rural livelihoods, and food security. However, the sector continues to face persistent structural challenges, particularly in relation to irrigation and water management. A substantial proportion of India’s cultivated land remains dependent on erratic monsoon rainfall, resulting in unstable agricultural productivity and increased vulnerability for farmers (Yadav, Naberia & Verma, 2020). Despite the expansion of irrigation infrastructure over the years, only

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about 45–48 per cent of the net sown area is irrigated, highlighting the urgent need for effective water resource management strategies (Government of India, 2015).

In response to these challenges, the Government of India launched the Pradhan Mantri Krishi Sinchai Yojana (PMKSY) in 2015 with the objective of enhancing irrigation coverage and improving water-use efficiency. The scheme is guided by the principles of “Har Khet Ko Pani” (water for every field) and “Per Drop More Crop,” which emphasise both the expansion of irrigation infrastructure and the efficient utilisation of available water resources (Government of India, 2015). By integrating multiple existing irrigation and watershed development programmes under a unified framework, PMKSY aims to ensure a holistic and coordinated approach to water management across the country (Wani et al., 2016).

A key feature of PMKSY is its focus on decentralised planning through District Irrigation Plans (DIPs), which enable location-specific strategies based on local water availability, agricultural patterns, and resource requirements (Department of Agriculture, 2016). The scheme also promotes the adoption of modern irrigation technologies such as drip and sprinkler systems, which are expected to reduce water wastage and enhance agricultural productivity (Roy & Majumder, 2020). In addition, PMKSY seeks to improve farmers’ socio-economic conditions by encouraging investment in agriculture, increasing crop yields, and supporting sustainable farming practices.

Despite its ambitious objectives, the effectiveness of PMKSY depends largely on its implementation at the ground level. Various studies have pointed out issues such as administrative delays, lack of awareness among farmers, and regional disparities in access to irrigation facilities, which may limit the overall impact of the scheme (Tripathy et al., 2023; Singh & Mazhar, 2024). These challenges underscore the need for a comprehensive policy analysis to assess the extent to which PMKSY has succeeded in enhancing agricultural productivity and to identify areas for improvement.

Therefore, this study aims to analyse the role of PMKSY in improving agricultural productivity in India, with a particular focus on its impact on irrigation access, water-use efficiency, and farmer outcomes. By examining both the achievements and limitations of the scheme, the study seeks to contribute to the ongoing discourse on sustainable agricultural development and effective water resource management.

Overview of PMKSY

The Pradhan Mantri Krishi Sinchai Yojana (PMKSY) was launched by the Government of India in 2015 as a comprehensive initiative to enhance irrigation coverage and improve water-use efficiency in agriculture. The scheme is guided by two central visions: “*Har Khet Ko Pani*” (ensuring water access to every field) and “*Per Drop More Crop*” (maximising agricultural output with efficient water use) (Government of India, 2015). These guiding principles reflect the broader objective of achieving sustainable agricultural growth while addressing the challenges of water scarcity and uneven irrigation distribution.

PMKSY is structured around several key components that collectively aim to strengthen irrigation infrastructure and promote efficient water management. The Accelerated Irrigation

Benefits Programme (AIBP) focuses on the timely completion of ongoing major and medium irrigation projects to enhance irrigation potential. The “Har Khet Ko Pani” component emphasises the expansion of irrigation facilities to underserved areas through the creation of new water sources, repair and restoration of existing systems, and development of distribution networks. The “Per Drop More Crop” component specifically promotes micro-irrigation techniques such as drip and sprinkler systems to improve water-use efficiency and reduce wastage (Roy & Majumder, 2020). Additionally, the watershed development component focuses on rainwater harvesting, soil moisture conservation, and groundwater recharge, particularly in rainfed and drought-prone regions (Government of India, 2015).

Institutionally, PMKSY adopts a multi-level and integrated framework involving coordination among various ministries, including the Ministry of Agriculture and Farmers Welfare, Ministry of Water Resources, and Ministry of Rural Development. The scheme operates through decentralised planning mechanisms, with District Irrigation Plans (DIPs) and State Irrigation Plans (SIPs) serving as the foundation for implementation (Department of Agriculture, 2016). At the national level, oversight is provided by inter-ministerial committees to ensure coordination, monitoring, and efficient allocation of resources. Funding under PMKSY is shared between the central and state governments, with an emphasis on convergence of financial resources from multiple schemes to maximise impact and avoid duplication of efforts (Government of India, 2015).

The Pradhan Mantri Krishi Sinchai Yojana (PMKSY) aims to strengthen Indian agriculture by addressing irrigation gaps and improving water management. Its primary objective is to expand cultivable area under assured irrigation, reducing dependence on erratic monsoons and stabilising production (Government of India, 2015). The scheme also promotes efficient water use by minimising wastage and encouraging optimal utilisation. Additionally, it supports precision irrigation technologies like drip and sprinkler systems to enhance productivity (Roy & Majumder, 2020). By improving irrigation access, PMKSY seeks to increase crop yields, boost farmer income, and promote sustainable agricultural development.

Literature Review

The Pradhan Mantri Krishi Sinchai Yojana (PMKSY) was introduced to address persistent irrigation challenges in Indian agriculture, particularly the heavy dependence on monsoon rainfall and inefficient water use. Indian agriculture continues to face structural constraints, with only about 45–48 per cent of the net sown area under irrigation, leaving a large proportion of farmland vulnerable to climatic uncertainties and low productivity (Yadav, Naberia & Verma, 2020; Government of India, 2015). The scheme aims to expand irrigation coverage through the principle of “Har Khet Ko Pani” while simultaneously improving water-use efficiency through modern irrigation techniques. District Irrigation Plans (DIPs) have been emphasised as a key planning tool to ensure decentralised and integrated water resource management at the local level (Department of Agriculture, 2016).

A central component of PMKSY is the promotion of water-use efficiency through the concept of “Per Drop More Crop,” which focuses on the adoption of micro-irrigation technologies such as drip and sprinkler systems. Studies indicate that these technologies significantly reduce

water wastage while enhancing crop productivity. For instance, Roy and Majumder (2020) found that micro-irrigation under PMKSY in Sikkim led to improved water-use efficiency and better agricultural outcomes, although the extent of impact varied across regions. Similarly, Wani et al. (2016) emphasised the importance of demand-driven innovations and precision irrigation in maximising the effectiveness of the scheme. These findings suggest that efficient water management is essential for achieving sustainable agricultural growth, particularly in water-scarce regions.

The socio-economic impact of PMKSY on farmers has also been widely discussed in the literature. Research conducted by (Yadav, Naberia and Verma (2020) revealed that beneficiaries of the scheme are typically middle-aged farmers with moderate education and landholding, which influences their adoption of improved irrigation practices. Furthermore, studies have shown that access to irrigation under PMKSY contributes to increased farm income, improved social status, and enhanced risk-bearing capacity among farmers (Singh & Mazhar, 2024). The availability of assured irrigation encourages farmers to invest in better inputs and modern farming techniques, thereby improving productivity and livelihoods.

Despite these positive outcomes, several studies highlight significant challenges in the implementation of PMKSY. Tripathy et al. (2023) identified key constraints such as complex administrative procedures, delays in accessing subsidies, lack of spare parts, and frequent equipment breakdowns. Similarly, Singh and Mazhar (2024) reported issues such as lack of awareness, delays in fund disbursement, and institutional inefficiencies, which hinder the effective adoption of irrigation technologies. These challenges indicate a gap between policy design and ground-level execution, limiting the overall effectiveness of the scheme.

From an institutional perspective, PMKSY adopts an integrated and multi-sectoral approach by converging various irrigation-related programmes under a single framework. It involves coordination among multiple ministries and emphasises decentralised planning through state and district-level institutions (Government of India, 2015; Department of Agriculture, 2016). The scheme focuses on the entire irrigation value chain, including water source development, distribution systems, and efficient on-farm application, thereby promoting sustainable water resource management.

Overall, the existing literature suggests that PMKSY has made significant contributions to improving irrigation access and water-use efficiency in India. However, its impact on agricultural productivity is influenced by regional disparities, implementation challenges, and varying levels of awareness among farmers. There remains a need for comprehensive policy analysis to evaluate its long-term effectiveness and to identify strategies for improving its implementation and outcomes.

Research Methodology

This study adopts a descriptive and analytical research design to examine the impact of the Pradhan Mantri Krishi Sinchai Yojana (PMKSY) on agricultural productivity and water-use efficiency in India. The research is based on secondary data collected from government reports, policy documents, district irrigation plans, and relevant academic studies. A comparative approach is used to analyse changes in irrigation coverage, water-use efficiency, and crop

productivity before and after the implementation of the scheme. Additionally, selected case studies from different regions are reviewed to understand variations in outcomes and implementation. The study also identifies key challenges affecting the effectiveness of PMKSY. However, the findings are limited by reliance on secondary data and the availability of region-specific information.

Analysis of PMKSY

The Pradhan Mantri Krishi Sinchai Yojana (PMKSY) has significantly contributed to improving irrigation infrastructure and agricultural productivity in India by promoting the principles of “*Har Khet Ko Pani*” and “*Per Drop More Crop*.” The scheme has expanded irrigation coverage, reduced dependence on monsoon rainfall, and encouraged the adoption of micro-irrigation technologies, leading to better water-use efficiency and higher crop yields. However, its impact varies across regions due to challenges such as delays in fund disbursement, lack of farmer awareness, and technical constraints. Although PMKSY has enhanced productivity and farmer income, gaps in implementation and coordination continue to limit its overall effectiveness.

India’s agricultural productivity has shown a consistent upward trend from 2015–16 to 2023–24, driven by improved irrigation, technological adoption, and policy interventions, although disparities across crop categories persist.

comparison table of agricultural productivity (India)

Indicator	2015–16	2023–24	Trend
Foodgrain Production (Lakh tonnes)	2510	3322.98	Strong Increase
Rice Yield (kg/ha)	2400	2882	Improved
Wheat Yield (kg/ha)	3030	3559	Improved
Pulses Yield (kg/ha)	656	881	Moderate Increase
Oilseeds Yield (kg/ha)	968	1314	Improved
Cropping Intensity (%)	142	155.9	Increased
Gross Cropped Area (Lakh ha)	2000	2193.57	Slight Increase

Source: Government of India (2024–25) *Annual Report, Department of Agriculture & Farmers Welfare*

Agricultural Productivity in India (2021–22 to 2023–24)

Crop Category	Area (Lakh ha) 2023–24	Production (Lakh tonnes) 2023–24	Yield (kg/ha) 2023–24
Rice	478.28	1378.25	2882
Wheat	318.33	1132.92	3559
Coarse Cereals	249.38	569.36	2283

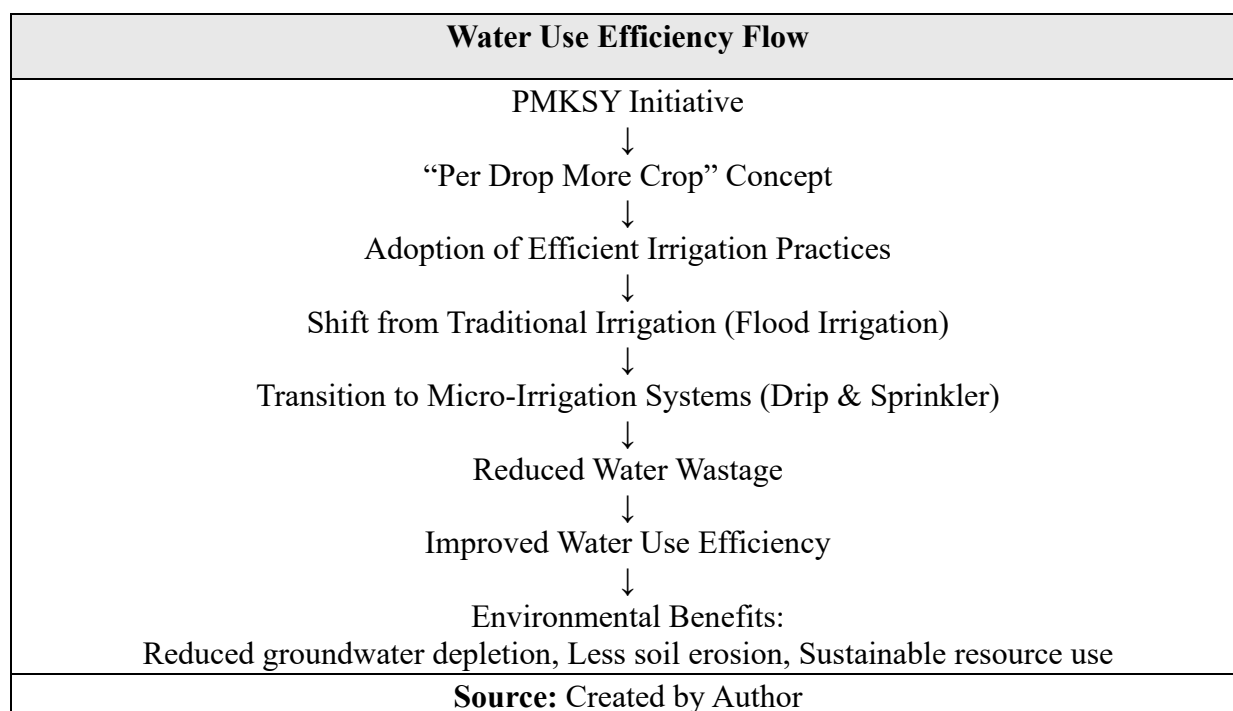
Pulses	275.05	242.46	881
Foodgrains (Total)	1321.04	3322.98	2515
Oilseeds	301.92	396.69	1314
Sugarcane	57.40	4531.58	78,953
Cotton*	126.88	325.22 (lakh bales)	436
Jute & Mesta*	6.37	96.92 (lakh bales)	2737

Source: Government of India (2024–25) *Annual Report, Department of Agriculture & Farmers Welfare*

The data indicates that India’s total foodgrain production reached a record 3322.98 lakh tonnes in 2023–24, reflecting significant growth in agricultural productivity. Among major crops, wheat exhibits the highest yield (3559 kg/ha) among cereals, highlighting its superior productivity compared to rice (2882 kg/ha) and coarse cereals (2283 kg/ha). Sugarcane shows an exceptionally high yield (78,953 kg/ha), which is largely due to its biological nature as a bulky, high-output crop. However, pulses continue to record relatively low productivity (881 kg/ha), making them a major concern for policymakers. Overall, the data suggests that while foodgrain production and yields have improved, productivity disparities across crops persist, indicating the need for targeted interventions in low-performing sectors like pulses.

Water Use Efficiency Analysis:

The Pradhan Mantri Krishi Sinchai Yojana (PMKSY) emphasises water-use efficiency through its core principle of “*Per Drop More Crop*,” which focuses on maximising agricultural output with minimal water usage.



This approach has contributed to a significant reduction in water wastage by promoting efficient irrigation practices and better water management at the farm level. A key shift observed under the scheme is the transition from traditional irrigation methods, such as flood irrigation, to modern micro-irrigation techniques like drip and sprinkler systems, which ensure precise water application. This shift not only enhances crop productivity but also conserves water resources.

Additionally, improved water-use efficiency under PMKSY supports environmental sustainability by reducing groundwater depletion, minimising soil erosion, and promoting balanced use of natural resources.

SWOT Analysis of PMKSY (Pradhan Mantri Krishi Sinchai Yojana)

Strengths	Mission-driven initiative focused on “Har Khet Ko Pani” (water to every field), addressing a critical agricultural need. Promotes efficient water use through micro-irrigation techniques like drip and sprinkler systems, enhancing productivity while conserving resources. Integrates multiple departments under a unified framework for better policy alignment. Strong emphasis on watershed development and rainwater harvesting improves long-term sustainability and drought resilience.
Weaknesses	Implementation delays and bureaucratic bottlenecks hinder progress. Uneven regional adoption creates disparities between states. Limited awareness among farmers, especially in remote areas, reduces scheme effectiveness. Financial constraints and high initial costs of micro-irrigation systems discourage small and marginal farmers despite subsidies.
Opportunities	Expansion of digital tools and precision agriculture can enhance efficiency and impact. Public-private partnerships offer scope for faster infrastructure development and innovation. Growing climate challenges position PMKSY as a key pillar for climate-resilient agriculture. Increased training and awareness initiatives can drive large-scale adoption, particularly among progressive farmers.
Threats	Climate change-induced water scarcity and erratic rainfall patterns pose serious risks. Poor inter-departmental coordination may continue to affect efficiency. Mismanagement or over-extraction of water resources could undermine sustainability goals. Weakening financial support or policy inconsistency may slow long-term progress.

PMKSY is a strong, well-structured initiative with transformative potential, but its success ultimately depends on disciplined execution, widespread awareness, and effective coordination.

Challenges and Constraints

The effective implementation of agricultural initiatives often encounters several persistent challenges. One major issue is implementation delays, which slow down the delivery of

intended benefits and reduce overall impact. Additionally, there is an unequal regional distribution of resources and support, leaving certain areas significantly underserved.

A lack of awareness among farmers further compounds the problem, as many are either uninformed about available schemes or uncertain about how to access them. Financial and technical barriers also play a critical role, limiting the ability of farmers—especially smallholders—to adopt new technologies or practices.

Finally, coordination issues between departments create inefficiencies, leading to overlaps, gaps, and delays in execution. Together, these constraints hinder the smooth functioning and success of agricultural programmes.

Recommendations

To enhance the effectiveness and long-term impact of PMKSY, several strategic measures should be prioritised. Strengthening monitoring and evaluation systems is essential to ensure timely implementation, transparency, and accountability across all levels of execution.

There is a pressing need to increase farmer awareness programmes so that beneficiaries are well-informed about available schemes, technologies, and application processes. Promoting digital irrigation technologies—such as sensor-based systems and data-driven water management—can significantly improve water-use efficiency and agricultural productivity.

Improving inter-department coordination is crucial to minimise overlaps, reduce delays, and streamline decision-making processes. Finally, adopting region-specific policy adjustments will allow the scheme to better address diverse agro-climatic conditions, ensuring more equitable and effective outcomes across different areas.

Conclusion

The analysis of PMKSY highlights a programme built on a strong and necessary vision—expanding irrigation coverage, improving water-use efficiency, and promoting sustainable agricultural practices. While the scheme has made measurable progress in enhancing irrigation infrastructure and encouraging modern techniques, its impact remains uneven due to implementation gaps, limited awareness, and regional disparities. In terms of overall effectiveness, PMKSY demonstrates clear potential and has delivered tangible benefits in several regions. However, its full promise is yet to be realised, as systemic challenges continue to limit its reach and consistency. The final verdict is straightforward: PMKSY is directionally right but operationally inconsistent. It is delivering results, but not at the scale or speed originally envisioned. Looking ahead, there is significant scope for future research, particularly in evaluating long-term sustainability outcomes, the role of emerging technologies in irrigation, and the effectiveness of policy adaptations across diverse agro-climatic zones. Strengthening these areas will be key to unlocking the scheme's full potential.

Limitations

This analysis is constrained by several factors that may influence its accuracy and scope. It primarily relies on secondary data, which may not fully reflect current ground realities or recent developments, and variations in data quality across regions can lead to inconsistencies. The

absence of extensive primary research and direct farmer feedback limits deeper insight into on-ground challenges and implementation gaps. Additionally, regional diversity in agro-climatic conditions and administrative capacity makes it difficult to present a completely uniform assessment of PMKSY. As policy outcomes continue to evolve, some findings may require revision with the availability of updated data and further research.

References:

- Department of Agriculture, Cooperation & Farmers Welfare. (2016). *Guidelines for preparation of District Irrigation Plans (DIPs)*. Government of India.
- Government of India. (2015). *Pradhan Mantri Krishi Sinchai Yojana (PMKSY): Operational guidelines*. Ministry of Agriculture & Farmers Welfare.
- Government of India. (2024–25). *Annual report 2024–25*. Department of Agriculture & Farmers Welfare.
- Roy, D., & Majumder, A. (2020). Impact of micro-irrigation on agricultural productivity: Evidence from Sikkim. *Journal of Water Resource and Protection*, 12(5), 345–358.
- Singh, R., & Mazhar, F. (2024). Evaluating the socio-economic impact of PMKSY on farmers in India. *Indian Journal of Agricultural Economics*, 79(1), 112–125.
- Tripathy, S., Patel, K., & Mishra, R. (2023). Implementation challenges of irrigation schemes in India: A case study of PMKSY. *International Journal of Rural Development Studies*, 10(2), 45–60.
- Wani, S. P., Rockström, J., & Oweis, T. (2016). Rainfed agriculture: Unlocking the potential. *CAB International*.
- Yadav, S., Naberia, S., & Verma, P. (2020). Adoption of irrigation technologies and their impact on farmers' livelihoods in India. *Agricultural Economics Research Review*, 33(2), 201–210.