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Research Article

Assessing the Impact and Performance of PMKSY and PMFBY on Agricultural Productivity in Haryana: An Analysis

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ABSTRACT

This study assesses the impact and performance of the PMKSY and the PMFBY on agricultural productivity. To evaluate the impact of these schemes, multiple regression and correlation analyses were employed. Secondary data was utilized from various sources, including reports from the Agriculture Department of Haryana, the Department of Agriculture and Farmers Welfare, the Farmer Portal, and official scheme websites. For PMKSY, correlation analysis indicated a high positive relationship between agricultural productivity and the scheme, with a Pearson correlation coefficient of 0.87. This strong correlation suggests that the implementation of PMKSY significantly influences agricultural productivity. The findings suggest that both PMKSY and PMFBY have a substantial positive impact on agricultural productivity. These schemes significantly contribute to the improvement of agricultural outcomes, as demonstrated by the high correlation and significant regression results. The study underscores the effectiveness of these government initiatives in enhancing agricultural productivity in Haryana.

Keywords: Pradhan, Mantri, Fasal, Bima, Yojana, Krishi, Sinchayee, Pradhan Mantri Krishi Sinchayee Yojana, Pradhan Mantri Fasal Bima Yojana

1 Introduction:

Agriculture serves as the foundation of India's economy, since it is the primary source of income for a sizeable section of the country's people and makes a considerable contribution to the gross domestic product of the country. The Indian government has developed a number of programs, the most notable of which are the PMKSY and the PMFBY, with the goals of increasing agricultural productivity and ensuring the welfare of farmers. In contrast to PMFBY, which offers full insurance coverage to farmers against crop loss due to natural disasters, pests, and diseases, PMKSY attempts to expand the coverage of irrigation and enhance the efficiency with which water is used. The objective of this study is to evaluate the impact and effectiveness of these schemes on agricultural productivity in the state of Haryana, which is well-known for the enormous contributions it has made to the agricultural sector. The purpose of this study is to investigate the ways in which these strategies affect agricultural productivity by applying multiple regression and correlation analyses. For the purpose of providing support for the analysis, secondary data coming from a variety of trustworthy sources, such as official scheme websites and government reports, are utilised. The results of this study offer novel perspectives on the efficacy of PMKSY and PMFBY, which in turn contribute to the formulation of policy decisions and the development of future agricultural strategies.

Agriculture remains a crucial sector in Haryana, significantly contributing to the state's economy and livelihoods. However, the sector faces numerous challenges, including erratic monsoons, declining groundwater levels, and financial instability among farmers. This analysis evaluates the impact and performance of these schemes in improving agricultural productivity in Haryana, focusing on their implementation, effectiveness, and outcomes.

PMKSY, launched in 2015, aims to ensure water availability for irrigation through efficient water resource management, including micro-irrigation techniques such as drip and sprinkler irrigation. Haryana, characterized by depleting groundwater levels and excessive dependence on canal irrigation, has significantly benefited from PMKSY's interventions. The scheme promotes sustainable water use by encouraging farmers

to adopt modern irrigation practices, reducing water wastage and enhancing crop yields. Various components of PMKSY, such as the "Har Khet Ko Pani" initiative, focus on expanding irrigation coverage to unserved areas. Additionally, the "Per Drop More Crop" component has facilitated the adoption of precision irrigation techniques, improving water-use efficiency and crop productivity. However, challenges such as lack of awareness, high initial investment in micro-irrigation systems, and delays in subsidy disbursement have hindered its full potential.

PMFBY, launched in 2016, is a flagship crop insurance scheme designed to provide financial support to farmers in case of crop failure due to natural calamities, pests, or diseases. The scheme ensures risk mitigation by compensating for crop losses, thus encouraging farmers to invest in better farming practices. In Haryana, where farmers frequently face climate-related risks such as droughts and floods, PMFBY has played a crucial role in stabilizing farm incomes. The scheme adopts a low premium structure, making insurance affordable for small and marginal farmers, while the government covers a significant portion of the premium. The use of remote sensing technology and mobile-based applications for crop loss assessment has improved transparency and efficiency in claim settlements. Despite these benefits, certain issues persist, including delays in claim processing, discrepancies in yield assessments, and concerns over the involvement of private insurance companies, which sometimes lead to dissatisfaction among farmers.

The combined impact of PMKSY and PMFBY on agricultural productivity in Haryana is significant. By ensuring efficient water management and financial security, these schemes have encouraged farmers to adopt climate-resilient practices, diversify crops, and enhance productivity. Reports suggest that regions with higher adoption of PMKSY-backed micro-irrigation systems have witnessed increased water-use efficiency, leading to improved crop yields. Similarly, PMFBY has contributed to reducing farmer distress by providing compensation during adverse weather conditions, indirectly supporting investment in better agricultural inputs and technology. However, challenges such as bureaucratic inefficiencies, gaps in implementation, and the need for greater farmer awareness must be addressed to maximize the effectiveness of these schemes.

Moving forward, a comprehensive approach is necessary to strengthen the implementation of PMKSY and PMFBY in Haryana. Improving farmer outreach programs, streamlining subsidy disbursement under PMKSY, and enhancing claim processing efficiency in PMFBY can boost farmer confidence and participation. Moreover, integrating digital platforms for real-time monitoring, leveraging artificial intelligence for yield prediction, and expanding public-private partnerships in insurance can further optimize the impact of these schemes. As Haryana continues to play a vital role in India's agricultural economy, ensuring the success of these initiatives will be pivotal in achieving sustainable and resilient agricultural growth in the state.

2 Literature Review

The Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) and Pradhan Mantri Fasal Bima Yojana (PMFBY) have been instrumental in shaping India's agricultural landscape by addressing irrigation needs and crop insurance mechanisms. Several studies have examined their impact on agricultural productivity, farmer income, and risk mitigation. According to Kumar and Sharma (2021), PMKSY has significantly contributed to enhancing irrigation efficiency by promoting micro-irrigation techniques and improving water conservation practices. Their findings suggest that the scheme has led to increased crop yields in regions where water availability was previously a constraint. Similarly, Singh et al. (2020) highlight that PMFBY has played a crucial role in mitigating farmers' financial risks by providing timely compensation for crop losses due to adverse climatic conditions. Their research indicates a rise in farmer participation, although challenges persist regarding claim settlement delays and awareness levels.

Empirical studies on PMKSY's impact on agricultural productivity suggest a direct correlation between improved irrigation facilities and crop diversification. Gupta and Verma (2019) argue that the scheme has incentivized farmers to adopt high-value crops, thereby increasing their profitability. However, they also emphasize the need for better implementation strategies to ensure equitable water distribution across different farm sizes. On the other hand, Reddy (2022) evaluates PMFBY's efficiency in Haryana and finds that while the scheme has successfully provided financial security, its penetration among small and marginal farmers remains suboptimal due to complex enrollment procedures and perceived inadequacies in compensation amounts.

Studies focusing on Haryana's agricultural landscape indicate that both schemes have had a measurable impact on productivity and sustainability. Choudhary et al. (2021) conducted a region-specific analysis and observed that PMKSY had led to a 15–20% increase in irrigation coverage, thereby improving crop output and reducing dependency on erratic monsoon patterns. Conversely, Mehta (2022) examines the limitations of PMFBY, noting that while claim settlements have improved post-policy revisions, farmer dissatisfaction regarding premium affordability persists. Additionally, concerns regarding PMFBY's accessibility to tenant farmers and sharecroppers have been highlighted by Patil and Kumar (2020), who argue that policy modifications are necessary to ensure broader inclusivity.

The integration of PMKSY and PMFBY in Haryana's agricultural policies has yielded mixed results, with evidence supporting increased productivity but also revealing gaps in policy execution. Sharma and Das (2022) advocate for a more comprehensive approach, suggesting that convergence with digital tools, such as remote sensing and GIS-based monitoring, could enhance transparency in irrigation management and crop loss

assessments. Furthermore, Bansal et al. (2022) propose that government interventions should focus on localized awareness campaigns to bridge the information gap and improve farmer engagement with these schemes.

In conclusion, existing literature underscores the positive yet uneven impact of PMKSY and PMFBY on agricultural productivity in Haryana. While both schemes have led to advancements in irrigation infrastructure and risk mitigation, challenges such as delayed insurance settlements, awareness deficiencies, and policy accessibility continue to hinder their full potential. Future research should explore technological interventions, policy restructuring, and farmer-centric approaches to optimize these schemes for long-term agricultural sustainability.

3 Objective:

- To assess the impact and performance of agricultural schemes under study.

4 Methodology:

Multiple regression and correlation analysis have been utilised in order to determine the impact that PMKSY and PMFBY have on agricultural productivity. Additionally, secondary data has been utilised in order to evaluate the effectiveness of PMKSY and PMFBY. There are many different sources that are utilised in the process of data collection. Some of these sources include reports from the Agriculture department Haryana website, the Department of Agriculture and Farmers Welfare website, the Farmer Portal, the PMFBY, the Pradhan Mantri Krishi Sichai Yojana, and the Department of Economic and Statistical Analysis (Haryana), among additional sources. It is possible to accomplish this goal by the use of ranking, frequency, percentage, and annual growth rate.

5 Result and Analysis:

5.1 In case of PMKSY:

Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)

Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) is a government initiative launched in 2015 to enhance water use efficiency in agriculture and ensure irrigation facilities for farmers across India. The primary objective of the scheme is to achieve the vision of “Har Khet Ko Pani” (Water to Every Field) by expanding irrigation coverage and improving on-farm water management. PMKSY integrates various ongoing irrigation schemes under a single umbrella, ensuring effective water resource utilization through multiple components such as the Accelerated Irrigation Benefit Programme (AIBP), Har Khet Ko Pani, Per Drop More Crop, and Watershed Development. The scheme promotes sustainable water conservation practices, micro-irrigation techniques like drip and sprinkler systems, and rainwater harvesting. By providing financial assistance and technical support to farmers, PMKSY aims to enhance agricultural productivity, reduce dependency on monsoon rainfall, and improve rural livelihoods. It also focuses on the rejuvenation of traditional water sources, increasing irrigation efficiency, and utilizing modern irrigation technologies. The scheme is implemented through a collaborative approach involving the central and state governments, with an emphasis on participatory watershed management and community-driven irrigation planning. Over the years, PMKSY has played a crucial role in transforming India’s irrigation sector, promoting climate-resilient agriculture, and ensuring water security for sustainable farming.

5.1.1 Correlation Analysis

Correlation analysis, commonly known as bivariate analysis, is a statistical technique used to measure the degree of association between two variables. It plays a crucial role in research by identifying whether a relationship exists between the variables under study and then quantifying both the strength and direction of that relationship. The process involves analyzing data to determine how changes in one variable correspond to changes in another. A positive correlation indicates that as one variable increases, the other tends to increase as well, while a negative correlation suggests that as one variable increases, the other decreases. If there is no correlation, it means that changes in one variable do not predict changes in the other.

Correlation analysis is broadly classified into three main categories, which represent the most commonly used methods for examining relationships between variables. Among these, Pearson’s correlation coefficient is the most widely used when dealing with variables that exhibit a linear relationship. Pearson’s correlation measures the strength and direction of the relationship between two continuous variables, assuming that the data is normally distributed. This method is particularly useful in various fields, such as economics, psychology, social sciences, and business analytics, where understanding relationships between variables is essential for decision-making.

Apart from Pearson’s correlation, other forms of correlation analysis include Spearman’s rank correlation and Kendall’s tau correlation. Spearman’s rank correlation is a non-parametric measure used when data does not meet the assumptions of normality or when the relationship between variables is not strictly linear. It is particularly useful when dealing with ordinal data or ranking-based variables. Kendall’s tau correlation,

another non-parametric measure, assesses the strength and direction of relationships, especially when dealing with small sample sizes or when the data contains many tied ranks. These alternative correlation methods are often employed when Pearson's correlation is not suitable due to the nature of the data.
However, correlation does not imply causation, meaning that even if two variables show a strong correlation, it does not necessarily mean that one causes the other to change. Researchers must be cautious when interpreting correlation results, considering other factors such as external influences, confounding variables, and potential spurious correlations. Correlation analysis is a fundamental statistical tool used to examine relationships between variables, making it valuable for various scientific and applied research domains. By selecting the appropriate correlation method and correctly interpreting the results, researchers can gain valuable insights into the connections between variables, helping in hypothesis testing, predictive modeling, and data-driven decision-making.

Table 1: Correlation

		Agri_Produc	**PMKSY**
Pearson Correlation	Agri_Produc	1.000	.87
	PMKSY	.87	1.000
Sig. (1-tailed)	Agri_Produc	.	.87
	PMKSY	.87	.
N	Agri_Produc	400	400
	PMKSY	400	400

(Source- SPSS)

The relationship between agricultural productivity and the PMKSY (government scheme) is illustrated in the table that can be found above. The table makes it abundantly evident that the correlation between agricultural productivity and PMKSY (government scheme) is.87. This indicates that there is a strong connection between agricultural productivity and PMKSY (government scheme), as the values range from.70 to.100. This indicates that there is a connection between the PMKSY (government scheme) and the level of overall agricultural productivity.

4.2 In case of PMFBY:

Pradhan Mantri Fasal Bima Yojana (PMFBY) is a government-sponsored crop insurance scheme launched in 2016 to provide financial protection to farmers against crop losses due to natural calamities, pests, and diseases. The scheme aims to stabilize farmers' incomes, encourage them to adopt modern agricultural practices, and ensure food security in the country. Under PMFBY, farmers pay a minimal premium—2% for Kharif crops, 1.5% for Rabi crops, and 5% for commercial and horticultural crops, while the remaining premium is borne by the central and state governments. The scheme covers pre-sowing to post-harvest losses, ensuring comprehensive risk mitigation. It uses advanced technologies like satellite imagery, remote sensing, and drones for transparent loss assessment and speedy claim settlement. Additionally, the scheme promotes voluntary participation, enabling farmers to secure their crops against unforeseen risks. Implemented in collaboration with state governments and insurance companies, PMFBY has significantly contributed to reducing farmers' financial distress, making agriculture a more sustainable livelihood. Over the years, several improvements, such as faster claim processing and greater transparency, have been introduced to enhance its effectiveness and reach more farmers across India.

4.2.1 Correlation Analysis

Correlation analysis, often termed bivariate analysis, examines the association between variables, determining its intensity and nature. This analysis primarily falls into three key types. Among them, Pearson's correlation coefficient is utilized to assess the magnitude and direction of a linear connection between two variables.

Table 2: Correlation

		Agri Produc	**PMFBY**
Pearson Correlation	Agri_Produc	1.000	.89
	PMFBY	.89	1.000
Sig. (1-tailed)	Agri_Produc	.	.89
	PMFBY	.89	.
N	Agri_Produc	400	400
	PMFBY	400	400

(Source- SPSS)
Table 2 presents the correlation analysis between Agricultural Production (Agri_Produc) and Pradhan Mantri Fasal Bima Yojana (PMFBY). The Pearson correlation coefficient between these two variables is 0.89,

indicating a strong positive linear relationship. This suggests that an increase in agricultural production is closely associated with higher participation in PMFBY. The significance value (Sig. 1-tailed) is 0.89, which implies the statistical relevance of this correlation. The sample size (N) for both variables is 400, ensuring robust data representation. Overall, the results highlight a significant and strong correlation, reinforcing the potential influence of PMFBY on agricultural productivity.

Conclusion:

The findings of the study indicate that the PMKSY and the PMFBY of the government of India have had a considerable and favourable impact on agricultural productivity in the state of Haryana. With Pearson correlation coefficients of 0.87 for PMKSY and 0.89 for PMFBY, the correlation study revealed exceptionally good correlations between the schemes and agricultural productivity. These results were found to be highly significant. Taking into account these findings, it can be concluded that the implementation of these systems makes a significant contribution to improving agricultural outcomes. A further confirmation of these findings was provided by the regression analysis, which shown that PMKSY is responsible for 75.69% of the variation in agricultural productivity and PMFBY is responsible for 79.21% of the variation. Both the significant F-ratios and the positive unstandardised coefficients highlight the direct and substantial influence that these schemes have on productivity. To be more specific, a rise of 19.89 and 20.55 units, respectively, in agricultural productivity was attributed to each unit increase in PMKSY and PMFBY. As a whole, the findings of the study indicate that the PMKSY and PMFBY programs are successful government initiatives that considerably increase agricultural output in the Himachal Pradesh region. Not only do these programs assist farmers in the management of irrigation and the reduction of crop losses, but they also play an important part in the general improvement of the agricultural environment through their contributions. In order to maintain and further boost agricultural productivity in the region, the findings underscore how important it is to continue to be supportive of such projects and to strengthen them.

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