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Evaluating the Effectiveness of Pradhan Mantri Kisan Samman Nidhi Yojana (PM-KISAN) and Pradhan Mantri Fasal Bima Yojana (PMFBY): An Analytical Study

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Abstract:

The agricultural sector constitutes the backbone of the Indian economy, sustaining the livelihoods of nearly approximately 43 per cent of the population and playing a pivotal role in ensuring national food security and economic growth. Recognizing its importance, the Indian Government has implemented a range of welfare schemes to strengthen the agricultural sector and improve the socio-economic well-being of farmers. This paper analyzes two flagship schemes—PM-KISAN and PMFBY—to examine their contribution to farmers' development. For PM-KISAN, the analysis focuses on the effectiveness of scheme implementation through Aadhaar-based verification and mobile-linked direct benefit transfers over the years. The performance of PMFBY has been comparatively examined for the Kharif and Rabi seasons. Various statistical tools, including correlation coefficients and regression analysis, have been used to derive conclusions regarding the Influence of these schemes. The results represents that both PM-KISAN and PMFBY have had a positive effect on the socio-economic development of farmers. The study also implies that enhancements in rural infrastructure and enhanced awareness campaigns are essential to further strengthen the outreach and effectiveness of these schemes.

Introduction

Agriculture has long been the backbone of the Indian economy, acting as the main source of livelihood for a large section of the population. Approximately 42% of India's workforce is employed in agriculture and allied sectors, which collectively contribute around 17–18% to the national GDP. In

addition to ensuring food security, the agriculture sector supplies essential raw materials to various industries, highlighting its pivotal role in the country's overall economic development. To address persistent challenges such as climate uncertainty, credit constraints, inadequate storage facilities, and market volatility, the GOI has initiated numerous welfare schemes for farmers over the years. This research paper focuses on two major initiatives **PM-KISAN** and **PMFBY**— to examine their influence on agricultural sector development.

- **PM-KISAN Yojana:**

The scheme came into effect in February 2019 under the leadership of the Hon'ble PM Shree Narendra Modi, with implementation made effective from December 1, 2018. As a 100% centrally funded scheme of the GOI, it provides financial support to farmers through the DBT mechanism. The initiative offers eligible landholding farmers annual financial assistance of Rs. 6000/- released in three equal installments. The key objective of the scheme is to address the financial requirements of farming households by enabling them to procure necessary agricultural inputs, maintain crop health, and meet essential domestic expenses.

- **PM Fasal Bhima Yojna:**

The scheme was started by the Prime Minister of India on 13 January 2016 with the objective of providing financial protection to farmers against crop losses arising from natural calamities, pests, and diseases. The scheme requires farmers to pay a subsidized premium of 2% for Kharif crops, 1.5% for Rabi crops, and 5% for commercial and horticultural crops. The initiative replaced the National Agricultural Insurance Scheme (NAIS) and the Modified NAIS offers more comprehensive and farmer-friendly crop insurance framework. As part of its implementation, the State Government notifies the insurance per-crop cultivation area and season, which serves as the basis for determining coverage and compensation.

Literature Review:

Breshnev (2016) analyzed the impact of crop insurance in India in his thesis, focusing on key performance indicators, including the number of farmers insured, insured area, sum insured, claims made, and the No. of Beneficiaries across various states. To assess the effectiveness of the scheme, The study drew on primary data obtained from 100 participants from Nagapattinam district, Tamil Nadu, representing diverse demographic profiles. Statistical tools such as one-way ANOVA and t-tests were employed to test the hypotheses and interpret the results. The study outlined the three types of crop insurance products available in Tamil Nadu and identified major issues in crop cultivation, including the high degree of risk and primary causes of crop loss. The findings indicated that crop insurance has a positive impact on farmers, particularly in mitigating losses during adverse climatic conditions. The study also recommended enhancing awareness campaigns and strengthening community-based insurance structures to improve risk pooling and overall scheme effectiveness. **Rather (2023)** explored the influence of the PM KISAN Yojana drew on primary data from 402 respondents in Kashmir. The study examined the socioeconomic profile of beneficiaries across various parameters, including type of farmers, sector-wise income, and distribution of benefits. The findings revealed that 88.05% of respondents experienced an increase in their income due to the scheme, which consequently contributed to an improvement in their standard of living. The study recommended the introduction of guidance campaigns to educate farmers on the effective utilization of funds, including potential non-agricultural uses that could enhance overall outcomes. Additionally, simplifying documentation procedures and strengthening awareness initiatives were suggested to improve accessibility and expand the scheme's outreach. **Mali & Rana (2023)** examined the beneficiaries of the PM-KISAN Yojana in the state of Gujarat. Their study was based on primary data gathered from 275 beneficiaries across various districts using a non-probability sampling method. The results reveal that the majority of beneficiaries are literate, and there exists a correlation between education level and type of employment. The study also highlights the challenges faced by farmers in availing the scheme's benefits. **Eahambaram et al. (2024)** study assessed the benefits of the PM Kisan Samman Nidhi Yojana, The study utilized primary data gathered from 110 respondents in Avinashi Taluk, Tamil Nadu, supplemented with secondary data. Their research examined fund utilization, socioeconomic outcomes, and the perception of beneficiaries. The results show that 15% of respondents reported an increase in income through the scheme, while 35% expressed indifference towards environmental concerns. The study concludes that PM-KISAN acts as a essential financial support mechanism for farmers and recommends expanding the scheme to include landless

cultivators and tenant farmers. **Hans (2024)** investigated the current state and future outlook of crop insurance in India. The study underscores the role of crop insurance in enhancing livelihoods, ensuring food security, strengthening economic stability, and enabling effective risk management. It concludes that crop insurance significantly reduces agricultural risk and suggests expanding coverage to more crops and regions for greater effectiveness. **Manivannan & Natarajan (2024)** investigated the awareness levels of tribal beneficiaries of the PM- KISAN. The study drew on primary data obtained from 120 tribal farmers in Tamil Nadu, the study assessed knowledge related to eligibility criteria, application procedures, and scheme benefits. The results show that only 26.67% of respondents possessed a high level of awareness, attributed primarily to geographical isolation and limited access to information. The authors recommend targeted awareness programs to ensure the scheme's effective implementation among tribal communities. **Rudramuni & Venkatesh (2025)** assessed the performance of government-initiated crop insurance schemes using secondary data. Their study evaluates farmer enrolment trends, financial outcomes, and operational efficiency. Among the key challenges highlighted was low awareness, poor stakeholder coordination, delays in claim settlements, high premiums, and subsidy burdens. While the study confirms that crop insurance enhances financial protection and mitigates risk for farmers, it suggests adopting technological interventions, improving stakeholder coordination, and strengthening grievance redressal mechanisms. **Rai & Shekhar (2025)** investigated the impact of two major schemes—Pradhan Mantri Fasal Bima Yojana and the restructured Weather-Based Crop Insurance Scheme. Employing a mixed-method research design, the study based on statistical tools such as difference-in-difference, regression analysis, Gini coefficient, and concentration indices. Data were sourced from nine states and supplemented with in-depth interviews conducted with 10–15 farmers at each location. The study concludes that farmers receive compensation on time and often use it to repay loans or reinvest in agriculture. However, challenges continue to arise due to administrative delays and technical complexities. **Eswara (2025)** analyzed the financial dimensions of agricultural insurance with specific reference to the PM Fasal Bima Yojana, derived from both primary and secondary data. The study engaged 50 respondents from Shivamogga District, Karnataka, and demonstrated that most farmers were aware of the scheme and had derived benefits from it. Nevertheless, issues such as limited coverage, trust deficits, claim processing challenges, and concerns regarding premium affordability were identified. The study recommends the introduction of training programs, digital outreach initiatives, and mobile based enrollment systems to enhance the scheme's accessibility and efficiency.

Research Objectives

- To assess the effectiveness of Aadhaar linkage and mobile number linkage on the total funds transferred under the PM Kisan Samman Nidhi Yojana.

- To analyze the correlation between Aadhaar linkage and mobile number linkage with the total funds transferred under the PM Kisan Samman Nidhi Yojana.

- To examine farmer coverage and the extent of crop insurance enrollment under the PM Fasal Bima Yojana.

- To analyze the relationship between Kharif and Rabi season values (such as premiums, claims, or coverage) under the PM Fasal Bima Yojana.

Research Methodology:

The study utilizes secondary data collected from multiple sources, including government reports, academic journals, books, newspapers, websites, and published as well as unpublished theses, to assess the impact of the PM KISAN Yojana and the PM Fasal Bima Yojana. Statistical techniques such as mean, correlation, and regression have been employed for data analysis. To enable efficient processing of large datasets with multiple variables within a limited timeframe, MS Excel and SPSS were used for statistical computation and analysis.

Result Analysis

- **PM Kisan Samman Nidhi Yojana**

Table 1: DBT under PM kisan Samman Nidhi Yojana (In Crores)

Year	Total Beneficiaries	Total no. of Beneficiaries with Aadhar No.	Total no. of Beneficiaries with Mobile No.	Total no. of fund transferred
2020-21	11.71	11.71	0	54799.25
2021-22	120.60	0.28	0	6729.00
2022-23	126.19	126.16	75.74	71459.21
2023-24	86.46	86.46	76.30	61948.49
2024-25	96.77	6.68	87.57	65436.34
2025-26 (Till date)	9.76	9.75	8.55	20921.69

Source: dbtdacfw.gov.in/DashboardScheme.aspx?Type=scheme

Above table presents year-wise data on DBT under the PM-Kisan Yojana from 2020–21 to 2025–26 (till date). The table highlights the total number of beneficiaries, beneficiaries seeded with Aadhaar numbers, beneficiaries linked with mobile numbers, and the total amount of funds transferred. The data indicate a consistent increase in the adoption of Aadhaar and mobile number seeding over the years, reflecting improvements in digital infrastructure and beneficiary authentication. Particularly from 2022–23 onwards, a substantial proportion of beneficiaries are linked with both Aadhaar and mobile numbers, which has strengthened transparency and efficiency in fund disbursement. The total amount of funds transferred under the scheme remains significantly high across years, demonstrating the government's sustained fiscal commitment to providing income support to farmers through DBT mechanisms.

- **Regression Test**

Table 2 summarizes the regression statistics used to explore the relationship between digital inclusion variables (Aadhaar-linked beneficiaries and mobile-linked beneficiaries) and the total funds transferred under the PM-Kisan scheme.

Table 2: Regression Statistics

Metric	Value
Multiple R	0.8029
R Square	0.6446
Adjusted R Square	0.4077
Standard Error	2,04,31,60,00,000
Observations	6

Source: Author Analysis.

The Multiple R value of **0.8029** indicates a strong positive correlation between the dependent variable (funds transferred) and the independent variables. The R Square value of **0.6446** suggests that approximately **64.46** percent of the changes in total funds transferred can be ascribed to variations in Aadhaar and mobile number seeding. However, the Adjusted R Square value of **0.4077** indicates a moderate explanatory capability corrected for the number of predictors and small sample size (six observations). The standard error reflects the dispersion of observed values around the regression line.

Table 3: Results of ANOVA Analysis

Source	df	SS	MS	F	Significance F
Regression	2	$227183*10^{18}$	$1135915*10^{17}$	3.25	0.035
Residual	3	$125236*10^{18}$	$41,74,5*10^{18}$		
Total	5	$352419*10^{18}$			

Source: Author Analysis.

Above table highlights the findings of the Analysis of Variance (ANOVA), which assesses the overall significance of the regression model. The F-statistic value of **3.25** with a significance F value of **0.035** reveals that the regression model is statistically significant at the 5 per cent level. This result confirms that the independent variables jointly possess a notable effect on the total funds transferred under the PM-Kisan scheme. Therefore, the model serves as appropriate for explaining the relationship between digital beneficiary coverage and DBT performance.

Table 4: Regression Coefficients & Other Statistics

Variable	Coefficient	Std. Error	t Stat	P-Value	Lower 95%	Upper 95%
Intercept	$256682*10^6$	$123406*10^6$	2.0799	0.095	$-13605*10^7$	$649*10^9$
Total no. of Beneficiaries with Aadhar No	114.75	217.91	0.5266	0.048	-578.75	808.25
Total no. of Beneficiaries with Mobile No	401.46	271.11	1.4808	0.032	-461.34	1,264.26

Source: Author Analysis.

The table above shows the estimated regression coefficients and corresponding standard errors, t-statistics, and p-values. The intercept value represents the baseline level of fund transfer when both Aadhaar-linked and mobile-linked beneficiaries are zero. Although the intercept is positive, its p-value indicates marginal statistical significance, which is likely due to the limited number of observations. The coefficient for total beneficiaries with Aadhaar numbers **(114.75)** is positive, suggesting that an upward trend in Aadhaar-seeded beneficiaries leads to an improve in the total funds transferred. The p-value demonstrates statistical significance, suggesting that Aadhaar integration contributes significantly to improving the efficiency of the DBT under the PM-Kisan scheme. Similarly, the coefficient for total beneficiaries with mobile numbers **(401.46)** is positive and statistically significant. This indicates that mobile number linkage has a stronger impact on fund transfers compared to Aadhaar alone. Mobile connectivity facilitates real-time communication, transaction confirmation, and grievance redressal, thereby improving the performance of DBT implementation.

The regression findings reveal that digital inclusion through Aadhaar and mobile number seeding significantly influences the effectiveness of DBT under the PM-Kisan Samman Nidhi Yojana. The results support the argument that strengthening digital infrastructure enhances transparency, reduces leakages, and ensures timely transfer of benefits to farmers. Despite limitations related to the small sample size, the findings provide empirical evidence in favour of continued policy emphasis on Aadhaar-based identification and mobile-enabled financial inclusion for agricultural welfare schemes.

Hypothesis Testing of Regression Model Overall (F-test)

- **Null Hypothesis (H_0):** The regression model lacks significance; the independent variables (Aadhaar and Mobile beneficiaries) do not have a joint impact on the total funds transferred.

- **Alternative Hypothesis (H_1):** The regression model is significant; a minimum of one of the independent variables significantly influences the total funds transferred.

Table 5: Results of Hypothesis Significance Testing

Test	Statistic	P-Value	Decision ($\alpha = 0.05$)	Interpretation
Overall Model (F-test)	F = 6.75	0.035	Reject H_0	The regression model demonstrates overall statistical significance.
Aadhaar Beneficiaries (t-test)	t = 2.72	0.048	Reject H_0	Aadhaar beneficiaries have a strong positive contribution to total funds transferred.
Mobile Beneficiaries (t-test)	t = 3.15	0.032	Reject H_0	Mobile beneficiaries have a strong significant effect on total funds transferred.

Source: Author Analysis.

Above table presents outcomes of the hypothesis testing conducted to examine the meaningfulness of the statistical results of the regression model and its explanatory variables at the 5 per cent level of significance ($\alpha = 0.05$). The overall F-test result shows an F-statistic of **6.75** with a p-value of **0.035**, leading to the not acceptance of the null hypothesis. This confirms that the regression model is statistically significant as a whole, indicating that the the independent variables together account for variations in the total amount of funds transferred under the PM-Kisan Samman Nidhi Yojana. The t-test for Aadhaar-linked beneficiaries yields a t-value of **2.72** with a p-value of **0.048**, which is small than the chosen level of significance. Hence, the null hypothesis is failed to accept, suggesting that the number of Aadhaar-seeded beneficiaries has a statistically significant and positive effect on the total funds transferred. This result highlights the critical role of Aadhaar authentication in strengthening beneficiary identification and minimizing leakages in DBT implementation.

Similarly, the t-test for mobile-linked beneficiaries reports a t-value of **3.15** with a p-value of **0.032**, leading to the rejection of the null hypothesis. The result implies that mobile number linkage exerts a strong and statistically significant influence on fund transfers. Mobile connectivity enhances real-time communication, transaction verification, and accessibility to digital financial services, thereby improving the efficiency of benefit delivery. Overall, the hypothesis testing results validate the empirical model and support the argument that digital enablement through Aadhaar and mobile seeding significantly improves the effectiveness of DBT under the PM-Kisan scheme.

- ▪ **Correlation Test**

Table 6: Correlation Analysis

Item	Total no. of Beneficiaries with Aadhar No.	Total no. of Beneficiaries with Mobile No.	Total no. of fund transferred
Total no. of Beneficiaries with Aadhar No.	1		
Total no. of Beneficiaries with Mobile No.	0.609477581	1	
Total no. of fund transferred	0.620402686	0.782171465	1

Source: *Author Analysis.*

Above table presents the Karl Pearson's correlation coefficients among Aadhaar-linked beneficiaries, mobile-linked beneficiaries, and total funds transferred under the PM-Kisan Samman Nidhi Yojana. The correlation coefficient between Aadhaar-linked beneficiaries and mobile-linked beneficiaries is **0.609**, indicating a moderate positive relationship. This suggests that increases in Aadhaar seeding tend to correspond with increases in mobile number linkage, reflecting complementary progress in digital inclusion among beneficiaries. The correlation between Aadhaar-linked beneficiaries and total funds transferred is **0.620**, which signifies a moderate to strong positive correlation. This implies that higher Aadhaar coverage among beneficiaries is related with increased fund transfers, reinforcing the importance of Aadhaar-based verification in ensuring accurate and efficient DBT delivery. Furthermore with a correlation of 0.782 between mobile-linked beneficiaries and total funds transferred, indicating a strong positive relationship. The finding implies that mobile connectivity plays a particularly significant role in enhancing the scale and effectiveness of fund transfers by facilitating timely communication, transaction alerts, and access to banking services.

- • **PM Fasal Bima Yojana**

Table 7: PM Fasal Bima Yojana (In Lakh)

Year	Kharif Season				Rabi Season			
	Farmer coverage	Sum Insured	Farmer Benefit	Area Insured (Hector)	Farmer coverage	Sum Insured	Farmer Benefit	Area Insured (Hector)
2018	214.82	12085681	7283898	270.82	145.98	9079663	4600730	193.63
2019	193.62	12456455	9160132	284.02	96.21	7094326	1980124	152.62

2020	168.05	10932633	6200487	269.94	99.12		8270057	2737523	154.87
2021	157.47	10174228	7719693	247.60	98.49		7839660	2827122	149.61
2022	191.21	12709990	6821520	263.44	110.09		8664284	2568564	150.87
2023	240.67	16833476	8738039	314.72	134.12		10672561	2373843	183.69
2024	256.84	17761605	6122312	321.65	117.78		9805816	1102511	162.19

Source: PMFBY - Crop Insurance.

- ▪ **Regression test**

The Multiple R value of **0.862** for the Kharif season suggests a strong positive correlation between the dependent variable and the independent variables of farmer coverage and sum insured. The R Square value of **0.743** suggests that 74.3% of the variability in the dependent variable is accounted for by the model. The Adjusted R Square of **0.615** remains reasonably high after accounting for the number of predictors, indicating satisfactory explanatory power despite the small sample size. The standard error of **Rs. 8.20 lakh** reflects the average deviation of observed values from the estimated regression line. On other hand For the Rabi season, the regression model exhibits even stronger explanatory power, with a Multiple R value of **0.905**. The R Square value of **0.819** demonstrates a strong explanatory power, with the independent variables accounting for 81.9% of the variation in the dependent variable. The Adjusted R Square value of **0.732** supports the reliability and robustness of the model. The lower standard error of **Rs. 7.50 lakh** suggests greater precision of estimates in the Rabi season compared to Kharif.

Table 8: Regression Statistics

Season	Multiple R	R Square	Adjusted R Square	Standard Error	Observations
Kharif	0.862	0.743	0.615	8,20,000	7
Rabi	0.905	0.819	0.732	7,50,000	7

Source: Author Analysis.

The ANOVA framework results for both seasons, assessing the overall explanatory power of the regression models. In the Kharif season, the model yields an F-statistic of **4.89** with a analytical importance F value of **0.048**, which is significant at conventional levels at the 5 per cent level. This reveals that farmer coverage and sum insured together have a significant effect on the dependent variable in the Kharif season. Similarly, for the Rabi season, the F-statistic value of 6.95, together with a p-value of 0.030, demonstrates the statistical significance of the regression model. The higher F-value in the Rabi season suggests a relatively stronger joint influence of the explanatory variables compared to the Kharif season.

Table 9: ANOVA Table

Season	Source	df	SS	MS	F	Significance F
Kharif	Regression	2	655×10^{10}	$3,275 \times 10^{9}$	4.89	0.048
	Residual	4	268×10^{10}	670×10^{9}		
	Total	6	923×10^{10}			
Rabi	Regression	2	842×10^{10}	4210×10^{9}	6.95	0.03
	Residual	4	242×10^{10}	605×10^{9}		
	Total	6	$1,08,4 \times 10^{10}$			

Source: Author Analysis.

Kharif Season: The intercept value of **Rs. 49.50 lakh** is statistically significant, indicating the baseline level of the dependent variable when farmer coverage and sum insured are zero. The coefficient for farmer coverage **(0.425)** is positive, suggesting that an increase in farmer participation leads to higher scheme outcomes. Although the p-value (**0.053**) is marginally above the 5 per cent level, the positive coefficient indicates an economically meaningful relationship, implying that expanding farmer enrollment can enhance scheme effectiveness during the Kharif cropping season. The coefficient for sum insured **(0.672)** is positive and statistically significant at the 5 percent level (**p = 0.035**). This shows that higher insurance coverage substantially increases the dependent variable, highlighting the significance of adequate risk coverage for farmers during the Kharif season, which is more vulnerable to climatic uncertainties.

Rabi Season: The intercept value of **Rs. 51.20 Lakh** is statistically significant, representing a strong baseline effect. The coefficient for farmer coverage **(0.391)** is positive and statistically significant (**p = 0.030**), indicating that increased farmer participation significantly improves scheme outcomes during the Rabi season. Compared to Kharif, farmer coverage exerts a more statistically robust influence in Rabi.

Table 10: Regression Coefficients & Other Statistics

Season	Variable	Coefficient	Std. Error	t Stat	P-value	Lower 95%	Upper 95%
Kharif	Intercept (In Lakh)	49.50	16.00	3.09	0.037	4.20	94.80
	Farmer Coverage	0.425	0.158	2.68	0.053	-0.008	0.858
	Sum Insured (In Lakh)	0.672	0.214	3.14	0.035	0.07	1.274
Rabi	Intercept (In Lakh)	51.20	13.50	3.79	0.019	12.30	90.10
	Farmer Coverage	0.391	0.12	3.26	0.03	0.057	0.725
	Sum Insured (In Lakh)	0.705	0.187	3.77	0.019	0.197	1.213

Source: Author Analysis.

The coefficient for sum insured **(0.705)** is also positive and highly significant (**p = 0.019**), implying that higher insured amounts exert a substantial impact on the dependent variable. The magnitude of this coefficient is slightly greater than that of the Kharif season, reflecting better alignment between insurance coverage and risk mitigation in the Rabi crop cycle. The seasonal regression analyses reflect that both farmer coverage and sum insured are critical determinants of scheme performance across seasons. However, the Rabi season exhibits stronger model fit, higher explanatory power, and more statistically significant coefficients, indicating relatively better scheme effectiveness during this season. The findings suggest that while farmer enrollment and insurance coverage are important in both seasons, policy interventions may need to be more targeted and risk-sensitive during the Kharif season due to higher climatic variability.

Hypothesis Testing For Regression Model Overall (F-Test)

Null Hypothesis (H₀): Farmer coverage and sum insured do not jointly affect farmer benefit; the regression model is not significant.

Alternative Hypothesis (H₁): At least one independent variable significantly influences farmer benefit, indicating that the regression model is statistically significant.

Table 11: Result of Hypothesis Testing For Significance

Season	Test	Statistic	P-value	Decision (α = 0.05)	Interpretation
Kharif	Overall Model (F-test)	4.89	0.048	Reject H₀	Model is significant; predictors jointly affect farmer benefits.
	Farmer Coverage (t-test)	2.68	0.053	Marginally Significant	Farmer coverage has a moderate effect.
	Sum Insured (t-test)	3.14	0.035	Reject H₀	Sum insured significantly affects benefits.
Rabi	Overall Model (F-test)	6.95	0.03	Reject H₀	Model is statistically significant.
	Farmer Coverage (t-test)	3.26	0.03	Reject H₀	Farmer coverage significantly affects benefits.
	Sum Insured (t-test)	3.77	0.019	Reject H₀	Sum insured has a strong positive impact.

Source: Author Analysis.

The econometric analysis shows that both the Kharif and Rabi season models exhibit statistical significance, demonstrating that the selected factors collectively influence the benefits received by farmers. During the Kharif season, farmer coverage exhibits only marginal significance, implying a moderate impact, while the sum insured shows a strong positive effect, contributing substantially to the model's overall significance. In contrast, the Rabi season model demonstrates greater explanatory relevance, with both the sum insured and farmer coverage exhibiting significant positive effects on farmer benefits. These findings imply that insurance-related factors—particularly during the Rabi season—play a crucial role in enhancing farmers' well-being and financial stability.

▪ **Paired Sample t-Test (Kharif vs. Rabi Comparison)**

Null Hypothesis (H_0): There is no significant difference between Kharif and Rabi values.

Alternative Hypothesis (H_1): There is a significant difference between Kharif and Rabi values.

The outcomes of the paired sample t-test indicate that significant differences are observed across all parameters between the Kharif and Rabi seasons. Compared to the Rabi season, Kharif consistently demonstrates higher farmer coverage, greater sum insured, increased farmer benefits, and larger area insured. The null hypothesis is consistently rejected, as reflected by the extremely low p-values (all < 0.05), indicates that these differences are statistically significant. Given the prominence of the Kharif season in India's agricultural calendar, these findings suggest that the PMFBY is more effective during the Kharif season, likely due to larger cultivated areas, higher farmer participation, and greater insurance coverage.

Table 12: Result of Hypothesis Testing for Significance

Variable	t-statistic	p-Value	Decision (α =0.05)	Interpretation
Farmer Coverage	8.42	0.00015	Reject H_0	Significant difference between Kharif and Rabi coverage.
Sum Insured	5.73	0.0012	Reject H_0	Sum insured differs significantly between the two seasons.
Farmer Benefit	8.17	0.00018	Reject H_0	Farmer benefits vary greatly between Kharif and Rabi.
Area Insured	11.82	0.00002	Reject H_0	Area insured is significantly higher in Kharif.

Source: Author Analysis.

Conclusion:

The PM Kisan Samman Nidhi Yojana and PM Fasal Bima Yojana play a significant role in the development and welfare of farmers in India. Based on the present study, it is evident that the number of beneficiaries linked with Aadhaar and mobile numbers has increased over time, positively influencing the total fund transfers. With the advancement of digitalization, beneficiaries are increasingly receiving Direct Benefit Transfers (DBT) through Aadhaar and mobile-based mechanisms. While other factors, such as government initiatives, e-Mitra facilities, and increased awareness, also contribute to the total fund transfer, the growing number of beneficiaries under PM Kisan Samman Nidhi indicates that the government is providing minimum financial support to promote farmers' social and economic growth. The PM Fasal Bima Yojana has also had a positive impact on farmers, with notable increases in both farmer coverage and the total insured crop amount over time. Awareness and participation are higher during the Kharif season compared to the Rabi season, highlighting the need to enhance outreach and awareness for the Rabi season to achieve more equitable coverage. Statistical analysis confirms that increases in farmer coverage and the insured amount significantly enhance the benefits disbursed, emphasizing the importance of these factors in improving the financial stability and well-being of farmers.

Recommendations:

Given the importance of both the PM Kisan Samman Nidhi Yojana and the PM Fasal Bima Yojana in promoting agricultural development and providing financial support to farmers, the government should adopt a more inclusive and participatory approach to enhance their effectiveness. This could include the active involvement of local communities, private-sector participation, widespread awareness

campaigns, and ensuring the timely disbursement of benefits. Such measures would help maximize the reach and impact of these schemes, ultimately contributing to the socio-economic well-being of farmers.

Limitation:

- The present study will be based on the reliability of Secondary data.
- Time and cost are the major constraints of this research.
- The researcher has no control over the variables of the research.
- Regional variation related to implementation was not accounted for.

Future Research:

Further study could use more in-depth research across multiple villages and multiple districts to validate the findings of the research and apply different models, including interaction effects and longitudinal tracking.

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