

**ARTICLE HISTORY**

Received 28 May 2024

Accepted 30 October 2025

# DOES THE GOVERNMENT FINANCIAL SCHEME PM-KISAN SAMMAN NIDHI INCREASE AGRICULTURAL PRODUCTION AND TAX REVENUE?

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**KEYWORDS:**

Indian farmers, PM-KISAN, Agriculture production, Tax revenue, Economic development

**JEL CLASSIFICATION:**

Q01, Q14, R52

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## ABSTRACT

Pradhan Mantri Kisan Samman Nidhi (PM-KISAN) Yojana is a government initiative that provides financial support to Indian farmers, and this study investigates their impact on agricultural production and how it contributes to tax revenue. The study used secondary data from 21 Indian states from FY 2019-2022 as per availability, collected from the government's official websites. The results showed that PM-KISAN is positively significant for agricultural production, even with moderate infrastructure, and positively impacts tax revenues. The study suggests that the government should increase the amount according to farmers' land holdings and adjust it according to inflation. Regional offices and banks should provide information about the scheme to help farmers engage in services and avoid micro corruption. Previous studies have used primary data to investigate the effect of PM-KISAN on farmers' income, but no studies have examined how it affects agricultural production and tax revenues.

## 1. INTRODUCTION

India is a leading agricultural country, with the agricultural sector playing a critical role in the Indian economy. The government continues implementing many policies for farmers, notably the "Pradhan Mantri Kisan Samman Nidhi Yojana". This study looks into whether the "Pradhan Mantri Kisan Samman Nidhi Yojana" (PM-KISAN) helps to enhance agricultural productivity and how it affects tax income from agriculture in India (Varshney et al., 2020). The "Pradhan Mantri Kisan Samman Nidhi" (PM-Kisan) Yojana is a government project in India that began on February 24, 2019. Its goal is to give financial assistance to small and marginal farmers countrywide. India's Finance Minister, Piyush Goya, launched the initiative in the 2019-20 Interim Budget (Prajapati, 2022). The scheme was first introduced in the Interim Budget of 2019-20 as a significant step to address the challenges faced by India's farming community. It was presented as a way to provide direct income support to farmers and alleviate rural distress (Sekhar, 2021; Wagh & Dongre, 2016).

Prime Minister Narendra Modi officially launched the PM-Kisan Yojana on February 24, 2019, at a farmers' rally in Gorakhpur, Uttar Pradesh. PM-Kisan's primary goal is to provide income support to disadvantaged and financially challenged farmers (Varshney et al., 2020). The program aims to supplement farmers' financial needs for purchasing inputs, seeds, and other vital resources to increase agricultural output. Initially, the effort targeted small and marginal farmers with up to two hectares of cultivable land. Later, the effort expanded to include all qualifying farmers, regardless of landholding size (ICAR Society, 2020).

The "Department of Agriculture, Cooperation & Farmers Welfare" implements the program under the "Ministry of Agriculture & Farmers Welfare". Farmers can register for the scheme through designated government offices or online portals. The

Indian government allocates funds annually to finance the PM-Kisan Yojana. The scheme's budgetary allocation has been periodically revised to accommodate changes in the number of beneficiaries and expanded eligibility criteria (Balkrishna et al., 2022). The "Pradhan Mantri Kisan Samman Nidhi Yojana" represents a significant policy initiative to address India's farming community's income challenges. It has played a role in providing direct financial assistance to millions of farmers across the country. It has been integral to the government's efforts to boost rural incomes and agricultural productivity (Agrawal et al., 2020).

This study's importance is that the PM-Kisan Yojana for the rural poor farmers, increasing the farmers' agriculture's food grain production. That contributes to the government tax revenue, where this scheme increases the farmer's and government's income it is a crucial part of the economy because, in India's scenario, the agriculture sector is the most important sector that plays in the economic development (Kavitha et al., 2020; Varshney et al., 2020). According to recent literature, most of the studies have been conducted using primary data in different states of India. These studies investigated the effect of "Pradhan Mantri Kisan Samman Nidhi Yojana" on farmers' income. Studies by Mariyono (2019a; 2019b) and Mariyono et al. (2020) also showed that microcredit provided and accessed by farmers improved agricultural sales (production) in the country. Several studies are available exploring this aspect of government schemes. However, there is a lack of secondary data evidence in the literature to evaluate PM-KISAN (Verma et al., 2022; Kumari & Dahiya, 2022). Moreover, there has been no study on how PM-KISAN (farmers registered and fund transfer) increases agriculture production and how agriculture production supports the government tax revenue. Most studies have been done on how PM-KISAN increases farmers' income. However, they do not examine how PM-KISAN increases agricultural production and impacts India's economic development. Hence, this study is conducted to investigate the PM-KISAN impact on agricultural production and the contribution of agriculture production to government tax revenue.

There are several schemes launched by the Indian government for the welfare of the farmers. The PM-Kisan Samman Nidhi Yojana is one of the most schemes among all. Therefore, this study's motivation is based on the government scheme PM-Kisan for Indian farmers, where the Indian farmers and agriculture sector significantly contribute to the economy. PM-Kisan Yojana is vital in increasing farmers' food grain production, contributing to the country's tax revenue. So the PM-Kisan yojana is an essential part of financial support that increases farmers' income and contributes to the Indian economy (Varshney et al., 2020). In the view of this scheme's benefiting agenda, this study assumes five main hypotheses to validate i.e., "Pradhan Mantri Kisan Samman Nidhi registered farmers significantly affect agriculture production", "PM-KISAN fund transferred to farmers is significantly affecting the agriculture production", "PM-KISAN farmers registered is significantly affecting the agriculture production under the influences of Infrastructure" and "PM-KISAN fund transferred to farmers is significantly affecting the agriculture production under the influences

of Infrastructure” and “Agriculture production is significantly affecting tax revenue”. A detailed discussion on development of these hypotheses is given in the literature review section.

The novelty of this study is that it explores how the PM-KISAN affects agriculture production and the agriculture production's impact on the country's tax revenue. This study utilizes secondary data from 21 Indian states between 2019 and 2022. The official website is from several sources, including reports from the “PM-Kisan Samman Nidhi” (PM-KISAN) and the “Reserve Bank of India” (RBI). This study uses the 21 Indian states data because all state data was not available so after filtering as per the balance panel data this study found 21 Indian states data. This study collected data from the financial year 2019 to 2022 because this scheme was launched on 1 February 2019, so this study uses this period for the study (Kumari & Dahiya, 2022). This study uses the panel data analysis for the regression result.

This study's implication is to contribute to the extended policy-making for the PM-Kisan yojana, where the government should increase the PM-Kisan yojana fund from time to time. This scheme fund will be based on the farmers' agricultural land holdings. And government should ensure the farmers are aware of this scheme and their benefits and how they can be a part of this scheme which can be helpful to reduce corruption and misuse of this scheme.

The first section of this study is the introduction and background. The second section is on theoretical framework and the third is on literature review and hypothesis development. The fourth section is on data and methodology. The fifth section is on discussion, contributions, and implications. The final section is on the conclusions and limitations of this study.

## 2. THEORETICAL FRAMEWORK

The “Pradhan Mantri Kisan Samman Nidhi” (PM-Kisan) Yojana is a major Indian government initiative that provides financial assistance to small and marginal farmers. While PM-Kisan's primary purpose is to give farmers economic aid, it may indirectly influence agricultural output and tax income (Varshney et al., 2020). This theoretical framework describes the essential aspects and procedures via which PM-Kisan might impact agricultural productivity and tax income. PM-Kisan offers qualified farmers direct income support and financial security. This money has the potential to improve agricultural productivity through a variety of avenues. Farmers may use more cash to invest in excellent seeds, fertilizers, and sophisticated equipment, increasing agricultural yields and productivity. This theoretical framework explains how the “Pradhan Mantri Kisan Samman Nidhi Yojana” might affect agricultural output and tax income (Ghatak, 2023). Empirical investigations, data analysis, and economic modeling are required to determine the real impact, considering the intricate interaction of components and contextual details. Evaluating the scheme's efficacy

in fostering agricultural growth and increasing tax income is critical for informed policymaking and long-term viability. There are many welfare schemes are launched by Government of India including “Pradhan Mantri Kisan Samman Nidhi Yojana”. However, its impact on agricultural production, tax revenue, and infrastructure is not yet empirically examined. Therefore, this study fills the existing research gaps by exploring the impact of this particular on agricultural production, tax revenue, and infrastructure.

### 3. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The literature review of the study is divided into three sections. The first section discusses PM-KISAN and agriculture production, the second discusses infrastructure and agriculture production, and the last discusses agriculture production and tax revenue.

#### 3.1. *PM-KISAN and Agriculture Production*

PM-KISAN is a government-funded project introduced in December 2018 to assist Indian farmers in purchasing agricultural inputs. The initiative pays 6000 rupees annually in three installments to farmers with less than 2 hectares of land. Since June 2019, the plan has been extended to all 140 million farmers in India. PM-KISAN aims to reduce Indian farmers' cash limitations by encouraging them to participate in productive activities. Cash transfers can assist in reducing credit and liquidity limitations while acquiring agricultural supplies, which is especially important in India. However, the influence of financial transfers on agriculture, particularly on technology uptake, remains understudied. PM-KISAN offers a natural experiment that investigates the effects of cash transfers on agricultural outputs (Verma et al., 2022). According to Haryana research, farmers who are elderly and have registered landholdings are more likely to participate in the initiative. Most benefit money goes on fertilizers, pesticides, and home consumption. According to Kumari and Dahiya (2022), the initiative has improved farmers' production and level of living.

PM-KISAN scheme was examined in Uttar Pradesh and Bihar using the primary data from 120 respondents. They found that the majority of the respondents felt that the PM-KISAN scheme had only a moderate effect in addressing their needs, whereas 50 percent of Bihar respondents expressed that this scheme was medium successful in terms of the benefit they received and 25 percent of respondents thought this scheme is highly impactful (Ghosh et al., 2023). Uttar Pradesh (22%) has been the most successful state in implementing the PMKISAN initiative for farmers, followed by Maharashtra (10.2%) and Madhya Pradesh (7.2%). However, Manipur, Punjab,

Andaman and Nicobar Islands, Assam, and Haryana score high, whereas Sikkim, Goa, Lakshadweep, Puducherry, Tripura, and Bihar rank last (Kavitha et al., 2020).

After studying the recent literature, this study assumed two hypotheses mentioned below, under the PM-KISAN scheme and agriculture production.

**H<sub>1</sub>:** *Pradhan Mantri Kisan Samman Nidhi registered farmers significantly affect agriculture production.*

**H<sub>2</sub>:** *PM-KISAN fund transferred to farmers is significantly affecting the agriculture production.*

### 3.2. Infrastructure and Agriculture Production

The Indian government has implemented various agricultural reforms to improve farmers' livelihoods and boost the economy. These include the Kisan Credit Card, Soil Health Card, PMKSY, PMFBY, and neem-coated urea. Market changes, including the Farmers' Produce Trade and Commerce Act, the Farmers (Empowerment & Protection) Agreement on Price Assurance and Farm Services Act, and amendments to the Essential Commodities Act, have been implemented to increase farmer income, reduce price risk, and strengthen agricultural supply systems. Artificial intelligence and Smart Krishi have also been used to address farmers' problems and improve their livelihoods (Tripathi et al., 2023).

The Indian Parliament's recent farm laws have sparked debate on public support for farming, focusing on price support, income stabilization, fair trade, and government role. The government and state governments have launched programs, including an ambitious price support program and a direct income support program (Kavitha et al., 2020). A study analyzed these programs, finding direct income transfers have advantages over MSP-procurement systems. A judicious policy mix may be needed for food security (Kumar et al., 2023). The Indian Parliament's farm laws have sparked debate on public support for farming, with government and state governments launching programs like direct income transfers, suggesting a judicious policy mix for food security. The Indian government's PM-KISAN initiative provides financial support to qualified farmers (Bhadwal & Kumar, 2022). According to research conducted in Haryana's Jhajjar area, farmers who are elderly and have registered landholdings are more inclined to accept the system. Most benefit money is spent on fertilizer, pesticides, and household necessities. The initiative has raised farmers' living conditions and production (Kumari & Dahiya, 2022).

As per the previous study, this study assumed the two hypotheses mentioned below that are examined in this study.

**H3:** *PM-KISAN farmers registered is significantly affecting the agriculture production under the influences of Infrastructure.*

**H4:** *PM-KISAN fund transferred to farmers is significantly affecting the agriculture production under the influences of Infrastructure.*

### 3.3. Agriculture Production and Tax Revenue

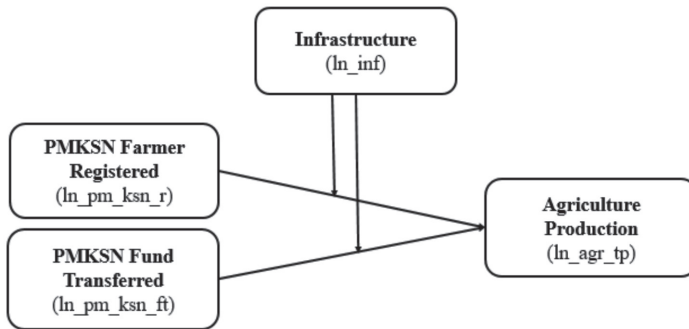
India's agriculture industry, one of the world's largest, is facing socioeconomic issues such as low income, excessive debt, and suicides. Research that examined data from the Cost of Cultivation Survey and the Situation Assessment of Farmers discovered low and unpredictable agricultural revenue (Lakdawala, 1975). A mere increase in the minimum support price is insufficient to boost income. The research offers short- and long-term initiatives to reform India's agricultural tax framework, emphasizing under-taxation and intersectoral unfairness. While land revenue is warranted, most changes do not resolve faults. This study investigates the influence of agriculture's sectoral contribution on revenue across nations and reviews the literature on land-based agricultural taxes (Rajaraman, 2004). It proposes a viable crop-specific charge design tailored to the skill levels of local governments in developing nations, as well as granting local governments land taxation rights. The study also investigates the Indian experience with agricultural taxes (Narayanamoorthy, 2017).

The Indian agricultural sector, which contributes 13.9% to the country's GDP, faces challenges and obstacles in developing in critical uncontrollable environments. The "Department of Agriculture and Cooperation" reports to the "Ministry of Agriculture" and is in charge of developing this sector. The Central Government has launched the "Pradhan Mantri Kisan Samman Nidhi" (PM-KISAN) project, which provides income support to marginal and small farmers. Each farmer earns INR 6000 annually in three installments of INR 2000. The government has budgeted INR 750 billion for 2019–20. The study aims to assess the PM-KISAN scheme's economic impact and compare it to a fertilizer subsidy program. The findings indicate that the PM-KISAN plan has a strong positive additional impact on farmer income and agricultural sector growth (Sharma, 2019).

Based on the recent literature, this study assumes the hypothesis mentioned below.

**H5:** *Agriculture production is significantly affecting tax revenue.*

**Figure 1.** Conceptual Model 1



Source: Author's compliance

**Figure 2.** Conceptual Model 2



Source: Author's compliance

## 4. DATA AND RESEARCH METHODOLOGY

### 4.1. Data

This analysis employs secondary data from 21 Indian states covering the fiscal years 2019-2022. The sample was chosen to reflect agricultural production and tax revenue and unearth fresh evidence based on newly available data with enough observations to produce reliable results. The data is gathered from a variety of sources, including reports from the “PM-Kisan Samman Nidhi” (PM-KISAN) and the “Reserve Bank of India” (RBI). The sample period is reasonable as it captures the evolving landscape of Indian agriculture and various economic policies. The 21 states are taken into consideration as of having authenticated data of 21 states only. Table 1 has an explanation of all of the variables for which the data collected and data sources used.

**Table 1.** Variables Definition

<b>Variable</b>	<b>Type</b>	<b>Definition</b>	<b>Citation</b>
<b>In_pm_ksn_r</b> (PM-KISAN Farmer Registered)	IV	PM-KISAN Farmer Registered refers to persons who successfully enlisted in India's "Pradhan Mantri Kisan Samman Nidhi" (PM-Kisan) scheme. These registered farmers meet specific eligibility criteria and provide necessary information, enabling them to receive financial assistance and support from the government to enhance their agricultural livelihoods.	Kumari and Dahiya, (2022); Kavitha et al., (2020)
<b>In_pm_ksn_ft</b> (PM-KISAN Fund Transferred)	IV	PM-KISAN Fund Transferred is the process of distributing financial assistance to registered beneficiaries of the "Pradhan Mantri Kisan Samman Nidhi" (PM-Kisan) Yojana. The government electronically deposits monies directly into qualified farmers' bank accounts to support income and improve agricultural well-being.	Kumari and Dahiya, (2022); Kavitha et al., (2020)
<b>In_inf</b> (Infrastructure)	MV	Infrastructure for farmers comprises facilities and systems designed to support agricultural activities. This includes irrigation systems, storage facilities, transportation networks, roads, and markets. Such infrastructure enhances farmers' access to resources, improves the efficiency of agricultural production, and aids in the distribution of agricultural products to markets.	PIB Delhi, (21, Dec 2021)
<b>In_agr_tp</b> (Production of Total Food grains)	DV	Production of Total Foodgrains The production of total food grains represents the aggregate output of staple crops, including cereals and pulses, within a specific geographical area or nation during a defined period, typically measured in metric tons. It is a crucial metric for assessing a region's food security and agricultural productivity.	Kumari et al., (2020)
<b>In_tr</b> (Tax Revenue)	DV	Tax revenue from agricultural production refers to the income generated by government authorities through various forms of taxation related to the agricultural sector. This revenue can be collected from taxes on agricultural income, land, sales of agricultural products, and other related activities. It contributes to government funding for public services and development projects.	Bird, (1974)
<b>In_infl</b> (Inflation)	CV	Inflation is an economic phenomenon characterized by a long-term increase in the overall price level of goods and services within an economy. It reduces the purchasing power of a currency, resulting in a drop in the actual worth of money, and can have various economic and social consequences.	Baltagi, (2008)

<b>ln_unemp</b> (Unemployment)	CV	Unemployment is a socio-economic condition characterized by working-age individuals actively seeking employment but not securing jobs. It reflects the absence of gainful work opportunities and can lead to economic and social challenges, including financial instability and reduced living standards.	Oner, (2017)
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Note: DV is Dependent Variable, IV is Independent Variable, MV is Moderating Variable, CV is Control Variable.

Source: Author's own compilation

## 4.2. Research Methodology

This study employs a quantitative approach with secondary data. To evaluate the framed hypotheses, the data design utilizes panel data regression analysis (PDRA) (which incorporates both cross-sectional and temporal dimensions). The PDRA employs states and UTs as cross-sectional units, with four years as temporal dimensions (2019-2022). Furthermore, PDRA models provide advantages over traditional cross-sectional or time-series analysis (Hsiao, 2007; Baltagi, 2008; Gautam et al., 2022, October). PDRA models provide more information than others since they include temporal and cross-sectional units. These models are also less susceptible to endogeneity issues. Thus, PDRA produces impartial results (Hsiao, 2007; Baltagi, 2008; Gautam et al., 2022, October). Four models have been constructed, including three base models (Models 1, 2, 5, and 6) and two interaction models (Models 3 and 4), using static PDRA models. As per the theoretical framework discussed in literature review and the concerned methodology, Static models are justified because they address the endogeneity issue using “ivregress” and the lag connection of the dependent variable, providing long-term insights into sustainable growth. The model specs are provided as follows:

$$\ln\_agr\_tp_{it} = \beta_1 \ln\_pm\_ksn\_r_{it} + \beta_2 \ln\_infl_{it} + \beta_3 \ln\_unemp_{it} + u_{it} \quad (1)$$

$$\ln\_agr\_tp_{it} = \beta_1 \ln\_pm\_ksn\_ft_{it} + \beta_2 \ln\_infl_{it} + \beta_3 \ln\_unemp_{it} + u_{it} \quad (2)$$

$$\ln\_agr\_tp_{it} = \beta_1 \ln\_pm\_ksn\_r_{it} + \beta_2 \ln\_infl_{it} + \beta_3 i\_lnpm\_ksn\_r\_ln\_infl_{it} + \beta_4 \ln\_infl_{it} + \beta_5 \ln\_unemp_{it} + u_{it} \quad (3)$$

$$\ln\_agr\_tp_{it} = \beta_1 \ln\_pm\_ksn\_ft_{it} + \beta_2 \ln\_infl_{it} + \beta_3 i\_lnpm\_ksn\_ft\_ln\_infl_{it} + \beta_4 \ln\_infl_{it} + \beta_5 \ln\_unemp_{it} + u_{it} \quad (4)$$

$$\ln\_tr_{it} = \beta_1 \ln\_agr\_tpr_{it} + \beta_2 \ln\_infl_{it} + \beta_3 \ln\_unemp_{it} + u_{it} \quad (5)$$

Models 1, 2, 3, 4, 5, are based on Eq.1, 2, 3, 4, and 5. In Eq. 1, 2, 3, and 4, the  $\ln\_agr\_tp$  is the dependent variable. ‘IV’ is the independent variable representing  $\ln\_pm\_ksn\_r$ ,  $\ln\_pm\_ksn\_ft$ . ‘MV’ is the moderating variable representing  $\ln\_infl$ . ‘CV’ is the control variable representing  $\ln\_infl$ ,  $\ln\_unemp$ . In model 5 or Eq. 5, the ‘DV’

dependent variable represents  $\ln\_tr$ . 'IV' is the independent variable representing  $\ln\_agr\_tp$ . 'CV' is the control variable representing  $\ln\_infl$ ,  $\ln\_unemp$ .

$\ln\_pm\_ksn\_r$  and  $\ln\_pm\_ksn\_ft$  are two independent variables is PM-KISAN farmers registered and fund transferred in the Indian states.  $i\_lnpm\_ksn\_r\_lninf$  and  $i\_lnpm\_ksn\_ft\_lninf$  (i.e.,  $i\_lnpm\_ksn\_r \times lninf$ ,  $i\_lnpm\_ksn\_ft \times lninf$ ) are two interaction variables with  $lninf$  (Infrastructure) as moderator. In addition,  $\ln\_infl$  and  $\ln\_unemp$  (natural log value of rural population) are used as control variables to ensure the model fits well. The 'ln' prefix in a variable indicates that it utilizes log values to handle multicollinearity and extreme values. 'it' indicates panel data, where 'i' stands for cross-section (states) and 't' for time (year). ' $uit$ ' is a residual that equals the sum of regular error ( $vit$ ) and individual effect ( $uit$ ).

## 5. RESULTS

### 5.1. Statistics Summary

In Table 2, the mean values for  $\ln\_tr$ ,  $\ln\_pm\_ksn\_r$ , and  $\ln\_pm\_ksn\_ft$  are 9.98, 14.52, and 12.67, respectively, with a little tendency toward low. This statistic demonstrates that overall revenue, registered farmers under PM Kisan Nidhi, and money transferred in India are below average. The minor standard deviation (SD) number indicates that sample states are not significantly different; hence, they have comparable statuses. The mean values for  $\ln\_inf$  and  $\ln\_agr\_tp$  are 0.56 and 1.99, respectively. However, both values are trending downward towards Min. As a result, it shows that, on average,  $\ln\_inf$ ,  $\ln\_agr\_tp$  expenditure is significantly low in India. The remarkably large value of SD indicates that states and UTs differ in  $i\_lnpm\_ksn\_r\_lninf$  and  $i\_lnpm\_ksn\_ft\_lninf$  by 99.69 and 87.42 standard deviations, respectively. It is Max. Hence, the Pm Kisan Samman Nidhi with the moderation of agriculture infrastructure in India is more than moderate level. ' $\ln\_infl$ ' and ' $\ln\_unemp$ ' with a mean value of 1.49 and 3.57. The lower SD of  $\ln\_infl$  and  $\ln\_unemp$  shows lesser variations between states.

**Table 2.** Descriptive Statistics

Variables	Mean	SD	Min	Max
$\ln\_pm\_ksn\_r$	14.52298	1.986649	9.383901	17.15873
$\ln\_pm\_ksn\_ft$	12.67321	4.044531	0	16.97454
$\ln\_inf$	6.88371	0.566895	5.660527	7.998268
$\ln\_agr\_tp$	8.214472	1.992513	4.337291	10.97004
$i\_lnpm\_ksn\_r\_lninf$	99.69878	14.50638	67.61719	118.9329

i_Inpm_ksn_ft_Ininf	87.42477	28.44571	0	116.824
ln_tr	9.98281	1.530344	6.495266	12.14921
ln_infl	1.490134	0.52476	-0.69315	2.332144
ln_unemp	3.577382	0.658027	1.609438	4.624973

Note: Mean, SD, Min, and Max represent mean value, standard deviation, minimum, and maximum, respectively. “ln\_infl” represents infrastructure and “ln\_infl” represents inflation.

Source: Author’s own compilation

## 5.2. Multicollinearity and Endogeneity

Table 3 shows that many pairs of explanatory variables have a substantial association. The greatest significant correlation coefficient between the interaction terms is 0.7096. The correlation matrix also shows no correlation coefficient with a value greater than 0.800. While the interaction variable has multicollinearity difficulties, it is structural multicollinearity so that we may examine it. As a result, the variables do not exhibit multicollinearity (Wooldridge, 2015; Baltagi, 2008).

**Table 3.** Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ln_pm_ksn_r (1)	1.0000							
ln_pm_ksn_ft (2)	0.4798*	1.0000						
ln_infl (3)	-0.2465	0.0825	1.0000					
i_Inpm_ksn_r_ lninf (4)	0.8351*	0.5131*	0.3204*	1.0000				
i_Inpm_ksn_ ft_Ininf (5)	0.4219*	0.9651*	0.3326*	0.6005*	1.0000			
ln_agr_tp (6)	0.8903*	0.3550*	-0.1073	0.7928*	0.3344*	1.0000		
ln_infl (7)	0.025	0.0548	-0.1682	-0.0745	0.0137	0.0266	1.0000	
ln_unemp (8)	0.01	0.0333	-0.0179	-0.0449	0.0077	-0.0199	-0.1367	1.0000

Note: \* represents a significant correlation coefficient at 0.05.

Source: Author’s own compilation

Furthermore, endogeneity is found using two famous tests (Durbin Ch2 and Wu-Hausman). These tests are conducted with lag 3 values as instrument variables (Pushp et al., 2023; Wooldridge, 2015). Table 4 shows that both tests have significant values at the 5% significance level in interaction model 3 (Model 3). Thus, the explanatory

factors are discovered to be endogenous. Thus, the instrument variable (ivregress) was employed to address the endogeneity issue.

**Table 4.** Endogeneity Test

	<b>Model 1</b> (ln_pm_ksn_r)	<b>Model 2</b> (ln_pm_ksn_ft)	<b>Model 3</b> (i_pm_ksn_r_inf)	<b>Model 4</b> (i_pm_ksn_ft_inf)	<b>Model 5</b> (ln_agr_tp)
Durbin Chi-2	.919358 (0.3376)	1.42562 (0.2325)	8.22015 (0.0041)	2.42532 (0.1194)	.116442 (0.7329)
Wu-Hausman Test	.839674 (0.3646)	1.31621 (0.2576)	8.47228 (0.0058)	2.18187 (0.1473)	.105888 (0.7463)

Note: The value in () is the p-value, while \* indicates a significant value at the 5% level.

Source: Author's own compilation

### 5.3. Results of regression analysis

Tables 5 and 6 show the regression results for all five models. A static model method is used to test the assumptions. The BP and Hausman tests verify that fixed or random effects are determined. Because all models have negligible Hausman test results, this study uses random effects in all five models. We used the Wald test for heteroscedasticity and the Wooldridge test for autocorrelation at a 5% significance level and robust standard error. Thus, using these models for regression analysis of sample data is consistent.

In Table 5, 'ln\_pm\_ksn\_r' and ln\_pm\_ksn\_ft in Models 1 and 2 are significant and positive with coefficient values of .893 and .173, respectively, at significance at 5%. Hence, PM Kisan Samman Nidhi, registered farmers, and funds transferred are improving agriculture's total production. And the Interaction terms (i.e., i\_lnpm\_ksn\_r\_lninfl and i\_lnpm\_ksn\_ft\_lninfl) are model 3 is insignificant at 5% which means the registered farmers are not affecting total agriculture production at higher rural infrastructure. Therefore, it indicates that total Kisan Samman Nidhi, registered farmers are not affecting agriculture production when rural infrastructure is moderating. Model 4 is positive and significant, 5%. Where the funds transferred enhance total agriculture production at higher rural infrastructure. The control variable inflation (ln\_infl) is insignificant in models 1, 2, and 3 and insignificant in model 4, unemployment (ln\_unemp) is insignificant in models 1 and 2, and models 3 and 4 are insignificant.

**Table 5.** Regression Result for Base and Interaction Model (Static Model)

DV: <i>ln_agr_tp</i>	Model 1 (Base Model)		Model 2 (Robust Base Model)		Model 3 (Interaction Model)		Model 4 (Interaction Model)	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
<i>ln_pm_ksn_r</i>	.893*	.059			-3.235	4.306		
<i>ln_pm_ksn_ft</i>			.175*	.014			-3.042*	.787
<i>ln_inf</i>					-7.641	8.538	-6.704*	1.556
<i>i_lnpm_ksn_r_lninf</i>					.586	.604		
<i>i_lnpm_ksn_ft_lninf</i>							.485*	.118
<i>ln_infl</i>	.001	.226	.010	.227	.273	.557	-.142	.403
<i>ln_unemp</i>	-.086	.180	-.094	.149	.616	.764	.283	.331
cons	-4.449*	1.148	6.316*	.391	46.850	58.099	49.692	10.160
BP-test (Random effect)	0.00 (1.0000)		0.00 (1.0000)		0.00 (1.0000)		0.00 (1.0000)	
Hausman Test	0.18 (0.9808)		0.88 (0.8306)		0.12 (0.9997)		0.74 (0.9808)	
Wald test for Heteroscedasticity <sup>1</sup>	0.25 (0.9691)		0.02 (0.9990)				0.65 (0.8852)	
F- test								
Chi- square	8.58* (0.0354)				97.19* (0.0000)		30.54* (0.0000)	
Wooldridge Autocorrelation Test <sup>2</sup> AR (1)	0.031 (0.8767)		254.644* (0.0039)				13.664 (0.0660)	

Note: The Wald test for heteroscedasticity comprises a null hypothesis of no heteroscedasticity. The null hypothesis for the Wooldridge autocorrelation test in panels is no autocorrelation (with one lag). Significant heteroscedasticity and autocorrelation lead to robust estimates. DV equals *ln\_agr\_tp* (agriculture production). \*Sig at 5%. “*ln\_inf*” represents infrastructure and “*ln\_infl*” represents inflation. The models 1, 2, 3, and 4 result based on Conceptual Model 1.  
Source: Author’s own compilation

In Table 6, ‘*ln\_agr\_tp*’ in Models 5 are significant and positive with coefficient values of .674 respectively, at significance at 5%. Hence, total agriculture production is positively increasing tax revenue. Therefore, the PM-KISAN supports the country’s farmers’ income and tax revenue. The control variable inflation (*ln\_infl*) is insignificant in model 6, And unemployment (*ln\_unemp*) is significant in model 6.

**Table 6.** Regression Result for Base Model (Static Model)

DV: ln_tr	Model 5	
	Coeff.	S.E.
ln_agr_tp	.674*	.046
ln_infl	.108	.177
ln_unemp	.312*	.141
cons	3.162*	.717
BP-test (Random effect)	0.00 (1.0000)	
Hausman Test	0.01 (0.9996)	
Wald test for Heteroscedasticity <sup>1</sup>	0.25 (0.9690)	
Chi- square	217.26* (0.0000)	
Wooldridge Autocorrelation Test <sup>2</sup> AR (1)	77.715* (0.0126)	

Note: As per Table 5. And the model 5 result based on Conceptual Model 2.

Source: Author's own compilation

## 6. DISCUSSION AND POLICY IMPLICATION

### 6.1. Findings

This study assumes five hypotheses (H1, H2, H3, H4, and H5) of the study after reviewing the literature. The first and second hypotheses are “Pradhan Mantri Kisan Samman Nidhi” farmers registered and fund transferred significantly affecting the agriculture production, as per the statistical results (in model 1 and model 2) these hypotheses (H1 and H2) cannot be rejected. The third and fourth hypotheses are that PM-KISAN farmers registered and fund transferred significantly affect agriculture production under infrastructure influences. As per the statistical results (in model 3), this hypothesis H3 is rejected, one reason could be that that registered farmers are only registered. They might not be benefitted or aware of the scheme. The fourth hypothesis cannot be rejected as per the statistical result in model 4, which means the PM-KISAN fund transferred is increasing the agricultural production at higher rural infrastructure. And fifth hypothesis is that agricultural production significantly affects tax revenue and as per the statistical findings (in model 5) this hypothesis cannot be rejected. That means the agricultural production is contributing to the tax revenue that's support Indian economic growth.

## 6.2. Comparison with previous studies

There are many studies on the welfare schemes for farmers in India. However, the existing studies are much oriented to primary studies. Studies based on secondary data are quite less. The current findings are compared with the previous literature in terms of findings. Verma et al. (2022), Kumari & Dahiya (2022) and Varshney et al. (2020) have explored PM-KISAN schemes potential. These studies are positively supporting the current study's result. Some studies' results such as Kavitha et al. (2020) are bit different in states like Goa and Sikkim. It is very helpful for purchasing farming-related materials, but the problem is that the amount is very low when the farmer has more landholdings, so this scheme should be extended. This study explored the PM-KISAN scheme's support to enhance agriculture production with the support of the rural infrastructure. This agricultural production also contributes to the tax revenue of the country. The government is expanding the fund through the PM-KISAN, indirectly increasing the country's economic development. These findings also support Tripathi et al (2023), Bhadwal and Kumar (2022), Rajaraman (2004) and Sharma (2019).

## 6.3. Contribution and policy implications

This study explored the PM-KISAN scheme playing a vital role in increasing agriculture production and this agriculture production is also significantly affecting the tax revenue to the country. To explore this problem this study used secondary data that was collected from 21 Indian states official websites. Moreover, this study used the panel data econometrics methodology to explore the result. As per the findings of this study, the following policy implications are given. The government should increase the funds as per the farmers' landholding, which can be increased from time to time as per inflation. The PM-KISAN scheme provider regional offices and banks NGO should provide knowledge about the scheme which can help to the farmer's inclusion of the services and it also protects from micro corruption (Gautam et al., 2022).

## 7. CONCLUSION AND LIMITATIONS

This study investigates how registered farmers and fund transfers to the farmers under the "Pradhan Mantri Kisan Samman Nidhi Yojana" are increasing agricultural production under the moderation of rural infrastructure. Moreover, examine how agricultural production is increasing tax revenue. This study concludes that the "Pradhan Mantri Kisan Samman Nidhi Yojana" significantly contributes to agriculture production and tax revenue. This scheme plays a vital role in farmers' and agriculture production. The findings give policy implications that the government should provide funds according to the farmers' land holdings, and the government should increase

from time to time as per inflation. This study uniquely contributes to the literature by providing novel insights on the PM-KISAN based on secondary data.

This study utilized secondary data from the 21 Indian states and the data was considered for four financial years that is 2019 to 2022, because the PM-KISAN was first introduced in 2019. This study explores the PM-KISAN impact on agriculture production and tax revenue in India. The study comes with the limitations on missing several states and UTs. It only provides the comprehensive insights. Hence, future studies can use primary data and can cover all states and union territories in India and international studies can be employed. Furthermore, specific states should also be studied for the benefit of such schemes in India.

## BIBLIOGRAPHY

Agrawal, H., Menon, S., Misra, P., Sippy, T., Srinivasan, S., Tandel, V., & Vedavalli, P. (2020). *PM Garib Kalyan Yojana: coverage, identification and implementation*. IDFC Institute. <https://artha.global/working-paper/pm-garib-kalyan-yojana-coverage-identification-and-implementation/>

Akerlof, G. A., Dickens, W. T., Perry, G. L., Gordon, R. J., & Mankiw, N. G. (1996). The macroeconomics of low inflation. *Brookings papers on economic activity*, 1996(1), 1-76. <https://doi.org/10.2307/2534646>

Balkrishna, A., Kumar, A., Arya, V., Sharma, G., Srivastava, D., Sharma, A., & Khan, N. (2022). Situational Analysis of Government Initiatives for the Welfare of Farmers in India: Impact and Futuristic Insights. *Indian Journal of Ecology*, 49(3), 1023-1035. <https://doi.org/10.55362/IJE/2022/3630>

Baltagi, B. H. (2008). *Econometric analysis of panel data*. Rohn Wiley.

Bhadwal, S., & Kumar, V. (2022). Fund Utilization Pattern of PM-KISAN Beneficiaries. *Journal of Krishi Vigyan*, 11(1), 185-191. <https://doi.org/10.5958/2349-4433.2022.00127.1>

Bird, R. M. (1974). Agricultural taxation in developing countries. *Finance and Development*, 11(3), 34. <https://www.proquest.com/openview/74af4e129ee9891bdco56b4726ddc650/1?pq-origsite=gscholar&cbl=1819673>

Gautam, R. S., Rawal, A., & Rastogi, S. (2022, October). Financial literacy and its impact on sustainable development of India using Internet subscribers as moderator. In 2022 *International Conference on Sustainable Islamic Business and Finance (SIBF)* (pp. 187-191). IEEE. <https://doi.org/10.1109/SIBF56821.2022.9939760>

Ghatak, M. (2024). Direct transfer policies for the poor. *Journal of Social and Economic Development*, 26(Suppl 1), 17-27. <https://doi.org/10.1007/s40847-023-00306-4>

Ghosh, B., Burman, R. R., Padaria, R. N., Mahra, G. S., Kumar, P., Bhowmik, A., & Paul, S. (2023). Effectiveness of cash transfer under the PM-Kisan scheme of Government of India in benefitting the small and marginal farmers by providing income support. *Journal of Community Mobilization and Sustainable Development*, 18(1), 12-18.

Hsiao, C. (2007). Panel data analysis—advantages and challenges. *Test*, 16(1), 1-22. <https://doi.org/10.1007/s11749-007-0046-x>

ICAR Society. (2020). ICAR Annual Report 2019–20. In *icar.org.in*. ICAR. <https://icar.org.in/sites/default/files/2022-09/AR-2019-20.pdf>

Kavitha, H. N., Kumar, P., Anbukkani, P., Burman, R. R., Venkatesh, P., Jha, G. K., & Prakash, P. (2020). Performance of universal basic income programme in India: A case of PM-KISAN Scheme. *Indian Journal of Extension Education*, 56(3), 1-8. <https://doi.org/10.5958/2454-552X.2020.00001.8>

Kumar, R., Raman, M. S., & Chauhan, S. (2023). Agricultural reforms in India. In P. K. Ghosh, A. Das, R. Saxena, K. Banerjee, G. Kar, & D. Vijay (Eds.), *Trajectory of 75 years of Indian Agriculture after Independence* (pp. 775-790). Singapore: Springer Nature Singapore. [https://doi.org/10.1007/978-981-19-7997-2\\_30](https://doi.org/10.1007/978-981-19-7997-2_30)

Kumari, N., Mehta, V. P., & Bhatia, J. K. (2020). Foodgrains production in India: Trend and decompositions analysis. *Economic Affairs*, 65(3), 333-342. <https://doi.org/10.46852/0424-2513.3.2020.3>

Kumari, P., & Dahiya, S. (2022). Determinants of adoption of PM-KISAN scheme: empirical evidence from Jhajjar district in Haryana. *Journal of Rural Development*, 41(4), 510-522. <https://doi.org/10.25175/jrd/2022/v41/i4/166259>

Lakdawala, D. T. (1975). Direct Taxation of Agriculture. *Indian Journal of Agricultural Economics*, 30(1), 1-15. <https://ageconsearch.umn.edu/record/268104/files/02%20Supplement.pdf>

Mariyono, J. (2019a). Micro-credit as catalyst for improving rural livelihoods through agribusiness sector in Indonesia. *Journal of Entrepreneurship in Emerging Economies*, 11(1), 98-121. <https://doi.org/10.1108/JEEE-06-2017-0046>

Mariyono, J. (2019b). Microcredit and technology adoption: Sustained pathways to improve farmers' prosperity in Indonesia. *Agricultural Finance Review*, 79(1), 85-106. <https://doi.org/10.1108/AFR-05-2017-0033>

Mariyono, J., Waskito, J., Kuntariningsih, A., Gunistiyo, & Sumarno. (2020). Distribution channels of vegetable industry in Indonesia: impact on business performance. *International Journal of Productivity and Performance Management*, 69(5), 963-987. <https://doi.org/10.1108/IJPPM-11-2018-0382>

Narayanamoorthy, A. (2017). Farm income in India: Myths and realities. *Indian Journal of Agricultural Economics*, 72(1), 49-75. <https://ageconsearch.umn.edu/record/302245/files/08-Keynote-Narayanamoorthy.pdf>

Oner, C. (2020). Unemployment: The curse of joblessness. In International Monetary Fund, *Back to Basics: Economic Concepts Explained* (pp. 1-81). International Monetary Fund. [https://books.google.co.in/books?hl=en&lr=&id=zBeWDwAAQBAJ&oi=fnd&pg=PA32&dq=Oner,+C.+\(2017\).+%E2%80%9CUnemployment:+The+Curse+of+Joblessness%E2%80%9D,+BASICS,+32.&ots=n85KrsdQ43&sig=IoULOTZpNmaK9gFrAhuensFBWqE&redir\\_esc=y#v=onepage&q&f=false](https://books.google.co.in/books?hl=en&lr=&id=zBeWDwAAQBAJ&oi=fnd&pg=PA32&dq=Oner,+C.+(2017).+%E2%80%9CUnemployment:+The+Curse+of+Joblessness%E2%80%9D,+BASICS,+32.&ots=n85KrsdQ43&sig=IoULOTZpNmaK9gFrAhuensFBWqE&redir_esc=y#v=onepage&q&f=false)

PIB Delhi, (21 Dec 2021). Role of Agricultural Infrastructure. *Press Information Bureau, Government of India, Ministry of Agriculture & Farmers Welfare*. <https://pib.gov.in/Pressreleaseshare.aspx?PRID=1783870>

Prajapati, K. B. (2022). Agriculture Development and Government Support. *IAHRW International Journal of Social Sciences Review*, 10(3), 382–384. <https://www.proquest.com/docview/2723856801?pq-origsite=gscholar&fromopenview=true&sourcetype=Scholarly%20Journals>

- Pushp, A., Gautam, R. S., Tripathi, V., Kanoujiya, J., Rastogi, S., Bhimavarapu, V. M., & Parashar, N. (2023). Impact of financial inclusion on India's economic development under the moderating effect of internet subscribers. *Journal of Risk and Financial Management*, 16(5), 262. <https://doi.org/10.3390/jrfm16050262>
- Rajaraman, I. (2004). Taxing agriculture in a developing country: A possible approach. In J. R. Alm, J. Martinez-Vazquez, & S. Wallace (Eds.), *Contributions to economic analysis: Taxing the Hard-to-tax: Lessons from Theory and Practice* (pp. 245-268). Emerald Group Publishing Limited. [https://doi.org/10.1016/S0573-8555\(04\)68812-2](https://doi.org/10.1016/S0573-8555(04)68812-2)
- Sekhar, C. S. C. (2021). *Price or income support to farmers? Policy options and implications*. Institute of Economic Growth. Washington: World Bank IEG Policy Paper, 420. <https://ideas.repec.org/p/awe/wpaper/420.html>
- Sharma, A. K. (2019). Macro-economic impact of income support programme for farmers in India. *Journal of Income & Wealth (The)*, 41(1), 177-187.
- Tripathi, G., Dhodia, A., Giri, A., Rathore, V., Verma, A., Shukla, A., & Verma, L. K. (2023). Government agriculture schemes in India: a review. *Asian Journal of Agricultural Extension, Economics & Sociology*, 41(11), 58-67. <https://doi.org/10.9734/ajaees/2023/v41i112261>
- Varshney, D., Joshi, P. K., Roy, D., & Kumar, A. (2020). PM-KISAN and the adoption of modern agricultural technologies. *Economic and Political Weekly*, 55(23). <https://www.epw.in/journal/2020/23/special-articles/pm-kisan-and-adoption-modern-agricultural.html>
- Verma, A., Singh, S. P., Kachroo, J., Jeelani, M. I., Kumar, S. S., Sharma, P., Bhagat, G., & Singh, M. (2022). An economic analysis of fund utilization by different categories of beneficiary farmers under PM-KISAN scheme in Jammu Region of J&K (UT). *The Pharma Innovation Journal*, 11(6), 3050-3055. <https://www.thepharmajournal.com/special-issue?year=2022&vol=11&issue=6S&ArticleId=13876>
- Wagh, R., & Dongre, A. P. (2016). Agricultural sector: status, challenges and it's role in Indian economy. *Journal of Commerce and Management Thought*, 7(2), 209-218. <https://doi.org/10.5958/0976-478X.2016.00014.8>
- Wooldridge, J. M. (2015). Control function methods in applied econometrics. *Journal of Human Resources*, 50(2), 420-445. <https://doi.org/10.3368/jhr.50.2.420>