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Modelling the Drivers of Income Shocks Among Civil Servant Farming Households in Southwest Nigeria

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ABSTRACT

This study examined the determinants of income shocks among farming civil servant households in Southwest Nigeria. Using a multistage sampling technique, 360 respondents were selected, and data were analyzed through descriptive statistics and a Probit regression model. Findings revealed that inconsistent salary payments were the primary source of income shocks, with 86.4% of respondents reporting irregular salary disbursements. Despite this, the overall impact on households was moderated, indicating the presence of coping mechanisms or supplementary income sources. The Probit regression analysis identified inconsistent salary payments ($p < 0.05$), shortage of rainfall ($p < 0.05$), high cost of improved crop varieties ($p < 0.01$), and high cost of fertilizer ($p < 0.01$) as significant determinants of income shocks. Based on these findings, the study recommends policies to ensure timely and consistent salary payments, guarantee access to subsidized farm inputs, promote climate-smart agricultural practices, and expand access to credit and insurance for civil servant farmers. Additionally, livelihood diversification should be encouraged to reduce dependence on a single income source. Implementing these measures would stabilize household income, enhance agricultural productivity, and reduce the vulnerability of civil servant farming households to income shocks.

1. Introduction

Nigeria has experienced periods of robust economic growth, averaging 7.4% between 2010 and 2019 (World Bank, 2019). However, the oil price collapse of 2014–2016, coupled with negative production shocks, caused GDP growth to decline to 2.7% in 2015. In 2016, the country experienced its first recession in 25 years, with economic contraction of 1.6%. Despite growth periods, approximately 43% of Nigerians (89 million people) live below the poverty line. Globally, over two billion people live on less than US$2 per day, with 1.2 billion living on less than US$1 per day (World Bank, 2001). By 2010, 1.4 billion people had consumption below $1.25 per day, with Sub-Saharan Africa accounting for 388 million of this population (Global Monitoring Report, 2012).

Rural areas, where about 70% of Africans reside, host roughly 80% of the continent's poor, who rely predominantly on agriculture for livelihoods (Nchuchuwe & Adejuwon, 2012). Many rural households diversify into other activities such as trading, civil service, and small-scale enterprises to mitigate income

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irregularities. Income shocks—events causing substantial reductions in household welfare—can trigger food insecurity, affecting health, nutrition, and overall well-being (World Bank, 2010). Economically, shocks may result in income or asset loss, while socially, they may cause stress, grief, or other

Income shocks are also linked to broader social instability. Blattman and Miguel (2010) identify income shocks as potential drivers of civil unrest, strikes, and conflicts, although their effects vary by context. Rural farming households are particularly vulnerable to ecological shocks, including drought, flooding, crop pests, and livestock diseases, which reduce agricultural output and household income (Pandey et al., 2007; Tongruksawattana et al., 2010). They are also exposed to health shocks, such as illness and death among household members, which further diminish well-being (Rasmus & Lund, 2009).

Households that are net consumers of food face additional risks from rising prices, wage declines, and unemployment, which may push them below subsistence levels. The COVID-19 pandemic has intensified these vulnerabilities, leading to wage delays, income uncertainty, and increased reliance on high-interest borrowing to meet household needs. In Nigeria, since 2015, salaries for civil servants in at least 27 states, including the Federal Capital Territory, have frequently been delayed, partially paid, or uncertain (Iweoha, 2017). This situation has resulted in financial deprivation, mental and physical health challenges, and an increased dependence on farming to supplement income.

Given these conditions, this study investigates the determinants of income shocks among civil servant farming households in Southwest Nigeria. By examining the factors contributing to income shortfalls, the study aims to provide insights into the vulnerabilities and coping mechanisms of these households, informing policies to stabilize income, enhance productivity, and reduce household susceptibility to shocks.

1.1. Objectives of the Study

The main objective of this study is to empirically model and analyze the determinants of income shocks among civil servant farming households in Southwest Nigeria. The specific objectives of the study were to:

1. Describe the socio-economic characteristics of farming civil servants in the study area.
2. Identify the types of shocks experienced by farming civil servant households in the study area.
3. Investigate the determinants of income shocks among farming civil servant households in the study area.

1.2. Justification of the Study:

Income shocks have continued to exacerbate conflicts in various parts of Nigeria and other countries worldwide. They are recognized as key drivers of social and economic instability (Blattman & Miguel, 2010). In Nigeria, income shocks have been a persistent issue, particularly affecting workers in the formal sector. The formal sector contributes approximately 58.83% to the nation's Gross Domestic Product (GDP), making it a larger economic contributor than the informal sector, which accounts for 41.43% (NBS, 2016).

Civil servants across Nigerian states have frequently received delayed, incomplete, or inconsistent salaries, a situation worsened during the COVID-19 pandemic. This has rendered households reliant on

civil servant income increasingly vulnerable, particularly in agrarian communities. To cope with inadequate remuneration, many civil servants engage in alternative livelihood activities to sustain themselves and their families. Despite these efforts, poverty remains prevalent in rural areas, affecting even civil servants and their households.

Women in these households often bear a disproportionate burden, ensuring that children are fed and that family members do not go without basic necessities. This situation raises critical concerns regarding gender, family stability, and the mitigation of income shocks among civil servants in rural Nigeria. As highlighted by Falola et al. (2020), the high incidence of poverty in rural households necessitates collective household efforts, particularly from women, to cope with economic challenges. Therefore, there is an urgent need to investigate the prevalence, major determinants, and coping strategies related to income shocks among rural civil servant households in Nigeria.

2. Literature review

The literature highlights the pervasive occurrence of shocks across Nigeria and Africa and their profound consequences for household welfare. Income shocks—stemming from unstable earnings, job loss, or macroeconomic fluctuations—have significant effects on household consumption and economic stability. While positive income shocks may not substantially alter the likelihood of food shortages, negative shocks and reductions in household income increase vulnerability and consumption volatility (Laura & Neil, 2010). Labour income fluctuations are associated with corresponding changes in consumption and wealth, and evidence suggests that these shocks have modest persistence, which can be partially mitigated through simple financial instruments such as bonds (Krueger & Perri, 2010).

Beyond household-level effects, income shocks carry broader socio-economic implications. They have been identified as important drivers of conflict, whereas positive economic shocks may reduce the risk of violence by increasing the opportunity cost of engaging in conflict (Blattman & Miguel, 2010; Fearon & Laitin, 2003). Studies from Japan, utilizing natural experiments such as the 2014 Value-Added Tax increase, demonstrate that consumption decreases proportionally in response to income shocks, consistent with the predictions of the Life Cycle and Permanent Income Hypotheses (David & Takashi, 2016). Rural households, in particular, exhibit reduced consumption in response to income uncertainty, highlighting their limited capacity to smooth expenditures over time.

Health shocks represent one of the most frequent idiosyncratic income shocks and are a major contributor to household poverty in developing countries. Many African households lack access to formal insurance mechanisms that could buffer the adverse effects of such shocks. For example, approximately 39.04%, 33.69%, and 69.03% of households in Burkina Faso, Niger, and Togo, respectively, remain vulnerable to poverty as a result of health-related shocks. Health shocks, combined with limited wealth and poor access to insurance, significantly undermine households' capacity to avoid poverty (Atake, 2018). The absence of health insurance increases both the frequency and severity of welfare losses, while household characteristics such as size, gender composition, educational attainment, and age of the household head further influence vulnerability.

Overall, empirical evidence indicates that income shocks and related disturbances substantially compromise household welfare. These shocks reduce consumption, increase reliance on coping mechanisms, and heighten long-term vulnerability to poverty, particularly among rural and low-income

households. The literature underscores the importance of financial instruments, social safety nets, and accessible health insurance as mechanisms to mitigate the adverse effects of shocks and strengthen household resilience.

3. Research Methodology

3.1. Study Area

The study was conducted in South-West Nigeria, a region comprising six states: Ekiti, Lagos, Ondo, Ogun, Oyo, and Osun. The region lies between longitude 2°31′ and 6°01′ East and latitude 6°21′ and 8°37′ North, covering a total land area of 77,818 km² with a projected population of 38,257,260 (NBS, 2010).

South-West Nigeria is bounded by Edo and Delta States to the east, Kwara and Kogi States to the north, the Republic of Benin to the west, and the Gulf of Guinea to the south. The region experiences a tropical climate with distinct wet and dry seasons. Temperatures range from 21°C to 34°C, while annual rainfall varies between 1,500 mm and 3,000 mm. The dry season occurs between November and March, with high temperatures, whereas the rainy season occurs between April and October, accompanied by heavy rainfall. Fertile soils support diverse crops, including cassava, maize, plantain, yam, cocoyam, cocoa, and kolanuts. Major occupations include farming and civil service.

Ekiti State is located between longitude 4°5′ and 5°45′ East and latitude 7°15′ and 8°5′ North, with a projected population of 3,270,800 (NBS, 2016). The state is bounded by Ondo State to the south, Kwara State to the north, Kogi State to the east, and Osun State to the west. Ekiti is predominantly agrarian, civil service with agriculture employing approximately 75% of the working population.

Ondo State lies between latitude 6.9149° N and longitude 5.1478° E, with a maximum temperature of 35.3°C and a projected population of 4,671,695 (NBS, 2016). The state borders Ekiti State to the north, Kogi State to the northeast, Edo State to the east, Delta State to the southeast, Ogun State to the southwest, Osun State to the northwest, and the Atlantic Ocean to the south. Its economy is largely agrarian, civil service, dominated by crude oil and crop production, with agriculture engaging about 75% of the working population. Ondo produces over 75,000 tons of cocoa annually, has the largest bitumen deposit in Africa, and boasts Nigeria's longest coastline of 180 km.

Osun State is situated in the tropical rainforest zone, covering approximately 14,875 km², and lies between latitudes 7°30′ N and longitudes 4°30′ E, with a projected population of 4,705,600 (NBS, 2016). It is bounded by Kwara State to the northeast, Ekiti State to the east, Ogun State to the south, and Oyo State to the west and northwest. The state experiences two cropping seasons, wet and dry, as well as the Harmattan. Major crops include cassava, yam, maize, beans, millet, cocoa, palm oil and kernel, and rubber. The predominant occupations are farming, civil service, and trading.

3.2. Sampling Technique

The target population for this study consisted of farming civil servant-headed households in Ekiti, Ondo, and Osun States, Southwest Nigeria. These states were purposively selected due to their relatively high concentration of civil servants engaged in farming activities, which aligns with the study's focus.

A multistage sampling technique was employed to ensure a representative sample. In the first stage, three states; Ekiti, Ondo, and Osun were purposively selected. In the second stage, two Local

Government Areas (LGAs) were randomly selected from each state to provide geographic diversity. In the third stage, three rural communities with a high concentration of civil servants were purposively chosen from each selected LGA. In the final stage, twenty farming civil servants were purposively selected from each community based on their engagement in both civil service and farming activities.

This approach yielded a total sample size of 360 respondents, which is considered adequate for statistical analysis and ensures the reliability of findings regarding the determinants of income shocks among civil servant farming households. The combination of purposive and random selection enabled the study to focus on the relevant population while maintaining sufficient variability for robust analysis

3.3. Data Analysis

Data for analysis were generated primarily using interview scheduled and structured questionnaires administered to three hundred and sixty (360) respondents selected for the study. Data analysis was achieved through the use of descriptive statistics and probit regression model.

3.4. Analytical Technique

Data for the study were analyzed using both descriptive and inferential statistics. Objectives (i) and (ii) were analyzed using descriptive statistics such as mean, percentages and frequency distribution. Objective (iii) was analyzed using Probit regression model.

3.5. Probit Regression Model

Probit regression model was used to analyze factors that influences income shocks among civil servant headed farm households. The Probit model estimates the probability of events based on dependent dichotomous variables (Gujarati and Porter, 2009). A dichotomous dependent variable assumes only two values (either zero or one). The probit model was estimated as:

$$P\left[Y_t = \frac{1}{x_i}\right] = \frac{exp(x_i\beta)}{1+exp(x_i\beta)} \quad \text{..... (1)}$$

Drawing from Gujarati and Porter, (2009), the following explicit function were estimated:

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 \quad \text{...(2)}$$

where:

Y is a binary response variable defined as; Y = (1: income shock); Y = (0: not income shock)

X_1= Salary (Dummy: takes value of 1 if regular and 0 otherwise))
X_2 = Disease infestation (Dummy: takes value of 1 if there is and 0 otherwise)
X_3 =Shot rainfall (Dummy: takes value of 1 if there is and 0 otherwise)
X_4= short of labour in (Dummy: takes value of 1 if there is and 0 otherwise)
X_5 = Marketing of produce (Dummy: takes value of 1 if there is and 0 otherwise)
X_6= high cost of improved varieties (Dummy: takes value of 1 if there is and 0 otherwise)
X_7= high cost of fertilizer (Dummy: takes value of 1 if there is and 0 otherwise)
b_1....b_9= parameter estimates
b_0 .....Intercept
e_i = error term

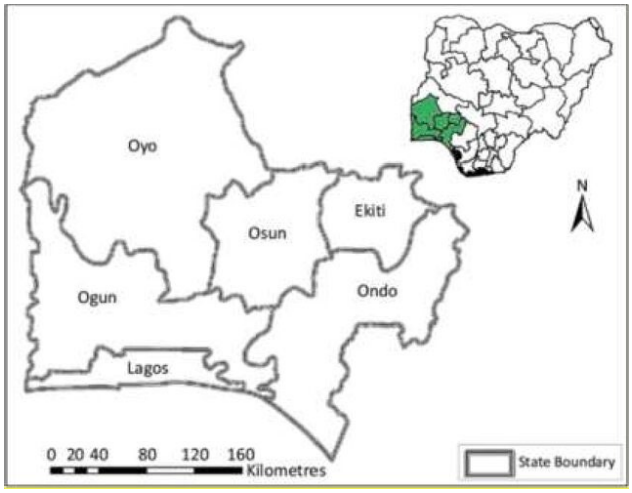

Figure 1. Map of Nigeria showing the Southwest States.

Source: Ojo, O.S. (2024)

4. Result and Discussion

4.1. Socio-economic characteristics

The results (Table 1) indicates that the majority (59.4%) of the civil servants were female, suggesting a higher representation of females than males in the government workforce within the study area. This finding is consistent with Bastos et al. (2019), who reported that females are more engaged in government employment compared to their male counterparts.

The age of the farming civil servants ranged from 22 to 70 years, with a mean age of 43 years. The average ages in Ekiti, Ondo, and Osun States were 39, 42, and 46 years, respectively. This indicates that most respondents fall within the economically and physically productive age range of 30–50 years (FAO, 2015).

The civil servants had an average household size of six persons per household, suggesting relatively large families among farming civil servants. This aligns with Ajani et al. (2012), who noted that large family sizes provide household labor that respondents often rely on for farm operations and marketing activities. Ogundele and Okoruwa (2006) further reported that large household sizes could influence poverty and limit the household's ability to meet financial expectations. Notably, the mean household size of six exceeds the national average of five persons reported by the National Bureau of Statistics (NBS, 2015).

Married respondents constituted the majority (87.2%), with 84.2%, 80.8%, and 96.7% of civil servants in Ekiti, Ondo, and Osun States, respectively, living with their spouses. The high proportion of married civil servants engaged in farming suggests increased household responsibilities, particularly in meeting family consumption needs.

Educational attainment among the respondents was high, with all civil servants having at least some form of formal education, ranging from primary to postgraduate levels. The majority (84.2%) had tertiary education. This is consistent with Ajala (2010), who emphasized that higher education enhances comprehension of technical information and positively influences productivity. Osun State had the

highest proportion of tertiary-educated civil servants (90.0%), followed by Ekiti (83.4%) and Ondo (79.1%).

The civil servants had an average working experience of 12 years, with state-specific averages of 9, 12, and 16 years for Ekiti, Ondo, and Osun, respectively. This suggests that the majority of respondents were well experienced, corroborating the findings of Oyewole (2012), which highlighted that productivity increases with years of service.

Income analysis revealed that most respondents were moderate-income earners, with average annual incomes of N759,416.7, N689,211.9, and N455,233.3 in Ekiti, Ondo, and Osun States, respectively. Using the World Bank (2019) poverty benchmark of US$1.90 per day, and applying the CBN exchange rate of $1 = N425, the poverty threshold corresponds to N634,315.6 annually. This indicates that the majority of respondents lived above the poverty line. The observed variability in household income reflects differences in purchasing power, which may influence food demand and responses to shocks, as noted by Brauw and Herskowitz (2021).

Finally, the results show that the majority (77.2%) of the civil servants were permanently employed, suggesting stable sources of income among the respondents.

. Table 1. Socio-economic Characteristics of Farming Civil Servants

Characteristics	Ekiti Freq	Ekiti (%)	Ondo Freq	Ondo (%)	Osun Freq	Osun (%)	Pooled Freq	Pooled (%)
Sex:								
Male	117	32.5	162	45.0	159	44.2	146	40.6
Female	243	67.5	198	55.0	201	55.8	214	59.4
Age (Years):								
< 30	26	21.7	15	12.5	4	3.3	45	12.5
31 – 40	51	42.5	39	32.5	23	19.2	113	31.4
41 – 50	25	20.8	48	40.0	63	52.5	136	37.8
51 – 60	18	15.0	14	11.7	30	25.0	62	17.2
> 60	0	0.0	4	3.3	0	0.0	4	1.1
Mean	39		42		46		43	
Household Size:								
<= 2	18	15.0	9	7.5	12	10.0	39	10.8
3 – 6	50	41.7	64	53.4	70	58.3	184	60.1
7 – 10	48	40.0	45	37.5	37	30.8	130	36.2
> 10	4	3.3	2	1.7	1	0.8	7	1.9
Mean	6		6		6		6	
Marital Status:								
Single	17	14.2	22	18.3	3	2.5	12	10.0
Married	101	84.2	96	80.0	116	96.7	104	87.2
Widow	2	1.7	2	1.7	1	0.8	4	2.8
Education Status:								

Characteristics	Ekiti Freq	Ekiti (%)	Ondo Freq	Ondo (%)	Osun Freq	Osun (%)	Pooled Freq	Pooled (%)
Primary	0	0.0	2	1.7	4	3.3	6	1.7
Secondary	12	10.0	10	8.3	1	0.8	23	6.4
Tertiary	100	83.4	95	79.1	108	90.0	303	84.2
Post Graduate	8	6.6	13	10.9	7	5.8	28	7.8
Work Experience:								
< 5	42	35.0	24	20.0	6	5.0	72	20.0
6 – 10	46	38.3	33	27.5	18	15.0	97	26.9
11 – 15	17	14.2	27	22.5	51	42.5	95	26.4
16 – 25	14	11.7	29	24.1	23	19.1	66	18.3
> 25	1	0.8	7	5.9	22	18.3	30	8.4
Annual Income:								
< 200,000	10	8.3	20	16.7	13	10.8	43	11.9
200,001–400,000	37	30.8	29	24.2	60	50.0	126	35.0
400,001–600,000	15	12.5	19	15.8	30	25.0	64	17.8
600,001–800,000	10	8.3	11	9.2	8	6.7	29	8.1
800,001–1,000,000	20	16.7	18	15.0	3	2.5	41	11.4
> 1,000,000	28	23.3	23	19.2	6	5.0	57	15.8
Mean	₳759,416		₳689,211		₳455,233		₳634,315	
Nature of Employment:								
Permanent	86	71.7	95	79.2	107	89.2	277	77.2
Temporary	34	28.3	25	20.8	13	10.8	83	22.8

Source: Computation from field Survey (2025)

4.2 Types of Shocks Experienced by Farming Civil Servant Households

Table 2 presents the types of shocks experienced by farming civil servant households in the study area and their potential implications for household welfare. The findings indicate that income irregularities were the most prevalent shock, affecting 86.7%, 76.7%, and 80.0% of respondents in Ondo, Osun, and Ekiti States, respectively. The pooled data show that 80.6% of respondents experienced income-related shocks. This highlights that, despite their stable employment, civil servant households remain vulnerable to fluctuations in salary or irregular payment schedules, which can constrain household expenditure and limit investment in farming activities.

Crop loss was another significant shock, affecting 81.6%, 70.8%, and 63.3% of respondents in Ondo, Osun, and Ekiti States, respectively. This indicates that agricultural production risks, including pest infestation, adverse weather, and poor agronomic practices, significantly impact the livelihoods of farming civil servants. Losses in crop yield reduce household food availability and income, increasing vulnerability to food insecurity.

In contrast, loss of farmland was relatively less common, affecting 35.0%, 32.5%, and 31.7% of respondents in Ondo, Osun, and Ekiti States, respectively. Similarly, shocks related to the death of

household members were reported by only 25.0%, 23.3%, and 20.0% of respondents in the three states. Although less frequent, these shocks can have profound socio-economic consequences, including labor shortages and increased financial obligations, which may exacerbate vulnerability to poverty and income instability.

Overall, the results suggest that irregular income and crop loss are the primary shocks affecting farming civil servant households in Southwest Nigeria. These findings imply that, even among formally employed households, vulnerabilities in both salary structure and agricultural productivity can compromise household food security, income stability, and resilience to economic shocks. Therefore, policy interventions targeting income stabilization, timely salary payments, and risk mitigation in farming could enhance the welfare of civil servant households engaged in agriculture.

Table 2. Distribution of Types of Shocks Experienced by Farming Civil Servant Households in the Study Area

Shocks Experienced	Ondo (Freq %)	Osun (Freq %)	Ekiti (Freq %)	Pooled (Freq %)
Irregular Income/Salary	102 (86.7)	92 (76.7)	96 (80.0)	290 (80.6)
Crop Loss/Failure	98 (81.6)	85 (70.8)	76 (63.3)	259 (71.9)
Loss of Land	42 (35.0)	39 (32.5)	38 (31.7)	119 (33.0)
Loss of Family Members	30 (25.0)	28 (23.3)	24 (20.0)	82 (22.8)

Source: Computation from field Survey (2025)

4.3 Determinants of Income Shocks Among Farming Civil Servant Households in the Study Area

The probit model used to estimate the determinants of income shocks among farming civil servant households produced an R^2 of 0.6322, indicating that approximately 63.2% of the variation in the probability of experiencing income shocks is explained by the independent variables included in the model. This high Pseudo R^2 suggests a good model fit and confirms that the selected explanatory variables are strong predictors of income shocks among the respondents. The results of the model (Table 3) shows that seven independent variables were included, of which four were statistically significant in determining the likelihood of experiencing an income shock. These significant variables are inconsistent salary, shortage of rainfall, poor access to improved varieties, and lack of access to fertilizer. Inconsistent salary exhibited a positive and statistically significant effect ($p < 0.05$) on the probability of income shock. This implies that, *ceteris paribus*, an increase in salary irregularities raises the likelihood of households experiencing income shocks. Specifically, a unit increase in inconsistent salary increases the probability of income shock by 1.6874, highlighting the vulnerability created by unstable wage flows among civil servants who supplement their income through farming. The coefficient of shortage of rainfall was negative (–0.0136) and statistically significant ($p < 0.05$). The negative sign indicates that a reduction in rainfall increases the probability of income shock among respondents. This aligns with Mulubrhan et al. (2018), who noted that adequate rainfall enhances agricultural productivity and stabilizes household consumption, thereby reducing exposure to income shocks. Poor access to improved crop varieties had a negative and statistically significant coefficient (–0.9506; $p < 0.01$), indicating that households with better access to improved varieties are less likely to experience income shocks. This is consistent with Lateef et al. (2021), who reported that improved varieties increase farm productivity and income, reducing vulnerability to shocks. Similarly, access to fertilizer showed a

negative and statistically significant effect ($p < 0.01$) on income shocks. This suggests that households with greater access to fertilizer are less likely to experience income shocks, corroborating the findings of Muhammad and Sidique (2019), which linked fertilizer access to higher crop yields and reduced household vulnerability.

Table 3. Probit Regression Model Showing Determinants of Income Shocks Among Farming Civil Servant Households (Pooled and State-Level Distribution)

Variables	Coefficient	Std error	P- Value
Inconsistent salary	0.6874	0.3700	0.000***
Disease infestation	-0.2244	0.3283	0.494
Shortage of rainfall	-1.0158	0.2487	0.000***
Insufficient labour	0.2383	0.3357	0.478
Marketing of produce	0.5173	0.3054	0.091
High cost of improved varieties	-0.9506	0.3529	0.007**
High cost of fertilizer	-0.5406	0.2686	0.044**
Cons	2.3278	0.7169	0.001
LR X^2:	58.21		
Prob> chi X^2:	0.040		
Pseudo R^2:	0.6322		
Log likelihood:	-132.97.978		
** and *** represent significance at 1%, and 5% respectively			

Source: Computation from field Survey (2025)

4.4. Determinants of Income Shocks Among Farming Civil Servant Households in Ekiti State

The probit model for Ekiti State produced an R^2 of 0.3737, indicating that approximately 37.4% of the variation in the probability of experiencing income shocks among farming civil servant households is explained by the independent variables included in the model. This suggests a moderate model fit, implying that factors such as inconsistent salary, shortage of rainfall, and marketing of produce are important predictors of income shocks in Ekiti State. Table 4 presents the detailed results of the model. Out of the seven independent variables included, three were statistically significant in determining household income shocks. Inconsistent salary was positive and highly significant ($p < 0.01$), indicating that, *ceteris paribus*, an increase in salary irregularities raises the probability of experiencing an income shock. Specifically, a unit increase in inconsistent salary increases the probability of income shock by 1.775 units, confirming that unstable wage flows significantly expose civil servant households to income vulnerability. Shortage of rainfall also had a positive and statistically significant effect ($p < 0.01$) on income shocks. This implies that insufficient rainfall increases the likelihood of experiencing income shocks. Each additional unit increase in rainfall shortage increases the probability of income shock by 1.196 units, highlighting the sensitivity of household income to climatic variability. The coefficient for marketing of produce was negative (–0.8538) and significant ($p < 0.05$), suggesting that households engaging more actively in marketing their produce are less likely to experience income shocks. This aligns with Osabuohein et al. (2019), who reported that increased marketing activities enhance farm income, thereby reducing vulnerability to income shocks.

Table 4. Probit Regression Model Showing Determinants of Income Shocks Among Civil Servants Farming Households in Ekiti State

Variables	Coef	Std er	Pvalue
Inconsistent salary	1.7751	0.5823	0.002***
Disease infestation	-0.4571	0.5248	0.384
Shortage of rainfall	1.1960	0.4009	0.003***
Insufficient labour	0.8129	0.6083	0.181
Marketing of produce	-0.8538	0.4436	0.050***
High cost of improved varieties	-0.2837	0.4881	0.561
High cost of fertilizer	0.2936	0.3783	0.438
Cons	1.1427	1.1099	0.198
LR X^2:	23.41		
Prob> chi X^2:	0.0014		
Pseudo R^2:	0.3737		
Log-likelihood:	-31.056		
*, ** and *** represent significance at 10%, 5% and 1%, respectively.			

Source: Computation from field Survey (2025)

4.5. Determinants of Income Shocks Among Farming Civil Servant Households in Ondo State

The probit model for Ondo State produced an R^2 of 0.34527, indicating that approximately 34.5% of the variation in the probability of experiencing income shocks among farming civil servant households is explained by the independent variables included in the model. This suggests a moderate model fit, implying that factors such as disease infestation, shortage of rainfall, and marketing of produce are meaningful predictors of income shocks among respondents. Table 5 presents the detailed results of the model. Out of the seven independent variables included, three were statistically significant in determining household income shocks. Disease infestation was positive and highly significant ($p < 0.01$), indicating that, *ceteris paribus*, an increase in disease occurrence on respondents' farms raises the probability of experiencing an income shock. This highlights the vulnerability of farming households to crop or livestock health challenges, which can reduce productivity and household income. Shortage of rainfall also had a positive and statistically significant effect ($p < 0.01$) on income shocks. This implies that insufficient rainfall increases the likelihood of households experiencing income shocks. Each increase in rainfall shortage raises the probability of income shock, consistent with Mulubrhan et al. (2018), who reported that reduced rainfall decreases agricultural productivity and household consumption, thereby heightening exposure to income shocks. The coefficient for marketing of produce was negative (–0.169) and statistically significant ($p < 0.01$), suggesting that households that engage more actively in marketing their produce are less likely to experience income shocks. Conversely, a reduction in marketing activities increases the probability of income shock. This finding aligns with the view that better access to markets enhances farm income and reduces vulnerability to income shocks.

Table 5. Probit Regression Model Showing Determinants of Income Shocks Among Civil Servants Farming Households in Ondo State

Variables	Coef	Std error	P-value
Inconsistent salary	-5.826	4.683	0.219
Disease infestation	77.844	37.017	0.004***
Shortage of rainfall	24.400	10.528	0.002***
Insufficient labour	50.735	112.53	0.680
Marketing of produce	-0.169	0.012	0.005***
High cost of improved varieties	95.811	54.593	0.089
High cost of fertilizer	16.325	79.00	0.856
Cons	-97.255	122.605	0.471
LR X^2:	73.31		
Prob> chi X^2:	0.0000		
Pseudo R^2:	0.34527		
Log likelihood:	-132.978		

*, ** and *** represent significance at 10%, 5% and 1%, respectively

Source: Computation from field Survey (2025)

4.6. Determinants of Income Shocks Among Farming Civil Servant Households in Osun State

The probit model for Osun State produced an R^2 of 0.6508, indicating that approximately 65.1% of the variation in the probability of experiencing income shocks among farming civil servant households is explained by the independent variables included in the model. This relatively high R^2 suggests a good model fit, implying that factors such as insufficient labour and access to fertilizer are strong predictors of income shocks among respondents in Osun State. Table 6 presents the results of the model. Out of the seven independent variables included, two were statistically significant in determining household income shocks. Insufficient labour was positive (0.7340) and statistically significant ($p < 0.05$), indicating that, *ceteris paribus*, higher labour insufficiency among respondents increases the likelihood of experiencing an income shock. The relatively higher incidence of labour shortages in Osun State compared to other states in the study area may be due to youth engagement in other artisan or non-farm activities. This finding aligns with Villacis and Mayonga (2022), who reported that insufficient labour can delay crop establishment, reduce fertilizer application, and limit adequate crop management, thereby lowering productivity and exposing households to income shocks. No access to fertilizer had a negative and statistically significant effect ($p < 0.05$) on income shocks. This implies that, *ceteris paribus*, increased access to fertilizer reduces the probability of experiencing income shocks among civil servant farming households. Access to fertilizers enhances crop productivity, increases household income, and consequently reduces vulnerability to shocks.

Table 6. Probit Regression Model Showing Determinants of Income Shocks Among Civil Servants Farming Households in Osun State

Variables	Coef	Std er	Pvalue
Inconsistent salary	18.012	1637.51	0.991
Disease infestation	-4.9985	731.98	0.995
Shortage of rainfall	-12.1558	1036.37	0.991
Insufficient labour	0.7340	0.8054	0.035**
Marketing of produce	0.2940	0.8901	0.736
No access to improved varieties	-13.39	1036.37	0.990
No access to fertilizer	-0.4215	0.793	0.049**
Cons	35.94	3109.12	0.991
LR X^2:	38.12		
Prob> chi X^2:	0.0000		
Pseudo R^2:	0.6508		
Log likelihood:	-10.228		
*, ** and *** represent significance at 10%, 5% and 1%, respectively.			

Source: Computation from field Survey (2025)

5. Conclusions and Recommendations

This study revealed that civil servant farming households in the South-West Nigeria were predominantly female, married, experienced, and within the economically active age range. They were permanent workers, well-educated, earning moderate salaries, and maintained relatively large households. Despite stable employment, these households were highly vulnerable to income shocks due to irregular salary payments, which remained their primary source of income. Key factors influencing income shocks included inconsistent salaries, shortage of rainfall, poor access to improved seed varieties, and limited availability of fertilizers. Many respondents reported being owed salaries for over seven months or placed on half pay, underscoring the severity of income instability.

To mitigate income shocks and enhance household welfare, the government should prioritize timely and consistent salary payments, exploring alternative revenue sources to complement federal allocations. Additionally, civil servant farming households should be provided guaranteed access to farm inputs and credit at subsidized rates, potentially using salaries as collateral. Efforts to improve access to modern seed varieties, fertilizers, and other agricultural inputs are also recommended, as these interventions can enhance productivity, increase household income, and reduce vulnerability to shocks.

In summary, addressing salary irregularities and improving access to farm inputs are critical strategies for reducing income shocks among civil servant farming households. By implementing these measures, government and policy stakeholders can strengthen the resilience and productivity of this unique population, ultimately improving their socio-economic well-being.

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