

The contribution of Ghana's Planting for Food and Jobs (PFJ) intervention to rural household food security achievement: Case study of Karaga District

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Abstract

This study explores how Ghana's Planting for Food and Jobs (PFJ) program, through agricultural input support, contributed to achieving household food security among rural farmers in Ghana. The study aims to fill the gap in empirical knowledge about PFJ's impact within the specific context at the household level in rural areas, examining the effectiveness of PFJ inputs on crop productivity and its effect on household food security achievement for farmers who were beneficiaries of the PFJ program in the Karaga district of Northern Ghana. Through a qualitative approach, in-depth inter-

views and observations were conducted among 40 purposively sampled respondents. The data were then subjected to reflexive thematic analysis, following the Braun and Clarke approach. The study finds that most beneficiaries experienced a productivity boost after PFJ adoption, particularly among female farmers, middle-income, off-farm-engaged, educated, and middle-aged farmers, as well as those with large family sizes. However, input delays mainly resulted in most beneficiaries still using locally reserved seeds that are not certified, late fertilizer application, and reduced farm sizes in the worst cases. These factors compromised the yield outcomes, further exacerbated by adverse environmental conditions, inadequate mechanization, and a lack of irrigation in the area. Deeper policy insights revealed poor coordination, miscommunication with key stakeholders, and poor timing as key reasons for input distribution lapses. The study further finds that PFJ has helped many beneficiary households to achieve food sufficiency through improved crop productivity,

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income from surplus farm produce sales, and off-farm economic benefits in food processing, livestock rearing, and tricycles for transport, which enhanced their food affordability and resilience. Nonetheless, economic hardships were generally severe, especially among households with poor yield outcomes and large family sizes, who struggled to meet their daily food requirements. The policy insights also acknowledged PFJ's positive impact on farmer productivity, job opportunities, and food availability. The study concludes that PFJ contributed significantly to achieving rural household food security through quality input support, enhanced crop productivity, on-farm and off-farm job opportunities, and food availability. Nevertheless, the incomplete program components and primary production focus promoted dependency syndrome, where beneficiaries rely more on government support, without investing in value addition and innovation. The study recommends the need for broader stakeholder engagement, allowing the local assembly to implement their input distribution modalities with frequent third-party audits, encourage drought-resistant seed varieties, complement targeted interventions, and improve public infrastructure like roads and irrigation systems. Subsequent studies should expand the respondents' base for a comparative impact of PFJ in other beneficiary communities in Ghana.

Keywords

Planting for Food and Jobs, agricultural input, reflexive thematic analysis, Braun and Clarke approach, rural household, crop productivity, household food security, Ghana

Introduction

Ensuring food security remains a central pillar of sustainable development, particularly in sub-Saharan Africa (SSA), where agriculture is the mainstay of rural livelihoods. The United Nations (UN) Sustainable Development Goal 2 (SDG2) aims to end hunger, malnutrition, and ensure universal access to safe and nutritious food by 2030. Agriculture is vital in addressing food insecurity and economic-related challenges in SSA. According to the Food and Agriculture Organization (FAO) of the United Nations, the sector plays

a significant role in achieving the UN SDGs to eliminate hunger and poverty worldwide. As a signatory to the SDGs, Ghana's agriculture is frequently characterized by low productivity, with one of the critical factors identified to be the inadequate access to and use of quality planting materials according to the Ministry of Food and Agriculture (MoFA) report in 2023. Agyemang et al. (2022) also emphasized that inefficient food production, particularly for cereals, is a critical challenge. They highlighted other challenges, including limited access to credit, unstable weather conditions and rainfall patterns, deteriorating soil nutrients, pest and disease outbreaks, low adoption of agricultural technology, and inadequate use of quality planting materials among smallholder farmers. Addressing these challenges requires targeted policy interventions that focus on addressing food insecurity at the household level and align with global strategies and commitments such as the Accra Agenda for Action, the World Food Summit in 2009, the Millennium Declaration aimed at alleviating poverty and hunger by 2015, and now the SDGs.

In Ghana, successive governments have implemented policies and interventions over the past decades with input subsidies aiming to boost crop production for food sufficiency and provide raw materials for industry. Al-Hassan (2018) identified these policies as the Food and Agriculture Sector Development Policy (FASDEP I) in 2002, which aimed to revolutionize the agricultural sector. FASDEP II (2007) became a revised version of FASDEP I, and the Medium-Term Agriculture Sector Investment Plan (METASIP) between 2010 and 2015 was an implementation strategy for FASDEP II. To improve the implementation of these plans, the Fertilizer Subsidy Program (FSP) was introduced in 2008 and subsequently replaced with the current PFJ Program (Pauw, 2022). The PFJ program is an agricultural policy initiative by the government of Ghana, implemented in the 2017/2018 farming season through the Ministry of Food and Agriculture (MoFA), that targets smallholder farmers mainly growing essential staple crops such as rice, maize, soybean, and vegetables. The initiative aims to support smallholder farmers by providing access

to quality seeds and fertilizers, improving access to extension services, creating market opportunities, and modernizing agricultural activities to increase crop yields, create jobs, and achieve food security (MoFA, 2018). The program began with a 50% discount on all inputs for beneficiaries holding not more than two hectares of cultivation. Inputs included NPK fertilizers, ammonium sulfate, organic fertilizers, improved seeds, and urea (46% nitrogen). To widen the beneficiary coverage as part of the National Medium-Term Development Policy Framework (NMTDPF), the government further reviewed the program in 2023 to include an input-credit system that is more private sector-led and expected to run until 2028 (MoFA, 2023).

While macro-level reports highlight increases in national food crop production under PFJ, questions remain about how these national gains translate into household-level food security among rural farming communities like Karaga district, particularly in the context of socioeconomic and environmental barriers that continue to affect smallholder productivity. Most existing evaluations are quantitative and focus predominantly on broader output trends. For instance, a study by Tanko et al. (2019) demonstrated that participation in the PFJ program positively affected the output and income of rice farmers in northern Ghana. The finding was consistent with the report of the Peasant Farmers Association of Ghana (PFAG, 2023). However, they noted that average yields for staple crops remain low due to persistent constraints with high costs of inputs, unavailability, and quality concerns. Moreover, Awafo et al. (2024) found significant improvements in farmer productivity attributable to the PFJ program. However, they emphasized the need for further research in light of continuous policy adjustments and the potential for varied outcomes in different contexts and geographical locations. By integrating farmer narratives and policy insights, the study focuses on the contribution of the PFJ to rural household food security in Karaga District, Northern Ghana. Specifically, it seeks to:

1. Explore the effectiveness of PFJ inputs on enhancing crop productivity.
2. Examine the PFJ effect on household food security achievement.

These objectives are situated within the broader theoretical and policy orientation of the PFJ, which reflects the productivist paradigm in agricultural development. The productivist paradigm, as described by Wilson (2007), emphasizes yield maximization, reliance on agricultural input support, and strong state involvement as the primary pathway to achieving food security.

Literature Review

The Concept of Household Food Security

The FAO (2008) defines food security as “physical and economic access to sufficient safe and nutritious food that meets dietary needs and food preferences for an active and healthy life” (p. 1). In contrast, food insecurity occurs when there is limited access to enough safe and nutritious food for normal growth and development and an active and healthy life due to unavailability of food and/or lack of resources to obtain food (FAO et al., 2024). Food security strongly relates to agricultural production since most people, particularly rural households, depend on farming for sustenance. Cameron et al. (2023) reported that the four FAO criteria (food availability, access, utilization, and stability) are mainly for large-scale food security assessment. Hence, adopting the FAO Food Insecurity Estimation Scale (FAO-FIES) for community-based assessment is deemed most appropriate. It classifies food insecurity assessment into three categories based on scores:

Food Security or Mild Food Insecurity: A household is considered food-secure when there is sufficient access to food, both in quantity and quality. When faced with uncertainties about future access to adequate food, households experience mild food insecurity.

Moderate Food Insecurity: Households are faced with situations that compel them to minimize the quality or quantity of their food intake. That also encompasses limiting the variety of food they eat or skipping meals.

Severe Food Insecurity: A household has generally exhausted its food supplies and, in

extreme cases, has endured one or more days without sustenance.

Therefore, in addition to extreme food insecurity, moderate food insecurity is also a concern since food availability is not guaranteed. Moreover, households might have to sacrifice other essentials to ensure they have food on the table, even if it is not the healthiest, but it could be the most convenient or affordable. Empirical studies show that the capacity of smallholders to produce sufficient food relies on production factors that include labor, technology, environmental conditions, agricultural policies, land availability, and access to inputs, significantly influenced by the socioeconomic circumstances of households, particularly for rural certain in most developing countries (Michelson et al., 2023; Tekuni et al., 2021). According to the FAO (2025), an intervention like PFJ in Ghana will improve food access and nutrition by providing input support for crop productivity enhancement and strengthening market linkages. Hence, this study specifically examines the effectiveness of PFJ inputs in enhancing productivity outcomes and their impact on household food security achievement in the Karaga district.

Empirical Review

Prior research has mainly concentrated on quantitative measures, including crop yields, input usage, and macroeconomic data related to food production. For instance, Prah et al. (2023) and Tekuni et al. (2021) have examined the opinions of beneficiaries and stakeholders regarding the PFJ program in Ghana. These studies highlighted the benefits of crop yield improvement and the challenges associated with its implementation. Research by Pauw (2022), integrating data from various public sources and independent reviews, showed that the PFJ increased maize and rice production by nearly 40% compared to what it would have been without the program, significantly increasing the amount of food and calories available to Ghanaians. Furthermore, Tanko et al. (2019) investigated PFJ's influence on the productivity and welfare of rice farmers, taking survey data collected about project-farmed rice. Respondents were randomly selected and data empirically analyzed. The result did not

show any significant increase in the income levels of farmers despite a drastic decline in farm and household expenditure. Awafo et al. (2024) also employed the probability model and propensity score matching in their recent study, and the results indicated that PFJ positively influenced the maize productivity and income of beneficiaries. Factors such as gender, farming experience, education, access to credit, cooperative membership, and farm distance significantly influenced participation. Nevertheless, restricted access to fertilizers and limited market opportunities emerged as the most significant obstacles to implementation.

Indeed, Ibrahim et al. (2024) and Donkoh (2024) both adopted a qualitative approach and reported a positive impact of PFJ on household food security and local economic development. However, the themes from their findings were not entirely explicit and comprehensive due to insufficient interaction between insights from beneficiary farmers and key informants. Echoing the need to focus more on the rural-farmer insights highlighted by Parks et al. (2021), this study is situated within the lived realities of smallholders in the Karaga district of Ghana by employing a qualitative approach to explore the contribution of the PFJ intervention to rural household food security while incorporating policy perspectives from key informants.

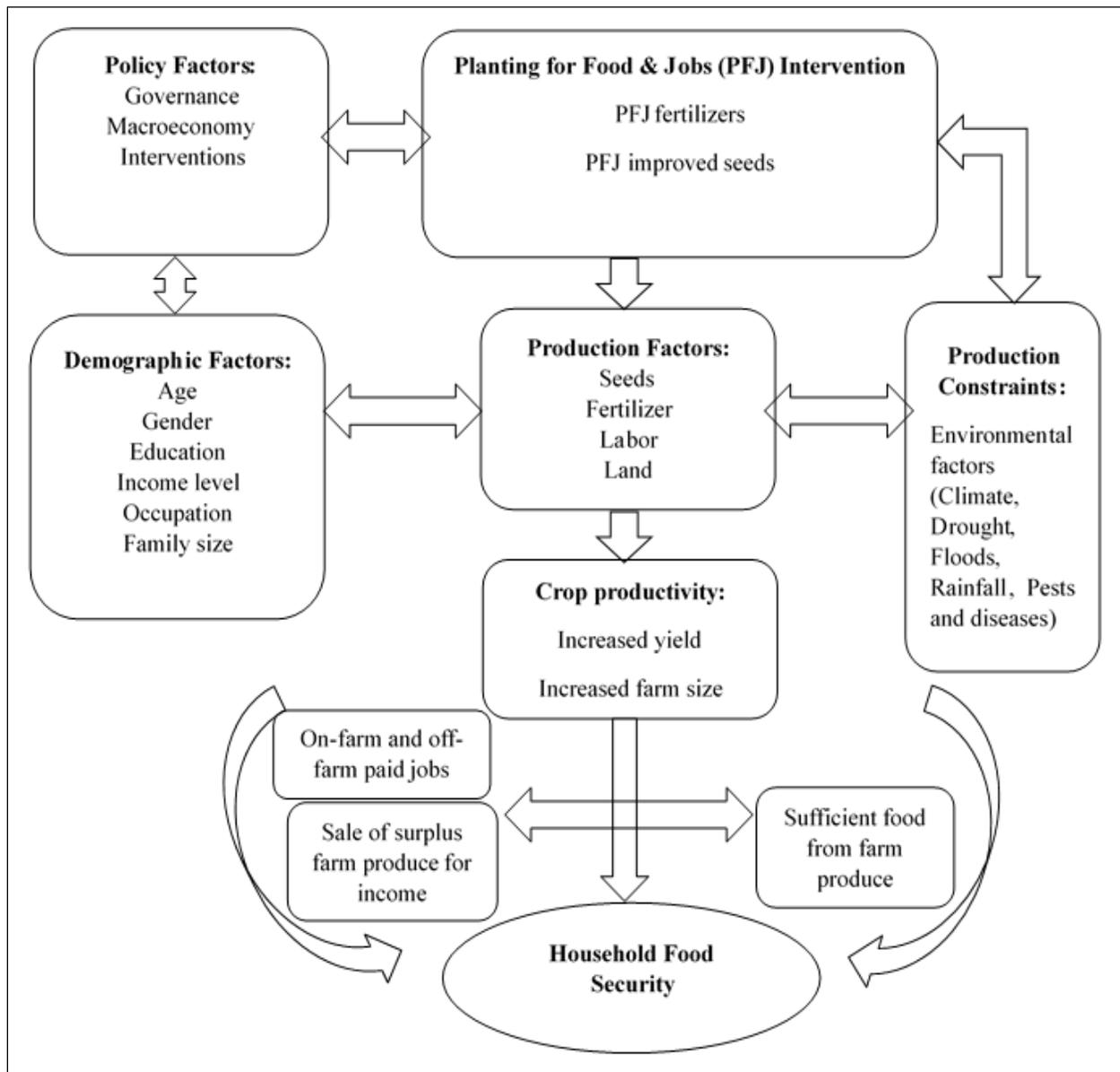
Analytical Framework

This study is premised on the input-output concept of the theory of production, and the theory of change (ToC), the theoretical framework for the implementation of the PFJ initiative. The theory of change explains the causal pathways linking input support under the intervention to outcomes in food production, other economic benefits, and food security impacts. The input-output concept of the theory of production assesses the relationship between essential factors of production: land, labor, capital (inputs), management (good agronomic practices), and outputs in crop yields (Debertin, 2012, pp. 355–365). In the context of the PFJ program, fertilizers and improved seeds could be the essential inputs, combined with other factors of production, for the productivity of smallholder farmers and contribute to household

food security. According to Thornton et al. (2017), the ToC under agricultural policy research provides a framework for linking interventions to outcomes and impacts. ToC emerged in the 1990s at the Aspen Institute Roundtable on Community Change as a framework for modelling and evaluating comprehensive community initiatives. It was later popularized by Carol Weiss when she highlighted poor assumptions and clarity in the implementation process of many initiatives, which impede their targeted goals (Weiss, 1995). Indeed,

Nfaafu (2022) adopted the ToC framework in a similar study on PFJ assessment where the input-output concept offered a structured approach to production outcomes determined by the efficacy of PFJ inputs. The sociodemographic dynamics of smallholders, with the potential impact of other policy factors and environmental elements on production, also play a significant role in determining beneficiary farmers' productivity and their household food security outcomes, as shown in Figure 1.

Figure 1. Conceptual Framework of the Study



Therefore, the study's independent variable is PFJ inputs with farmers' sociodemographic factors as determinants. The dependent variables include perceived input availability and access, yield outcomes, income, other economic benefits, and food situations of households. These are represented in the form of themes based on the study's qualitative approach. It is assumed that, by having access to fertilizer and quality seeds, PFJ beneficiaries will maximize food crop production, have more food and income from surplus farm produce, and save more for needs, which are all key indicators of household food security.

Sociodemographic factors, including age, gender, education, occupation, and income levels, directly influence beneficiary households' productivity by shaping their ability to access resources, adopt farming techniques, and make informed agricultural decisions. Households directly control these variables and are thus central to this study. Government policy, through its interventions with input support, extension services, and market access, is a crucial element at the household level, aiming to mitigate the resource limitations that often impede smallholders' productivity and food security achievement. Crop production is also greatly influenced by environmental elements caused either naturally or by humans. Natural elements such as rainfall, droughts, floods, and pests affect the productivity of smallholders in a rain-fed agricultural sector in Ghana, especially in vulnerable areas like Karaga District. Farmers are usually exposed to unpredictable weather patterns and extreme conditions, which affect yield outcomes (Zakaria et al., 2020).

Applied Research Methods

This study follows a qualitative approach, employing reflexive thematic analysis following the six-step framework of Braun and Clarke (2006) for inductive thematic analysis. The research focused on the Karaga district as the study area because most local households rely heavily on food crops and livestock production, despite the district facing significant food insecurity challenges and multidimensional poverty in Northern Ghana. The area is 73.9% rural, with about 95% of households

engaged in agriculture and participating in the government's PFJ intervention. It has the second-highest food insecurity rate among the 260 districts in Ghana, and over half of the population lives in multidimensional poverty according to the Ghana Statistical Service (GSS) report in 2022. The study used a multistage sampling procedure to strengthen the findings and reveal consistent thematic patterns for more reliable conclusions, as highlighted by Neuman (2014). The area was first classified into four zones: North, South, East, and West. One community was selected from each zone based on active participation in PFJ and accessibility. The four communities include Namburugu, Pishigu, Tulinga, and Yemo-Karaga (see Figure 2).

Five smallholder beneficiary farmers and two community leaders were purposively selected from each community, respectively. Other key informants interviewed were seven extension officers and five policymakers. All respondents were purposively selected based on their significant roles, associations, and experience with PFJ implementation. Table 1 summarizes the distribution of the respondents.

The data were collected from August to October 2024, during the 2024/2025 farming season. Smallholder farmers and key informants were the sources of primary data, and government reports, policy documents, and relevant literature served as secondary data sources. Data were collected through in-depth interviews and observations. Except for the PFJ desk officers and the Department of Agriculture and MoFA officers, whose interviews were held in English, all other interview sessions were conducted in the local dialect (Dagbani) and recorded in text and voice notes with respondents' consent. Kobo Toolbox was used in data collection, which also captured the GPS coordinates of each respondent. That facilitated tracking of data collection and tracing of respondents for any further clarifications or insights. All voice notes were later translated and transcribed into English for analysis.

The study followed the six-step framework developed by Braun and Clarke for thematic analysis of interview transcripts to generate and define themes that address the research objective. According to Braun and Clarke (2006), these steps

include “data familiarization, code creation, theme generation, theme review, theme naming, and report writing” (p. 16). Therefore, data from the interview first went through familiarization by cross-referencing transcripts with recorded interviews to verify their authenticity. Next came the generation of the preliminary codes, which

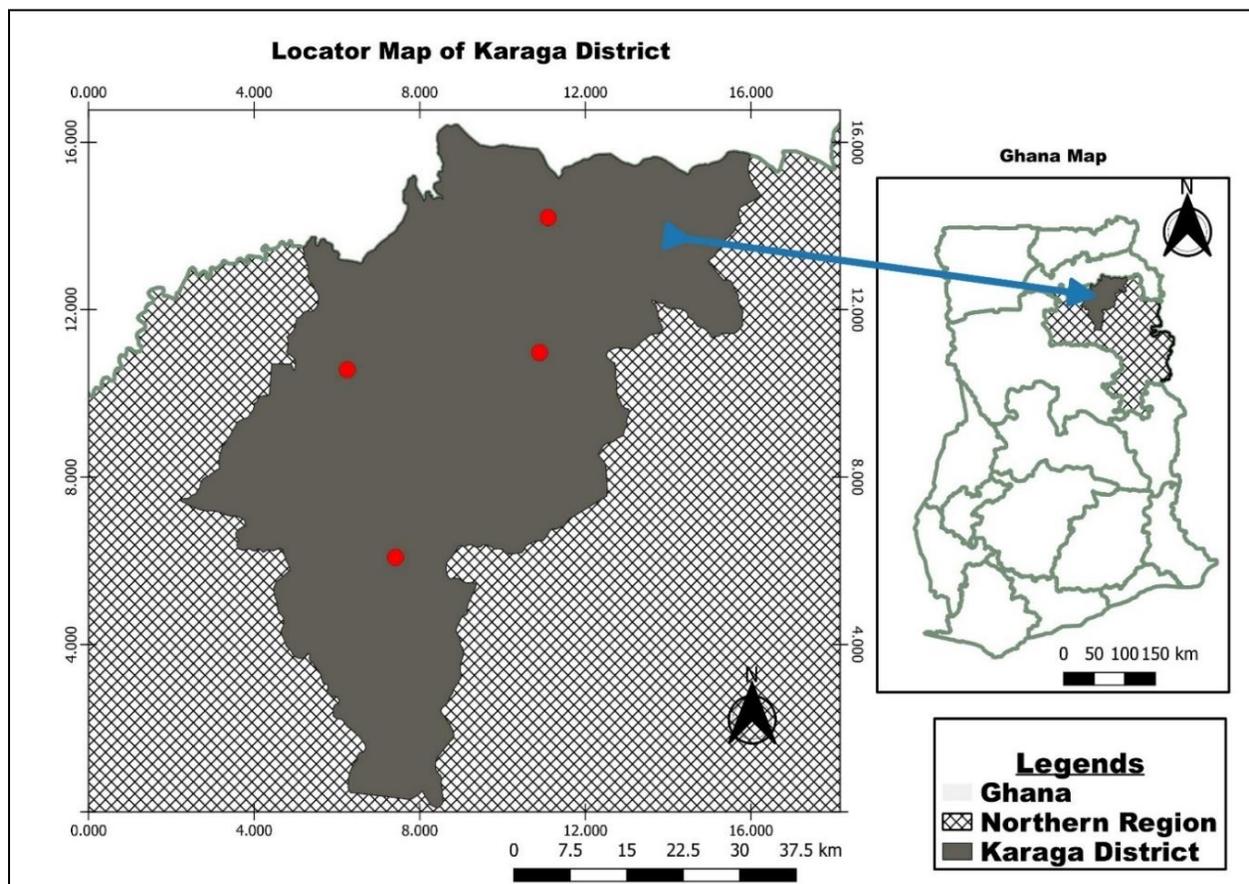
were then classified into themes based on their patterns. These were then presented as findings in a way that addressed the primary research objective. This analysis was performed by QDA Miner, a widely used computer-aided qualitative data analysis (CAQDAS) tool.

To enhance the analytical depth and support the findings from the qualitative insights on the contribution of PFJ to household food security achievement, the study used a Microsoft Excel spreadsheet to conduct descriptive analysis of the FAO-FIES scores for each beneficiary farm household. FAO-FIES is an experience-based metric

Table 1. Sample Size Summary

| Participants | District | Regional | National | Total |
|------------------------------------|----------|----------|----------|-----------|
| Beneficiary farmers | 20 | - | - | 20 |
| Community Elders (Leaders) | 8 | - | - | 8 |
| PFJ desk officers | 1 | 1 | - | 2 |
| Department of agriculture officers | 6 | 2 | - | 8 |
| MoFA officers | - | - | 2 | 2 |
| Total | | | | 40 |

Figure 2. The Study Area in Ghana



Source: Maps by the author.

consisting of eight standardized questions that capture households' challenges in accessing sufficient food. Responses were recorded dichotomously (yes = 1, no = 0), and household scores were aggregated and classified into three categories: food secure (0–3), moderately food insecure (4–6), and severely food insecure (7–8), following FAO guidelines. This scale has been widely validated for cross-country and individual comparisons and is considered one of the most reliable tools for measuring experiential food insecurity (FAO et al., 2024). In this study, respondents' FIES-based information for the period before PFJ adoption and for their current situation was taken. That enabled a comparative assessment of household food security status before and after PFJ, which supported and validated the qualitative findings on PFJ's role in improving food access and availability.

Results and Discussion

This section presents results from the data analyzed. It also interprets and discusses the findings to help deduce conclusions from the most significant patterns and themes that emerged from the data analyzed, relevant to achieving the research objectives.

Descriptive Analysis of Farm Households

This section presents the summary distribution of the 20 beneficiary households sampled for this study. Demographic data is shown in Table 2. In addition, the FIES scores for these households before and after PFJ adoption are shown in Table 3. These variables help to validate the discussion of the thematic insights and ensure proper contextualization across selected important socioeconomic circumstances for a clear understanding of how PFJ influences household food security achievement and affects subsequent policy decisions. The sample

Table 2. Descriptive Statistics of Beneficiary Farm Households

| Variable | Frequency | Percentage (%) |
|--|-----------|----------------|
| Gender | | |
| Male | 17 | 85 |
| Female | 3 | 15 |
| Total | 20 | 100 |
| Age (Years) | | |
| 18-35 | 8 | 40 |
| 36-59 | 9 | 45 |
| 60 and above | 3 | 15 |
| Total | 20 | 100 |
| Educational level | | |
| Basic | 8 | 40 |
| Secondary | 3 | 15 |
| Tertiary | 1 | 5 |
| None | 8 | 40 |
| Total | 20 | 100 |
| Average household size | | |
| Less than 5 | 2 | 10 |
| 5 to 8 | 8 | 40 |
| Above 8 | 10 | 50 |
| Total | 20 | 100 |
| Average monthly income (Ghc) | | |
| Less than 600 (\$37.50) | 10 | 50 |
| Between 600 (\$37.50)-2,000 (\$125.00) | 5 | 25 |
| Above 2,000 (\$125.00) | 5 | 25 |
| Total | 20 | 100 |
| Occupation aside from farming | | |
| Formal employment | 1 | 5 |
| Off-farm activities | 11 | 55 |
| None | 8 | 40 |
| Total | 20 | 100 |

NB: Ghana Cedis=Ghc, US Dollars=USD (\$), \$1.00=Ghc16.00

population reveals a significant gender gap, with males comprising the majority at 85% and females making up only 15%, reflecting a common characteristic of Ghanaian farm households, where over 71.6% are male-headed (GSS, 2023). Moreover, 40% of farmers have no formal education, which is above the national average of 20.8%. This highlights the rural nature of the area and points to potential challenges related to literacy and the

adoption of best agricultural techniques in rural Ghana. The lower female representation reveals potential gender-related barriers such as restrictive social norms and inequitable access to productive resources, which have been widely documented as constraints to female participation in agricultural initiatives in Ghana and SSA (Zakaria et al., 2020).

Furthermore, 40% of respondents were aged 18-35, indicating relatively strong youth representation. Given that one of the objectives of the PFJ program is to encourage greater involvement of young farmers in agriculture, with a holistic target of 40% for women, youth, and the vulnerable (MoFA, 2023). Nonetheless, qualitative responses from young participants highlight their inefficient participation in the program. Factors such as lack of experience, smaller landholdings, or insufficient resources may have contributed to this trend, emphasizing the need for more deliberate efforts to encourage youth participation in agricultural initiatives, as reported by Prah et al. (2023). Monthly income levels were categorized by Ghanaian cedi (GHc) and converted to U.S. dollars (USD), as follows: low income (below GHc600 or USD\$37.50), middle income (GHc600 or USD\$37.50 to GHc2,000 or USD\$125.00), and high income (above GHc2,000 or USD\$125.00) based on the latest minimum daily wage in Ghana (GHc18.15 = USD\$1.25) by the National Tripartite Commission (NTC) in 2023. Fifty percent of respondents are in the lower income bracket, earning less than \$1.25 daily. Household size is

key to production and food security, as the data show 90% of households have average sizes above five people. Large family sizes may provide a cheaper source of labor, lowering production costs, but may also create a food insufficiency threat due to high dependency. According to Nkegbe et al. (2022), income diversification enables beneficiary farmers to mitigate risks associated with farming and stabilize their income better than farmers without alternative income sources. Hence, 40% of households without alternative engagements are potentially at risk, with poor harvests or fluctuating market prices. The FIES scores presented in Table 3 highlight the fundamental problem of food insecurity in households. However, the before and after analysis of PFJ adoption supplements discussions on the thematic insights about PFJ's contribution to household food security achievement in the Karaga district.

Reflexive Thematic Analysis

The outcome of the reflexive thematic analysis process, generated from respondents' insights in the form of codes, are classified under themes shown in Table 4. The focus of the study is to examine the effectiveness of PFJ inputs on enhanc-

Table 4. Themes Generated from Beneficiary Farmers and Key Informant Interviews

| Themes | Type of Interview | | |
|--|-------------------|---------------|------------|
| | Farmer | Key Informant | Code Count |
| Input Availability and Access with PFJ | 20 | - | 89 |
| Crop Productivity with PFJ | 20 | - | 86 |
| Food Availability and Access with PFJ | 20 | - | 136 |
| Income and other Economic Effects with PFJ | 20 | - | 74 |
| Policy Coherence and Governance | - | 20 | 313 |

Table 3. Food Insecurity Estimation Scale (FIES) Scores of Households Before and After PFJ Adoption

| FIES Score | Frequency | | Percentage (%) | |
|---------------------------|------------|-----------|----------------|-----------|
| | Before PFJ | After PFJ | Before PFJ | After PFJ |
| Severely insecure (7-8) | 6 | 2 | 30 | 10 |
| Moderately insecure (4-6) | 9 | 6 | 45 | 30 |
| Secure (0-3) | 5 | 12 | 25 | 60 |
| Total | 20 | 20 | 100 | 100 |

ing crop productivity, and how households' food security is affected. Details of these themes are shown in the Appendices (Tables A1 and A2).

Objective 1: The Effectiveness of PFJ Input on Improving Crop Productivity

Theme 1: Input Availability and Access with PFJ

This theme gives insight into the availability, effectiveness, and accessibility of the PFJ inputs, contributes to the general objective of the program's effect on household food security, and identifies several crucial areas where PFJ beneficiary farmers are positively or negatively affected. Farmers reported inputs were accessible and available, which suggests that most farmers have some level of access to PFJ fertilizers and seeds. That reflects the views of Walls et al. (2023) and Michelson et al. (2023), who contend that the main objective of every agricultural input support program is to lower obstacles to resource access, especially for rural smallholder farmers who usually have difficulty with input access and affordability. Nonetheless, some beneficiary farmers reported input unavailability, inaccessibility, and insufficiency due to input delays, which reduced production outcomes. However, some farmers, through their alternative engagement, could afford inputs from the open market during the delay. Amaglobeli et al. (2024) identified logistical challenges as the primary cause for the delays and inefficiencies in PFJ input distribution and emphasized that those are common occurrences in most agricultural interventions. A 49-year-old male beneficiary from Namburug narrated:

Apart from farming, I am also a butcher. Usually, I sell some of my farm produce after harvest and start my butchery business during the lean season and save towards the new farming season. I usually buy from open market to supplement the few PFJ inputs I get for my farms.

A 63-year-old farmer from Tulinga described the high cost of inputs:

Imagine three or four years ago when I could sell two bags of rice to cover all input expenses

in one acre. Now even selling four bags is insufficient to cover the same acre. So, the government's decision to deliver the inputs on credit is commendable. Sometimes you intend to apply fertilizer, but the cost prevents you from obtaining the desired quantity for your farm.

Another farmer, a 46-year-old beneficiary from Tulinga, also said:

The main challenge is the unavailability and delay of inputs. I need to apply the NPK within two to three weeks after planting and follow with the urea after 40 days. My maize and rice farms are in the fifth week now and no fertilizers. I have not also saved enough cash to buy from the market.

Timely access to farming inputs is crucial, particularly in time-sensitive agricultural activities such as crop farming in Northern Ghana, which records only one rainy season annually. The widely reported delay of inputs remains a critical factor, leading to other constraints around input availability and accessibility. That leaves most farmers having to buy inputs at expensive open market prices to meet the planting period or only use reserved seeds and not apply fertilizer, which negatively affects crop productivity. Even those who could afford to buy inputs on the open market were still challenged by the high input costs, as witnessed in the respondents' quotes. These results are consistent with the findings of Pauw (2022) and Michelson et al. (2023), as they contended that PFJ inputs were still out of reach of the poorer farmers due to the high cost of inputs. The few concerns with input quality suggest that the PFJ inputs were of good quality, contrary to the reports by PFAG (2023). Despite the enhanced crop productivity that PFJ inputs supported, there were issues with input delays, inadequacies, and high costs, as referenced in the quotes from farmers. The narratives of these farmers during the interview sessions exposed multiple constraints that resulted in inconsistent crop yields and even low productivity outcomes among some beneficiaries. They include:

- Delay in receiving inputs, especially hybrid seeds, leaves most beneficiaries to rely on saved seeds, and some end up buying low-quality seeds to meet the planting period.
- The majority of the beneficiary farmers received insufficient quantities of inputs, particularly fertilizers, which will likely fail to yield the desired farm outputs.
- Most farmers were not following the best agronomic practices for production due to a lack of resources or ignorance about the benefits, as some cited the costly and time-consuming nature of these best practices. For instance, most farmers did not sow rice in rows or transplants but broadcast using about 40–50 kg of seeds per acre, while the former could be done with only about 20–25 kg per acre.

Theme 2: Crop Productivity with PFJ

Significant information generated under this theme shows varying outcomes in crop yields and farm sizes. Most farmers reported higher crop yields due to high-quality input access. Others recounted the support from extension officers in accessing and using inputs efficiently, highlighting the complementary role of technical assistance. Similar findings are reported by Agyemang et al. (2022) and Liu et al. (2024), as they also mention that farmers are frequently encouraged to increase production with better access to agricultural services and inputs for steady yield outcomes. These also help to build rural farmers' confidence and trust in the initiative. A 59-year-old male farmer from Pishigu provided the following response:

I think PFJ is beneficial despite the input difficulty. Two years ago, I got 3 bags of NPK and 2 bags of urea for a 5-acre rice farm and harvested 120 bags. I increased my acreage last year to seven acres and got 149 bags. My house still consumes food from last year's harvest, and I even sold some. I doubt I could have even harvested up to 80 bags without the inputs.

Meanwhile, another farmer, a 37-year-old male beneficiary from Yemo-Karaga, lamented:

I applied 3 bags of NPK 15:15:15 on four acres and got 52 bags of rice under PFJ, which was about double my previous yield. However, due to financial difficulties in buying supplementary inputs, plowing, and spraying costs, I reduced the acreage to two acres last year and had only 25 bags.

A 33-year-old farmer from Tulinga also responded:

PFJ motivated me to start farming, and it has been very supportive. However, engaging in serious farming as a beginner is challenging, since inputs alone are insufficient, without mechanization, personal land, and credit support.

The expanded farm size observed in the first quote is essential because it creates economies of scale for the farmers, potentially leading to higher yields and more food. That underpins the primary goal of the program, where quality PFJ inputs are linked to optimum productivity in yield, income, and food security. However, unstable crop yields and reduced farm size were reported in the second quote. There was also another important resource constraint, which led to poor productivity outcomes for beginning farmers, witnessed in the third quote and among most young farmers during interviews. This implies that not all farmers could have achieved productivity despite many recording increased yields and farm sizes with the PFJ intervention. According to the field interviews, most beneficiaries also lamented the erratic rainfall in the area. A similar finding by Owusu et al. (2024) asserted that smallholder farmers in Ghana frequently struggle with unstable weather patterns and inadequate irrigation systems, which account for seasonal variations in yields. Indeed, fundamental issues such as poor soil quality, lack of agronomic training, logistical constraints, and lack of proper farm management were also contributory factors. The poor agronomic practices again highlight the critical role extension delivery needs to play. Ibrahim et al. (2024) and Anang et al. (2022) noted that input subsidies can better increase yields if combined with appropriate

training and extension support to optimize farmers' use. However, the field interview reveals that the agricultural department lacks the necessary logistics to deliver timely and adequate extension services to farmers. According to farmers' insights, the following constraints contributed to undesirable productivity outcomes:

- Lack of irrigation and water management: Farming in this area is completely rainfed with inadequate irrigation facilities.
- Limited access to mechanization services: The absence of sufficient tractor services for land preparation, tillage, planting, and fertilization is a significant issue. In addition to the high costs associated with agricultural machinery and harvesting equipment, these issues are likely linked to some of the poor agronomic practices among farmers in the area, which restrict overall production levels.
- Environmental factors: Pest and disease outbreaks, soil erosion, and the long dry spells reported by many farmers affected yields heavily and compromised the effectiveness of PFJ input usage.

As long as these natural and human-related factors persist, farmers may continue to struggle to maximize their yields.

Objective 2: The Effect of PFJ on Household Food Security Achievement

Theme 3: Food Availability and Access with PFJ

This theme paints a complex picture of food availability, consumption, and coping measures for beneficiary households. Regular mealtimes and improvement of food security was reported after participating in the PFJ program, suggesting that the program has improved many households' capacity to meet their daily food needs. This is also significant among the key indicators of household food security based on the FAO-FIES. Several studies, including Awafo et al. (2024), Donkoh (2024), and Prah et al. (2023), have all found that PFJ has a positive impact on food sufficiency since beneficiary farmers can produce enough food to

meet their consumption needs. Others reported having a variety of diets throughout the season due to better crop yields since they have produced enough food for their households' consumption, due to PFJ support. Aminu (2022) and Lambongang et al. (2019) have also made similar findings with a direct correlation between farmers' PFJ participation and food security as a result of higher crop yields. A 43-year-old farmer from Tulinga explained:

I think the famine or hunger cases we witnessed years back have reduced since PFJ's introduction, as we can now afford more inputs to maximize production. I can't recall the last time I purchased main food items outside, except condiments. We typically eat the usual variety of meals throughout the season, which I produce from my farm.

But a 35-year-old beneficiary from Namburugu said this:

Even though yields have improved, it is just sometimes not enough. So immediately after harvest, I weigh my foodstuffs and buy to supplement for the season in case it is not enough. But I must admit that this year was very difficult. Just last week, I ordered a bag of maize for GHc700 on credit, and I have to pay it back after harvest.

A 54-year-old male beneficiary from Yemo-Karaga also responded:

Since the start of PFJ, I produced most of our household food from my farm with the help of the family. However, the quantity produced sometimes runs out of stock early, since the family is large, and money for the children's feeding on school days becomes problematic.

The first quote suggests an improvement in the food situation of their household due to crop productivity, which supports part of the anticipated impact factors of PFJ. Despite these positive sentiments, some households reported they occasionally need to borrow or purchase food to supplement

their farm harvests, as witnessed in the second quote. This implies that PFJ has not resolved food insecurity for some beneficiary households, especially those with inadequate yield outcomes. Indeed, there was a general concern about food shortages, to the extent that some even had to sell property or skip meals due to a food shortage or insufficiency. These issues are noticed especially amongst young, uneducated, low-income, unemployed, and large families. Factors such as high post-harvest losses, limited market access, or inefficiencies in input distribution can also exacerbate food shortage issues (FAO et al., 2024). These were also noted by PFAG (2023) and Sugri et al. (2021) as persistent problems that expose many farm households in Ghana to food shortages. As a result, many beneficiary families still have to look for additional food resources to supplement their farm harvests, highlighting the instability in yield.

These analyses reveal that the PFJ program has significantly improved food security due to increased crop productivity. The results from the FIES scores for households already discussed justify these outcomes, as significant increases and decreases were noticed in food secure and severely food insecure households, respectively. However, most beneficiaries still experience food shortages and encounter obstacles in attaining food security and adequate nutrition, as verified by some households' FIES scores of moderate and severe food insecurity.

Theme 4: Income and other Economic Effects with PFJ

This theme explores the socioeconomic effects of the PFJ initiative on beneficiary farmers. According to respondents, there are always buyers for surplus rice on market days. Some farmers have regular off-takers who buy in large quantities, while others, particularly female farmers, sell in smaller units, earning comparatively lower income from produce sales. This observation aligns with Nkegbe et al. (2022), who noted that market access for small-holder farmers is influenced by structural factors, including gender, access to productive resources, and institutional support. However, benefits from market access were not entirely guaranteed, as some farmers reported selling their produce quickly

at lower prices to meet urgent household needs. In contrast, others complained that inadequate market information limited their ability to make informed decisions on pricing and timing. A 61-year-old beneficiary from Pishigu said:

I complement my animals' feed with the crop husks from my farm after threshing. I also sell my produce to cover the costs of vaccines and veterinary services. So, the yields are good with PFJ, but the prices offered by the aggregators are just low. And we have to sell because we are pressed for money.

A 52-year-old beneficiary from Yemo-Karaga also said:

In my first year with the program, I had increased production by almost double, and I even acquired a tricycle to start my transport business. Last year, I increased my acreage from four to six acres and hired 'by-day' for my other maize and sorghum fields at harvest, which was very expensive. So, I have reduced my acreage this year, due to the financial burden and uncertainty about the inputs.

Financial constraints remain a fundamental challenge for many respondents, as evidenced by the quotes above. However, the PFJ plays a significant role in empowering farmers economically to relieve them of this financial burden. One main contribution is the expansion of food crop cultivation. This expansion requires additional labor for planting, weeding, and harvesting, which are all means of creating job opportunities and economic livelihoods for other locals. Farmers also are more likely to diversify their efforts into other crops, animal husbandry, artisanal work, and other economic activities. In Yemo-Karaga and Pishigu, for instance, the data showed evidence of income from off-farm engagements serving as a crucial financial resource for purchasing households' food and covering production costs, thus enhancing the PFJ's role in improving food availability. In this context, off-farm employment acted both as a coping mechanism to mitigate the effects of reduced farm productivity and as a means to

facilitate better food access. This highlights the multidimensional ways in which PFJ has impacted household food security.

According to the World Bank Group (2020), job creation through targeted agricultural initiatives is critical to strengthening rural economies by improving value-chain linkages, particularly in post-harvest marketing and processing. A key feature of the PFJ program is its credit-based input provision. However, this arrangement exposes farmers to the risk of accumulating debt if they are unable to repay. As several respondents explained, many farmers are cautious about taking inputs on credit because harvest outcomes are uncertain, and they fear being unable to meet repayment obligations in poor production years. This is highlighted in the study by PFAG (2023) and reflects findings by Khan et al. (2024) on how input support for farmers frequently leads to increased debt in the event of failed yields. The findings show that farmers have had several socioeconomic benefits with PFJ. Some accessed markets to sell surplus farm produce for income. Others discovered on-farm or off-farm employment in animal husbandry and acquired tricycles for transportation. These opportunities are significant for households to achieve financial sustainability and food affordability.

Theme 5: Policy Coherence and Governance

This theme reflects the broader insights of key informants about the program. It contributes to addressing the primary objective of this study, which is to examine the contribution of PFJ to rural household food security. The OECD (2024) defined policy coherence as the consistency of interdependent policy activities across government agencies and departments in attaining established goals. Within the framework of this study, the theme encompasses interconnected codes derived from the 20 key informant files related to governance issues within the implementation processes, highlighting both the positives and negatives of the program. The most frequently mentioned challenges, such as poor coordination and monitoring, political interference, and limited stakeholder engagement, were consistently cited as barriers that weakened program performance. Key informants explained that weak coordination among the

MoFA, district assemblies, and input suppliers delayed input distribution and reduced transparency. Political influence, particularly in the selection of farmers and in program oversight, discouraged some local actors and undermined trust in the system. Limited engagement with private-sector actors and farmer groups reduced opportunities for collaborative problem-solving and hindered innovation in funding and extension support. Together, these governance gaps constrain access to inputs and funding, diminish policymakers' willingness to commit long-term resources, and ultimately weaken the program's capacity to deliver sustained improvements in household food security. On a positive note, the most significant findings included increased yields and productivity, improved food security, and enhanced input usage, highlighting the programs' contribution to achieving food security in rural Ghana. A group leader in Namburugu said:

PFJ has made fertilizers abundant, and I know a lot of farmers who purchased tricycles after good harvests. I have expanded my acreage over the years, and now, I even hire 'by-day' for weeding and harvesting on my farm. My concern is just the slow pace of input delivery. No engagements or communication from officers, and inputs are just distributed anyhow. The political class should allow the agricultural office to manage everything professionally.

A key informant from the agricultural department, however, said:

The intervention has improved farming activities and livelihoods in our district based on our routine field assessments. However, the major challenge has been the poor timing of input delivery, which discourages most farmers' confidence in the process. The department is also under-resourced, which impedes our extension service delivery to all operational areas especially overseas, like Namburugu, Zandua, Bagli, etc.

Another key informant from the Directorate

of Agricultural Extension Service (DAES), MoFA, noted that:

The digitalization of PFJ beneficiary registration and input distribution through the Ghana Agriculture and Agribusiness Platform (GhAAP) has made the program more robust, reducing the perceived smuggling, theft, unnecessary human interference, and ensuring the security of farmers' data. However, there are some constraints with the delay in inputs arrival, and some of the PFJ components like mechanization are not active now. We still need to engage with key actors and improve on the timing. I think government should completely wean away from investments in production and focus more on value addition and marketing, to minimize the dependency syndrome. Overall, the PFJ initiative is commendable for its role in achieving food security, but it requires prompt implementation of its activities to ensure full and timely benefits for farmers. And I expect farmers to take advantage and register onto the database.

The insight from the first quote highlights the shortcomings in the registration and input distribution process, even after program reviews. It also highlights communication gaps among relevant stakeholders and some political interference. These responses suggest a significant breakdown in communication, leading to misunderstandings, and may prevent some farmers from participating in the initiative. The comments in the second quote reaffirm the complaints in the first quote and highlight other challenges, including impediments to delivery extension in PFJ implementation. The third quote hints at efforts to improve input delivery through digitalization but also reveals some constraints still faced. The 'dependency syndrome' in the quote refers to a situation where farmers increasingly rely on government support for production, rather than developing sustainable, independent farming practices. That has been noted in similar agricultural subsidy programs in SSA, where continuous dependence on external aid has weakened farmers' initiative to invest in their own production and value addition (Hemming et al., 2018; Mason &

Smale, 2017). According to the key informant interviews, the direct alignment of PFJ goals with improvement in food security highlights the significant impact of the program. However, its long-term sustainability is threatened by governance issues, including political interference, corruption, inadequate logistics, and insufficient monitoring. Their further insights also suggest a gradual shift from full input subsidies to cost-sharing models, strengthening farmer groups to improve collective access to markets and credit, and prioritising capacity-building in financial literacy and farm management. Such strategies can encourage greater farmer ownership and reduce long-term reliance on government support.

Food security is a vital component of rural economic development, and the PFJ aims to address this by enhancing food production and improving access to essential resources, including high-quality seeds, fertilizers, and technical support. The PFJ program's digital transformation to enhance input delivery is a significant governance improvement. According to Rolandi et al. (2021), digitizing agricultural programs enhances transparency and reduces opportunities for mismanagement and corruption. The program will, however, also require stronger collaboration with stakeholders, including farmers, community leaders, agricultural extension officers, and government agencies. These will minimize the perceptions of unfair input distribution processes due to nepotism and hegemony. Ibrahim et al. (2024) reported that multistakeholder coordination promotes efficient resource allocation throughout the value chain and ensures the program's success.

Policy Coherence within the Productivist Paradigm

This study's findings highlight both the contributions and limitations of the PFJ program in the Karaga district when examined through the lens of the productivist paradigm. Productivism, as described by Wilson (2007), is characterized by a strong state role in directing agricultural policy, farm input support, and the prioritization of yield increases as the dominant measure of success. The PFJ program embodies these principles through its subsidy-driven support for seeds and fertilizers,

centralized governance, and emphasis on national self-sufficiency in staple food crops. Moreover, the household food insecurity scores for the respondents indicate that production gains alone did not translate into sustainable improvements in all dimensions of food security. While household food availability improved, many households in the district continued to struggle with access and stability, highlighting the limitations of a production-focused approach.

Overall, PFJ demonstrates that while productivist strategies can boost production in the short term, they are insufficient to reduce food insecurity without complementary measures that are sustainable in the long term. Moving beyond productivism will require policies that integrate production support with market access, inclusive governance, gender equity, and ecological sustainability, aligning more closely with post-productivist or multifunctional agricultural approaches (Del Giudice, 2024; Wilson, 2007). Such a shift would enable agricultural interventions to address not only food availability but also the broader social, economic, and environmental factors that determine household food security.

Conclusion

The results from the study show that the PFJ program, through improved seeds and fertilizer support, has helped many beneficiary households in the Karaga district improve crop yields, secure enough food, earn income through surplus farm produce sales and off-farm engagements, enhance their ability to afford food, and improve their resilience, which are key factors to attaining food security and appear in line with the main goals of the program. Descriptive analysis of FAO-FIES scores confirmed that beneficiary households experienced reduced levels of food insecurity after PFJ adoption, a result further supported by farmers' narratives of improved access to food. For many participating households, these gains translated into reduced severity of food insecurity, highlighting the continued relevance of productivist approaches in contexts like Karaga district, where productivity gaps are wide and food deficits remain a pressing concern.

Outputs were not generally satisfactory for all

farmers due to challenges related to delays and insufficient quantities of inputs. Some had to rely on their saved resources, while others received support from their farmer groups and family members to purchase expensive farm inputs from the open market. Those who could not afford it continued to use reserved local seeds or even reduced the size of their farm cultivation. Other factors compromised household food security amid general economic hardships in the area. Such external production constraints included the lack of irrigation structures, poor agronomic practices, and adverse environmental conditions in the area, and further contributed to instability in crop productivity. Hence, most beneficiary households, particularly among the youth, low-income, less educated farmers, with no off-farm engagement, and those with larger family sizes, despite their advantage with cheap labor, had to rely on other coping measures by borrowing or selling a property for food and, in the worst case, skipping meals. These findings underscore the limitations of a purely productivist orientation, which prioritizes yield increases but neglects the multidimensional drivers of food insecurity.

In conclusion, the PFJ program provides an essential foundation for improving food availability but must be embedded within a broader policy framework that strengthens governance, enhances market systems, promotes gender equity, and supports farmer self-reliance. In the Ghanaian context, where productivity gaps remain high and dependence on food imports is a persistent concern, the rationale for a productivist approach is compelling. For many beneficiary households in Karaga, the immediate effect of PFJ was an increase in food availability, which helped reduce the severity of food insecurity as captured by FAO-FIES scores. In this sense, PFJ illustrates the continued relevance of productivist interventions in contexts where underproduction remains the binding constraint. However, the study findings show that production-oriented interventions alone cannot sustainably eliminate food insecurity.

The study recommends that policymakers engage more with local assemblies to design their domestic input distribution modalities that fit the specific needs and concerns of the farmers. For

example, frequent third-party audits enhance transparency in the input distribution process and civil society collaborations like the Peasant Farmers Association of Ghana (PFAAG) encourage drought-resistant varieties and short-duration seeds. Complementary social interventions are necessary to help improve the socioeconomic livelihoods and resilience of these farm households in the district. Policymakers should consider a program review and similar future interventions from production-centered to value addition and marketing to help generate stable incomes for farmers and even encourage enrollment of female farmers as direct beneficiaries. Finally, public infrastructure, such as irrigation facilities, storage facilities, and link roads connecting farms to markets should be improved.

Study Limitations and Future Research

Although the study adhered to the objective and strict qualitative protocols with explicit definitions for each code and theme, the main limitation will be the ability to generalize the study's findings. This is due to the qualitative nature of narrations, especially those regarding households' food insecurity experience before the PFJ intervention. These interpretations here may be subjected to fallibility. Moreover, the study's context and small respondent pool limit the general applicability of the findings to all districts in Ghana. Finally, Other equally

significant factors, such as macro-level indicators, international and environmental factors like floods, droughts, and pandemics, could have significantly influenced the study's outcome, but were not taken into account due to their complexity and scope.

Future research could increase the respondent pool, in order to assess a comparative outcome in community development and household food security across other beneficiary communities in Ghana. Also, an in-depth analysis of how institutions, macroeconomic, and adverse environmental factors influenced the effectiveness of the PFJ implementation should be explored. 

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Appendices

Table A1. Themes Generated from the Insights of Beneficiary Farmers

| Theme with codes | Files | Code counts |
|---|-----------|-------------|
| Input Availability and Access with PFJ | 20 | 89 |
| Access to inputs | 12 | 15 |
| Did not access inputs | 8 | 11 |
| Doubts about seeds quality | 1 | 1 |
| Good-quality inputs | 3 | 3 |
| Inputs are not sufficient for farm use | 5 | 8 |
| Input requests delayed | 16 | 20 |
| Inputs were available | 11 | 12 |
| Supplemented PFJ inputs at expensive price | 9 | 9 |
| Long distance to input distribution center | 2 | 2 |
| Seeds are not available | 7 | 8 |
| Crop Productivity with PFJ | 20 | 86 |
| Farm size not changed | 10 | 10 |
| Inconsistent rice yield | 13 | 22 |
| Increased farm size | 9 | 10 |
| Increased rice yield | 19 | 30 |
| Reduced farm size | 6 | 7 |
| Rice yield reduced | 6 | 7 |
| Food Availability and Access with PFJ | 20 | 136 |
| Borrow/buy to supplement household food | 15 | 21 |
| Food situation not changed | 10 | 15 |
| Food situation worse with PFJ | 9 | 14 |
| Having variety in diets | 15 | 26 |
| Improved food situation with PFJ | 16 | 29 |
| Sell a property or animal to buy food | 3 | 4 |
| Skipped meals | 2 | 2 |
| Worried/experiencing food shortage | 16 | 25 |
| Income and other Economic Effects with PFJ | 20 | 74 |
| Access to market for rice produce | 12 | 14 |
| Concerns about indebtedness | 4 | 4 |
| Financial constraints | 7 | 11 |
| Inadequate market information | 1 | 1 |
| More income from surplus rice sales | 14 | 20 |
| No employment opportunities | 5 | 5 |
| Opportunity for employment | 7 | 7 |
| Unstable income from rice sales | 4 | 4 |
| Unstable market for rice produce | 5 | 8 |

Table A2. Themes Generated from the Broader Insights of Key Informants

| Themes with codes | Files | |
|--|-----------|-------------|
| | KI | Code counts |
| Policy Coherence and Governance | 20 | 311 |
| Prospects: | | |
| Improved food security | 19 | 38 |
| Improved farmer productivity | 17 | 33 |
| Increased access and adoption of inputs | 18 | 34 |
| Increased farmer enrollment | 13 | 18 |
| Job creation | 5 | 9 |
| Private sector/NGO collaborations | 16 | 31 |
| Sensitization | 12 | 18 |
| Negatives: | | |
| Corruption and theft incidence | 10 | 15 |
| Dependency syndrome | 7 | 10 |
| Hegemony and political influence | 9 | 10 |
| Incomplete program components | 4 | 5 |
| Lack of broader stakeholder consultation | 14 | 18 |
| Poor coordination and monitoring | 19 | 38 |
| Poor timing | 17 | 34 |