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Farm-Level Effects of the 2019 Ghana Planting for Food and Jobs Program

An analysis of household survey data

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ACRONYMS AND ABBREVIATIONS

AEA	Agriculture Extension Agent
DTC	District Technical Committee
GoG	Government of Ghana
ICT	Information and Communication Technology
ISSER	Institute of Statistical, Social and Economic Research
MoFA	Ministry of Food and Agriculture
MT	Metric Tons
NAFCO	National Food Buffer Stock Company
NTC	National Technical Committee
PFJ	Planting for Food and Jobs
RTC	Regional Technical Committee

EXECUTIVE SUMMARY

Ghana's rising population, coupled with erratic weather patterns and soil nutrient deficiencies, pose a significant challenge to food crop production. In responding to universal calls for actions to end poverty, the Government of Ghana (GoG) launched the flagship Planting for Food and Jobs (PFJ) program in 2017. PFJ is designed to promote on-farm productivity through the intensification of fertilizer subsidies and adoption of improved seeds of targeted crops, thereby enabling job creation in agriculture and other interrelated sectors. Implemented by the Ministry of Food and Agriculture (MoFA), the PFJ program works in concert with other existing agricultural programs and policies to achieve the universal goal of ending hunger, achieving food security, and improving nutrition by promoting efficient and sustainable intensification and climate-proofing of agriculture by 2030 (Sustainable Development Goal 2).

The overall objective of the study reported on in this Working Paper was to assess the performance and outcome of the PFJ program in the 2019 farming year from the perspectives of beneficiary and non-beneficiary farmers. The specific objectives are to:

- Assess the performance of the PFJ implementation in respect to its implementation pillars;
- Analyze crop yield, storage, and post-harvest losses by agroecological zones;
- Assess the value of crop sales;
- Measure the outcome of the program on household welfare; and
- Analyze the effects of COVID-19 on the performance of the PFJ program

Methodology – A quasi-experimental design was adopted where PFJ beneficiaries served as the treatment group while non-beneficiaries served as a comparator group. This afforded us the opportunity to compare some of the results for beneficiary farmers with those for non-beneficiaries. We collected data from 2,100 beneficiary and 840 non-beneficiary farmer households across 21 districts evenly distributed across the Northern, Middle, and Southern agroecological zones of Ghana.

Most respondents in the sample had heard of the PFJ program for 2019, mainly through the media, farmers, friends, or relatives, and government officials. While most of the farmers intend to participate in the fertilizer subsidy program in the following 2020 crop season, only one-third of farmers plan to participate in the seed subsidy program. A lack of awareness and interest in participating in the program were the two primary reasons why some farmers do not intend to participate in either program in the 2020 crop season.

Assessment of Planting for Food and Jobs pillars

Access and use of subsidized seed or planting materials – Overall, 36.1 percent of beneficiary households obtained improved seeds. Comparatively, a more significant proportion of farmers in the Southern agroecological zone received improved seeds, relative to those in the Middle and the Northern zones. Maize (28.3 percent) and rice (6.9 percent) seed receipt dominates all other seeds across the three zones. Most farmers reported obtaining their seeds on time. Most farmers evaluated the maize and rice seed they obtained under the PFJ programs as being of good quality.

Access and use of subsidized fertilizer – Unlike seed, most beneficiary farmers (88.9 percent) accessed and used subsidized fertilizers under the PFJ program. Among the types of fertilizers, NPK was the most widely accessed and used fertilizer type (70.2 percent), followed by urea (46.8 percent). Only 1.2 percent of the farmers use organic fertilizer. The majority of the beneficiary farmers in all three zones obtained the PFJ fertilizers from agro-input dealers (70.2 percent) and

MoFA offices (25.1 percent). Almost all the beneficiary farmers who used the fertilizers intend to use them again because they are affordable and increase yields.

E-agriculture – Access to information through ICT platforms was generally low (13.3 percent) among beneficiary farmers. Radio or television and phone calls or text messages were the major sources of information for farmers. The government was the leading supplier of information. Most beneficiary farmers reported having seen an improvement in government-provided information services. Only 13.4 percent of beneficiary farmers encountered challenges during the registration process, highlighting the time-consuming nature of the process and distance to the MoFA office.

Agricultural extension services – The proportion of beneficiary farmers who received extension services was 44.5 percent. A significant proportion of beneficiary farmers in the Middle zone received extension services (65.1 percent), while only 28 percent of farmers in the Northern zone did so. Only a quarter of the farmers have extension agents in their communities. Many beneficiary farmers, especially in the Middle zone, received training on improved farming practices. Generally, the farmers were satisfied with the various extension services they received.

Marketing of produce – Many of the farmers (81.6 percent) sold all or a fraction of their harvested crop in the 2019 major planting season. The proportion of beneficiary farmers (83.3 percent) who sold all or part of their harvested crops was higher than among non-beneficiary farmers (77.2 percent). The majority of farmers sold their harvested crops to market traders. Less than one percent of the beneficiary farmers sold their produce to the National Food Buffer Stock Company (NAFCO) or had some arrangements with MoFA for the purchase of their harvested crops.

Crop yields and post-harvest losses – For all the crops cultivated, the average beneficiary farmer obtained higher yields, although marginal, than the average non-beneficiary farmer. Overall, 46.9 percent of households' store all or part of their produce after harvest. Compared to non-beneficiaries, beneficiaries recorded higher post-harvest losses for maize, soya bean, groundnut, and cassava, while the reverse was true for the remaining crops examined.

Planting for Food and Jobs outcome assessment – The food security analysis showed that the proportion of non-beneficiary households that experienced food shortage was 7.3 percentage points higher than beneficiary households. Welfare indicators reveal that a greater proportion of beneficiaries were better off than their non-beneficiary counterparts. The proportion of non-beneficiaries in the bottom income tercile (i.e., the poorest one-third) was 10.7 percentage points higher than for beneficiaries. In comparison, the proportion of beneficiaries within the top wealthiest tercile was 12.7 percentage points higher than for non-beneficiaries.

The COVID-19 pandemic had small effects on farmers. Only 3.3 percent decided not to participate in PFJ in the 2020 cropping season because of COVID, while 3.7 percent experienced unusual difficulties in acquiring seed or fertilizer for PFJ in 2020. Farmers reported experiencing some difficulties accessing MoFA's offices or PFJ outlets due to social distancing and travel restrictions under COVID.

Conclusions – The study revealed a number of significant issues on the overall 2019 PFJ program. Among these are the widespread access (1.6 million beneficiaries) of the program, although there had been more interest in fertilizer than seeds. We also see increased private market engagement for crops produced, with the government playing a less significant purchaser's role. Beneficiary farmers also experience improved crop yields, although marginally, relative to the non-beneficiary farmers. However, beneficiary farmers tended to be wealthier and less prone to food insecurity, although this may be indicative of selection bias as opposed to an outcome of PFJ. Last, although the COVID-19 pandemic has negatively affected every facet of the Ghanaian economy, it is not likely to greatly affect the PFJ program since most farmers are not going to reduce the size of their crop production in the 2020 planting season.

To enhance the sustainability and effectiveness of the PFJ program, it is imperative to focus on maximizing returns (increase crops yields) from the subsidies and to more strongly promote the seed component. In addition, government involvement in market arrangements via its agencies, such as NAFCO, should be revamped to give assurance to farmers about the purchase of their produce.

1. INTRODUCTION

Attaining food security through self-sufficiency has long been a policy priority in Ghana. The Government of Ghana in 2017 launched a vision of 'Ghana Beyond Aid' in which the nation is envisioned to use its resources to engineer social and economic growth so as to become self-reliant and to do away with the overdependence on grants and handouts from donor governments and agencies (GoG 2018). Aside from the country achieving self-sufficiency, openness to international trade through its ports offers an opportunity to capitalize on international markets such as through the African Growth and Opportunity Act, the African Continental Free Trade Area, the Economic Community of West African States, and other regional and international agreements that enable exporting of consumer-preferred Ghanaian fresh and processed products that have shorter travel times to European and regional markets (FtF 2018). However, Ghana's rising population, coupled with erratic weather patterns and soil nutrient deficiencies, pose a significant challenge to food crop production for domestic consumption alone (Müller-Kuckelberg 2012; Bationo and Andam 2018). The rising population has long prompted Ghana to choose development strategies that will motivate increased staple food crop productivity towards its self-sufficiency agenda.

For instance, due to the restrained growth in agricultural productivity experienced over the past decades, increase in local production has not kept up with the pace of change in consumer demand for crops such as rice, maize, sorghum, chili pepper, onion, and tomatoes, prompting local traders to import from neighbouring African countries and Europe. This is further aggravated by Ghana's growing population, which is expected to reach 30.5 million by the end of 2020, at an annual growth rate of 2.36 percent (UN 2015). The country has thus experienced a widening gap between local supply and demand and export opportunities. This trajectory, which also pertains to other sub-Saharan African countries, falls short of Asia's green revolution in the 1970s and 1980s, which propelled some Asian countries into improved food security and economic transformation.

Furthermore, the decline in productivity levels has partly been blamed on the fact that the vast part of Ghana's soils are inherently deficient in nitrogen and phosphorus, two of the three major productivity-enhancing nutrients (potassium being the third) (MoFA 2015; Antwi et al. 2016). By farming intensively without replenishing soil nutrients, soils get depleted at a rate of 35 kg of nitrogen, 4 kg of phosphorus, and 20 kg of potassium per hectare per year (Quansah et al. 2000; Scheiterle and Birner 2018). From 2008 onwards, GoG initiated a national Fertilizer Subsidy Program under which fertilizers were sold at subsidised prices. The purpose was to strengthen food security by increasing the domestic production of staple food crops through increased fertilizer use. Initially, the Fertilizer Subsidy Program enabled targeted crop farmers to access fertilizer at 50 percent of the retail price. However, in 2010, the program gave a green light to all farmers to access the subsidised fertilizer, which more than doubled the average expenditure from about 20 percent of total annual expenses of the Ministry of Food and Agriculture's (MoFA), increasing to 53 percent by 2012 (Scheiterle and Birner 2018). However, subdued uptake of fertilizers among farmers meant that to promote on-farm productivity there was the need for an improvement in the reachability of the subsidies; empowerment of farmers through capacity building that will ensure the sustainability of the supply and demand of inputs, and promotion of market-based solutions within the input and output supply chains.

Another leg of the Ghana's low crop productivity is the size of agricultural land held by households for commercial farming purposes. National statistics show that about 90 percent of farm holdings are less than two hectares in size (SRID 2011), contributing 80 percent of the country's total agricultural output (FAO 2015). Major staple food crops, including maize, rice, sorghum, millet, and root crops such as cassava, yam, and sweet potato, are often produced on smallholder farms, with inadequate technical and operational efficiencies. Furthermore, smallholder

farming of these food crops largely remains under rain-fed, subsistence-based production environments, where rising productivity remains a grim challenge.

Hence, responding to universal calls for action to end poverty and to ensure prosperity in the form of the Sustainable Development Goals (UN 2016), the GoG launched a flagship program dubbed Planting for Food and Jobs (PFJ) in 2017. PFJ is designed to promote on-farm productivity through the increased use of fertilizer and adoption of improved seed of targeted crops in order to enable job creation in agriculture and other interrelated sectors. The PFJ program works in concert with other existing agricultural policies to achieve the universal goal of ending hunger, achieving food security, and improving nutrition by promoting efficient and sustainable intensification and climate-proofing of agriculture (Sustainable Development Goal 2) by 2030. The program was established to address, amongst other things, the factors stifling total factor productivity in the agricultural sector, as revealed by studies undertaken by the Ministry of Food and Agriculture (MoFA 2017). These productivity bottlenecks included low accessibility to and inadequate use of certified seeds; insufficient fertilizer application; lack of extension services to farmers; weak linkages between producers and markets; and limited use of information and communication technologies (ICT) in the agriculture sector.

The main aim of this study was to assess the performance and outcome of the GoG's PFJ program in 2019 from the perspectives of the beneficiary and non-beneficiary farmers. Specifically, the assignment sought to:

- Assess the performance of the PFJ program's implementation pillars in the three agroecological zones of Ghana. This objective sought to analyze for both PFJ beneficiary farmers and non-beneficiary farmers in 2019:
  - Access to and use of seed/planting material.
  - Access to and use of fertilizer.
  - Access to and use of information through E-agriculture platforms.
  - Access to and use of agricultural extension services.
  - Access to marketing services.
- Analyze crop yield and post-harvest losses by PFJ beneficiary and non-beneficiary farmers in 2019.
- Assess crop storage by agroecological zones.
- Assess crop sales and farm revenue by the PFJ beneficiary farmers in 2019.
- Measure the outcome of the PFJ program on the welfare of beneficiary households compared to non-beneficiary households in 2019.
- Analyze the effects of COVID-19 on the performance of the PFJ program.

This report is organised as follows. Section 2 presents an overview of the PFJ program design and implementation, while section 3 discusses the study methodology. Section 4 presents result and analysis, starting with a description of household socio-economic and farm characteristics, including knowledge of and participation in the PFJ program. Section 5 assesses PFJ impacts as it pertains to the PFJ implementation pillars, while section 6 analyses household crop yields, post-harvest losses, and the value of crop sales. Section 7 assesses the PFJ outcomes in terms of improving household food security and welfare. We consider challenges faced by farmers, including general production constraints, in section 8 and COVID-19 specific constraints in section 9. Finally, section 10 presents a summary and conclusions drawn from the study.

2. THE PLANTING FOR FOOD AND JOBS PROGRAM

The overall goal of the PFJ program is to contribute to the modernization of the agriculture sector to bring about structural transformation of the national economy. The objectives of the program's strategy, as stated in PFJ strategic plan (MoFA 2017) are to:

- Ensure immediate and adequate availability of the selected crops in Ghana through improved productivity and intensification of food crops, and extended support to private sector service providers;
- Provide job opportunities for the teeming unemployed youth in the agriculture and allied sectors; and
- Create general awareness for all formal workers to either have farms and grow some cereals or vegetables or establish backyard gardens when enough land is not available and accessible.

Program pillars

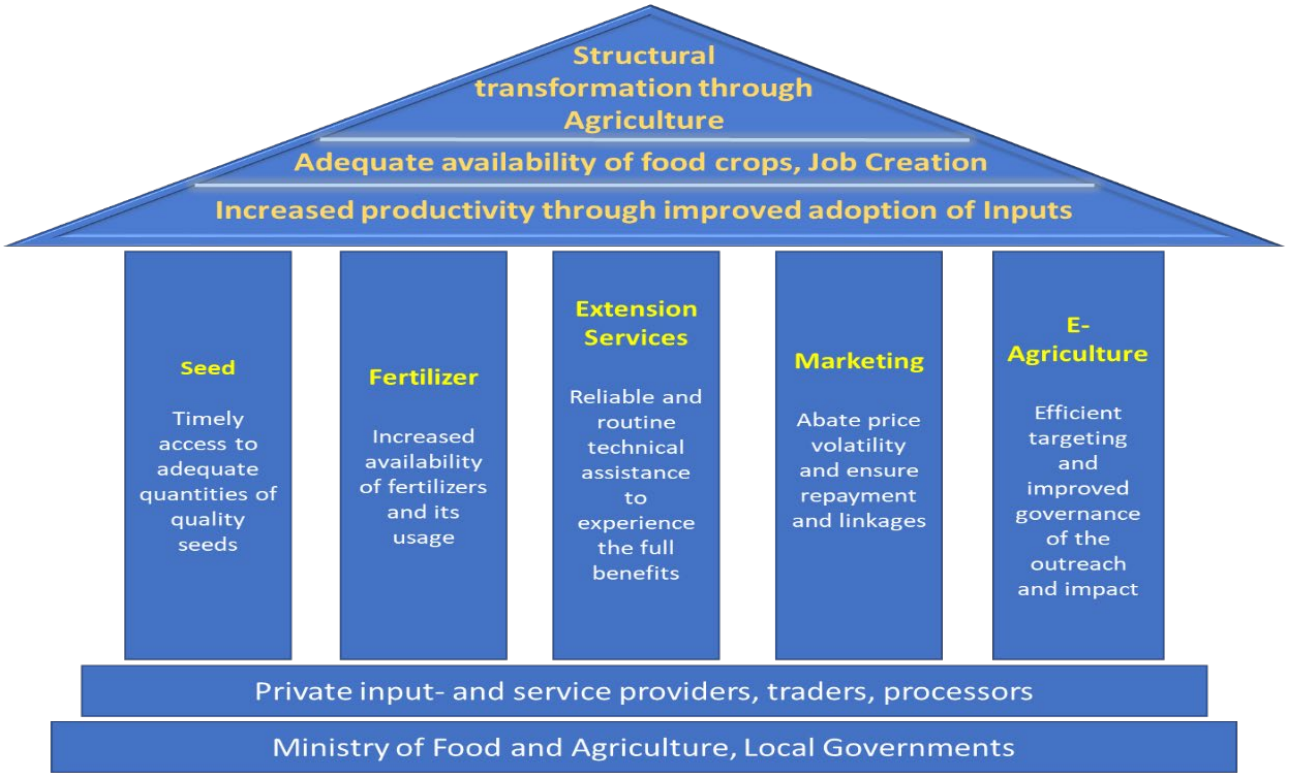
The PFJ program has adopted an integrated and comprehensive approach to increase productivity through increased access to inputs (seeds and fertilizers) and output markets. The program focuses on the following key mechanisms:

- Facilitation of adoption of inputs, good agronomic practices, and output marketing through an integrated e-agriculture platform; and
- Provision of support to private sector actors who are engaged in delivering goods and services along the value chains in an efficient manner.

The PFJ program seeks to motivate the farmers to adopt modern inputs by subsidizing fertilizers and improved seed. Since smallholder farmers are likely to spend a significant portion of their farm revenue (due to low-income levels) in buying these inputs, the PFJ program will moderate farmers' financial burden by providing an option for farmers to pay only half of the payable portion (MoFA 2017) The major interventions under the PFJ are organised around the following five strategic pillars (Figure 1).

- The **seed pillar** of the program is designed to catalyse market-led production of adequate quantities of quality seed by private enterprises and to facilitate the timely distribution of the certified seed at subsidized prices through public and private outlets to the targeted beneficiaries (MoFA 2017).
- The **fertilizer pillar** aims to increase the availability and the use of fertilizers by farmers. Private companies engaged in fertilizer production, blending, and importation will meet the beneficiary farmers' fertilizer demands under the PFJ program through timely procurement, transportation, and distribution (MoFA 2017).
- Through the **extension services pillar**, GoG will recruit and place Agriculture Extension Agents (AEA) in all the 216 districts, provide them with required logistics, and embed them to work closely with participating farmers. In partnerships with local governments and private inputs and service providers, extension services will program and provide reliable technical assistance so that the beneficiaries will access and experience the full benefits of the promoted technological packages (MoFA 2017).

Figure 1. Strategic pillars of the Planting for Food and Jobs program



Source: MoFA (2017) PFJ Strategic Plan for Implementation (2017-2020)

- The **marketing pillar** promotes partnerships amongst farmers, nucleus farmers, farmer associations, farmer-based organizations, and private aggregators with a view to strengthen marketing of both inputs and outputs. It is envisaged that the facilitation of increased uptake of inputs will increase the production of the targeted crops. New storage warehouses will be constructed in areas closer to the production areas, and where necessary, old warehouses will be rehabilitated and rendered functional. The PFJ program will also assist farmers in marketing their farm outputs to (i) ensure the recovery of the remaining payment for subsidized inputs, (ii) minimize any ill-effects of price volatility through increased participation and competition by private players, and (iii) widen the benefits of increased production by establishing linkages with value addition and other food purchase programs (MoFA 2017).
- The **e-agriculture pillar** is to improve beneficiary targeting and to avoid diversion of subsidized inputs. The PFJ program will profile the beneficiaries by engaging a state-of-art ICT platform. Through real-time and cloud computing services, the data collected from the beneficiaries will be validated. By integrating ICT with the other program pillars and processes, responsiveness, efficiency, transparency, and accountability of the government agencies and private service providers in providing inputs and services to farmers and other stakeholders will be strengthened (MoFA 2017).

Programmatic framework

The Ministry of Food and Agriculture (MoFA) is responsible for overall strategic guidance and coordinates the PFJ program's implementation through a three-tier structure (Figure 2). The lead agency for coordinating the program within MoFA is the National Technical Committee (NTC). Chaired by the Deputy Minister (Crops), the NTC steers the general course of actions and sets directions in conformity with the overarching national developmental strategies. NTC drives the implementation process through Regional Technical Committees (RTC) and District Technical

Committees (DTC) established across the nation. The NTC holds the key decision-making responsibilities, while the RTC and DTC have oversight and coordination functions (MoFA 2017).

Figure 2. Implementation structures of the Planting for Food and Jobs program

Source: MoFA (2017)

The NTC oversees the implementation of strategic activities at national level and reports on the program's progress to the Minister for Agriculture. It also coordinates with development partners and other national stakeholders on the implementation of the PFJ program. Representatives of the private sector from all levels of the value chains are included in any discussions related to the design and implementation of the program.

The RTC, in consultation with the DTCs of districts in the region, establishes the institutional arrangements, safeguards against risks, develops a monitoring plan, coordinates and supervises the respective region's implementation, and prepares quarterly decision reports for the NTC.

The DTC develops seasonal and annual operational plans, mobilizes private- and public-sector actors and supporters, implements and monitors the day-to-day activities, continuously assesses and manages any risks and threats to the implementation, and proposes decisions, reporting monthly to the RTC (MoFA 2017).

Following a year of implementing the PFJ program, agricultural output grew at a rate of 8.4 percent in 2017 (MoFEP 2019). On account of this success, the Government implemented an expanded version of the PFJ program in 2018 with more ambitious targets. Compared with an initial target of 500,000 farmers, a total of 577,000 farmers were supplied with subsidised fertilizers and seeds for the 2018 cropping season, with a projected expansion to about one million farmers subsequently (MoFEP 2019).

In 2019, the GoG launched the livestock module of the PFJ, called Rearing for Food and Jobs, with the intention of increasing selected livestock production, especially poultry. Under the module, a total of 30,000 cockerels were distributed to 3,000 farmers in 12 regions in 2019, chosen to cross with local hens in order to improve the live weight of chickens from 1.2kg to 1.5kg and egg-laying rate from 70 to 110 eggs per year. A total of 7,500 small ruminants were also distributed to 750 farmers in six selected regions. As of June 2020, an additional 531,100 improved breeds of livestock and poultry species, including sheep, goats, pigs, cockerels, and guinea fowls, were procured to be distributed to farmers under the Rearing for Food and Jobs Module (MoFEP 2020).

In 2019, the government also launched the Planting for Export and Rural Development Module to promote the development of selected tree crops for diversified export earnings, increased farmer incomes, agro-industries, and empowerment of rural economies. A total of 15 million seedlings of cashew, coffee, coconut, and oil palm were distributed to farmers (MoFEP 2020). Additionally, the Aquaculture for Food and Jobs Initiative was piloted in 2019 under which 321 youths were trained in modern methods of aquaculture production. In 2020, the government intends to scale this Initiative in Ashanti, Bono, Bono East, Western, Volta, Oti, and Eastern Regions (MoFEP 2020).

The government also embarked on constructing 30 warehouses, each with a capacity of 1,000 metric tons throughout the country as part of measures to ensure food security, reduce post-harvest losses, guarantee farmer incomes, and improve marketing. As of November 2019 (when the 2020 budget was read at parliament), 17 of the warehouses were completed, with the remaining scheduled for completion by December 2020 (MoFEP 2020).

The PFJ, as originally designed, is now known as the Crops Module of the broader PFJ program. PFJ also now includes the Agricultural Mechanisation Service Centres program and the Greenhouse Village program. So, together with the Planting for Export and Rural Development Module and the Rearing for Food and Jobs Module, there are five modules in total. The analysis in this study focuses explicitly on the Crops Module of PFJ – throughout the text, any reference to PFJ is explicitly a reference to the Crops Module.

3. METHODOLOGY FOR THE ASSESSMENT OF THE 2019 PLANTING FOR FOOD AND JOBS PROGRAM

In this section, we discuss the research design and the approach followed to assess the performance and outcome of the PFJ program in the 2019 major crop season. The study adopted a quantitative quasi-experimental design by randomly sampling farmers who accessed PFJ subsidised fertilizers and improved seeds (beneficiaries) and those who did not (non-beneficiaries) in 21 districts across the three agroecological zones of Ghana.

Study design

A quasi-experimental design does not require a strict random assignment of the beneficiary and non-beneficiary farmers concerning access to the PFJ intervention. This approach was judged most feasible since farmers had already enrolled in the program, which was non-discriminatory among farmers of selected crops. However, the study adopted a quantitative comparative approach in assessing beneficiary households' crop marketing, yields, post-harvest losses, crop sales, labor use, and household assets vis-à-vis non-beneficiary households in the 21 study districts across the three zones. In this regard, questionnaires were designed as the main instrument of data collection. The following definitions were used for the study:

Beneficiary: A farmer is considered a beneficiary if he/she directly obtained subsidised fertilizer or improved seeds under the PFJ program for the 2019 planting season.

Non-beneficiary: A non-beneficiary farmer is one who did not directly obtain subsidised fertilizer or improved seeds under the PFJ program for the 2019 planting season.

Scope of the study

About half of Ghana’s total land area of 238,535 km² is arable for farming activities, with the rest covered by either inland water or forest. The PFJ program is national in scope, reaching all the country's districts where the prioritized food crops are grown. Therefore, the PFJ program's assessment used a nationally representative selection of PFJ prioritized crops and districts where

these crops are mostly grown. Ghana Statistical Service (GSS) defines agroecological zones as geographical areas exhibiting similar soil and climatic conditions that support rain-fed agriculture (GSS 2020). These include the Coastal Savannah, Forest Zone, Transitional Zone, and Northern Savannah (GSS 2020). Other studies categorise Ghana's agroecological zones into six distinct zones based on the climatic conditions and the soil types: Guinea savannah zone, Forest-savanna transition zone, Semi-deciduous forest zone, Sudan savannah zone, Coastal savannah zone, and the Rain forest zone (moist and wet evergreen) (Asravor et al. 2019; AGRA 2017). However, following the GSS categorisation, for purposes of the study the Coastal Savannah and Forest Zones were combined into one 'Southern' zone. This was done based on the similarities among the two agroecological zones in the production of selected PFJ crops. The study also refers to the Transitional Zone as the 'Middle' zone and the Northern Savannah as the 'Northern' zone.

Focus crops

Under the PFJ program, the GoG intends to enhance the productivity of prioritized crops of significance for food and feed in Ghana through subsidies and integrated services on farming and crop marketing. According to the PFJ program implementation plan, the prioritized crops were selected based on their contribution to national socio-economic development, including for (i) food security, (ii) smallholder farm profitability and incomes, (iii) supply of raw material for the livestock and industrial sector, (iv) reduction in food import bill, (v) job creation, and (vi) economic activity from various actors along the value chain.

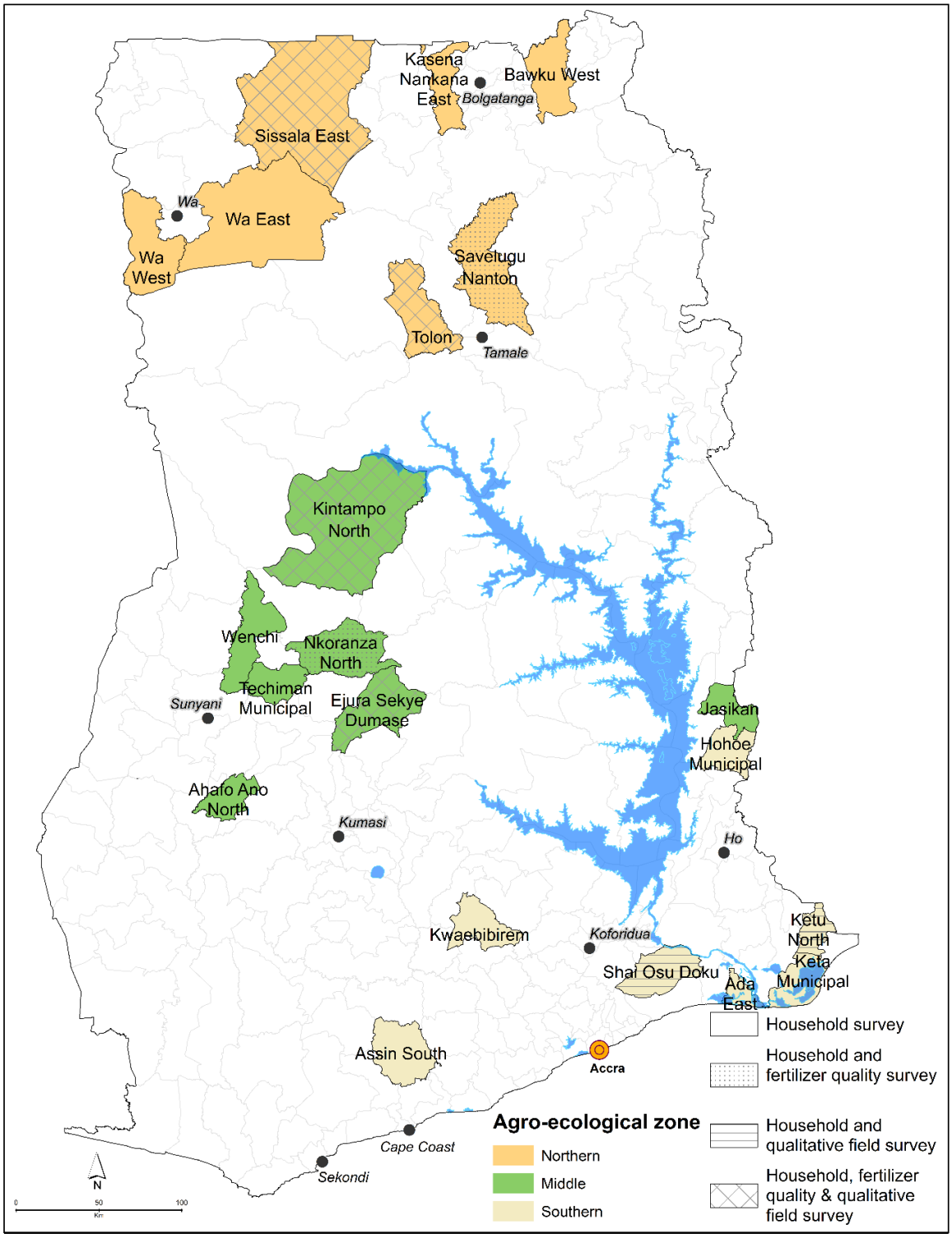
The initial crops and their value chains selected for support under the PFJ program included maize, rice, sorghum, soya bean, tomato, onion, and chili pepper. However, in the 2018 and 2019 planting seasons, the program increased its prioritized food crops to include other crops, such as cassava, plantain, yam, and groundnuts, among others (MoFA 2019).

Focus zones

The study focused on the reclassified three agroecological zones in Ghana (Figure 3). The Northern agroecological zone has only one rainy season that occurs from May to September, with a semi-arid climate. As a result, there is only one major planting season. Compared to the forest and transitional zones, the vegetation is sparse, characterised by low trees and grassy areas. The Volta River flows through this region, allowing for rice farming. The sampling in the Northern zone targeted households that farm four of the seven initial PFJ target crops: maize, rice, sorghum, and groundnut.

South of Northern Savannah is the Middle zone, which is also the Transitional agroecological zone, where thick forest gradually transforms into savannah and grassland. It is called a transition zone because it shares its climate with Savannah. It receives an annual rainfall of 1,200 mm, which is quite fair compared to the forest and the Savannah. The transition zone covers 28 percent of Ghana's agricultural lands, and experiences two rainy seasons, a major season from March to July and a minor season from September to October. Crops widely cultivated in this zone include maize, rice, yam, cocoyam, groundnut, cowpea, and plantain. However, the PFJ focus crops for the zone were maize and rice.

Figure 3. Map of Ghana with selected districts for evaluation, by agroecological zone



Source: IFPRI, 2020

Finally, the Southern zone covers both the Forest and the Coastal Savannah zones, located in the tropical and coastal parts of Ghana in the South and Southwestern regions. The rainforest is made up of trees, mainly hardwood, with high soil fertility and high rainfall of up to 2,200 mm, suitable for crops such as vegetables. Hence, the PFJ focus crops for this zone included maize, rice, and vegetables (chilli pepper, lettuce, cabbage, and carrots). Table 1 summarizes the regions, the distribution of districts, zones of coverage, and focus crops that the study examined.

Table 1. Study districts selected for assessment of the 2019 Planting for Food and Jobs Program

No.	Selected District	Region	Agroecological zone	Focus PFJ crops
1	Kasena Nankana Municipal	Upper East	Northern	maize, rice, sorghum, groundnut
2	Bawku West	Upper East	Northern	maize, rice, sorghum, groundnut
3	Sisala East	Upper West	Northern	maize, rice, sorghum, groundnut
4	Wa West	Upper West	Northern	maize, rice, sorghum, groundnut
5	Wa East	Upper West	Northern	maize, rice, sorghum, groundnut
6	Savelugu	Northern	Northern	maize, rice, sorghum, groundnut
7	Tolon	Northern	Northern	maize, rice, sorghum, groundnut
8	Ejura Sekyedumase	Ashanti	Middle	maize, rice
9	Ahafo Ano North	Ashanti	Middle	maize, rice
10	Wenchi	Bono	Middle	maize, rice
11	Kintampo North	Bono East	Middle	maize, rice
12	Nkoranza North	Bono East	Middle	maize, rice
13	Techiman	Bono East	Middle	maize, rice
14	Jasikan	Oti	Middle	maize, rice
15	Ketu North	Volta	Southern	maize, rice, vegetables
16	Hohoe	Volta	Southern	maize, rice, vegetables
17	Keta Municipal	Volta	Southern	maize, rice, vegetables
18	Assin South	Central	Southern	maize, rice, vegetables
19	Kwaebibrim (Kade)	Eastern	Southern	maize, rice, vegetables
20	Shai Osudoku	Greater Accra	Southern	maize, rice, vegetables
21	Ada East	Greater Accra	Southern	maize, rice, vegetables

Source: ISSER PFJ Survey, 2020.

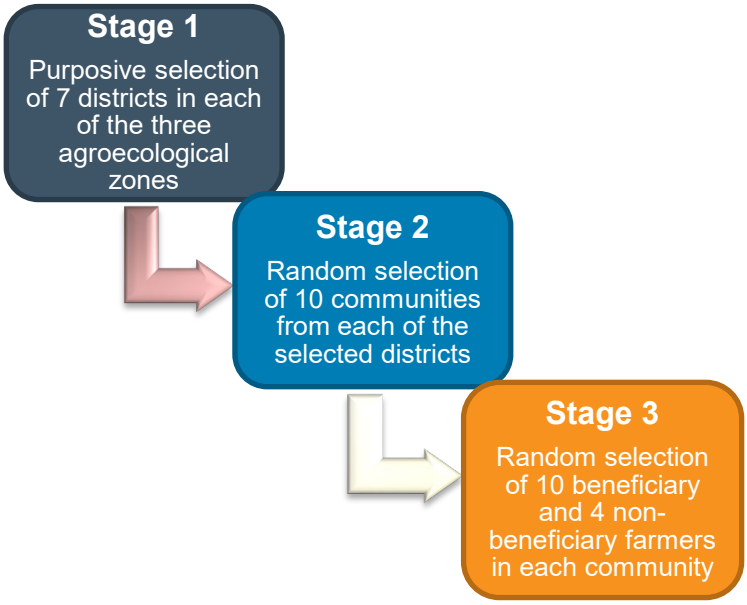
Fieldwork

MoFA does not maintain a comprehensive list of all PFJ beneficiary farmers by district or community. Hence, in the absence of the PFJ beneficiary sampling frame for 2019, it was necessary for the researchers to undertake reconnaissance visits to the selected districts. The main aim of the visits was to interact with MoFA officials in the purposively selected districts to elicit support to select communities and then to build up the sample from a listing of farmers in the selected communities. The research team did not anticipate obtaining the desired farmer list during the visits, but, rather, made the visits to establish contacts with the PFJ desk officers. The study team subsequently engaged further with the PFJ desk officers in order to select communities and to obtain PFJ beneficiary lists for those communities within the shortest possible time. In that regard, the research team shared templates with the MoFA officers in each district to guide the compilation of all communities and the beneficiary farmers in selected communities in the districts. Thus, the compilation process was of two phases: first, a compilation of a frame of communities in the selected districts, and second, a compilation of sampling frames of PFJ beneficiary farmers.

This study adopted a three-stage stratified sampling approach, as shown in Figure 4. This approach was carried out in close collaboration with the MoFA head office and the 21 MoFA district offices, as shown in Figure 5. The first stage involved purposive[1] selection of seven districts in each of the three agroecological zones (Southern, Middle, and Northern zones).

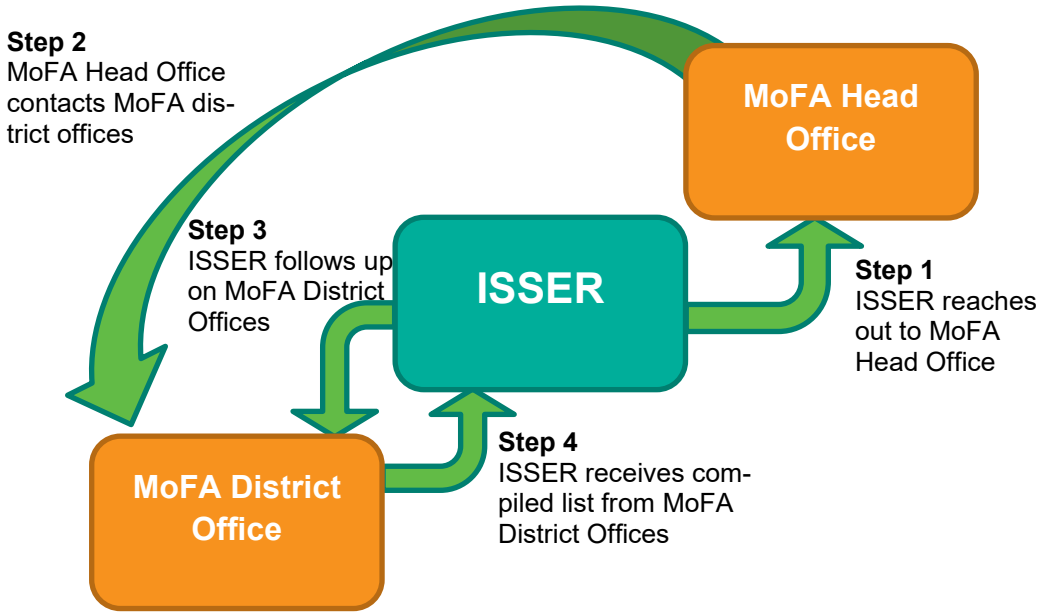
[1] Selection of these districts was determined by MoFA and the PFJ secretariat stakeholders because of their active participation in the PFJ program.

Figure 4. Stages of sampling



Source: ISSER PFJ Survey, 2020

Figure 5. Channels for compiling the sampling frame



Source: ISSER PFJ Survey, 2020

In the third and final stage, MoFA officers assigned AEAs to each of the communities in the selected districts to help compile a list of at least 50 beneficiary and 20 non-beneficiary farmers using a template which captured information on: (i) name of beneficiary or non-beneficiary; (ii) community; (iii) contact details; (iv) gender; and (v) target crops grown. The compiled list was, again, forwarded to ISSER for a random selection of 10 beneficiaries and 4 non-beneficiary farmers from each of the selected communities.

Overall, 288 (9.8 percent) of the initially selected 2,940 respondents were replaced for various reasons. In most cases, the name and phone contacts of respondents were incorrectly recorded during the listing phase and, therefore, could not be traced. In other instances, some non-beneficiary farmers were erroneously identified as beneficiaries and vice versa. Others refused to participate in the survey. On the other side, 12 (5.7 percent) communities out of the 210 study

communities were replaced for varying reasons, ranging from inaccessibility due to floods or incorrect community names or lists of beneficiaries in the community. However, in one community, farmers refused outright to participate in the survey after several attempts to persuade them. Where a respondent was not reachable or refused to participate, a different farmer was randomly selected from the sample frame to serve as a replacement. Also, in the case of an inaccessible community or total refusal, a new community was randomly selected from the frame of communities and the third stage of sampling was repeated.

Sample size calculation

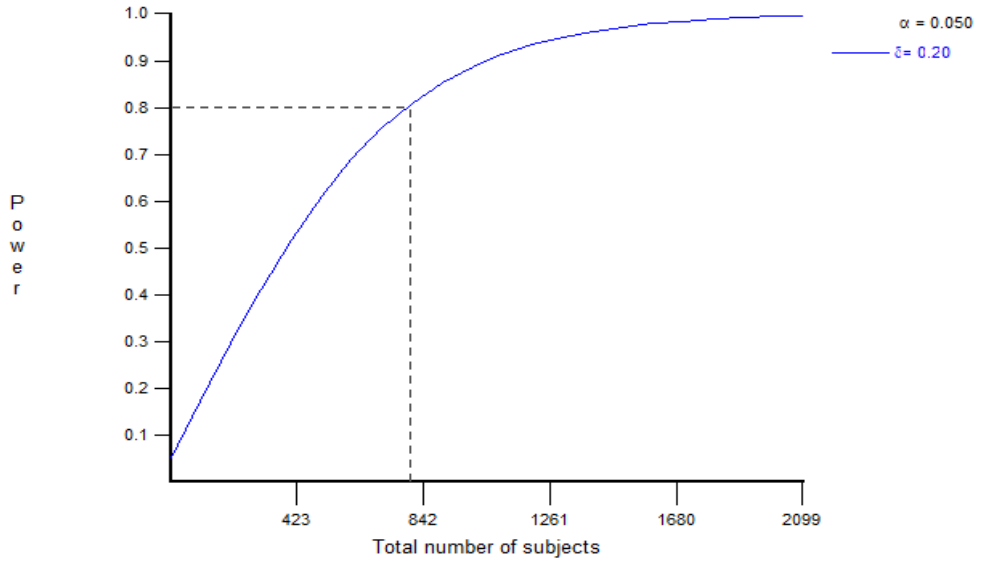
Since the population of the beneficiaries for the PFJ in 2019 is known, the Yamane formula (Yamane 1967) was used to determine the sample size:

$$n = \frac{N}{(1 - Ne^2)}$$

In this formula, n is the sample size, N is the population size, and e is the margin of error. Given a population of 577,000 beneficiary farmers (MoFA 2019), and assuming a margin of error of 2.2 percent based on similar nationwide agricultural surveys conducted by ISSER, a sample size of 2,100 farmers would yield a statistically representative sample for the assignment.

With a sample size of 2,100 for the treatment group, we relied on power analysis to determine the non-beneficiary group's optimal sample size. Power analysis helps determine the smallest sample size suitable to detect the minimum effect of a given test at the desired level of significance. Choosing a power of 80 percent, a 5 percent significance level, and a standard 20 percent effect size yielded a minimum sample size of 840 for the non-beneficiary group to be sampled across the 21 districts (Figure 6).

Figure 6. Sample size calculation for the control group



Source: ISSER PFJ Survey, 2020

The breakdown of the final sample size is shown in Table 2. An equal sample of 700 beneficiary farmers and 280 non-beneficiaries were drawn from each of the three agroecological zones (Table 1). Therefore, in each of the 21 districts, ten communities were selected (i.e., 210 communities in total), while from each community a total of ten beneficiaries and four non-beneficiaries were selected. With 14 households from each of the 210 communities, the total sample size was 2,940,

of which 2,100 were PFJ beneficiaries and 840 were non-beneficiaries. As is common with surveys, the final sample size varied slightly from this target sample size.

Table 2. Breakdown of the final farmer sample size by agroecological zone

Agroecological zone	Beneficiary	Non-beneficiary	Number of districts	Number of communities	Sample farmers per community
Southern	700	280	7	7x10=70	10+4=14
Middle	700	280	7	7x10=70	10+4=14
Northern	700	280	7	7x10=70	10+4=14
Total	2,100	840	21	210	

Source: ISSER PFJ Survey, 2020

4. ANALYTICAL RESULTS

Household characteristics

This section offers a snapshot of the survey households and the key characteristics that describe them on average, broken down by agroecological zones. Aside from the socioeconomic and farm characteristics, the section also contains results on the farmers' knowledge and intention to participate in the PFJ program in the 2020 crop season. Additional results are provided in the Annex.

The demographic characteristics of the household heads and members are presented in Table 3. A household is defined as a group of people living in the same dwelling or living space, who share a household head and feeding and production arrangements. The distribution of households across the three agroecological zones is Northern 998, Middle 991, and Southern 985. The average households are large, with about five members living in the same home, sharing farming and feeding arrangements. The Northern and Southern agroecological zones have an average household size of around 5.6 members, while the households in the Middle zone have on average 5.2 members. Overall, and within each agroecological zone, most household heads are males (90.2 percent). Similarly, there are more male household members (overall male of 51.7 percent) than females across the entire sample.

The average age of household members is approximately 25 years, while the household heads averaged about 47 years in age. Households in the Northern zone showed the lowest average age for household members and household heads. Overall, the majority of the household members were in the working-age category of between 15 and 64 years of age. In terms of marital status, most household heads (71.4 percent) are monogamously married.

Table 3. Demographic characteristics of households

	Agroecological zone			
	Northern	Middle	Southern	Total
Households	998	991	985	2,974
Household size	5.6	5.2	5.5	5.4
Gender of household head				
Male	91.2	89.5	89.9	90.2
Female	8.8	20.5	10.1	9.8
Gender of household members				
Male	51.6	50.8	50.9	51.1
Female	48.4	49.2	49.1	48.9
Average age, years				
Household head	45.2	47.4	48.8	47.1
Household members	22.8	25.8	26.1	24.9
Age categories				
0-14 years	40.6	34.2	34.1	36.4
15-64 years	56.3	62.5	62.4	60.3
65+ years	3.1	3.3	3.6	3.3
Marital status of household head				
Single	4.2	5.3	4.2	4. 6
Monogamous married	57.5	78.2	78.6	71.4
Polygamous married	29.2	7.4	6.2	14.3
Widowed	7.9	5.7	5.1	6.2
Divorced or other	1.2	3.2	6.0	3.4

Source: ISSER PFJ Survey, 2020
Note: Annex Table 1 presents similar statistics by PFJ beneficiary and non-beneficiary status.

The level of literacy of farmers is an essential determinant of the success of agricultural interventions, as it influences the uptake of inputs, agronomic practices, and extension services (Siebrecht 2020). Respondents were asked whether they ever attended school and about their literacy levels, defined by their ability to read or write a phrase in English (Table 4).

Table 4. Household education and literacy

Indicator	Agroecological zones			
	Northern	Middle	Southern	Total
Household heads that ever attended school, %	29.9	71.8	91.2	64.4
Adult literacy (15 years and older)				
Can read, %	35.3	56.6	74.8	56.3
Can write, %	35.5	56.6	74.5	56.2
Literacy of all household members				
Can read, %	23.6	52.2	75.5	50.5
Can write, %	23.7	51.6	74.9	50.1

Source: ISSER PFJ Survey, 2020.
Note: Annex Table 2 presents similar statistics by PFJ beneficiary and non-beneficiary status.

Overall, 64.4 percent of the household heads have ever attended school. While many household heads in the Southern (91.2 percent) and Middle (71.8 percent) zones have ever attended school, the share in the Northern agroecological zone is substantially smaller (29.9 percent). Overall, many adults (those above 15 years of age) are literate (can read and write), while about half of the household members are literate. However, across the agroecological zones, the adults and literate household members' share is lower in the Northern agroecological zone compared to the Middle and Southern zones.

Knowledge about and participation in the Planting for Food and Jobs program

The proportion of beneficiary farmers who have heard of the PFJ program and the information sources are presented in Table 5. Overall, most of the farmers (92.3 percent) had heard of the PFJ program prior to the survey. Knowledge about the PFJ program was received through multiple sources (i.e. media, family and friends and government) with media (62.7 percent) as the dominant source. Some of the beneficiary farmers also heard about the PFJ program through other farmers, friends, and relatives (47.5 percent), and government officials (40 percent) (Table 5).

Most of the beneficiary farmers in the Northern zone heard about the PFJ program through the media and through other farmers, friends, or relatives. Most of the beneficiary farmers in the Middle zone heard about the PFJ program through the media and government. In the Southern agroecological zone, most of the farmers heard of the PFJ program through the media. Other farmers also heard about the program through the government (42.6 percent) and other farmers, friends and relations. Thus, most farmers depend on the media for most of their information needs.

Table 5. Knowledge about and source of information on the Planting for Food and Jobs program

	Share of respondents (%)			
	Northern	Middle	Southern	Total
Never heard of it prior to today	8.3	6.4	8.4	7.7
Media (radio, television, newspaper)	65.2	69.2	53.4	62.7
Farmers, friend, or relatives	60.0	42.5	39.7	47.5
Government official	23.8	53.8	42.6	40.0
Politician	9.2	4.4	2.2	5.3
Other	0.7	1.0	2.6	1.4

Source: ISSER PFJ Survey, 2020. Note: Respondents permitted to select more than one source.
Note: Annex Table 3 presents these statistics by PFJ beneficiary and non-beneficiary status.

The intention of the beneficiary farmers to participate again in the PFJ program in 2020 is presented in Table 6. Overall, a large proportion of the farmers across the agroecological zones indicated they intend to participate in the fertilizer subsidy component of the program in 2020. The proportion of farmers who intend to do so is relatively less in the Southern zone.

Table 6. Intentions to participate in the fertilizer or seed subsidy program of the 2020 Planting for Food and Jobs program

	Share of respondents (%)			
	Northern	Middle	Southern	Total
Participation				
Intends to participate fertilizer subsidy 2020, %	75.0	76.4	61.3	70.9
Intends to participate seed subsidy 2020, %	17.8	44.7	37.1	33.2
Reasons for not participating in 2020				
Not aware of program	43.8	20.6	38.4	35.6
Not interested in participating or do not need subsidy	19.9	18.4	23.7	21.0
The co-payment for subsidized inputs is too high	7.4	4.4	2.8	4.8
Registration process is too cumbersome	1.7	0.0	1.0	1.0
I was turned away by officials when attempting to register	25.6	22.8	12.8	19.7
Inputs supplied are of low quality/yields are too low	1.7	0.7	1.0	1.2
The inputs I need are not available	1.1	1.5	1.4	1.3
Others	14.8	41.2	21.8	24.5

Source: ISSER PFJ Survey, 2020
Note: Annex Table 3 presents these statistics by PFJ beneficiary and non-beneficiary status.

However, only about a third of the farmers intend to participate in the seed subsidy component of the program in 2020. It was observed that, even though generally the proportion of farmers who intend to participate in the seed program is low across the three zones, the proportion is relatively lower in the Northern zone compared to the Middle and Southern zones. Some of the farmers reported that they do not intend to participate in either the fertilizer or seed subsidy program in 2020 because they were not aware of the program or were not interested in participating. A large share also explained that they were turned away by officials when they attempted to register for the input subsidies. In addition to non-awareness, the second major reason for non-participation in the Northern and Middle zones is that they were turned away by officials when they attempted to register. In the Southern zone, the second major reason for not participating in the program is that farmers were either not interested in the program or believed they did not need the subsidy.

Farm characteristics

This section compares the PFJ beneficiary farmers' farm characteristics with the non-PFJ beneficiary farmers. The results in Table 7 show that the overall average farm size in the 2019 planting season was 3.6 ha. The average farm size of the beneficiaries (3.8 ha) was relatively higher than the non-beneficiaries (3.1 ha). The average number of plots the farmers cultivated was 1.4; the beneficiaries cultivated about two plots, while non-beneficiaries cultivated about one. The overall average number of target crops cultivated per plot was 1.7, with little difference between beneficiaries and non-beneficiaries.

Table 7. Farm characteristics by treatment indicator

Indicator	Beneficiary	Non-beneficiary	Overall	Sample
Mean farm size (ha)	3.8	3.1	3.6	2,974
Mean number of plots cultivated	1.4	1.3	1.4	2,974
Mean number of target crops cultivated per plot	1.7	1.8	1.7	4,298
Mean cultivated area by crop group (ha)				
Cereals[1]	2.5	1.8	2.3	2,974
Legume[2]	0.7	0.9	0.7	2,974
Vegetables[3]	0.4	0.1	0.3	2,974
Roots and tubers[4]	0.4	0.4	0.4	2,974
Suckers[5]	0.01	0.01	0.01	2,974
Cultivated plots obtained through: (%)				
Purchase	3.1	2.2	2.8	4,298
Received as gift or inheritance	57.5	61.9	58.7	4,298
Rented-in-for fixed payment	20.4	13.5	18.6	4,298
Sharecropped-in	9.5	9.9	9.6	4,298
Borrowed-in	6.2	8.0	6.7	4,298
Just walked in	2.3	3.6	2.6	4,298
Other	1.0	0.9	1.0	4,298
Mean distance from homestead to farm (km)	4.6	4.5	4.6	4,298
Plots that are irrigated (%)	16.0	11.1	14.7	4,298
Source of water for irrigation (% of irrigated plots)				
Dam	11.0	12.0	11.2	625
Pond	1.2	2.4	1.4	625
River	45.0	53.6	46.7	625
Well	12.4	4.8	10.9	625
Dug/out	10.8	10.4	10.7	625
Other	19.6	16.8	19.0	625

Source: ISSER PFJ Survey, 2020.
Notes: (1) Cereals include rice, maize, and sorghum; (2) legumes include soya bean, groundnut and cowpea; (3) vegetables include tomato, onion, chili pepper, cabbage, cucumber, lettuce, and carrot; (4) roots and tubers include cassava, yam, and sweet potato; and (5) suckers include plantain.

Among the target crops, cereals are the predominant crops cultivated by the sampled farmers. This may have occurred as a result of the purposive sampling of maize, rice, and sorghum-growing districts. Cereals occupy 2.3 ha of the total average land area under cultivation by each farmer in the 2019 planting season. The beneficiaries cultivated an average of 2.5 ha of cereals, while non-beneficiaries cultivated 1.9 ha. On average, legumes occupy 0.7 ha of the total land size under cultivation: 0.7 ha for beneficiaries and 0.9 ha for non-beneficiaries. While vegetables occupy 0.3 ha, roots and tubers occupy 0.4 ha, and suckers occupy only 0.01 ha.

The majority of the cultivated plots for both beneficiaries (57.3 percent) and non-beneficiaries (61.8 percent) were received as a gift or an inheritance (Table 7). Some of the farmers (18.8 percent) also rented their plots for a fixed payment. Few obtained their land through a shared cropped-in arrangement (9.6 percent), borrowed-in (6.6 percent), purchased it (2.8 percent), or by just walking in (2.6 percent).

The average distance from the farmer's homestead to the farm was 4.7 km. The distance for beneficiaries was 4.7 km, while the distance for non-beneficiaries was 4.5 km. Also, 15 percent of plots were irrigated. A large proportion of farmers with irrigated plots used rivers as their source of water (46.7 percent).

5. ASSESSMENT OF PLANTING FOR FOOD AND JOBS PILLARS

The main thrust of this study is to evaluate the performance of the PFJ program in relation to its five pillars. The five pillars of the PFJ program are access and use of improved seed or planting materials, fertilizer, e-agriculture, agriculture extension services, and marketing.

Access and use of subsidized improved seed or planting materials

The first pillar of the PFJ program is to facilitate the production and supply of adequate quantities of certified improved seeds or other planting materials at subsidised prices through public and private outlets to the targeted beneficiaries. Table 8 presents the findings on the proportion of beneficiary households that obtained certified improved seeds, the outlets where they were obtained, the period during when it was obtained, and the distance to the nearest distribution outlet.

Overall, 36.1 percent of beneficiary households obtained improved seeds and other planting material. A greater fraction (47.2 percent) is in the Southern agroecological zone, followed by the Middle and the Northern zones with 43.2 percent and 18.4 percent, respectively. Maize (28.3 percent), rice (6.9 percent) and soya bean (0.3 percent) are the top three seeds obtained by beneficiary farmers in our sample across the three zones. Apart from maize and rice, beneficiary farmers in the Northern zone also obtained soybean, groundnut, and cowpea seeds. They however did not obtain any of the other seeds distributed under the PFJ program since those did not target the Northern zone.

Table 8. Access and use of seed/planting material by agroecological zones

Indicator	Agroecological zone				
	Northern	Middle	Southern	Overall	N
Beneficiaries who received seeds, %	18.4	43.2	47.2	36.1	2,123
Beneficiaries who received seeds for, %					
Maize	16.0	31.2	37.8	28.3	2,123
Rice	3.2	12.7	4.9	6.9	2,123
Soya bean	1.1	0.1	0.0	0.4	2,123
Groundnut	0.3	0.4	0.0	0.2	2,123
Cowpea	0.3	0.4	0.0	0.2	2,123
Tomato	0.0	1.1	5.9	2.3	2,123
Onion	0.0	0.1	1.4	0.5	2,123
Pepper	0.0	0.8	2.0	0.9	2,123
Cabbage	0.0	2.4	0.1	0.9	2,123
Cucumber	0.0	0.0	0.3	0.1	2,123
Lettuce	0.0	0.1	0.1	0.1	2,123
Cassava	0.0	0.3	0.1	0.1	2,123
Yam	0.0	0.1	0.0	0.1	2,123
Beneficiaries who received seeds from, %					
Agro-input dealer	68.8	46.0	49.2	51.0	767
Agricultural Office	21.4	48.4	47.0	43.5	767
CEAs brought it to community	2.7	5.6	3.5	4.2	767
Other	7.1	0.0	0.3	1.2	767
Beneficiaries who planted seeds they received, %	86.2	93.5	94.8	92.8	767
Seed recipients who intend to use again, %	97.3	96.2	94.5	95.6	709
Reasons why they would use PFJ seed again, %					
High yielding	83.5	75.4	88.7	82.5	709
Disease resistant	8.3	10.5	8.9	9.4	709
Pest resistant	7.3	12.0	6.5	8.9	709
Drought tolerant	2.8	5.1	7.2	5.6	709
Affordable	29.4	75.7	77.5	69.0	709
Output more marketable	6.4	7.6	4.1	5.9	709
High germination rate	18.4	37.0	22.2	27.6	709
Recommended by extension staff	4.6	11.2	15.4	12.0	709
Stores well for longer	2.8	3.6	3.4	3.4	709
Uniformity in maturity	0.0	21.4	8.9	12.5	709
Early maturing	9.2	55.8	65.9	52.7	709
Other	3.6	3.3	7.8	5.3	709
Seed recipients who received seeds late, %	0.4	6.3	0.9	2.5	2,123
Average distance to the PFJ retail outlet (km)	30.0	13.3	6.7	13.1	767

Source: ISSER PFJ Survey, 2020

The zonal distribution of access to seeds indicates that 18.4 percent of beneficiary farmers in the Northern zone accessed improved seeds, while 43.2 percent and 47.2 percent of beneficiary farmers accessed seeds in the Middle and Southern zones, respectively. This implies that fewer farmers in the Northern zone obtained improved seeds compared to the Middle and the Southern zones. It could be observed that a majority of the farmers in the Northern zone who accessed seeds, obtained them from PFJ retail outlets (86.2 percent). These are located, on average, about 30 km distant from the homes of the farmers. This could be a disincentive to a lot of farmers who wished to obtain improved seeds in 2019 season, since long distances would mean higher cost of transportation. The result of this may lead farmers resorting to recycling their PFJ seeds cultivated in the 2018 season rather than purchasing new seeds.

The five most often cited reasons why beneficiary farmers intend to use subsidized seeds again in future seasons include the fact that seeds are high-yielding, affordable, early-maturing, and have a high germination rate. The high-yielding quality is most frequently expressed in the Southern zone followed by the Northern zone, while affordability is most mentioned by farmers in the Middle and Southern zones, respectively. This further explains why beneficiary farmers in the Northern zone have lower rate of access to improved seeds. Interestingly, while 83.5 percent of beneficiaries in the Northern zone said PFJ seeds were high yielding, a much smaller proportion cited affordability as a reason compared to the Southern and the Middle zones. Early maturing is also touted mostly by farmers in the Middle and Southern zones, far more than was mentioned by farmers in the Northern zone. On the other hand, higher percentages of farmers in the Middle and Northern zones praised the high germinating quality of the PFJ seeds obtained in 2019 season. Other important reasons, such as uniformity in maturity, recommended by extension staff, disease and pest resistance, were also cited as reasons the farmers intend to participate again in future. On timeliness of access to subsidised seeds, it emerged that 97.5 percent obtained their seeds on time.

Farmers' assessment of the quality of seeds obtained under the PFJ program provides a subjective rather than an objective measure of the quality of seeds received, but this may be an important indicator of the future participation. As shown in Table 9, maize and rice seeds together constitute most seeds received by beneficiary farmers. Most of the farmers rated the maize and rice seeds as "good". Other crop seeds also had a relatively high percentage of good ratings, although the share of farmers who obtained such seeds are is small. Amongst them, sorghum, cowpea, cucumber, and yam had a 100 percent good rating, while lettuce, cabbage, and carrots had the highest "bad" ratings.

Table 9. Planting for Food and Jobs seed recipients' assessment of PFJ seed quality

Crop seed	Good	Somehow good	Bad	N
Maize	94.1	4.9	1.0	591
Rice	93.3	4.7	2.0	149
Sorghum	100.0	0.0	0.0	4
Soybean	87.5	12.5	0.0	16
Groundnut	94.4	5.6	0.0	18
Cowpea	100.0	0.0	0.0	11
Tomato	74.4	24.4	1.3	78
Onion	65.4	23.1	11.5	26
Pepper	86.4	13.6	0.0	44
Cabbage	65.5	13.8	20.7	29
Cucumber	100.0	0.0	0.0	4
Lettuce	66.7	0.0	33.3	3
Carrot	69.2	15.4	15.4	13
Cassava	92.9	7.1	0.0	14
Plantain	94.4	5.6	0.0	18
Yam	100.0	0.0	0.0	5

Source: ISSER PFJ Survey, 2020

Access and use of subsidized fertilizer

This pillar seeks to increase the availability and the use of fertilizers by farmers by subsidising certified fertilizers under the PFJ program. Together with extension services, the pillar encourages the uptake of fertilizer use among smallholder farmers to increase staple food crop production. In this light, Table 10 presents an analysis of the access to and use of fertilizer by beneficiary

farmers. As shown, 95.5 percent of household beneficiaries in the Northern zone received fertilizer under the PFJ program, while in the Middle and Southern zones, 93.3 percent and 77.7 percent, respectively, did so. This implies that most farmers in all three zones, unlike improved seeds, benefited from subsidized fertilizers, comprising NPK, urea, and organic fertiliser. Among the types of fertilizers, NPK is the most widely accessed fertilizer type across the zones. As expected by the operational design of the PFJ program for 2019, most of the beneficiary farmers in all three zones obtained the PFJ fertilizer from agro-input dealers, followed by the MoFA office.

Table 10. Access and use of fertilizer by agroecological zones

Indicator	Agroecological zone				
	Northern	Middle	Southern	Overall	N
Beneficiaries who received fertilizer,%	95.5	93.3	77.7	88.9	2,123
Beneficiaries who received, %:					
NPK	92.3	79.9	73.7	82.1	2,123
Urea	30.5	70.3	45.0	48.6	2,123
Organic fertiliser	0.7	0.6	2.3	1.2	2,123
Beneficiaries who received fertiliser from, %:					
Agro-input dealer	73.6	66.7	70.2	70.2	1,888
Agricultural Office	18.0	30.8	26.8	25.1	1,888
CEAs brought it to community	7.1	2.4	2.5	4.1	1,888
Other	1.2	0.0	0.6	0.6	1,888
Households that used PFJ fertiliser received, %	96.6	98.9	98.2	97.9	1,888
Fertilizer recipients who intend to use again, %	99.5	99.5	98.7	99.3	1,888
Reasons why they would use PFJ fertilizer again, %					
Improvement in crop yields	64.2	65.8	85.4	72.0	1,875
Affordable	66.7	89.6	69.2	78.2	1,875
Recommended by extension staff	4.2	12.6	17.2	12.4	1,875
Stores well for longer	1.7	2.2	2.5	2.2	1,875
Only input available	3.3	0.0	1.5	1.2	1,875
Easy to access the fertiliser supplier	1.7	1.4	2.0	1.7	1,875
Other	0.8	0.7	0.0	0.5	1,875
Fertilizer recipients who received fertilizer late, %	7.8	16.6	2.6	10.1	1,888
Average distance to the PFJ retail outlet, km	22.9	13.4	7.8	15.2	1,888

Source: ISSER PFJ Survey, 2020

Furthermore, almost all beneficiary farmers used the obtained subsidized fertilizers received and intended to use them again. Multiple reasons are ascribed to farmers' intention to participate in the fertilizer component again in future. These include the fact that the subsidized fertilizers helped boost their crop yields, that it was affordable, and that fertilizer use is recommended by AEAs. Notwithstanding, in the 2019 planting season, some farmers (10.1 percent) across the three agroecological zones reported to have obtained their fertilizer late. The timeliness of fertilizer delivery, according to beneficiary farmers, varied across the three zones: 7.8 percent of household beneficiaries in the Northern zone, 16.6 percent in the Middle zone, and 2.6 percent in the Southern zone. Lastly, the average distance to the nearest PFJ retail outlet is highest in the Northern zone (22.9 km), followed by the Middle zone (13.4 km) and then the Southern zone (7.8 km) (Note that the subsample of farmers receiving fertilizer is different from those receiving seed, hence the slight differences when compared to Table 8).

E-agriculture

The E-agriculture component of PFJ seeks to improve beneficiaries' targeting by engaging state-of-the-art ICT platforms. In this regard, beneficiary farmers were asked about their main source of

information, suppliers of that information, including government sources, and, more generally, challenges encountered during the registration process.

Table 11. Access to and use of E-agriculture platforms, by agroecological zones

Indicator	Agroecological zone			
	Northern	Middle	Southern	Total
Farmer that receive information, %[1]	32.2	39.3	28.5	13.3
Main source of information, %				
Radio or television	37.5	52.5	10.0	50.4
Newspapers	50.0	50.0	0.0	1.5
Phone calls or text messages	22.9	41.7	35.4	24.2
Brochures or flyers	0.0	0.0	100.0	11.6
Mobile apps or online tools	46.2	53.9	0.0	3.27
Farmers, friends or relatives	75.0	3.6	21.4	7.1
MoFA officers using PA system	12.5	0	87.5	2.0
Main supplier of information, %				
Government	27.8	41.3	30.9	80.6
Private sector company	50.0	36.7	13.3	7.6
Private individuals	59.1	18.2	22.7	5.5
NGOs	42.9	57.1	0.0	3.5
Development agencies	50.0	50.0	0.0	0.5
Other	28.6	0.0	71.4	1.8
Farmers who have seen improvement in government-provided services, %	28.9	41.91	29.19	87.5
Farmer who encountered challenges, %	33.5	54.5	12.1	13.4
Types of challenges faced, %				
Process is very time-consuming	32.3	65.9	1.8	59.6
Distance to MoFA office is far	19.4	80.6	0.0	22.9
Had to make several trips to MoFA office	19.3	64.9	15.8	25.3
Expected to pay a bribe	7.1	85.7	7.1	3.1
Others	27.3	72.7	0.0	2.4
No challenges faced	19.5	43.9	36.6	9.1

Source: ISSER PFJ Survey, 2020.
Note: Information here may refer to information on government programs (e.g., PFJ), extension advice, marketing information, weather, and so on. Annex Table 4 presents similar statistics by PFJ beneficiary and non-beneficiary status.

Table 11 shows that 13.3 percent of farmers received information through ICT platforms. Overall, access to information through ICT platforms is generally low (13.3 percent) among beneficiary farmers. The major sources of information among farmers who received agriculture information were radio or television (50.4 percent), followed by phone calls or text messages (24.2 percent), brochures or flyers (11.6 percent), and the least being newspapers (1.5 percent). There were no farmers who reported to having received agriculture information through brochures or flyers in the Northern and Middle zones, while 100 percent of the beneficiary farmers in the Southern zone reported to have received information through brochures or flyers. Also, there was no farmer who accessed information through newspapers in the Southern zone. The leading supplier of the information is from government sources (80.6 percent), while 87.5 percent of beneficiary farmers indicated improvements in government-provided information services.

About 13.4 percent of beneficiary farmers indicated they had encountered challenges during the registration process. The top three challenges included the time-consuming nature of the process; the long distance to the MoFA office; and the numerous trips that had to be made to the MoFA office.

Agricultural extension services

Table 12 shows the percentage of beneficiary farmers who received agriculture extension services. Overall, 44.5 percent of farmers received extension services. In the Northern zone, 28 percent of beneficiary farmers received agriculture extension services, in the Middle zone, 65.1 percent, and in the Southern zone, 40.3 percent. Furthermore, the overall percentage of farmers who have resident agricultural extension officers in their communities is 25.9 percent. Among the zones, the percentage of resident AEAs is higher in the Middle zone (32.5 percent) followed by the Northern (24.9 percent) and Southern (20.1 percent) zones.

Table 12. Agriculture extension services

Indicator	Agroecological zone			
	Northern	Middle	Southern	Overall
Beneficiaries who received extension service, %	28.0	65.1	40.3	44.5
Beneficiaries with Agricultural Extension Agents in their community, %	24.9	32.5	20.1	25.9
Number of extension visits received, average	1.3	6.9	3.6	3.9
Average distance from community to the nearest Agricultural Extension Agent, km	17.8	12.7	16.1	15.6
Farmers who received training on, %:				
Improving crop farming practices	28.0	65.1	40.3	44.5
Health and social issues	4.6	16.0	2.4	7.7
Post-harvest handling, processing, & storage	2.2	14.6	6.9	7.9
Livestock production	1.3	13.2	2.4	5.6
Environmental issues	0.6	15.4	1.3	5.8
Adult literacy	0.1	1.8	0.0	0.7
Marketing support Information	0.6	4.6	1.6	2.3
Seed multiplication	0.1	8.7	3.2	4.0
Managing the farm's business or finances	0.6	6.2	1.4	2.7
Sample size	717	713	697	2,127

Source: ISSER PFJ Survey, 2020

By inspection, the percentage of reported resident AEAs could be argued to have an influence on access to extension services in the Middle zone since the percentage of farmers who reported to have a resident AEA was highest, which also corresponds to the highest percentage of farmers who received extension services. However, the case is different between the Northern and the Southern zone – a higher percentage of farmers reported to have a resident AEA in the Northern zone compared to the Southern zone, but the percentage of farmers who received extension services was less in the Northern zone. The mean number of AEA visits per farmer is also highest in the Middle zone (6.9 visits), followed by the Southern zone (3.6).

Also, for farmers who did not have a resident AEA, the average distance to the nearest community which has a resident AEA is highest in the Northern zone (17.8 km), followed by the Middle zone (12.7 km) and the Southern zone (16.1 km). This could further explain the lower percentage of farmers who reported to have received extension services in the Northern zone. On the type of extension service received, a greater percentage of beneficiary farmers received training on ways of improving crop farming practices: Northern (28.0 percent), Middle (65.1 percent) and Southern (40.3 percent). The other overall top four issues treated under the extension services received across the three zones included health and social issues (7.7 percent); post-harvest handling, processing, and storage (7.9 percent); livestock production (5.6 percent); and environmental issues (5.8 percent).

An assessment of the content of the extension services received is essential to gauge the satisfaction of beneficiary farmers who received the services from the AEAs. Results of this

assessment are presented in Table 13. Across all agroecological zones and all extension services received, the majority (above 90 percent) of beneficiary farmers indicated they were satisfied with the content received. At the same time, the rest were either neutral or dissatisfied with the service content. In the Northern zone, extension services on health and social issues had the lowest satisfaction rating (84.9 percent). No farmer reported dissatisfaction with any of the services delivered – at the least, they were neutral or indifferent.

Table 13. Share of beneficiary farmers satisfied with extension services received

	Agroecological zone			
	Northern	Middle	Southern	Total
Extension services	%	%	%	%
Improving crop farming practices	96.0	97.8	96.4	97.0
Health and social issues	84.9	100.0	94.1	96.3
Post-harvest handling, processing and storage	93.8	97.0	97.9	97.0
Livestock production	88.9	92.5	94.1	92.4
Environmental issues	100.0	97.3	77.8	95.9
Adult literacy	100.0	92.3	0.0	92.9
Marketing support Information	100.0	97.0	81.8	93.8
Seed multiplication	100.0	98.4	95.5	97.7
Managing the farm's business or finances	100.0	97.7	100.0	98.3
Sample size	717	713	697	2,127

Source: ISSER PFJ Survey, 2020

On the other hand, extension services on adult literacy and livestock production recorded the least satisfaction rates of 92.3 percent and 92.5 percent, respectively, among farmers in the Middle zone. The relatively higher dissatisfaction rating in livestock production extension services could be due to the PFJ program's focus on crop production only and not animal production, thereby making AEAs not in a position to prepare and deliver contents on livestock production at the time of training. The Southern zone extension service on environmental issues recorded the lowest satisfaction rating (77.8 percent), followed by marketing support information (81.8 percent). This was the case since a higher number of farmers indicated they were neither satisfied nor dissatisfied (that is, neutral) with those extension services delivered to them by the AEAs. However, apart from the service on 'improving crop farming practices', which had 0.7 percent of the farmers reporting their dissatisfaction, for all other services, the farmers in the Southern zone indicated no dissatisfaction with the services delivered to them. Adult literacy had no assessment because farmers did not receive any extension service on the topic.

Marketing of produce

The PFJ program seeks to help farmers market their farm outputs to minimise any ill effects of price volatility through increased participation and competition by private players. Apart from engaging private aggregators, the program also seeks to revamp NAFCO to render a last-resort buy option to farmers to provide an assured market for the target crops and curb post-harvest losses in times of bumper harvest. Nevertheless, the marketing outlets available to beneficiary farmers are also open to non-beneficiaries as well. Therefore, it is important to assess the patronage of the identified marketing outlets by the beneficiary farmers vis-à-vis the non-beneficiary farmers. Hence, Table 14 reports on the marketing outlets patronised by the beneficiary farmers and the non-beneficiary farmers.

Table 14. Marketing of harvested crop by households

Indicator	Beneficiary	Non-beneficiary	Overall
Households that sold some crop harvested, %	83.3	77.2	81.6
Households that sold the crop harvested to, %:			
Pre-harvest contractor	2.5	2.9	2.7
Farmgate buyer	16.8	18.0	17.1
Market trader	89.0	83.2	87.4
Consumer	26.4	26.4	26.4
Sale trading organization	1.2	0.6	1.0
Co-operative	0.7	0.0	0.5
Exporter	0.2	0.4	0.3
Government organization	1.5	0.8	1.3
NGO	0.9	0.6	0.8
Other	0.5	0.6	0.5
Sold directly to a school caterer	0.9	0.5	0.8
Sold their produce to the National Buffer Stock Company (NAFCO)	0.3	0.0	0.2
Had arrangement with MoFA to purchase crop	0.2	0.0	0.1
Average distance from house to nearest main road, km[2]	3.5	2.8	3.3
Average distance from house to the nearest market, km[3]	7.6	5.9	7.1
Sample size	2,123	851	2,974

Source: ISSER PFJ Survey, 2020

A higher percentage of beneficiary farmers (83.3 percent) reported having sold all or a portion of their harvested crop, compared to non-beneficiary farmers (77.2 percent). Overall, 81.6 percent of farmers had sold all or a fraction of the harvested crop for the 2019 major planting season. The distribution of marketing outlets shows that a higher proportion of beneficiary and non-beneficiary farmers' produce is sold to market traders, direct consumers, and farm-gate buyers. Selling to a pre-harvest contractor has the fourth-highest percentage of beneficiary farmers (2.5 percent) and non-beneficiaries (2.9 percent). Less than one percent of either type of farmer sold their produce to NAFCO or had some arrangement with MoFA for the purchase of harvested crops, respectively. These exceptionally low rates either indicate that MoFA is not acting as a buyer of last resort or that farmers are able to sell their produce through regular, commercial channels. The mean distances from a beneficiary farmers' house to the nearest main road (3.5 km) and or marketplace (7.6 km) are higher than the for non-beneficiary farmers. This suggests that beneficiary households live in remote areas farther away from a main road or a marketplace than non-beneficiary households.

6. CROP YIELD, POST-HARVEST LOSSES, AND VALUE OF CROP SALES

The PFJ program seeks to mobilize access to both input and storage facilities, thereby directly motivating farmers to increase their crop yields, reduce post-harvest losses, and increase their income. Therefore, this section assesses crop yields, crop storage, and post-harvest losses among beneficiary and non-beneficiary farmers and across the agroecological zones. The section also

[2] The difference in average distance from the house to the nearest main road (km) is not statistically significant (at 5% significance level: p-value=0.458) between beneficiary and non-beneficiary households.

[3] The difference in the average distance from the house to the nearest main market (km) is also not statistically significant (at 5% significant level: p-value=0.161) between beneficiary and non-beneficiary households.

contains analysis of the value of sales farmers made from the crops they sold in the 2019 planting season.

Increasing crop yield is one of the expected results of the PFJ program as farmers readily access inputs and extension services. Thus, in this study an assessment of the program compares the beneficiary households' crop yields vis-a-vis the non-beneficiary households. In this regard, crop yield measured in metric tons per hectare (MT/ha) is computed as the total crop harvested by each household, aggregated across all farm plots (mono-cropping and mixed-cropping) cultivated by the household and divided by the total plot size in hectares.

As shown in Table 15, therefore, crop yields of beneficiary households in the 2019 major planting season are, on average, higher than for non-beneficiary households. This suggests that beneficiary households were able to produce more per hectare as compared to the non-beneficiary households. This could be attributable to either improved seed use, fertilizer application per hectare cultivated, or both. In this study, however, the definition of a PFJ beneficiary at the household level constrains a plot-level analysis of productivity arising from agricultural plot intensification.

Table 15. Crop yields, by beneficiary and non-beneficiary farmers

Crop (MT/ha)	2019 reported national avg. yields (1)	2019 yields in PFJ sample					
		Beneficiaries avg. MT/ha	Non-beneficiaries avg. MT/ha	Whole sample mt/ha Mean	Whole sample mt/ha Max.	Statistical significance (p-values)	N
Maize	2.5	1.5	1.2	1.4	4.15	0.00*	2,527
Rice	3.3	2.0	1.7	1.9	5.27	0.03*	658
Sorghum	1.5	0.6	0.5	0.6	2.34	0.34	86
Soya bean	1.7	0.5	0.4	0.5	1.52	0.05*	181
Groundnut	1.7	1.0	0.9	1.0	2.98	0.17	618
Cowpea	1.5	0.8	0.5	0.7	2.27	0.01*	214
Tomato	8.0	1.4	0.8	1.3	6.50	0.05*	265
Onion	18.1	6.6	4.0	5.9	16.97	0.04*	77
Chili pepper	9.0	1.1	0.8	1.1	4.76	0.04*	401
Cabbage	-	12.2	10.4	12.1	51.33	0.81	48
Carrot	-	3.0	2.0	2.9	11.25	0.56	31
Cassava	21.7	4.1	3.6	3.9	13.00	0.20	432
Plantain	11.9	10.5	11.1	10.7	37.50	0.80	161
Yam	17.5	7.9	7.9	7.9	37.50	0.96	412
Sweet potato	2.1	2.2	1.9	2.1	5.46	0.73	19

Source: ISSER PFJ Survey, 2020 and (1) MoFA, 2020. Note: The p-values indicate whether the difference in yields between beneficiary and non-beneficiary households is statistically significant. The crops marked with an asterisk (*) indicate a statistically significant different at 5 percent.

Table 15 shows significant differences in yields between beneficiary and non-beneficiary households for maize, rice, soya bean, cowpea, tomato, onion, and chili pepper. It emerged that crop yields for PFJ beneficiary households were generally higher than non-beneficiary households. For instance, maize yield for beneficiary households (1.5 MT/ha) was higher than non-beneficiary households (1.2 MT/ha). However, the mean overall yield (1.4 MT/ha) was less than the overall maize yield recorded for 2019.[4] Similarly, the mean overall yield for rice and the other crops, except sweet potato, was also less than the 2019 crop yield per hectare as per official reports.

[4] The relative low yield recorded in this study can be attributed to the recall approach used in obtaining the yield estimates from the farmers and the period of the data collection. The farmers were made to recall their yield from the 2019 crop season. A few days after commencing the data collection in March, the entire country was partially locked down due to the COVID-19 pandemic. So, the data collection was postponed and resumed in June 2020. Farmers recalling 2019 yield estimates in June 2020 has the potential to distort the yield figures they provided.

Crop storage practices, as shown in Table 16, reveal that overall, 46.9 percent of households stored their crops in various forms after harvest. Comparing across the zones, a higher proportion of households (59.1 percent) in the Northern zone reported post-harvest crop storage compared to those in the Middle (44.6 percent) and Southern (36.9 percent) zones.

Table 16. Crop storage by agroecological zones

	Agroecological zone			
	Northern	Middle	Southern	Total
	%	%	%	%
Households that stored crop after harvest, %	59.1	44.6	36.9	46.9
Households that stored crop in, %:				
Traditional crib	8.8	28.1	25.1	19.1
Improved crib	0.7	4.3	0.0	1.7
Room	90.5	61.3	45.2	69.5
Kitchen	0.0	5.4	27.6	8.9
Community storage	0.0	0.0	1.4	0.4
Other storage	0.0	0.9	0.8	0.5

Source: ISSER PFJ Survey, 2020
Note: Annex Table 6 presents similar statistics by PFJ beneficiary and non-beneficiary status.

Overall, a comparatively higher proportion of farmers (69.5 percent) stored their crops in a room, followed by a traditional crib (19.1 percent) and kitchen (8.9 percent). Beneficiary households in the Northern zone mainly stored their harvested produce in a room (90.5 percent), followed by a traditional crib (8.8 percent). We observed that farmers in the Northern zone did not store harvested crops in kitchens, community storage and other storage facilities. On the other hand, the Middle zone also mainly stored crops in a room (61.2 percent) and in a traditional crib (28.1 percent), and few others stored in the kitchen (5.4 percent) and in an improved crib (4.3 percent). Also, we observed that the distribution of storage-facility use among farmers in the Southern zone was similar to what pertained in the Northern and Middle zones. That is, a greater percentage of farmers who harvested their crops stored them in a room (69.5 percent), in a traditional crib (19.1 percent), in a kitchen (8.9 percent) and in an improved crib (1.7 percent). Community storage which was one of the key strategies under the PFJ program has not been patronised by the farmers, especially in the Northern and the Middle zones where none of the farmers reported to have utilised a community storage facility.

Reducing crop losses, particularly after harvest, boosts both the food and income bases of rural households and increases food availability to urban areas. Table 17 presents feedback from both PFJ beneficiary and non-beneficiary farmers on their post-harvest losses at different stages after the harvest in 2019. These stages include transportation, drying, winnowing, threshing, sorting and grading, and storage. It can be seen that, overall, beneficiary households' post-harvest losses exceeded non-beneficiary households' losses for maize, rice, tomato, onion, and pepper. For example, post-harvest loss in maize among the beneficiary households was estimated at 9.5 percent compared to 1.9 percent among non-beneficiary households. Much of the maize loss, especially among beneficiary households, occurred during the winnowing and storage stages. However, this was less than the loss in maize in 2018, based on a MoFA report (MoFA 2019). Similarly, rice losses for the beneficiary and non-beneficiary households occurred mainly during drying (0.05 and 5.4 percent, respectively) and winnowing (8.2 and 4.4 percent, respectively). Yet, except for the non-beneficiary households, the losses for rice and the rest of the crops were less than the post-harvest losses in 2018.

Table 17. Crop post-harvest losses by activity and crop among Planting for Food and Jobs program beneficiaries and non-beneficiaries, percent of harvest

		2019														
	2018	Transporta-tion		Drying		Winnowing		Threshing		Sorting & grading		Storage		Overall		
Crop*	over-all	BF	N/BF	BF	N/BF	BF	N/BF	BF	N/BF	BF	N/BF	BF	N/BF	BF	N/BF	N
Maize	17.95	0.26	0.14	0.40	0.44	1.64	1.04	0.18	0.01	0.08	0.10	1.88	1.55	9.48	1.86	2,541
Rice	5.19	0.04	0.07	0.05	5.35	8.17	4.41	0.01	0.00	0.04	0.26	0.50	0.56	0.59	5.90	664
Sorghum	7.28	0.00	0.00	0.00	0.11	0.21	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.22	0.13	86
Soya bean	-	0.04	0.00							0.00	0.03	0.10	0.00	0.13	0.03	182
Groundnut	-	0.09	0.02							0.14	0.02	0.52	0.13	0.75	0.16	622
Cowpea	-	0.01	0.01							0.01	0.12	0.07	0.00	0.08	0.24	219
Tomato	-	0.27	0.45							0.56	0.81	0.09	0.77	0.92	2.03	283
Onion	-	0.03	0.00							0.46	2.05	0.00	0.00	0.50	2.05	86
Pepper	-	0.02	0.54							0.19	0.98	0.25	1.17	0.47	2.69	406
Cassava	25.06	0.14	0.00							0.00	0.00	0.20	0.30	0.34	0.30	569
Yam	21.46	0.15	0.02							0.00	0.00	0.00	0.04			428
Sweet Potato	-											0.51	0.00			23

Source: ISSER PFJ Survey, 2020 and MoFA, 2019 (Medium Term Expenditure Framework (MTEF) for 2019-2022).
Note: * Lettuce, cabbage, carrot and plantain omitted due to small sample size. BF = Beneficiary; N/BF = Non-beneficiary.

Table 18. Value of crop sold, Ghana Cedis

Crop	Beneficiary	Non-Beneficiary	Overall	N
Maize	3,158.7	1,853.9	2,809.5	1,872
Rice	7,113.5	6,405.3	6,951.7	569
Sorghum	908.6	2,353.3	1,291.0	34
Soybean	1,210.8	1,285.6	1,230.2	150
Groundnut	2,246.5	1,620.0	2,075.6	502
Cowpea	3,963.6	1,194.9	3,118.0	167
Tomato	13,819.8	5,830.2	12,605.4	250
Onion	15,500.7	3,870.6	12,357.5	74
Pepper	8,594.1	5,540.7	7,960.4	371
Cassava	4,768.4	17,658.1	9,564.5	344
Yam	16,544.7	14,330.7	15,889.3	275
Sweet potato	2,704.7	3,793.8	2,922.5	20
Carrot	11,961.6	6,193.8	11,074.2	26
Lettuce	5,316.1	200.0	4,804.5	10
Plantain	32,549.6	19,851.6	28,666.8	121
Cabbage	23,259.4	14,166.7	22,713.8	50
Cucumber	5,766.2	100.0	5,361.4	14

Source: ISSER PFJ Survey, 2020. Note: This analysis is based on only farmers who sold some of their crops harvested. It is important to note that those whose sales included the previous year's harvest were excluded from the analysis.

In the 2019 planting season, the crops from which farmers obtained the highest average value of sale were plantain (GHS 28,666.8) and cabbage (GHS 22,713.8) (Table 18). Others were yam (GHS 15,889.3), tomato (GHS 12,605.4) and onion (GHS 12,357.5). Crops which farmers made lowest sales were soybean, sorghum, groundnut, maize, sweet potatoes, and cowpea. Comparatively, the beneficiaries recorded higher sales in many of the crops than non-beneficiaries. Among the 17 crops listed in Table 18, the non-beneficiary farmers' sales values were relatively higher for sorghum, soybean, cassava and sweet potatoes as compared to the beneficiaries. For the remaining 13 crops, the beneficiaries recorded higher sales than did the non-beneficiaries. For instance, the beneficiary farmers' sales value from onion was about four times that of the non-

beneficiaries. Similarly, the beneficiary farmers' sales from lettuce, plantain, cabbage and cucumber were more than twice that of the non-beneficiary farmers. The relatively higher value of sales for beneficiaries can be attributed to higher volumes due to higher yields (per hectare) and the higher quantity of crops sold by the beneficiaries as compared to the non-beneficiaries.

7. PLANTING FOR FOOD AND JOBS OUTCOME ASSESSMENT

The section looks at crop productivity, food security, and labor use (proxy for jobs) to measure PFJ program outcomes. Having already presented productivity (measured as crop yield), only food security and labor use are discussed in this section.

Food security

Strengthening food security by increasing the production of staple food crops through uptake in fertilizer use is another subtle welfare improving measure of the PFJ program at the household level. Table 19 summarises household food security indicators across beneficiary and non-beneficiary households in the 2019 farming season.

Table 19. Food security analysis

Indicator	Beneficiary	Non-Beneficiary	Overall
Households that experienced food shortage, %	39.1	46.4	41.2
Months households experienced food shortage, mean number	0.7	0.9	0.8
Hunger scale			
Little to no hunger in the household, %	70.9	63.9	68.9
Moderate hunger in the household, %	26.7	32.4	28.3
Severe hunger in the household, %	2.4	3.6	2.8
Sample size	2,123	851	2,974

Source: ISSER PFJ Survey, 2020

The results reveal that a larger proportion of non-beneficiary households experienced higher (46.4 percent) food shortages than did beneficiary households (39.1 percent). The average number of months a non-beneficiary household reported experiencing food shortages (0.9) in the 2019 planting season is more than what was experienced by a beneficiary household (0.7). This means that, on average, a typical beneficiary household experienced about 21 days (0.7 mean number of months) of food shortage in 2019 while a non-beneficiary household experienced 27 days (0.9 mean number of months) of food shortage in the entire crop year of 2019. Further analysis on the hunger scale shows that a higher percentage of beneficiary households (70.9 percent) experienced little to no hunger, while 2.4 percent experienced severe hunger in the household. Comparatively, however, a smaller percentage of non-beneficiary households (63.9 percent) experienced little to no hunger, with a relatively higher percentage (3.6 percent) experiencing severe hunger.

Labor use

An important target of the PFJ program, as its name suggests, is the generation of jobs in both rural and urban areas through increased value chain activities, production, value addition, commodity processing and marketing. Jobs in this study are computed by way of the average number of person-days employed per hectare of farm plot. Table 20 shows the number and type of labor used per hectare of farm plots by the beneficiary and non-beneficiary farmers. The findings revealed that overall, the mean total person-days used per hectare was 159, with beneficiary households employing a higher average number (160) of workers per hectare. Apart from hired labor, the results showed that non-beneficiary households used more family and communal

person-days per hectare than beneficiary households. This could mean that beneficiary households can afford the services of hired labor as a result of lower costs incurred on fertilizer and improved seeds purchased under the PFJ program. Beneficiary farmers also have more land and obtain higher output per hectare, so they have to hire in labor if they do not have enough family labor. This finding is also confirmed by the share of the various categories of labor in total farm labor. For instance, for beneficiary households, the share of hired labor, which is the highest in the total farm labor, is 43.0 percent, followed by family labor (37.3 percent). Also, among non-beneficiary households, the share of family labor occupies the highest proportion (40.2 percent) of the total farm labor, followed by hired labor (38.6 percent). Lastly, female labor in total family labor is higher among non-beneficiary households (16.6 percent).

Table 20. Farm labor use by household

Indicator	Beneficiary	Non-Beneficiary	Overall	N
Total person-days per hectare	160	157	159	2,986
Family person-days per hectare	60	64	61	2,986
Family labor in total labor, %	37.3	40.2	38.2	2,972
Female in family farm labor, %	14.5	16.6	15.1	2,972
Hired labor person-days per hectare	43	32	40	2,986
Hired labor in total labor, %	43.0	38.6	41.7	2,972
Communal person-days per hectare	57	61	58	2,986
Communal labor in total labor, %	19.7	21.3	20.1	2,972

Source: ISSER PFJ Survey, 2020
Note: Annex Table 5 presents similar statistics by PFJ beneficiary and non-beneficiary status.

Household welfare

An asset index is a proxy measure for the household welfare status of the surveyed farmers. The index, categorised into terciles, as shown in Table 21, reveals that among the beneficiary farmers, the wealthiest group form the largest (36.7 percent), followed by the middle (33.4 percent) and the poorest (29.9 percent). Conversely, the poorest and the richest terciles form the largest (40.7 percent) and smallest (25.0 percent) groups among the non-beneficiary farmers. In short, beneficiary households are overrepresented in the wealthiest income group, while non-beneficiary households are over-represented in the poorest income group.

Table 21. Household assets

	Beneficiary	Non-Beneficiary	Overall
Asset Index			
Poorest one-third	29.9	40.7	33.3
Middle one-third	33.4	34.3	33.3
Richest one-third	36.7	25.0	33.3
Mean expenditure per capita, GHS	1,282.3	1,087.5	1,226.2
Sample size	2,123	851	2,974

Source: ISSER PFJ Survey, 2020

Household consumption measured in the form of mean household expenditure per capita is also higher (GHS 1,282.3) among beneficiary farmers than among the non-beneficiaries (GHS 1,087.5). This implies that, generally, beneficiary households are wealthier than non-beneficiary households.

8. PLANTING FOR FOOD AND JOBS CHALLENGES

Just as any social intervention is not without challenges, a nationwide program of the magnitude of the PFJ program will definitely not be free from challenges. The implementation of the PFJ program in 2019 had its successes and challenges. The success of the program, however, lies in the ability of the beneficiaries to flag these challenges for redress. This section presents the challenges outlined by the beneficiary farmer households across the three agroecological zones.

General program challenges

As shown in Table 22, most farmers surveyed indicated that they face no challenges with the implementation of the program. In the Northern zone, 92.4 percent stated no challenges, while 79.7 percent and 96.6 percent of farmers surveyed in the Middle and Southern zones, respectively, indicated no challenges. Overall, 89.1 percent of farmers had no challenges with the implementation of the PFJ program in 2019. Nonetheless, some respondents enumerated challenges, including having to make several trips to the MoFA office or input dealer before obtaining fertilizer. This has the potential of discouraging farmers from accessing the subsidised inputs and could affect the timely application of fertilizer.

Additionally, 7.1 percent of farmers, overall, indicated late delivery of seeds for planting. Like for fertilizer, delays in the delivery of seed are detrimental to crop yields. Suggestions that subsidised PFJ program inputs were overpriced, that outlets did not carry the right products (seed or fertilizer) or were unavailable, or that beneficiaries could not access the full quota of inputs were non-existent in the Northern zone, but were minimally expressed in the Southern and the Middle zones.

Table 22. Challenges encountered with access to Planting for Food and Jobs program inputs, percent of beneficiaries reporting

Challenge	Northern	Middle	Southern	Total
Had to make several trips to the MoFA office/input dealer before could collect fertilizer	4.6	12.1	1.5	6.3
Delivery of seed was late for planting	2.3	14.7	1.9	7.1
They did not have the right product available	0.0	0.3	0.0	0.1
Not allowed to collect full quota, i.e., enough seed for 5 acres	0.0	0.3	0.0	0.1
Was expected to pay a bribe or more than the 50% co-payment	0.0	0.3	0.3	0.3
Other	0.8	2.3	0.3	1.2
No challenge	92.4	79.7	96.6	89.1

Source: ISSER PFJ Survey, 2020

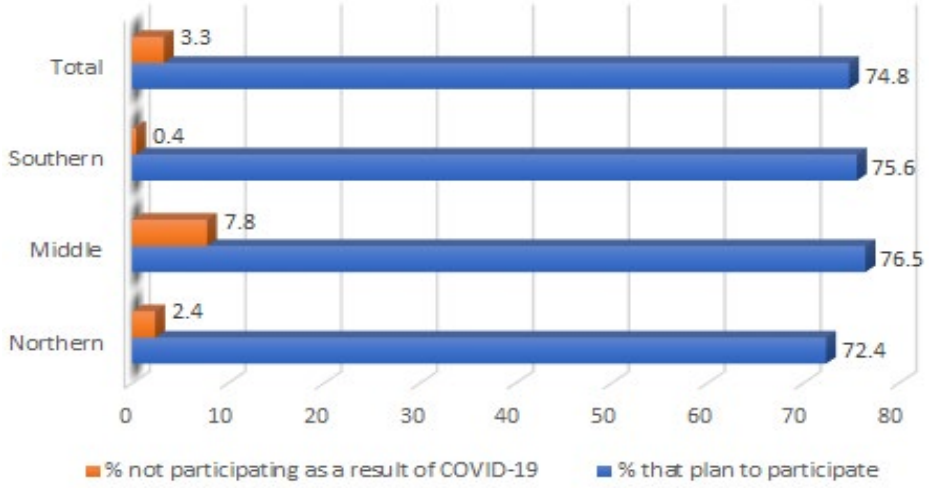
COVID-19 and the Planting for Food and Jobs program

This section covers COVID-19 related effects on farmers' participation, registration, acquisition of seed and/or fertilizer, marketing, and farm decisions across zones for the 2020 farming season. Also, the reasons for non-participation and the difficulties experienced are discussed.

Of the 2,662 farmers, 75 percent indicated having plans of participating in the PFJ program for the 2020 cropping season. The largest share of farmers who plan to participate in the program is from the Middle agroecological zone. It could be seen that the COVID-19 pandemic had some impact on participation decisions by some farmers, resulting in some deciding not to participate in the PFJ program for the 2020 cropping season (Figure 7). Across the three agroecological zones, the Middle zone recorded the largest number of farmers who decided not to participate in the program due to COVID-19, followed by the Southern zone and the Northern zone. The reasons for non-participation due to COVID-19 did not vary much across the zones – difficulty in accessing MoFA's offices and PFJ outlets due to social distancing restrictions was a dominant reason. In the Northern zone, difficulty in reaching the MoFA office or PFJ outlet and uncertainty regarding the

availability of inputs required are the main reasons accounting for non-participation. However, in the Middle zone, many farmers attributed non-participation to the inability to afford the registration cost due to income loss attributed to COVID-19.

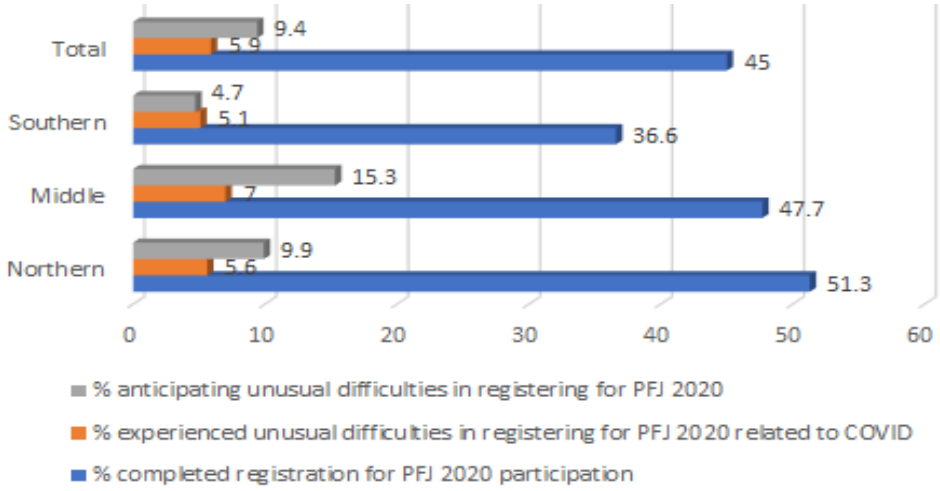
Figure 7. COVID 19 and decision to participate in the 2020 Planting for Food and Jobs program



Source: ISSER PFJ Survey, 2020
Note: Annex Table 7 presents similar statistics by PFJ beneficiary and non-beneficiary status.

Regarding farmer registration for the PFJ program by agroecological zones, the Northern zone recorded the highest number of farmers who had completed their registration. However, it also recorded the highest number of farmers who indicated experiencing difficulties in registration. The Middle zone recorded the second-highest number of registrants, followed by the Southern zone. However, the Southern zone had the largest share of farmers who acquired subsidized seed and/or fertilizer, followed by the Middle zone (Figure 8).

Figure 8. COVID-19 and plans to register for inputs under the 2020 Planting for Food and Jobs program



Source: ISSER PFJ Survey, 2020
Note: Annex Table 8 presents similar statistics by PFJ beneficiary and non-beneficiary status.

Table 23. Difficulties experienced in acquiring subsidized seed and/or fertilizer for the 2020 Planting for Food and Jobs program related to COVID-19

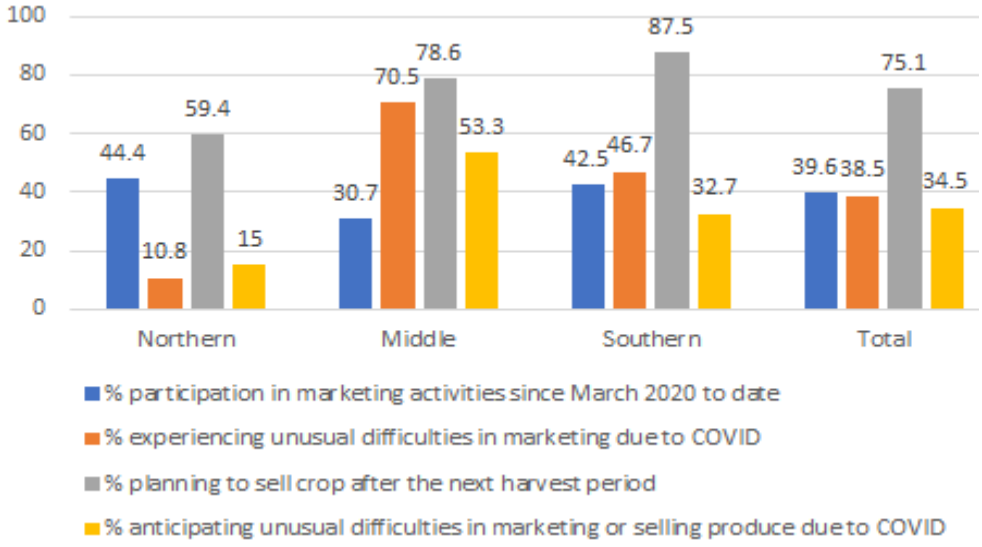
Difficulties	Agroecological zones			
	Northern	Middle	Southern	Total
COVID-19 travel and social distancing measures have made it difficult to reach MoFA district office, %	80.0	33.3	75.0	68.8
Experienced income losses due to COVID-19 and found it expensive to register for PFJ 2020, %	20.0	33.3	25.0	25.0
Type and/or quantity of inputs required were not available as a result of COVID-19, %	0.0	33.3	0.0	6.3

Source: ISSER PFJ Survey, 2020

Travel and social distancing restrictions and income loss due to COVID-19 were the dominant reasons for the difficulty in acquiring improved seed/fertilizer across all zones (Table 23). In the Middle zone, 33 percent of farmers who had difficulty acquiring improved seed and/or fertilizer attributed it to non-availability of the type or quantity of input required due to COVID-19.

Overall, difficulty in the marketing of farm produce was the most significant challenge presented by COVID-19 on PFJ participation. Figure 9 shows the Middle zone has the largest share of farmers who had difficulty marketing, followed by the Southern zone. Difficulty in marketing was relatively less of a problem in the Northern agroecological zone. This perhaps is due to a smaller share of farmers who plan to sell their crops after the next harvest from the Northern zone compared to the Middle and Southern zones. Of the farm households who indicated having difficulty in marketing crops due to COVID-19, 56 percent of them pointed to social distancing measures as the major cause of marketing difficulties. This challenge would likely have an impact on the volume of sale of farm produce.

Figure 9. Marketing in the era of COVID-19



Source: ISSER PFJ Survey, 2020
Note: Annex Table 9 presents similar statistics by PFJ beneficiary and non-beneficiary status.

Furthermore, about 30 percent of households in the Northern and Southern zones indicated unwillingness of traders to come to the farm gates to purchase farm produce as the second most significant cause of marketing challenges due to COVID-19. Social distancing restriction made it difficult to transport farm produce to the market; this came as the third major challenge across all agroecological zones. However, less than one percent of households experienced an increase in post-harvest losses due to COVID-19.

From Table 24, it emerges that COVID-19 had minimal impact on farm household decisions to change quantities of crop produced. On average, 83 percent of farmers indicated no change in the quantity produced across all zones. Also, most farm households indicated they do not plan to change their cropping pattern, farming method, or input use even with the COVID-19 pandemic. Overall, a small number of households indicated plans for using fewer inputs, such as fertilizer, mechanisation services, or hired labor, due to COVID-19. An average of 14 percent of farmers plan to plant more, while only 3 percent plan to plant less due to COVID-19.

Table 24. COVID-19 effects on farm decisions

Indicators	Agroecological zones			
	Northern	Middle	Southern	Total
Decided to change crop quantities produced due to COVID, %				
No change	86.6	79.8	82.0	82.9
I plan to plant more than usual	11.9	15.9	13.6	13.7
I plan to plant less than usual	1.5	4.3	4.4	3.4
Decided to change type of crops to plant due to COVID, %				
I do not plan to change my cropping patterns	96.2	88.6	88.2	91.1
I plan to plant more for own consumption, less for market	3.2	8.6	9.5	7.0
I plan to plant fewer perishable crops and more staples	0.5	1.1	1.5	1.1
I am planting a greater variety of crops	0.1	1.6	0.2	0.6
Other	0.0	0.1	0.5	0.2
Decided to change farming methods/ input use due to COVID, %				
I do not plan to change farming methods or inputs use	98.6	96.5	95.0	96.7
I plan to use less fertilizer or chemicals in total	0.8	1.5	2.1	1.4
I plan to decrease the use of mechanization services	0.1	1.0	1.1	0.7
I plan to hire fewer laborers	0.5	0.5	1.5	0.9
Other	0.0	0.6	0.3	0.3

Source: ISSER PFJ Survey, 2020

9. SUMMARY AND CONCLUSIONS

The study presents an evaluative analysis of the PFJ program in the 2019 crop season. To establish the program's performance, for most of the indicators, a comparative analysis was conducted for beneficiaries and non-beneficiaries. The analysis also assessed the performance of the beneficiary households across the three agroecological zones.

From the analysis of the results, the following are the summarized key findings.

- The majority of farmers knew of the PFJ program prior to the survey through the media, farmers, friends or relatives, and government officials.
- The proportion of beneficiary farmer households who intend to participate in the fertilizer subsidy program in the 2020 crop season is almost twice the proportion of farmers who intend to participate in the seed subsidy program.
- The farm size cultivated by beneficiaries in the 2019 crop season was relatively higher than by non-beneficiaries. Among the various crops, cereal was the predominant crop type the farmers cultivated in the 2019 planting season.
- The assessment of the PFJ pillars showed the following:
  - While many of the farmers accessed and used subsidized fertilizers, only about a third of the farmers accessed and used improved seeds in the 2019 planting season.

    - Access to information through ICT platforms was very low among beneficiary farmer households.
    - The proportion of beneficiary farmer households who received extension service was higher in the Middle agroecological zone compared to the Northern and Southern zones.
    - The majority of farmers sold their harvested crops to market traders. Only a few farmers sold some of their produce to NAFCO or had some arrangement with MoFA for the purchase of harvested crops.
- For all the crops cultivated, the beneficiary farmer households yields were relatively higher than those of non-beneficiary farmer households. This increased yield could be attributed to the use of improved seeds, fertilizer application, or both.
- A large proportion of the farmers store their crops in a room. Beneficiaries' post-harvest losses for maize, soya bean, groundnut, and cassava were higher than for non-beneficiaries, while the reverse was true for all the remaining crops examined.
- Beneficiaries' average per hectare total man-days employed on their crops was slightly higher than for non-beneficiaries.
- The proportion of beneficiary households who were food secure was higher than for non-beneficiaries.
- The welfare of beneficiary households was higher than the non-beneficiary households.
- The COVID-19 pandemic affected only a few farmers, resulting in some deciding not to participate in the PFJ program in the 2020 crop season.

The study has revealed a number of significant issues on the overall PFJ program over the study period. Among these are the widespread access (1.6 million beneficiaries) of the program, although there had been more interest in fertilizer than seeds; the existence of increased private market engagement for crops produce, with government playing a less significant purchaser's role; and beneficiary farmers realizing improved crop yields, although marginally, relative to non-beneficiary farmers. More so, beneficiary farmers tended to be wealthier and less prone to food insecurity, although this may be indicative of selection bias as opposed to an outcome of PFJ; and last but not the least, although the COVID-19 pandemic has negatively affecting every facet of the economy, it is not likely to greatly affect the PFJ program since most farmers are not going to reduce the size of their crop production in the 2020 planting season.

To enhance the sustainability and effectiveness of the PFJ program, it is imperative for the program to focus on the maximisation of the returns (increased crops yields) from the subsidies and further promotion of the improved seed component. In addition, government involvement in the market arrangement via its agencies, such as NAFCO, should be revamped to give better assurance to farmers about a market for their increased production.

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ANNEX

Annex Table 1. Demographic characteristics of beneficiary and non-beneficiary households

Indicator	Beneficiary	Non-beneficiary	Total
Households	2,123	851	2,974
Household size	5.59	5.05	5.44
Sex of household head, %			
Male	83.47	79.32	82.28
Female	16.53	20.68	17.72
Sex of household members, %			
Male	91.19	87.78	90.22
Female	8.81	12.22	9.78
Average age, years			
Household head	46.51	48.61	47.11
Household members	24.49	25.86	24.86
Age breakdown, %			
0-14 years	36.85	35.08	36.38
15-64	60.13	60.73	60.29
65+	3.02	4.19	3.33
Marital status of household head, %			
Single	4.82	3.91	4.56
Monogamous married	71.47	71.33	71.43
Polygamous married	15.55	11.02	14.25
Divorced	2.05	2.13	2.07
Widowed	5.06	9.12	6.22
Separated	0.91	2.13	1.26
Cohabitation	0.14	0.36	0.20

Source: ISSER PFJ Survey, 2020

Annex Table 2. Education characteristics of beneficiary and non-beneficiary households

Indicator	Beneficiary	Non-beneficiary	Total
Ever attended school, household heads, %	63.84	65.64	64.35
Adult (15 years of age or more) literacy			
Can read, %	56.56	55.47	56.26
Can write, %	56.53	55.39	56.22
Household member literacy			
Can read, %	51.05	49.05	50.48
Can write, %	50.67	48.82	50.14
Female	63.84	65.64	64.35

Source: ISSER PFJ Survey, 2020

Annex Table 3. Knowledge and participation in the fertilizer or seed subsidy program of the Planting for Food and Jobs program by beneficiary and non-beneficiary households

Indicator	Beneficiary	Non-beneficiary	Total
Knowledge about the fertilizer or seed subsidy program of the Planting for Food and Jobs program, %			
Never heard of it prior to today	2.51	21.62	7.71
Media (radio, television, newspaper)	65.33	55.75	62.72
Farmers, friend or relatives	51.18	37.67	47.50
Government official	46.07	23.77	40.00
Politician	5.87	3.79	5.30
Other	0.85	2.91	1.41
Participation, %			
Intends to participate in fertilizer subsidy in 2020	85.63	34.2	70.91
Intends to participate in seed subsidy in 2020	38.34	20.21	33.15
Reasons for not participating, % of non-participants			
Not aware of program	20.34	37.50	35.56
Not interested in participating or don't need subsidy	33.90	19.40	21.03
Registration process is too cumbersome	1.69	5.17	4.78
The inputs I need are not available	1.69	0.86	0.96
The co-payment for subsidized inputs is too high	16.95	20.04	19.69
Inputs supplied are of low quality/yields are too low	0.00	1.29	1.15
I was turned away by officials when attempting to register"	3.39	1.08	1.34
Others	25.42	24.35	24.47

Source: ISSER PFJ Survey, 2020

Annex Table 4. Access to and use of e-agriculture platforms by beneficiary and non-beneficiary households

Indicator	Beneficiary	Non-beneficiary	Total
Farmer that received information on ICT, %)	14.74	9.75	13.32
Main source of information, %			
Radio or television	47.92	59.04	50.25
Newspapers	0.96	3.61	1.52
Phone calls or text messages	25.88	18.07	24.24
Brochures or flyers	13.42	4.82	11.62
Mobile apps or online tools	2.56	6.02	3.28
Farmers, friends or relatives	6.71	8.43	7.07
Other	2.56	0	2.02
Main supplier of information, %			
Government	79.87	84.34	80.81
Private sector company	8.63	3.61	7.58
Private individuals	5.11	6.02	5.30
NGOs	3.19	4.82	3.54
Development agencies	0.32	1.20	0.51
Other	2.24	0.00	1.77
Information van	0.32	0.00	0.25
Public address system	0.32	0.00	0.25
Farmers who have seen improvement in government-provided services, %	94.57	59.04	87.12
Farmer who encountered challenges, %	14.14	6.9	13.39
Types of challenges faced, %			
Process is very time-consuming	59.78	66.67	59.86
Distance to MoFA office is far	36.59	66.67	36.92
Had to make several trips to MoFA office	40.58	33.33	40.50
Expected to pay a bribe	5.07	0.00	5.02
Others	3.99	0.00	3.94
No challenges faced	14.86	0.00	14.70

Source: ISSER PFJ Survey, 2020

Annex Table 5. Labor use by beneficiary and non-beneficiary households

Indicator	Beneficiary	Non-beneficiary	Total	N
Total man-days used on the farm, per hectare	160.42	157.77	159.66	2,123
Family man-days used on the farm, per hectare	59.52	63.99	60.80	2,123
Hired man-days used on the farm, per hectare	43.44	32.14	40.21	2,123
Communal man-days used on the farm, per hectare	57.46	61.64	58.66	2,123
Family labor in total farm labor, % share	37.36	40.13	38.16	2,972
Hired labor in total farm labor, % share	42.95	38.51	41.67	2,112
Communal labor in total farm labor, % share	19.69	21.36	20.17	2,112
Female labor in total family farm labor, % share	14.50	16.58	15.10	2,112

Source: ISSER PFJ Survey, 2020

Annex Table 6. Crop harvest storage by beneficiary and non-beneficiary households

Indicator	Beneficiary	Non-beneficiary	Total
Households that stored crop after harvest, %	46.54	47.83	46.91
Households that stored crop in, %:			
Traditional Crib	19.23	18.92	19.14
Improved crib	1.92	0.98	1.65
Room	69.74	68.8	69.46
Kitchen	8.20	10.57	8.89
Community storage	0.40	0.25	0.36
Other storage	0.51	0.49	0.50

Source: ISSER PFJ Survey, 2020

Annex Table 7. COVID-19 related reasons affecting non-participation

Reasons	Agroecological zones			
	Northern	Middle	Southern	Total
COVID-19 travel and social distancing measures will make it difficult to reach the MoFA office or PFJ outlets, %	50.0	20.0	0.0	27.3
Have experienced income losses due to COVID-19 and will not be able to afford the registration process or co-pay for inputs, %	0.0	40.0	0.0	27.3
Do not believe the type and/or quantity of inputs I require will be available as a result of COVID-19 disruptions to input markets, %	50.0	0.0	0.0	13.6
Do not think there will be demand for the output I will produce as a result of COVID-19, %	0.0	6.7	0.0	4.5
Other reasons, %	0.0	33.3	100.0	27.3

Source: ISSER PFJ Survey, 2020

Annex Table 8. Difficulties experienced in registering for the 2020 Planting for Food and Jobs program related to COVID-19

Difficulties	Agroecological zones			
	Northern	Middle	Southern	Total
COVID-19 travel and social distancing measures have made it difficult to reach MoFA district office, %	36.8	47.6	84.6	52.8
Experienced income losses due to COVID-19 and found it expensive to register for PFJ 2020, %	57.9	42.9	15.4	41.5
MoFA district staff have not been available to help because of COVID-19, %	5.3	4.8	0.0	3.8
Other difficulties, %	0.0	4.8	0.0	1.9

Source: ISSER PFJ Survey, 2020

Annex Table 9. Difficulties experienced in marketing crops related to COVID-19

Difficulties	Agroecological zones			
	Northern	Middle	Southern	Total
Lack of demand in the market due to social distancing measures, %	45.5	64.4	50.5	56.0
Getting crops to the market was difficult because of travel restrictions and/or harassment along the road, %	22.7	23.7	14.1	19.3
Traders did not come to farm gate due to social distancing measures/border closures, %	29.5	6.2	30.4	19.8
Experienced an unusual increase post-harvest losses due issues related to those noted in rows above, %	2.3	0.0	1.1	0.7
Experienced other difficulties, %	0.0	5.6	3.8	4.2

Source: ISSER PFJ Survey, 2020

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