

REVIEW

## Planting for food and jobs in post-COVID era: identifying the missing gaps for sustainable food production – a review

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### Abstract

Agriculture is the backbone of the Ghanaian economy and serve as a source of employment, income generation and poverty reduction for many people in the agricultural value chain. Agriculture over the years has contributed significantly to Gross Domestic Product (GDP) until recently when the performance of the sector and the contribution to GDP began to dwindle. With the current economic challenges after COVID-19, high fuel costs and ravaging food prices, every effort should be put in place to increase food production to reduce food importation which put pressure on the local currency and drives food prices high. The introduction of the Planting for Food and Jobs (PFJ) policy was to boost agricultural productivity, eliminate hunger, reduce poverty, achieve food sufficiency and reduce unemployment. The policy is also to help achieve the Sustainable Development Goal 1- No Poverty and Goal 2 - Zero hunger especially in this post-COVID era. This paper was carried out by reviewing policy documents, articles and interacting with certain stakeholders on the Planting for Food and Jobs initiative. The PFJ policy hinges on five pillars namely: improved seeds, fertilizer supply, dedicated extension services; market, and e-agriculture. However, the policy is flawed with many challenges. The review showed that the policy lacks clear direction as regards its implementation. Key implementation features such as provision of irrigation facilities, introduction of mechanization services, dedicated market for farmers' produce and land tenure systems among others were major issues. It was also observed that there were poor monitoring and evaluation, corrupt practices such as the diversion of improved seeds and fertilizers, high cost of farm inputs and lack of sustainability plan as in the case of previous interventions. This article will, therefore, help policymakers and the government to review and focus on key areas of the policy that will improve food production, create jobs, ensure food security and transform the general economy.

**Keywords:** Planting for Food and Jobs, COVID-19, Missing Gap, Sustainable Food Production, Policy

### Introduction

Agriculture is the backbone of the Ghanaian economy and serves as a source of employment, income generation and poverty reduction for many people in the agricultural value chain (Mensah, 2019). Ghana's agricultural development has gone through various transformations since independence to reduce poverty and make Ghana food secured. Even though Agriculture is supposed to be the engine of growth to transform the national economy and improve food security in the country, the contribution of agriculture to GDP has dwindled since independence. The contribution of agriculture to GDP has declined from 56 % in 1980 to 19.25 % in 2020 (MoFA, 2020). Ghana's agricultural sector which is essentially agrarian, smallholder based and also dependent on rainfall is bedevilled with many challenges. The low productivity in the agricultural sector has resulted in many people living in abject poverty especially those in the three Northern regions (Ragasa and Chapoto, 2017). With the current economic challenges after COVID-19, high fuel hikes and ravaging food prices, every effort should be put in place to increase food production to reduce food importation which put much pressure on the local currency and drives food prices. According to Valdés and Foster (2010) increased

agricultural productivity will facilitate the economic growth of every nation. Smallholder farmers who rely on rain-fed agriculture contribute about 80 % of the total domestic agricultural output (FAO, 2015).

The Planting for Food and Jobs (PFJ) aims to increase food production, ensure food security, reduce food importation, increase farmers' income and create jobs. It hinges on five pillars viz: improved seeds, fertilizer supply, dedicated extension services; market and e-agriculture (MoFA, 2018). The policy also has the potential to address some of the Sustainable Development Goals (SDGs) especially goals 1 & 2 of ending poverty and hunger, achieving food security, improving nutrition, and promoting sustainable agriculture. This policy, if properly implemented, will ensure sustainable food production for local consumption and for export. The policy is expected to increase maize production by at least 30%, rice production by 49 %, Soybean by 25 % and Sorghum by 28 %. However, the policy is flawed with implementation challenges. It also lacks certain key implementation strategies which when considered could improve the success of the policy.

This article, therefore, seeks to identify the missing gaps and the implementation strategies, which when addressed will ensure the sustainability of the programme, increase food production, attract the teeming youth into agriculture and enhance the agricultural value chain. The article also proposes suggestions for the policy for sustainable food production. This article will help policymakers and the government to review and focus on key areas of the policy that will improve food production, create jobs, ensure food security and transform the general economy. The impact of COVID-19 is still lingering and thus the need to introduce innovation into the agricultural sector as the only hope to transform the economy and place the country on the path to prosperity. This paradigm shift is the only way to achieve the sustainable development goals of ending poverty and hunger by 2030.

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### COVID-19 and Food Security

Coronavirus disease (COVID-19) started in Wuhan, China and spread almost across the entire globe with the US and Europe having the heaviest toll from the virus. The pandemic has caused tremendous havoc globally pushing several companies, industries, businesses and other goods and services to be closed. Many jobs have been lost and many people were sent home without jobs and income (McDowell *et al.*, 2020).

Many economies were on the verge of collapsing due to slow growth in productivity, low income from taxes, and general hardship due to various measures such as lockdowns, social distancing and restriction of movement that hampered food production, distribution and trading. Loss of employment and income for many has also affected people's ability to afford food. According to the World Food Programme (WFP), 135 million people who were facing acute food insecurity before the COVID-19 crisis were likely to increase to 265 million by the end of 2020 (WFP, 2020). The WFP works in collaboration with the Food and Agriculture Organization of the United Nations (FAO) and the International Fund for Agricultural Development to provide more than 15 billion rations annually to about 86.7 million people. The World Bank also discovered that about 820 million people were hungry and undernourished in 2018 which is equivalent to 1 out of 9 people (WB, 2020). Countries likely to be hard-hit by post-COVID-19 are those with extreme weather events, high poverty rates, and conflict-prone and weak economies including Ghana (FAO, 2020). COVID-19 is predicted to disrupt food supply chains worldwide over the coming years which will impact negatively on the poor especially those in low-income countries.

Despite the challenges associated with the COVID-19 pandemic, another blow from Russia – Ukraine war has necessitated an astronomical increase in fuel prices resulting in high food prices and food insecurity. The FAO has already predicted the impact of COVID-19 on the food and agricultural sector and therefore urges nations to provide food needs to the vulnerable, boost social protection activities, ensure global food movement and domestic food supply chain as well as support smallholder farmers to increase food production to mitigate the hardship (FAO, 2020). It is estimated that over 80% of the activities of smallholder or family farmers are limited to local and domestic food markets globally (FAO, 2018). It is also estimated that family farming or smallholder farmers form about 88% of the

570 million farms globally and produce about 80% of the food needed globally (FAO, 2020).

### Typology of agricultural policies since independence

Since independence, there have been various policies to transform the agricultural sector but nothing much has been achieved. All the policies are geared towards modernizing the agricultural sector and improving food production to feed the growing population but the country is still struggling to be food sufficient. Among the policies rolled out since independence are:

1. Establishment of state farms in 1962 by Osagyefo Dr Kwame Nkrumah
2. Introduction of Operation Feed Yourself programme by Ignatius Kutu Acheampong in 1972
3. The Launch of Accelerated Agricultural Growth and Development Strategy (AAGDS) to support Vision 2020 which seeks the application of science and technology to increase productivity without damaging the environment.
4. Agricultural Sector Growth Improvement Project (AgSSIP)
5. Mass Cocoa spray and fertilizer subsidies
6. Ghana Poverty Reduction Strategy (1 & 2).
7. Food and Agriculture Sector and Development Policy (FADEP I & II)
8. Medium-Term Agriculture Sector Investment Plan METASIP I & II (2014-2017) and
9. The recent Planting for Food and Jobs (PFJ) policy introduced in 2017.

Despite the successive governments' efforts to introduce several policies aimed at revamping the sector to maximize returns, the agricultural sector's contribution to GDP has failed to realise the expected transformation as indicated in Figure 1 (PFJ, 2017). Unfortunately, the sector continues to suffer many challenges such as access to finance, land tenure system, post-harvest management and inadequate irrigation facilities (EU, 2017). Research shows that about 96 % of all cultivated land in Ghana has no source of reliable water for irrigation as agriculture is mainly rain-fed (OBG, 2017). With erratic rainfall patterns and the threatening effect of climate variation and change, more investment is needed to expand irrigation water sources to ensure a dependable source of water for agriculture (IFPRI,

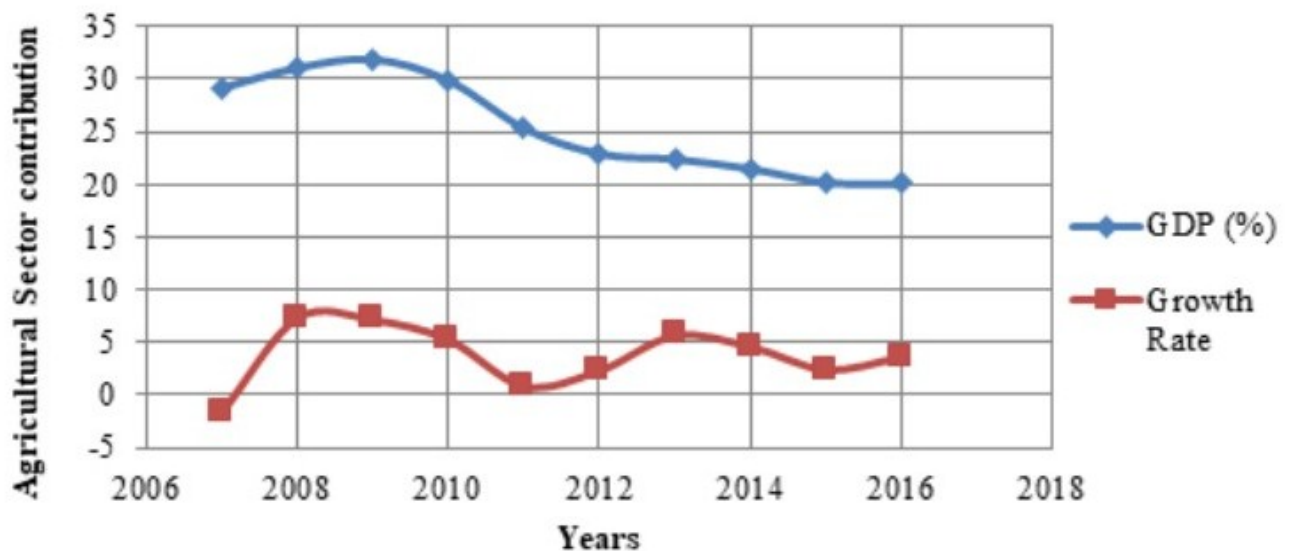


Figure 1 Agricultural sector contribution to GDP and annual growth rate (PFJ, 2017)

2009) otherwise, the country will become a net importer of various basic foods which will put much pressure on the local currency. The introduction of Planting for Food and Jobs in 2017 is therefore in the right direction to improve agricultural productivity and ensure food security in the country if all the necessary parameters are put in place.

#### Why do agricultural policies fail?

Historically, most of the policies come in the form of projects with foreign donor support or aid and as long as there is flow of funds to execute the project, everything seems to be fine until the flow of funds ceases. It appears all the projects are tied to the inflow of funds from external sources with low internal financial support when the external funding ends. There are a lot of factors that cause agricultural policies to fail and chief among them are lack of sustainability plan, low investment, and poor monitoring (Figure 2). Other factors that also influence the collapse of many agricultural projects are poor road networks, transportation problems, lack of storage facilities and market for farm produce. The reasons can also be attributed to lack of financial support, late delivery of farm inputs, smuggling, distribution biased, and other implementation challenges (Jayne *et al.* 2018). Besides, the policies are also mainly flawed with inefficiencies from high administrative costs and political interferences (Banful, 2010). It is therefore important that proper sustainability and implementation plans are rolled out to support the continuity of projects for increased food production, especially the current PFJ policy.

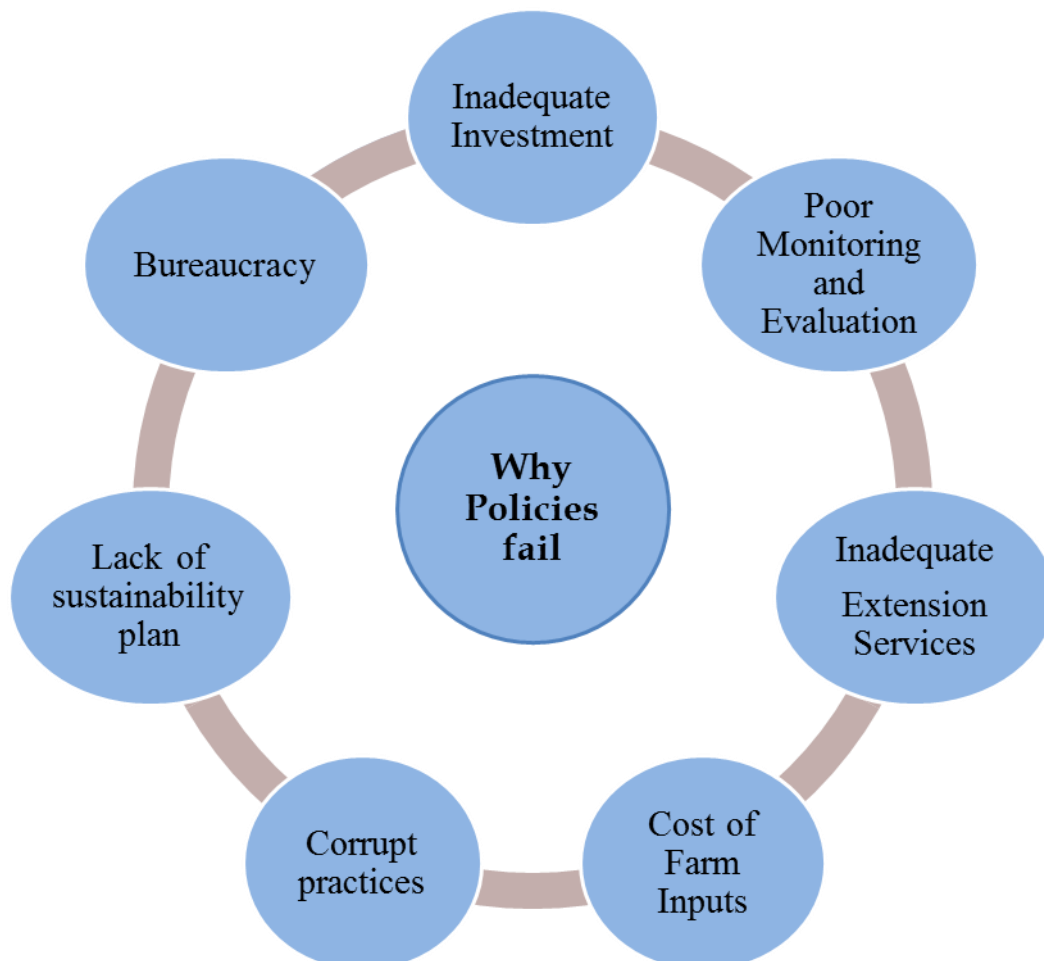
#### Introduction of Planting for Food and Jobs Policy

Planting for Food and Jobs (PFJ) policy is one of the government's flagship programmes which began in 2017 as an intervention to increase food production and reduce poverty and

create jobs. The programme provides subsidies on improved seeds (50 % of the market price), fertilizer (50 % subsidy), extension services to farmers for free, ready markets for farmers' produce and e-agriculture to provide relevant information and create a database for farmers (PFJ, 2017). Agriculture being the backbone of the Ghanaian economy require policies and the political will to revamp the entire agricultural value chain, especially the recent PFJ policy. It is not the only policy introduced as there have been various agricultural policies introduced by the previous governments. Unfortunately, most of them did not achieve the intended objectives. The introduction of the government policy on "planting for food and job" is to modernize agriculture activities, which will increase food production and ensure food security, reduce food importation, increase farmers' income and create jobs for the teeming youth (PFJ, 2017). Among the crops targeted are cereals (Maize, Rice), legumes (Soybeans, Sorghum) and Vegetables (Tomato, Onion, Chili pepper).

The policy will encourage farmers to work harder to produce more food thus improving their income levels and enhancing their livelihood. Proper implementation of the policy and the provision of available inputs and resources will encourage the youth also to go into agriculture to produce more food for internal consumption and for export. However, for the youth to go into agriculture, the sector must be made attractive through innovation, availability of credit facilities and investment opportunities. The youth should be given training on all aspects of farming activities especially the planting of vegetables which are needed to improve nutrition.

The PFJ policy is implemented through the provision of subsidies to help farmers to meet their need for inputs and deal with challenges with inputs acquisition (Bizikova *et al.*, 2017). Unfortunately, subsidies are often focused on the supply of



**Figure 2** Factors that cause many policies to fail (from varying sources)

chemical fertilizers without recourse to the efficient and proper application of the fertilizer on the farms (Jayne *et al.*, 2018). According to Morris *et al.* (2007), subsidies introduced since independence have not yielded the expected results in agricultural productivity due to ineffective implementation thus need for review of the current policy on PFJ.

### **The five pillars of planting for food and jobs**

#### ***Improved seeds***

The distribution of improved seeds is to produce high-yielding crops that can withstand pests and diseases. High yielding crops and successful food production and security will depend mainly on the quality of seeds supplied (Azumah *et al.*, 2019). The improved seeds are to be supplied to productive and resource-poor farmers, smallholder farmers in deprived areas with lands, of less than 2 hectares, who are willing to take part in the policy to increase crop production and farm output. Improved seeds were imported at the early stages (80%) during the inception of the policy but currently, all seeds for PFJ are sourced domestically apart from hybrid maize seeds, which are still being imported (MoFA, 2020). The quality of seed is also an important part to ensure an increased crop yield when all other agronomic practices are carried out (FAO, 2017).

#### ***Fertilizer subsidy***

The PFJ also supplies subsidized fertilizer to boost crop production and increase yield. The use of chemical fertilizer has gained substantial acceptance across the country since it was reintroduced in 2008 to help boost agricultural production. In 2016, it was estimated that 90,000 metric tonnes of fertilizer were imported and supplied to farmers (MoFA, 2017). Fertilizer application on farms has increased from the previous 8 kg to 20 kg/ha due to the Abuja declaration to increase fertilizer use to 50kg/ha (MoFA, 2020). Fertilizers in supply by the programme are NPK (15:15:15), NPK (23:10:05) and urea (46:0:0) (PFJ, 2017). Farmers are to pay half of the 50% payable cost as down payment, and the remaining half at the end of the harvest season.

#### ***Extension Officers***

Extension officers play a vital role in enhancing farming activities by supporting farmers in a variety of ways. Regular visits of the extension officers to the farms will help appropriate fertilizers and pesticides to curb misapplication. The PFJ provides free extension services to farmers to increase food production. It is therefore very important that extension officers are provided with the needed logistics and training to regularly visit the farmers.

#### ***Marketing***

Marketing has been a major hindrance to food security due to high post-harvest losses. The introduction of marketing as part of the pillars is very important to reduce post-harvest losses, increase farmers' income and make food accessible to the general public. The proper market operations can also regulate food prices on the market.

#### ***E-agriculture***

The introduction of e-agriculture is to offer state-of the -art information and communication technology (ICT) platform in agriculture which will provide timely information on the weather, farm input and market prices to farmers and the general public to make informed choices. It will provide a fast, reliable and accurate dissemination of information, including detailed information on distribution channels, extensions and other services. The e-agriculture through the PFJ is expected to assess the re-

quirements of the ICT models and tools for the deliverables of the programme which will include registration and validation; inclusion of the youth and women; establishment of a database for information dissemination; weather forecasting and communication; post-harvest handling methods among many others. Information will be disseminated through Web Portals, Text Based Services and Mobile Internet-Based Services (PFJ, 2017).

### **Benefits of the policy to the Ghanaian economy**

The overall goal of the PFJ programme is to contribute to the modernisation of the agricultural sector and structural transformation of the national economy through food security, employment opportunities and reduced poverty (MoFA, 2017). There is no doubt of the enormous benefit that the policy could bring if implemented successfully. Among the perceived benefits of the policies are:

#### ***Creation of jobs***

The PFJ when properly implemented will create more jobs in the agricultural value chain from land preparation, planting, harvesting, processing, distribution and sales to the final consumers. Irrigated agriculture is likely to use more labour than rain-fed agriculture thus creating jobs. The availability of irrigation facilities will also encourage farmers to increase their use of inputs, fertilizers, pesticides, improved seeds, and other agricultural inputs and services (WB, 2005) thus creating employment along the labour supply chain. A study in the Philippines showed that local demand for labour in irrigated agriculture increased from 18d/ha in 1995 to 54 d/ha in 2002 (Shively and Pagiola, 2004). Improved water management to increase farm output will arouse the demand for more labourers due to increased crop density and increased farm size. Jobs will also be created during the construction of irrigation dams, maintenance of irrigation canals, pumps and fieldwork (Hussain, 2005). Employment could also be created during planting, weed management, harvesting and even processing of the products and these will help reduce the rural-urban migration.

According to MoFA (2017), one of the objectives of the planting for food and jobs programme is to provide job opportunities for the teeming unemployed youth in the agriculture and allied sectors. Evidence from the green revolution in Asia has revealed that higher agricultural output stimulates employment in the rural and urban non-farm sectors through both forward and backward linkages (Hanmer and Naschold, 2000). Implementation of the PFJ is therefore bound to generate jobs in both rural and urban areas in Ghana through increased value chain activities, production, value addition and commodity processing and marketing (MOFA, 2017). It is conceivable that the rise in trading, grading, processing, packaging, value addition and marketing activities in food and feed industries that the PFJ programme would render could create more jobs, especially for the youth and women, in both farm and off-farm sectors. It should be noted that most of the job creation will come through micro, small and medium enterprises in rural and urban areas.

#### ***Improved food security***

Food security has been defined differently by different researchers including its availability, accessibility, nutritional content, and presentation among others but FAO (2013) defines food security as when all people, irrespective of where they are at all times, can have access to sufficient, safe and nutritious food at all times to meet their dietary needs and food preferences for an active and healthy life. This indicates that food security should comprise availability, accessibility, affordability and utilization and the food should be able to provide the

micro and macro nutrients needed for healthy growth. According to FAO (2014), food security should be at four levels namely; international, national, household and individual levels even though these levels will vary from region to region. According to the World Bank, food security is access to enough food by all people at all times for an active and healthy life. One of the objectives of the PFJ programme strategy is to create general awareness for all the citizens to get involved by having farms and backyard gardens to produce crops such as cereals or vegetables where land is available and accessible. To achieve this, the programme should catalyze market-led production of adequate quantities of quality seeds by private enterprises, certified seed companies and agro-dealers, and facilitate the timely distribution of the certified seeds at subsidized prices through public and private outlets to the targeted beneficiaries. This will boost food production to ensure food security in the country.

#### **Food availability and lower food prices**

The World Food Programme (WFP) defines food availability as “The amount of food that is present in a country or area through all forms of domestic production, imports, food stocks and food aid” (WFP, 2009). Food availability can also be defined as sufficient quantities of food of appropriate quality supplied. One of the objectives of the planting for food and jobs policy is 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 (MoFA, 2017). Report from the 2019 budget statement indicated that there have been significant yield increases recorded in 2017 compared to 2016 levels for selected crops; maize yield increased by 67 per cent from 1.8mt/ha to 3.0mt/ha; rice yield increased by 48 per cent from 2.7mt/ha to 4.0mt/ha and soya yield also increased (MoFA, 2017). With the abundance of food, prices will automatically drop due to demand-supply principles.

#### **Increased income for the farmer**

More food production will mean more food to be exported to other countries which will bring about the foreign exchange to stabilize the foreign currency in the country. Farmers having a ready market for their products will get more money to take care of their household needs and the education of their children. The abundance of food will also improve nutrition due to the variety of food substances that people can choose from.

#### **Reduction of food importation and promotion of export**

When food is produced in large quantities, people will have more food to consume and some for export. Importation of rice, maize, dairy products and wheat among others will be reduced thus improving the government’s balance of payment. The export of cash crops and other commodities will also increase government revenue and increase foreign earners for the country.

#### **Provision of raw materials for industry**

The planting for food and jobs will produce enough raw materials to feed the one district, one factory (1D1F) policy which will eventually reduce post-harvest losses and increase employment. The 1D1F policy is supposed to drive the PFJ to produce more food crops and other raw materials for local consumption, export and industrial processing. The industries are to process the abundant food crops produced into other forms to extend their shelf life. The processed crops can then be stored longer for local consumption and also for export. This will add value to the crops and improve their nutritional value of the crops. It

will also improve the agricultural value chain and create more jobs along the value chain.

#### **Increased food production**

In the budget statement and economic policy of the government of Ghana for the 2019 financial year, GH¢ 380,000,000.00 was allocated for the planting for food and jobs project. According to the budget statement for the 2019 report, following a year of implementation of the Planting for Food and Jobs (PFJs) programme, the sector witnessed a growth rate of 8.4 % in 2017. This was after almost a decade of erratic performance with an average growth rate of 3.4 %. It is important to mention that significant yield increases were recorded in 2017 compared to 2016 levels. The success achieved is an indication of government efforts towards the transformation and modernization of agriculture. On account of the success, the government implemented an expanded version of the PFJ in 2018 with more ambitious targets. Compared with a target of 500,000 farmers, a total of 577,000 farmers were supplied with subsidized fertilizers and seeds for the 2018 cropping season by 150 per cent from 1mt/ha to 2.5mt/ha. This will reflect in increased in food production for local consumption and for export to bring in foreign currency.

#### **Implementation challenges of the policy**

The challenges associated with planting for food and jobs include low accessibility and availability of certified quality seeds, lack of sufficient fertiliser application, lack of extension services to farmers, weak linkages between producers and markets, and limited use of information and communication technology (ICT) (MoFA, 2017). The implementation of the programme is observed to be practically weak and one of the major challenges is inadequate logistics for monitoring and evaluation of the programme. A study by Mabe *et al.* (2018) revealed that inadequate quantities of fertilizer and seeds were identified as a major implementation problem reported by most of the stakeholders.

Also, political interferences, lack of support from Municipal and District Assemblies, and smuggling and re-selling were identified in the same study (Mabe *et al.*, 2018). The stakeholders also complained that the inputs are supplied late and this may be due to political interference. The release of inputs was generally late (after the farming season has taken off). Therefore, most farmers did not benefit fully from the seed component. Farmers used their own seeds before the arrival of the PFJ seeds (Mabe *et al.*, 2018). In some cases, seeds were in short supply. Some farmers even paid for the seeds but did not get them. The preference of the seeds variety for farmers was also identified to be a challenge. Findings from the study by Mabe *et al.* (2018) indicated that private sector engagement to drive and sustain most of the pillars was generally low. Inadequate and untimely supply of inputs, especially seed and fertilizers was a problem. Another challenge to the programme is the youth showing disinterest in it. The young folks are staying away from the programme because they believe that white coloured jobs are more rewarding and fulfilling.

Furthermore, inadequate capital is compelling some farmers to pull out from the programme, since they do not have enough funds to pay for the 50 % seedling and fertilizers. The prerequisite is that farmers are supposed to provide at least one acre of land to qualify for this program and not all farmers own land or can afford it. Besides, low accessibility and availability of certified quality seeds, lack of sufficient fertiliser application, lack of extension services to farmers, weak linkages between producers and markets, and limited use of ICT is also a major challenge (MoFA, 2017). Poor road networks, transpor-

tation problems, lack of storage facilities, market for produce and postharvest losses, and low application of improved seeds and organic fertilizers are all part of the challenges.

### What are the missing gaps?

The PFJ is, without doubt, a very good policy that when properly implemented can improve food security, make agriculture attractive and improve the living standard of many farmers. However, the policy is flawed with implementation challenges. The policy is hinged on five pillars but only two components of the pillars are given attention (improved seeds and fertilizer distribution). Besides, there are other key missing factors that when considered could enhance the success of the policy. Among the factors are the introduction of mechanization services, provision of irrigation facilities, dedicated market and land tenure systems. For the success of this programme, effective monitoring and evaluation will be required and every effort should be made to reduce or eliminate corrupt practices, especially during the supply of farm inputs. It is very important to consider research into crop varieties, improved agronomic practices, drought-sensitive crops, pests and disease infestation, and soil-nutrient deficiencies to increase agricultural productivity (Namara *et al.*, 2010). Among the missing gaps observed are:

#### *Distorted policy focus*

Apart from the PFJ, other policies such as Planting for Export and Rural Development, Greenhouse Technology, and Rearing for Food and Jobs among others have been introduced while the initial PFJ has not fully been implemented and assessed. This situation will not only reduce the commitment to the task but jeopardize the investment needed to make the PFJ work efficiently. It is therefore prudent to focus on ensuring the success of the PFJ before extending it to other areas. Some of the thematic areas are also conflicting. For instance, planting for export and rural development and aquaculture for Food and Jobs can still be under the PFJ since part of the agricultural products can still be exported and the proceeds used for rural development.

#### *Inadequate irrigation facility*

The use of natural rain for food production is no more sustainable due to the effect of a changing climate which will affect water availability (Janmatt, 2004). The planting for food and job is currently dependent on the rainy season which does not support all-year-round production of food. The provision of water sources for farmers to continue in business is very critical, especially during the dry season. The lack of adequate water resources will affect both the productive and consumptive application of many farmers and water users (Molden *et al.*, 2007). The government policy on one village, one dam (1V1D) is supposed to provide relief to farmers and make irrigation accessible to small-scale farmers as well as livestock watering. Improved water availability and management in agriculture will increase crop yield, increase cropping intensity and cultivated area, reduction of crop losses and increase the income levels of many farmers (Smith, 2004). The initiative was lauded by many individuals and organizations but its implementations have been marred with many challenges. Dr. Nyaaba, the president of the Peasant Farmers Association of Ghana (PFA) reiterated the importance of the 1V1D concept that it could be an alternative to rain-fed agriculture to protect farmers from the vulnerability of rain-fed agriculture to drought.

The 1V1D policy, if properly implemented will serve as the engine to run the PFJ. The success and sustainability will also depend mostly on the availability of water for irrigation. This is due to the changing climate and unfavourable climatic

conditions facing the world today. Irrigation dams apart from providing water for crops and other purposes will serve as a source of underground water recharge to provide water for boreholes. Research has shown that impoundment of small-scale runoff and improved soil conservation practices could boost agricultural production in Africa because of the present and future climate variability (Wisser *et al.*, 2010). According to Hussain (2005), the provision of irrigation facilities offers employment in the area of irrigation water management and supply, construction of canals and pump management. It will even reduce rural–urban migration to ease the pressure on urban amenities. Intensive cropping could also be encouraged and cultivated areas increased. Continued cultivation through irrigation facilities will raise crop output levels, increase farmers' income and improve their livelihood, reduce food prices and promote food security.

However, water availability alone cannot improve food availability without proper agronomic practices, proper pricing, market accessibility, proper trade policies and post-harvest management (Smith, 2004). Growing water scarcity due to water pollution and poor management of water are major threats to the sustainability of water development in arid and semi-arid regions. Integrated water resources management, planning, rehabilitation of infrastructure, improvement drainage management and control flow are all very important to warrant continuous production of food to feed the growing population. Education on water saving and water conservation measures, water use efficiencies, capacity building and institutional interventions will also be required to improve food production.

#### *Focus on chemical fertilizer at the expense of organic fertilizer (compost)*

Fertilizer is one of the inputs for increased crop yield and the focus of the PFJ is to supply subsidized fertilizer to farmers to enhance food production. Fertilizer application on farms has increased from the previous 8 kg/ha to 20 kg/ha due to the Abuja declaration to increase fertilizer use to 50kg/ha (MoFA, 2020). Despite the potential of chemical fertilizer to boost food production, the continuous use of the fertilizer will compromise the quality of the food produced (Sun *et al.*, 2015). The consistent use of chemical fertilizer will cause soil degradation, water pollution and consistently reduce crop yield in the long term (Nkoa, 2014). The excessive use of chemical fertilizer will impact negatively on surface and groundwater quality due to leaching and surface runoff thus moderation is needed in this case. Once chemical fertilizer is used on soil, it is expected that the same fertilizer should be applied in the next planting season and this could lead to loss of organic matter and soil acidification. The nitrogen component of the fertilizer breaks down into nitrates which trickle into the soil and accumulate over time and cause heavy metals contamination (Gao, 2001). The uptake of heavy metals in the soil by plants could also have serious implications on human health. The use of chemical fertilizer will only maximize short-term economic gains at the expense of soil and water quality. Besides, the quality of fertilizer imported and distributed is questionable as about 1/3 of fertilizer sampled were below the recommended standard (GoG, 2015) and this is likely to affect crop production and output.

The introduction of organic farming within the policy could be considered to improve the quality of food crops produced which tend to fetch more money than the use of chemical fertilizer. Organic fertilizer is noted for improved microbial activities, reduce pests and diseases and increase crop yield (Zhang, *et al.*, 2012). The use of organic manure, compost, animal waste, farm waste and slurry from the digester will improve soil conditions, reverse soil acidification and improve

crop yield and quality (Li *et al.*, 2018). The use of organic manure improves soil microbe activities and the water-retaining capacity of the soil. The introduction of organic fertilizer for crop production will therefore be one of the best ways as far as planting for food and jobs is concerned. The adoption of organic farming will add value to the crops produced and also improve agricultural lands in the long term, creating jobs by encouraging the processing and sales of composts for organic farmers. The switch to organic fertilizer will create jobs, improve organic waste management, positively influence soil quality and produce food of good quality. Government subsidy on chemical fertilizer and the cost for importation could therefore be channelled into the production of organic fertilizer locally which will eventually benefit the country in diverse ways.

### **Inadequate mechanization centres**

One of the aims of PFJ is to create jobs for the teeming unemployed youth who see agriculture as a tedious job because of the perceived drudgery associated with the use of hoes and cutlasses in farming. The introduction of mechanization is, therefore, intended to improve efficient food production and to eliminate the culture of “hoes and cutlasses” to make agriculture attractive, especially to the youth (Mockshell and Birner, 2015). In Ghana, Agricultural mechanization started after independence when the government at the time offered highly subsidized mechanization services to farmers (Boamah, 2006). However, the subsidies were suspended in the early 80s and reintroduced in 2003 with the establishment of Agricultural Mechanization Services Enterprise Centers (AMSEC). AMSEC is a private organization to provide timely and affordable mechanization services to smallholder farmers who cannot afford to own agricultural machinery. According to Pingali (2007), agricultural mechanization fails because of governance challenges. The government of Ghana imports farm equipment and subsidizes for individual farmers who can afford to buy and those who cannot afford the equipment are ignored. Small-scale farmers hardly get access to tractor services and the tractor hire markets are also limited to medium and large-scale farmers who do not own farm equipment (Jayne *et al.*, 2019). AMSEC is thus to provide services to such small-scale farmers but such arrangement could not be a viable business model (IFPRI, 2013). Also according to Mrema *et al.* (2018), it is quite difficult for tractor-hiring operators to remain economically viable due to the limited scope of operation. Despite that, most of the equipment such as tractors often breakdown due to poor maintenance, lack of skills for tractor operation, and inability to acquire spare parts and qualified mechanics by the individual farmers who own the tractors.

The establishment of Mechanization Centres in selected farming communities to serve both small and medium-scaled farmers could be of greater benefit. Land preparation is one of the key farming activities for agricultural intensification to increase food production and farmers' income (Diao *et al.*, 2014). To meet the needs of the smallholder farmers in terms of land preparation and other farm services, a state-owned mechanization hiring centre could be established to serve the farmers. Access to mechanization by smallholder farmers will reduce drudgery on the farm, and encourage farmers to expand their farms thus increasing food production as observed by Kirui (2019) when he studied mechanization in eleven different African countries. The Centre can also be used as a farm equipment assembling point, training farmers and Agricultural Engineering students and other stakeholders (FAO, 2016).

The Centre can provide services to farmers at a fee and those who cannot pay upfront are served on credit and paid when farmers harvest their crops. Land preparation, planting, fertilizer input and processing equipment are very important to

facilitate crop production. The Mechanization Centre can also be used as a training centre for farmers, students and other stakeholders. The Centre should be resourced with equipment such as tractors with accessories, combined harvesters, planters, boom sprayers, power tillers, seed drillers, slashers, ridges, and milling or grinding machines as well as tools for maintenance. The Centre could have a rooster for all institutions for the practical training of their students. The proposed Centre should operate under the management of the University in the region with oversight responsibility from the District Assembly and the sector Minister. The e-agricultural platform could be employed for information dissemination to and from farmers.

### **Reliable and ready markets**

The market for farm produce is very important to avoid post-harvest losses which is one of the most disincentive businesses in agriculture. According to Steiner-Asiedu *et al.* (2017), the limited increase in food production is as a result of a lack of market than production constraints. Farmers in rural communities produce a lot of foodstuffs but hardly find a reliable market to sell them. The produce eventually goes to waste and this affects farmers' efforts and income. Unfortunately, the PFJ policy focuses mainly on the provision of seeds and fertilizers with minimal support for market (Quarmin *et al.*, 2020) even though the creation of market opportunities for farmers will increase farmers' income and motivate them to increase production (Holden, 2019). According to the PFAG (2019), the PFJ is said to be a failure without an effective and sustainable market and value addition to promote food variety and better nutrition. Marketing is very important in every business venture thus farmers will need a reliable market for their produce to remain in business. Post-harvest losses occur when food crops are left on the farms due to lack of proper storage, transportation facilities and inadequate processing capacity for seasonal production excesses (FAO, 2019).

To ensure a ready market for farmers, prevent post-harvest losses and supply adequate food with varieties, the National Buffer Food Stock Company (NAFCO), which was incorporated under the Companies Code of Ghana, 1963, Act 179, on 11<sup>th</sup> March 2010 should be supported to execute its mandate as in the cocoa sector. NAFCO is expected to work with farmers to provide ready market, prevent post-harvest losses, and ensure stable food prices and income for farmers. The company buys the bulk of all farm produce across the country, especially cereals and legumes which are non-perishable from the various farms and transports them to their warehouses for onward transfer to other regions for sales and distribution to market women, industries, schools, hospitals, prisons and cooperate organizations at moderate prices. NAFCO can also supply the one district, one factory (IDIF) with sustainable raw materials and also regulate market prices across the country. The food supply chain, according to (FAO, 2019) includes the harvest of agricultural food, post-harvest management, storage, transportation, processing, sales and consumption by households and food services. If NAFCO is brought on board for proper implementation of the PFJ, it will create jobs, improve farmers' income, enhance food availability, and sustain food prices and security in the country. The market is therefore critical for the success of the PFJ.

The e-agriculture platform can also be used to disseminate information between farmers and NAFCO on one hand and other stakeholders on the other hand as regards harvested crops, storage, sales and distribution of food crops. With this approach, farmers will be certain that their products will be purchased upon harvest and this will help them generate enough money, and be happy to work on their farms and this can attract and motivate the youth to go into farming. Post-harvest losses

will also be reduced drastically and more food could also be made available all year round. The aftermath of COVID-19 and the recent Russia and Ukraine should be a big lesson to the country.

#### **Land tenure systems**

Most of the unemployed youth may wish to venture into farming but do not have access to available land and other farm inputs. The land tenure system is a major issue in Ghana and thus Government can acquire land and make them available to the youth who are interested in agriculture as part of the PFJ policy. The youth will be registered individually or as groups and assigned portions of the land for farming. The mechanization services centre can play a crucial role in supporting farmers and the youth in training, production support, and ready market. This support can be done at a fee which the farmers are allowed to pay after harvesting. NAFCO after buying the produce will deduct whatever cost incurred during land preparation, planting and harvesting stages. The extension officers would be tasked to support and monitor what happens on the farms and relay the information to NAFCO which works closely with the mechanization service centres.

#### **Conclusion and Recommendations**

The PFJ is an important policy that can transform and modernize the agricultural sector for economic growth but requires deliberate planning, investment and proper implementation strategies to make it successful. Certain key factors such as irrigation, mechanization services, market access, and land tenure systems among others are required for the success of the policy. Water availability is an indispensable component as farmers cannot rely exclusively on rain-fed agriculture which is not sustainable due to erratic rainfall patterns and climate change. The market is also a key component that must be given serious attention. Available markets for farm produce will not only ensure easy access to food but stabilize food prices, prevent post-harvest losses and ensure food security. Mechanization services especially for land preparation and harvesting will ease the drudgery farmers go through and make agriculture attractive. The establishment of mechanization centres will necessitate increased food production and processing. The continuous importation and use of inorganic fertilizer is known to affect soils negatively in the long term thus the introduction of organic fertilizer will be the best alternative that will reduce the cost of fertilizer importation, create jobs and improves the quality of soils for long-term food production.

The focus on mechanization services, a dedicated market, addressing land tenure systems, and the introduction of organic fertilizer instead of relying on foreign chemical fertilizer will improve food production, create jobs, make agriculture attractive and improve the lives of farmers and those interested in agriculture. Also, the use of e-agriculture to aid resource planning, information dissemination on weather, food price and distribution, and market information are all necessary to improve food production and distribution across the country. The role of NAFCO in food distribution is critical for the success of the PFJ. If the proposed measures are given the needed attention, it will make agriculture an attractive and income-generation venture. However, an extensive evaluation and research into the PFJ programme including beneficiaries must be conducted to have a clear picture of the merit and demerit of the policy.

#### **Conflict of Interest Declarations**

The authors declare that they have no known commercial or associations that pose competing interests or personal relationships in connection with the material presented in this paper.

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