

Food Security and Agricultural Policies: Conceptual Discourse on Socioeconomic–Environmental Nexus in Nigeria

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Abstract

This study examines how socioeconomic and environmental issues affect the state of food security using the case of Nigeria. It presents some case studies to draw out some micro-macro nexus on food security using two of the major stable crops (notably cassava and rice) in Nigeria. The paper proposes a policy analytical model and recommends the need for value chain coordination to reduce post-harvest losses and improve infrastructural development; the need for the private sector leadership to promote key value chain participants by taking responsibility for articulating and implementing agriculture's growth plan. Also, there is the need for continuous evaluation that can help in the identification of areas for improvement and also develop pointers to measure the overall impacts of the implemented programmes in addressing food security challenges. Finally, smallholder farmers who are responsible for the production of a greater percentage of food in the country should also be trained to have access to market information systems to plan appropriately and avoid risks and uncertainties. If these measures are put in place, it would improve agricultural production and ensure food security in Nigeria.

Keywords: 1.Agricultural policies; 2.Environmental issues; 3.Food security; 4.Socioeconomic shocks.

1. Introduction

Efforts have been made by governments across countries in tackling the problem of food insecurity; however, the condition of undernourishment remains an issue of concern across the globe (FAO, 2018). This is due to the increasing number of hungry people globally (Matthew, Osabohien, Ogunlusi, & Edafe, 2019). The Food and Agricultural Organisation-FAO (2021) report shows that the number of undernourished people globally remains significantly high, as it increased from 777 million in 2015 to 828 million in 2021 (FAO, 2021).

Food security is a major problem in Nigeria, where the country ranks 98th position out of 107 countries on the 2020 Global Hunger Index. In Nigeria, over 9 million people face food insecurity, and the United Nations (UN) Food and Agricultural Organisation (FAO) recently warned that unless appropriate policies are implemented, or resilience-focused and humanitarian actions are taken, millions of Nigerians are likely to suffer while some of them are already being threatened by famine (FAO, IFAD, UNICEF, WFP and WHO, 2021)

The state of food insecurity in Nigeria is worsened by socioeconomic shocks such as loss of jobs, business failure, an increase in the price of inputs and fall in the price of output, increase in the price of food items among others (Osabuohien et al., 2022); and environmental issues such as land investments, destruction of harvest by fire, poor rain and flood, pest and disease invasion that cause harvest failure, conflicts and wars, among others, are listed as the major issues responsible for food Insecurity (Anser et al., 2021; Oyawole et al., 2020). It is also projected that the world population would increase to at least 9 billion in 2050, while Nigeria's population is projected to rise to over 400 million people by 2050 (United Nation [UN], 2022). This will double the demand for food. In this wise, agricultural production needs to increase alongside the growing population that aids in the productive capacity of the agricultural sector.

Furthermore, available evidence shows that over the last four decades, environmental challenges such as pollution, environmental degradation, extreme weather, fire disaster and deforestation, among others, have increased in Nigeria (Adedoyin, Nwulu, & Bekun, 2021; Akadiri et al., 2022; Okringbo, Chukuigwe, & Sikpi, 2022; Yameogo, & Dauda, 2022). This is complicated by a weak institutional framework required to time mitigate the aftermath impact (Adeleye et al., 2021; Egbetokun et al., 2018; 2020). Also, the information from Nigeria Meteorological Agency [NIMET] (2020) shows that the annual mean climatic conditions in Nigeria have witnessed huge variation (NIMET, 2020; Egbetokun et al., 2020), which has negative implications on food security.

Socioeconomic activities within various sectors such as agriculture, manufacturing and services have witnessed significant changes in recent times. Among others, the agricultural and manufacturing sectors are mostly affected by such problems (Adeleye et al., 2021). The occurrence of the Coronavirus (COVID-19) pandemic and attendant socioeconomic challenges such as lockdown and restriction of movement and other socioeconomic activities have further affected food production and disrupted the entire food supply chain. Other burning issues in the Nigerian economy such as rising insecurity, farmer-herder conflicts, and youth unemployment among others have also culminated in food insecurity (Popoola, 2021; Osabuohien et al., 2022).

Therefore, this paper explores the state of food security and how it is affected by socioeconomic and environmental challenges using the case of Nigeria. It investigates the state of food security in Nigeria, in relation to the current socioeconomic and environmental issues affecting agricultural production. Furthermore, it presents some case studies to draw out some micro-macro nexus to food security in Nigeria. The paper proposes a conceptual model and concludes with some recommendations.

2. The Nigerian Food Security Concerns

2.1 Socioeconomic Challenges and Food Security

Many studies investigated the role of socioeconomic factors in determining food security around the world. Some of the studies found thematically that various household and individual characteristics such as education, income, salaries, household size, and occupation, amongst others, determine the chances of the (un)availability of food (Adeniyi & Dinbabo, 2019; 2020; Ibukun & Adebayo, 2021; Kolawole, 2017). However, looking at socioeconomic factors as just individual and household observable characteristics, is traditional (Connolly-Boutin & Smit, 2016; Lerner & Rottman, 2021; Osabohien et al., 2020; Osabuohien et al., 2022). Following the FAO report (2021), important socioeconomic drivers of food security especially when observing its impact across food systems are human conflicts, poverty, income level, gender inequalities, availability of a nutritious diet, the business cycle, technology and innovation, amongst others (FAO, IFAD, UNICEF, WFP and WHO, 2021; Karakara and Osabuohien, 2020).

Consequently, besides from poor policy interventions and climate challenges, conflict influences food security (Ujunwa, Okoyeuzu, & Kalu, 2019). Ujunwa et al. (2019) find that conflict, specifically armed conflicts negatively

affect food security. In Nigeria, insecurity remains a huge challenge, especially with the continued attacks and terrors of Boko Haram, mainly in the North East (Meagher, 2014; Dunn, 2018; Brechenmacher, 2019).

Studies show that insurgencies from Boko-Haram have contributed to the food insecurity challenge faced in Nigeria, as production and distribution channels of the agricultural value chain have been disrupted (George, Adelaja & Weatherspoon, 2019; Kah, 2017). Furthermore, studies show that the continued farmer-herder conflicts are negatively impacting the food production and distribution chains (for instance; North-Central and South-West), thereby exacerbating food insecurity (Alao, Shaibume, Ogunwemimo, Alao & Ogunwemimo, 2019; Ojelade, 2019; Tanko, 2021; Yakubu, Musa, Bamidele, Ali, Bappah, Munir and Manuwa, 2020). Therefore, it is evident in the literature that conflict is an important determinant of food security as it affects different levels of the agricultural value chain.

Boko Haram's insurgency, Banditry, Niger Delta conflicts and fights between Fulani-herders and farmers over common-pool grazing resources are all types of conflicts in Nigeria. Attacks by Boko Haram in the northern part of the country have led to a drastic reduction in food production, loss of lives and properties, large-scale displacement of people, as well as high and rising food inflation in Nigeria. The Boko Haram crisis resulted in the displacement of millions of people in the north-eastern part of Nigeria alone and exacerbated food shortages for Nigerians.

The Niger Delta conflicts which began as a result of disputes between international oil firms and some minority ethnic groups, have also wreaked havoc on the country's food security. The artisanal small-scale fish growers in the Niger Delta region produce around half of the fish consumed in Nigeria. Oil spills and overfishing have escalated the problem, impeding access to fish, which accounts for around 40% of all animal protein consumed in Nigeria. There have been cases of hikes in the prices of food which is one of the reasons for food insecurity.

2.2. Environmental Challenges and Food Security

Factors like climate change, flooding due to unusually heavy rain-falls over a long period of time, excessively long dry seasons, as well as pollution, deforestation, increasing population growth and desertification, amongst others, are important determinants of environmental degradation in Nigeria and all over the world (Osabuohien, Efobi and Gitau, 2015). Environmental issues and other farm-related shocks (like pest infestation, crop failure, and crop theft) explain how factors like climate change impact the entire agricultural value chain which influences food security.

When observing determinants of food security, it is important to consider environmental issues, as well as shocks (Bolaji-Olutunji, Adebagbo and Tolawo, 2008; Okoli and Ifeakor, 2014; Metu *et al.*, 2016; Ogundipe, Obi and Ogundipe, 2020; Osabohien *et al.*, 2022; Osabuohien, *et al.*, 2022). Empirically, studies find that environmental pollution, desertification and climate change issues significantly influence and impact food security in Nigeria (Igbokwe-Ibeto, 2019; Ogundipe *et al.*, 2020; Ogunpaimo, Oyetunde-Uzman and Surajudeen, 2021).

Natural disasters like erosion, drought, desertification, flooding and socioeconomic shocks have all resulted in poor agricultural practices, land and environmental degradation, and a drop in crop production. About 90% of Nigeria's food is produced by small-scale farmers with less than two hectares of land under cultivation (Edefe, Osabuohien & Osabohien, 2021). Unless they use sustainable agricultural practices that safeguard land, soil, water, or precision farming techniques that make them more robust to natural calamities, small-scale farmers would be unable to feed their families or meet public demand (Edefe, Osabuohien & Osabohien, 2021).

3. Some of Nigeria's Agricultural Policies in relation to Food Security

This section briefly presents some Nigeria agricultural policies that are related to food security. It focuses mainly on the recent ones that were put in place after the country finally returned to a democratic era in 1999.

National Economic Empowerment and Development Strategy (NEEDS): In 1999, Olusegun Obasanjo founded NEEDS. Poverty eradication, employment creation, wealth creation, and value reorientation through agriculture were critical components of this development strategy. NSPFS (National Special Programme on Food Security): During Olusegun Obasanjo's presidency, this program was initiated in January 2002 and implemented in all 36 states of the Federation. The overall purpose of the initiative was to increase food production while simultaneously alleviating rural poverty.

National Food Security Programme (NFSP, 2008 – 2011):The Federal Ministry of Agriculture and Water Resources launched the National Food Security Programme (NFSP) in August 2008 with the goal of achieving food security by ensuring that all Nigerians have access to high-quality food while simultaneously making Nigeria a major food exporter.

Agricultural Transformation Agenda (ATA, 2011-2015): It is aimed at restoring sustainable agriculture to the Nigerian economy which was based on a business-like approach led by the private sector. In the Agricultural Transformation Agenda (ATA), agriculture is a business, and agricultural policies should promote agriculture as a business. The ATA focused on how to increase the productivity, efficiency, and effectiveness of Nigeria's agricultural sector, as well as create jobs, earn foreign exchange, and cut food import costs (Obayelu, 2015; Adeleye et al, 2020).

The Agriculture Promotion Policy (APP, 2016 – 2020): The Agriculture Promotion Policy (APP) was created under President Muhammadu Buhari's administration. It was designed to address two economic issues: a lack of food for local consumption and imports, and a lack of foreign cash obtained from agriculture exports. The goals of the policy were to:

- Improve production in a number of domestically oriented crops and activities as a top priority. Rice, wheat, maize, aquaculture (fish), dairy milk, soya beans, poultry, horticulture (fruits and vegetables), and sugar, among others.
- Prioritize the production of cowpeas, cocoa, cashew, cassava (starch, chips, and ethanol), ginger, sesame, oil palm, yams, horticulture (fruits and vegetables), beef, and cotton for export markets.

A number of gaps could be identified in these agricultural policies/programmes, which are surmised herein:

- The policies and programs have a short lifespan.
- Agriculture policy is weak/ineffective.
- Delay, embezzlement, misappropriation, and a lack of funds to pursue specific policies/programmes through to completion
- Different programmes and projects have conflicting roles.
- Monitoring and assessment of the programmes/projects are lacking or inadequate.
- Regional policies/programmes are inconsistent or incompatible with national policies/programmes.
- The focus is mostly on food and animal production.
- Virile technical advisory/extension services are insufficient.
- Weak interaction between and among stakeholders.

4. Data Sources and method of analysis

This study employed a case study of two of the major stable crops (cassava and rice) in Nigeria to provide some micro-macro discussion on efforts toward food security. Data was obtained from Central Bank of Nigeria (CBN) statistical bulletin, the Food and Agriculture Organisation Corporate Statistical Database (FAOSTAT). Also, Cassava is one of the Central Bank of Nigeria (CBN)'s 10 intervention commodities for investors with which to develop the agribusiness value chain in Nigeria with an estimated opportunity gap of 11.8 million metric tonnes in 2019 (CBN, 2019).

4.1 The Case of Cassava- Ironical Posture

In 2018, Nigeria is reckoned as the highest producer of cassava worldwide accounting for about 21.5% of global production with about 57.13 million metric tonnes yearly from about 3.7 million hectares of land. The irony is that within the same period, the country was only able to export 9,628 tonnes with a value of about \$913,000, which accounted for a modicum 0.06% export share (See Figure 1 and Table 1).

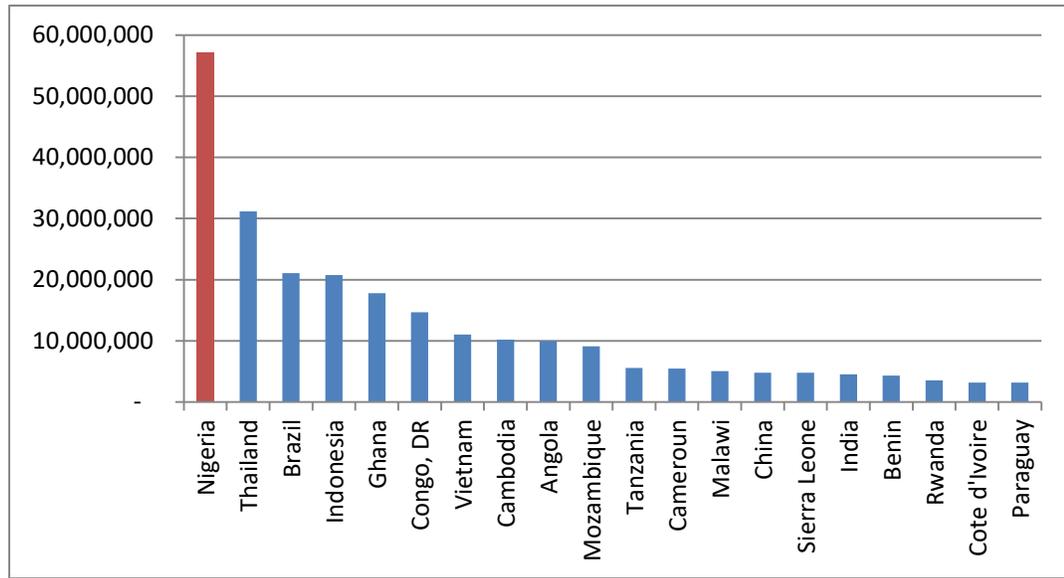


Figure 1: Nigeria’s Cassava Production (Tonnes)
 Source: Plotted using World Atlas (2020) and FAOSTAT (2021)

Table 1: Nigeria’s Share in Global Cassava Export

S/N	Country	(%) Export Share	Export Value in (\$'000)
1	Thailand	81.00	1,360,000
2	Vietnam	13.00	213,000
3	Cambodia	1.70	28,000
4	Paraguay	0.81	13,600
5	Germany	0.64	10,700
6	USA	0.14	2,360
7	Nigeria	0.06	913

Source: Computed from FAOSTAT (2021)

One question that comes to mind is whether Nigeria should focus mainly on producing for domestic consumption or for export. However, it has also been noted that the country imports most of the starch used by pharmaceutical companies (Adebayo and Silberberger, 2020). This further supports the need for more value chain development to process the products and benefit from the derivatives and by-products as well as reduce post-harvest losses. Also, the country’s average yield of cassava (about 3.63 metric tonnes per hectare) is lower than the potential yield of 40 metric tonnes per hectare (FAO, 2021). Nigeria’s yield per hectare is one of the lowest in the world. One of the reasons adduced is that cassava production in Nigeria is largely dominated by small-scale farmers with low efficiency and dependence on traditional means of propagation and rainfall (Adebayo and Silberberger, 2020). Similarly, in a recent study by Obayelu et al (2021), it was noted that technical efficiency is crucial for the livelihood of households in Nigeria (i.e., either being non-poor or exiting the poverty threshold and reducing poverty duration using the case of cassava farmers).

Some efforts have been made to boost the production of cassava such as the establishment of the Nigeria Cassava Growers Association (NCGA) in 1982, which is the registered body for cassava farmers with branches in all the States and Federal Capital Territory-FCT (NCGA, 2020; Ohaegbu,2021). Its activities cover small-scale and large-scale cassava farmers, and it assists members in different ways such as cooperative schemes, acquisition of farmlands, information dissemination, and cluster farming, among others. It also serves as a kind of interface between farmers (over 250, 000) and government agencies.

Another effort of the government was an initiative in 1999 during the administration of President Olusegun Obasanjo. One of the policy interventions was to boost the production of cassava and use the product for baking flour, pharmaceutical fillings and sweeteners. The policy could be said to be impactful as the production of cassava almost double during the period (Observatory of Economic Complexity, 2018; Ohaegbu, 2021). However, the initiative on cassava flour did not enjoy continuity during the administration of President Umaru Musa Yaradua (Ebewore 2019). In 2013, President Goodluck Jonathan 're-activated' the import substitution policy of wheat with cassava flour under the 'cassava bread initiative'. Unfortunately, after the end of the administration of President Goodluck Jonathan, the initiative was not pursued as one would have expected.

4.2 The Case of Rice -The Constrained Priority Crop

Rice is one of the priority crops within the framework of Nigeria's agricultural transformation agenda (ATA) given its increasing relevance and prominence in terms of consumption. This is essential as Nigeria is one of the largest food importers globally with an annual food import of \$10 billion in 2015 and rice having a huge proportion of it (Obayelu, 2015). As of 2016, the level of local rice production was about 4.8 million tonnes (Osabuohien, Okorie & Osabohien, 2018). However, there has been a huge gap between domestic demand and supply of rice in Nigeria as rice consumption is said to increase yearly by 10% (Osabuohien, Okorie & Osabohien, 2018).

Until recent times, rice production is characterised by small-scale farmers with low productivity arising from the use of traditional technologies. There is emerging participation of private investors in the production of rice in Nigeria, which include: Flour Mills of Nigeria, Bidda-Badeggi, Niger State; Ebony Rice, Ikwo, Ebonyi State; and Dominion Farms, Gassol, Taraba State, among others (Osabuohien, Okorie & Osabohien, 2018). As noted by Harold and Tabo (2015), rice is a priority crop in the implementation of the New Partnership for Africa's Development (NEPAD) and the Comprehensive Africa Agriculture Development Programme (CAADP).

Like the case of cassava, most of the efforts are in production. As depicted by a study on Rice Growers' Association of Nigeria (RGAN), more than 80% of the activities concentrate on rice production with processing, marketing and distribution sharing the remaining (see Figure 2).

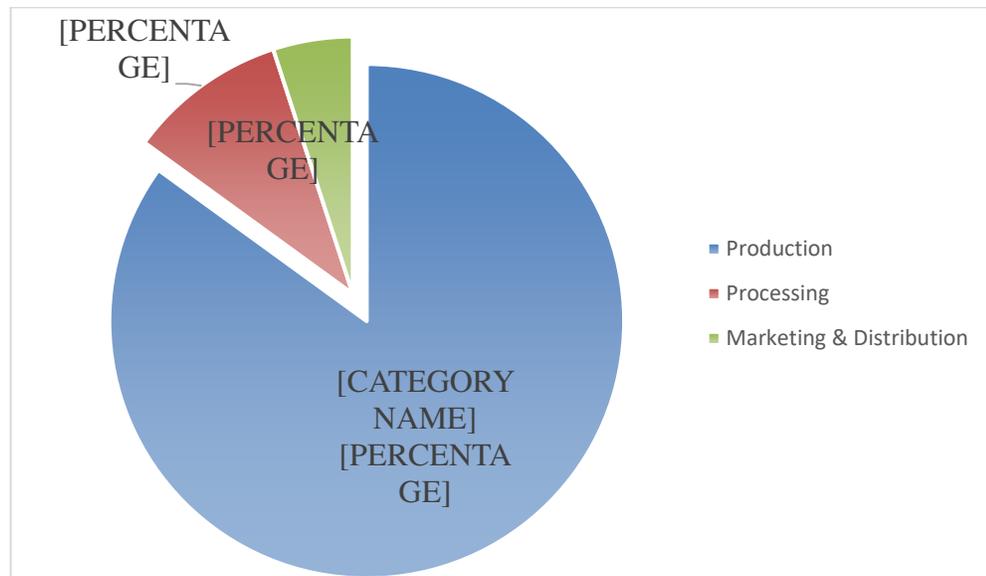


Figure 2: Figure Proportion of Rice Growers' Activities

Source: The Authors' using information from Osabuohien et al (2018)

Major constraints outlined for the challenges include: financial constraints, limited access to quality inputs, un-mechanised processes, birds'infestation, weak linkages for marketing and distribution, among others.

Some efforts of the government to boost rice production include: Presidential Initiative on Increased Rice Production (PIIRP), Nigerian National Rice Development Strategy (NRDS), Presidential Agricultural Transformation Agenda (PATA), Cross-Commodity Input Support, Fertilizer Policy, Cross-Commodity Price Support Measures, Guaranteed Minimum Price, and National FADAMA Development Project (NFDP).

5. Addressing Food Security in Nigeria

From the assessment of various programmes and policies reviewed in thispaper, the issue of continuity, to engage the environment for high productivity, isan apparent challenge. Food security should be drivenby government authorities ruling per time.

The programme and policies put in place by the previous government should not be allowed to die when another administration takes over. This is because the rulinggovernment serves as both the coordinating and umpire stakeholder, especially in attaining food security inthe economy, among other important government programmes. Thus, the need for continuity which would allow for long-term planning and investment is essential in improving the performance of the agricultural sector in moderating the environment and reducing socioeconomic challenges confronting agricultural productivity in general and food security, in particular.

The quest to address the fundamental challenge of food insecurity demands the adoption of a suitable model approach, anchored on the brave action by stakeholders, aimed to achieve a departure from universality (the use of traditionally accepted approaches) to contextuality. Such an approach can help refocus the efforts of stakeholders and moderate the environmental challenges to the contextual realities regarding the issues relating to food security in Nigeria. This equally requires effective stakeholder engagement and evaluation of contextual realities. This will enhance commitment to joint development of acceptable approaches that reflect the current as

well as an informed commitment to the implementation of resilient programmes aimed at improving food security.

A related observation is the fact that emphasis is mainly placed on the production aspect of agricultural activities. Most of the programmes and policies did not have clear-cut agenda for off-farm activities, particularly the issue of distribution, processing and preservation, and marketing (i.e., value chain development). Uninterestingly, evidence has shown that more than three-quarters of the returns from agricultural activities revolve around the value chain (Lawal, 2019; Osabuohien, 2020). Thus, for the agricultural sector in Nigeria to be positioned to play a crucial role in tackling food insecurity, frantic efforts need to be placed on value chain development.

Furthermore, the role of research and development (R&D) was not essentially pursued nor given due emphasis, which creates a kind of lacuna between knowledge creation and utilisation towards the attainment of sustainable food security status in the Nigerian economy. In essence, available evidence indicates that the expenditure on R&D as a percentage of gross domestic products (GDP) in Nigeria is far lower than those of selected economies across the world (see Figure 3). This raises the critical question of how Nigeria can cope with the dynamic wave of food security challenges, hinging on socioeconomic issues such as increases in population, rural-urban migration, price volatilities, among others. The stance of this paper is that the embrace of research and development can guarantee the chance for continuous improvement in the drive towards addressing the conspicuous challenge of food security in Nigeria. This is essential given the relevance of technology (Ejemeyovwi et al, 2021; Khan et al, 2022).

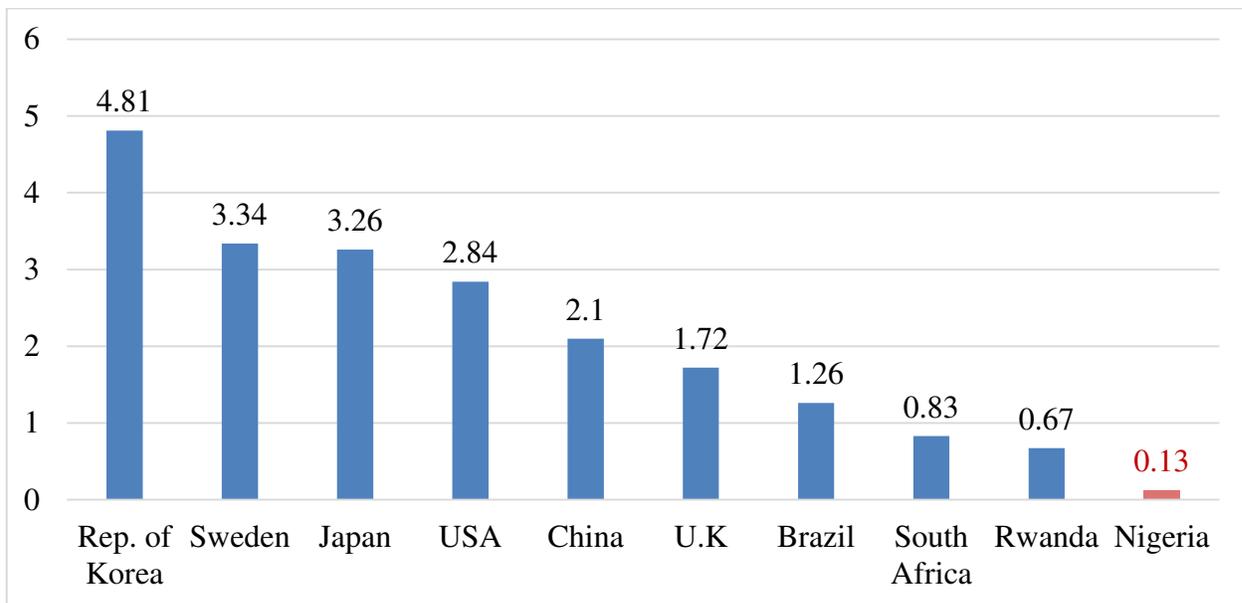


Figure 3: Research & Development Expenditure (%GDP for 2021)

Sources: Computed using Data for UNESCO Institute for Statistics (2020); Olayinka (2021)

For instance, R&D expenditure as a percentage of GDP in Nigeria is more than 37 times lower than the value for South Korea. Even within the African continent, Nigeria's expenditure on R&D as a percentage of GDP is more than 5 and 6 times lower than those of South Africa and Rwanda, respectively. This re-emphasizes the need for more frantic effort towards research and development, which the occurrence of COVID-19 has brought to the limelight on seeking domestic and internalised solutions in solving domestic issues as the lockdown limited cross-border travels, among others (Ufua et al, 2021).

6. Conceptual Policy Model for Food Security in Nigeria

This paper proposes a schematic model for addressing the concerns based on the connection between socioeconomic and environmental issues and how they affect food security. This is presented in Figure 4.

In Figure 4, Panel 1 depicts the best-case scenario, which is the current condition of food security. In this case, environmental issues such as destruction of harvest by fire, pest and disease invasion, drought and flood that cause harvest failure, among others are low. In addition, at this stage, socioeconomic issues such as job loss, business failures, death of income-earning households, increase inputs prices, an increase in the price of commodities, and reduction in the price of output, theft, and conflicts are also low. The implication of this is that, in Panel 1, a reduction in environmental and socioeconomic issues results in food security. This scenario calls for policy intervention such as social protection and stakeholders’ commitment to mitigate shocks and vulnerability.

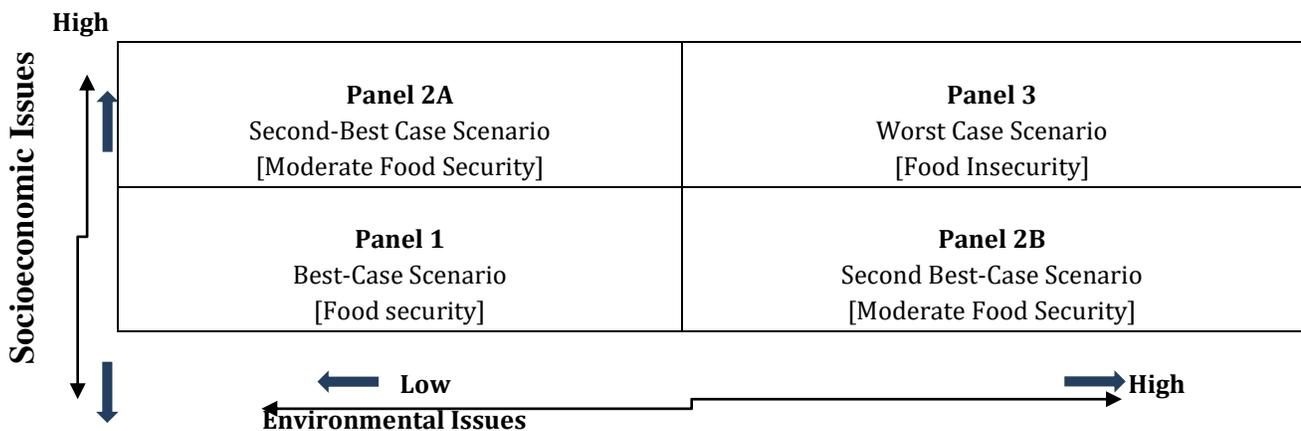


Figure 4: Environmental and Socioeconomic Issues Interaction on Food Security

Source: The Authors’

Panels 2A and Panel 2B are the second-best case scenarios, which is moderate food security. At this stage, though, socioeconomic and environmental issues may be declining, but slower than in case 1, where socioeconomic and environmental issues are reducing faster. At this stage, environmental and socioeconomic issues are moderately low, unlike panel 1 where the issues are at the lowest. It implies that as environmental and socioeconomic issues are reducing, food insecurity is reducing as well. Panel 3 depicts the worst-case scenario, which is food insecurity. At this point, socio-economic and environmental issues are pressing. The implication is that as socioeconomic and environmental issues worsen, the situation of food security begins to deteriorate, or perhaps worsens faster than the emergence of food insecurity.

7. Conclusion

Nigeria has enacted many policies toward improving the contribution of the agricultural sector to the economy; however, there is a need to re-focus some of the policies, particularly regarding food security. This calls for a reinvention of approaches through the engagement of all concerned stakeholders to expedite joint actions to redevelop resilient policies and programmes, that first reflect the current state. Also, forms a platform for the pursuit of agricultural sector reforms that can effectively address the fundamental challenge of food security in Nigeria, as well as provide a source of export.

Developing the Nigerian agricultural sector, therefore, requires a synchronised process to enable the sector to attain developmental heights that can enhance its potential and contribution to broad macroeconomic benefits

such as the provision of employment local tax and foreign revenues. A critical concern in the Nigerian agricultural sector is the age-long dominance of subsistence agricultural practices that have projected limited abilities. It has also kept the sector on an unwanted threshold that has not permitted further contributions to the national economy.

The need for systemic intervention in the transformation of the agricultural sector including the modernisation/formalisation of the informal sector. The sector could serve as a key contributor to food security, and provides a shock-absorbing platform for overall macroeconomic stability. The sector is currently providing sources of livelihood for the teeming portion of the population that function outside the formal economic sector. It hosts the potential to provide a source of long-term tax revenue. Approach to sector transformation include: identification and engagement with key and affected stakeholders in the informal sector; joint development of acceptable transformative approaches to regularise and participation of the private sector, joint development of improvement approach to continue advancement of the Nigerian informal sector, enactment and enforcement of fair regulatory guidelines in the informal sector through an institutional support system

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Furthermore, with a view to improving agricultural production and ensuring food security, there is the need for value chain coordination to reduce post-harvest losses and improve infrastructural development; and the private sector leadership should promote key value chain participants by taking responsibility for articulating and implementing agriculture's growth plan. The sector managed by private sectors should be well maintained, with government intervention limited to regulation and certification. There is a need for continuous evaluation that can help in the identification of areas for improvement and also develop pointers to measure the overall impacts of the implemented programme aimed to address food security challenges over a certain period of time. In addition, fiscal policies that are beneficial by lowering taxes on inputs, equipment, and other items should be put in place. Finally, smallholder farmers who are responsible for the production of the greater percentage of food in the country should also be trained to have access to market information systems to plan appropriately and avoid risks and uncertainties.

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