Public Investment on National Food Security Programs in Nigeria: A CGE Analysis of the Macroeconomic, Welfare and Gender Impact on Small Farm Holders in Nigeria

RESEARCH PROPOSAL
Presented to Partnership for Economic Policy (PEP)

By
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&
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Festus Gift Emmanuel
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Nigeria

10th August, 2019
There are three main dimensions to all PEP-supported projects: capacity building, research and policy engagement. Each dimension must be considered with due care and attention as they will be assessed individually and concurrently to determine the overall quality of a proposal.

The PEP proposal template is structured in five sections:

1. Project overview and objectives
2. Capacity building – team composition and experience
3. Research – literature review, method and data
4. Informing policy - context, relevance, process and dissemination
5. Other considerations

SECTION I – PROJECT OVERVIEW & OBJECTIVES

1.1. Abstract (100 to 250 words)

State the main research question, the context and its relevance in terms of evidence-informed policymaking, in relation to PAGE priority issues. Complete with a brief description of the method and data that will be used.

The focus on elimination of hunger and poverty alleviation in the SDGs clarifies the important role of agriculture in developing countries. More so, in many economies in sub-Saharan Africa, women are a major source of labour supply for the agriculture sector, making the sector a harbinger of women empowerment and gender equality. Nigeria has invested significantly on agricultural production over the years, but she is still characterized by food importation and food price inflation and massive food importation. As a key priority area in the current real sector intervention programs of the Federal
Government, the National Food Security Programs (NFSP), launched in 2016, is expected to increase domestic food production and export and enhance the contribution of the sector to the national economy. Given the link between the agriculture sector and rural women, the program could also induce female employment. It is in this context that this study seeks to investigate the macroeconomic impacts of the NFSP using a computable general equilibrium (CGE) model and social accounting matrix (SAM) for Nigeria. The study will focus on the impacts of the program on agriculture and sectoral output, food and agricultural imports, exports and prices, household income and consumption, employment and other indicators. The induced male and female employment effects of the program will serve as an indicator of the gender impacts. The results of this study will help the government in coordinating and harmonising its policy options for improved agriculture and food security while attaining other social and development objectives.

1.2. **Main research questions** (max 500 words)

Explain the focus (or key questions), including the gender-sensitive aspect, of your research and its relevance for policy.

Improvement in agricultural productivity is key to achieving food security and poverty reduction in Nigeria. However, unabated population growth without commensurate increase in agricultural production poses a potential food crisis. Various reasons have been advanced for the dismal performance of agricultural production in Nigeria. Saheed and Ila (2017) highlights inefficient policies and corruption, conflicts and violent conducts, climate change and natural disasters, low technology for processing and storage. Another major limitation of the sector is inadequate funding and investment. The huge public investments in the agriculture sector over the years have failed to achieve desired transformation, leading to massive food importation and food price inflation. The National Bureau of Statistics of Nigeria (NBS) puts food import at an average of 7.7 per cent of total import between 2016 and 2018, which is a serious challenge considering the food needs of the country and pressure on the scarce foreign reserves and the exchange rate.

One of the key recent interventions to boost agricultural productivity is the National Food Security Program (NFSP). Among other things, the Program (NSFP) provides funding to large commercial agricultural enterprises, provides nation-wide storage facilities for excess food production, and develops out-grower schemes that target contribution of women into the sector value chain. The program’s emphasis on women is based on the idea of gender gaps in agriculture in developing countries (Diiro, et al., 2018; FAO, 2010, 2011) and the role of the sector in employment in Nigeria (Diao, et al. (2012). Empirical evidences show gender-based patterns in agricultural employment (UNCTAD, 2015). These empirical evidences are further corroborated by data from the National Bureau of Statistics of Nigeria which shows that though females account for 70% of agriculture labour, they account for only 7.69% of ownership in the sector (NBS, 2013). Therefore, it is hypothesized that well-targeted investment in the agriculture sector in developing countries could boost the participation of women in the sector.

Therefore, it is important to investigate the extent to which the NFSP has lived to its objectives of increased food security, women participation in the agricultural value chain and the macroeconomic impacts. Thus, the main research question is: What are the macroeconomic impacts of the National Food Security Program (NFSP)? The specific research questions include: Does the program enhance food security? How does investment in the program impact small scale farmers? What are the welfare impacts of the program in terms of the impacts on household income, agriculture and food consumption, including the
differentiated impacts on rural and urban households? Does investment in agricultural production aimed at boosting food security have gendered employment impacts? The indicators of food security in this study include the impact of the program on food production, exports, imports, prices and consumption. The gender impacts are also deduced from the impacts of the program on male and female employment and ownership in the agriculture sector.

The proposed simulation scenarios for this study will include increase in government investment in the agriculture sector, increase in agricultural productivity, capital supply to the sector, among others. Further scenarios will be considered as the modeling progresses.

References

1.3. Main contributions (max 500 words)

Describe why and how you expect this research/evidence to contribute to addressing important knowledge gaps, both in terms of scientific contributions and to inform policymaking.

For the gender-sensitive aspect, explain the potential usefulness of your work for gender-oriented policy.

*Agriculture is a crucial sector for the attainment of the United Nations’ Sustainable Development Goals (SDGs). In addition to its contributions to the national economy, the sector is also vital for ensuring food security, elimination of hunger and poverty alleviation in developing countries, including Nigeria. However, agriculture in Nigeria is hampered by poor farming techniques, inadequate skills, insufficient investment, poor marketing facilities, unfavourable land tenure system, limited access to credit facilities, among other factors. Some of these limiting factors, for example access to credit facilities and traditional land tenure systems, are even more pronounced for women and discourages them from participating in the sector.

Given the crucial linkage between agriculture and poverty reduction and other socio-economic development goals, the current government has emphasized accelerated agricultural production for rapid economic diversification and transformation. This is indicated in the substantial public investments...
in the sector under the government’s direct real sector intervention programs. The NFSP is one of such intervention programs and aims to promote rapid food production through the participation of small farm holders, particularly women and youth in agricultural production.

Different studies have been conducted on public investments in agriculture, growth and poverty reduction, but there is a large variation in the empirical findings on the magnitude and direction of the impacts, partly due to the methodological approaches, data used and coverage. Furthermore, most studies have focused on the relationship between agriculture intervention investment and single outcome indicators such as GDP or agriculture output. The focus on such single indicators does not account for the sectoral linkages and the economy-wide impacts of the intervention programs. Being one of the pioneer studies to investigate the empirical impacts of the National Food Security Program, this study will fill an important gap in the academic literature. It will assess the quantitative and overall impacts of the program in Nigeria using a CGE model. Further advancing existing studies in this field, this study will also examine the impacts of the program on gender equality. By gender equality, it will investigate the program’s influence on male and female employment as well as gender-segregated agriculture sector. A major area of advancement is also to analyse how the program will impact small scale holders in the Nigerian agriculture sector. Empirical evidence in this area is lacking in the literature.

In terms of policy, the study’s findings would provide insights into the effectiveness of the program as well as its role in achieving other socio-economic and development objectives. It will provide evidence-based information on how policy makers in Nigeria’s agricultural sector can revise the program to optimize the economic and non-economic benefits.

**SECTION II - CAPACITY BUILDING**

### 2.1. Team composition and experience

For each team member, please indicate (using the following tables - one per member):

1. **Age, sex, and relevant training, experience and/or expertise** (start with team leader).

   Note that:

   - Teams **must be** composed of both researchers and government officials/officers:

     - Four (4) **researchers** - including one senior/experienced researcher, acting as team leader and at least two researchers aged under 30 - with a sufficient academic and/or professional background in economic policy analysis. In particular, having a master’s degree/diploma or being currently enrolled in a master’s program is considered a minimum requirement (generally, team leaders should have a doctoral degree/diploma or be currently enrolled in a doctoral program). These members should describe their relevant training and experience in the issues and research techniques involved.

     - Two (2) **government officials/officers** from (and with their involvement sanctioned by) the institution in charge of the policy/program that the
research aims to inform. These government-affiliated members must have a good understanding of the relevant policy processes and priorities but are not required to have research experience.

- Applicant teams must be gender mixed, with female members representing at least 50% of all members (including the team leader) and contributing substantively to the project. PEP encourages teams with a female leader.
- All members of applicant teams must be African nationals (and reside in Africa for the duration of the project).
- Priority is given to projects in low-income economies, and/or fragile or conflict-affected situations (LIE/FCS) but proposals are welcomed from all African countries (including North Africa).
- A researcher can be funded as a team member a maximum of three times by PEP (no more than twice as team leader) and should show marked progression over time.
- A researcher who is already involved in a funded project is not eligible to submit a new proposal before the approval of the final report of the currently funded project.
- Each listed member must post an up-to-date CV in their profile on the PEP website – refer to “How to submit a proposal” and the eligibility criteria on the call webpage.

2. **Benchmark and expected capacity building:**
   - Describe the capacities that each team member (and potentially her/his affiliated institutions) is expected to build through their participation in this project. This is an important aspect in the evaluation of proposals and should be presented in detail.
     - What techniques, practices, literature, theories, tools, etc. will each team member and her/his institutions learn (acquire in practice) or deepen her/his knowledge of?
     - How will these skills help each team member in their career (development) and/or professional responsibilities?
     - What is each team member’s current state of knowledge with regard to the project you are proposing?

3. **Task and contributions to project:** Indicate the specific tasks each team member would carry out in executing the project.

   Note that, in this particular initiative, while all outputs should be focused on the research-policy nexus and produced through a collective and coordinated effort, PEP will provide more specific training/support for:
   - Researcher team members to take the lead in developing a high-quality scientific research paper (i.e. reporting the process of and results from methodological applications).
   - Government-affiliated members to take the lead in developing a “policy paper” (i.e. positioning the research and findings within the country’s broader policy contexts and strategies).
Team leader

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<th>Name</th>
<th>Age</th>
<th>Sex (M/F)</th>
<th>Highest degree/diploma</th>
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<tr>
<td>Emily Edoisa Ikhide</td>
<td>35</td>
<td>F</td>
<td>PhD in Development Finance</td>
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</table>

**Training and experience**

I am Research Fellow in the Department of Research and Training of the National Institute for Legislative and Democratic Studies (NILDS). As a research fellow at NILDS, I undertake policy analysis, bill analysis, policy briefs, research reports and publications for the Institute and I also conduct research on various topical issues in the country and global which are submitted to parliament. I have a doctorate degree in Development Finance from the University of Stellenbosch, Cape Town, South Africa. My Ph.D. research focused on financing options for energy alternatives and economic growth in Nigeria. I am an experienced researcher with over five years of research experience. I had worked with the Nigerian Government at the federal and state level, including a position as a Strategic, Monitoring and Evaluation Officer. I was a team member on a previous PAGE II project using computable general equilibrium (CGE) modelling. I have presented some of my research papers at various international conferences, and three of my PhD papers have been sent to journals and have received constructive comments and due for publication. Thus, I have a good background in the subject of this research as well as the proposed methodology.

**Expected capacity building**

I have participated in a previous PEP-PAGE II project and I hope to build on the knowledge gained from the project. This project would enable me improve my modelling skills as well as the application to policy-oriented research in Nigeria. I will gain more knowledge in applying the standard PEP CGE models to varieties of research areas. This knowledge will have immediate impacts on my career as I will be able to conduct policy relevant research and provide recommendations to policy makers in line with my current position.

**Contribution to project**

The project will include contributions from all the team members. However, I will lead the modelling parts of the project, with assistance from the other team members.

Researcher #2

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<th>Name</th>
<th>Age</th>
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<th>Highest degree/diploma</th>
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<tr>
<td>Ezra Umaru Kure</td>
<td>49</td>
<td>M</td>
<td>Ph.D. (Economics)</td>
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</table>

**Training and experience**

Ezra Kure is an Assistant Director with the Research Department of the Central Bank of Nigeria, where he has worked for over eleven years. He had, prior to his current position at the CBN, also
taught various courses in economics at a university for over twelve years. He holds a Ph.D. in Economics with over eight years post-doctoral research experience. His core research areas are development economics, open macroeconomics and policy. He has published articles in journals and made chapter contributions to books.

### Expected capacity building

The research will advance his knowledge in development economics, finance and policy. The capacity building training from PEP will be beneficial to him by increasing his knowledge in theory and practical application of computable general equilibrium (CGE) modelling, which is essential for impact assessment of the various intervention programs he has monitored at the Bank. The knowledge gained from the project will be shared with colleagues and officials of the Central Bank to aid policy design and analysis.

### Contribution to project

Dr Kure brings his expertise and experience in development economics to the research team. The team will draw from his knowledge and vast experience in development finance, econometrics, macroeconomics and microeconomics and data analysis on different developmental issues. He will contribute extensively to the theoretical framework and empirical literature review and discussion of the results of the project. With the knowledge he would gain from the PEP online course, he would equally contribute to the modelling exercise for the project. Finally, his vast experience in development finance at the Central Bank and practical knowledge of the operations of the National Programme on Food Security would provide us with adequate background information on the subject of this research.

### Researcher #3

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<tr>
<td>Fehintola Motunrayo Oyebola</td>
<td>29</td>
<td>F</td>
<td>B.Sc. Economics; M.Sc. Economics, PhD. Economics (in view)</td>
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</table>

### Training and experience

Fehintola holds a Bachelor of Science degree in Economics from Bells University of technology, Ota, Ogun State, Nigeria in 2011 and holds an M.Sc in Economics from Covenant University, Ota, Nigeria (October 2014 - September 2016). She is currently a graduate research student (Ph.D. in economics) at Olabisi Onabanjo University, Ago Iwoye, Ogun State, Nigeria. Her M.Sc dissertation was titled “Investigation of Cattle Production Value Chain in South West, Nigeria” and her research interests are in Agriculture, Energy and Environment and International Economics. She has experiences in data collation and analysis.
**Expected capacity building**

Fehintola in her few years as a researcher has demonstrated her research interest by presenting her research findings on “Employment Effects of Nigeria’s Agricultural Transformation Agenda: Evidence from Cattle Value Chain” at the University of Ibadan Oyo State Nigeria in August 2016 and she seeks to build on her academic development and research career through her participation in this project. She is hard working and eager to learn new economic tools, techniques and methodology. This project will make her acquainted with both the theoretical and practical aspects of public policy analysis and CGE modelling. She would also benefit from PEP human capacity trainings and development, and also build a wider network at conferences, and other benefits associated with the project.

**Contribution to project**

With her background in agriculture, she will contribute to the project in a number of ways. First, she will be responsible for conducting an extensive literature review for the project. Second, as a versatile data analyst, she will also contribute to the project via collection and analysis of survey data for eventual use for the disaggregation of the SAM. She will also participate in the actual modelling.

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### Researcher #4

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**Training and experience**

Festus is currently an Assistant Lecturer at the University of Lagos and a Ph.D. candidate in economics at the university. He is also a member of the Departmental public lecture committee for the current year. Having graduated as the best student in the department at both bachelor’s and master’s levels with a first class and distinction respectively, he was retained to teach at the university. His Ph.D. research focuses on development finance, with particular reference to the energy sector in sub-Saharan Africa. He has extensive research experience, and has worked as a research assistant for senior faculties in the university.

**Expected capacity building**

Festus’s current research focuses on development economics, microeconomics and macroeconomics, energy sector in sub-Saharan Africa, and rural development. His methodological expertise is in econometric analysis. Through this project, he will add CGE model to his arsenal of applied economic analysis tools. This would enhance his PhD research and he would be able to pass the knowledge gained to his students and colleagues at the university.
**Contribution to project**

Festus will contribute to the project in a number of ways. First, he would be working with team lead in building and developing the CGE model and will be in charge of data collection and analysis. Second, he will be involved in writing the final report.

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**Government official/officer #1**

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<th>Highest degree/diploma</th>
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<tr>
<td>Mary Oketa</td>
<td>45</td>
<td>F</td>
<td>B.Sc. History</td>
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**Training and experience**

Mary Oketa is an Officer at the Department of Research and Planning, Ministry of Agriculture and Rural Development. She has worked with Department for over ten (10) years, hence, she had acquired extensive knowledge about the operations of the Ministry, particularly the subject matter. She provides administrative support organising policy programs for the Department. She graduated from Ahmadu Bello University, Zaria, Kaduna State.

**Expected capacity building**

As an Officer in Research and Planning, she acts as the point of contact for all employees, provides administrative support and manages their queries. By her participation in the project, she would gain insights on how researchers operates, learn how to communicate with researchers, learn how to use scientific evidence to support policy and identify the scientific evidence that is relevant to improve her departmental duties.

**Contribution to project**

Mary will contribute to the project by providing relevant information that can enhance analysis. She will support the dissemination of final report for stakeholders.

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**Government official/officer #2**

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<td>Sunday BARKA AMBUNO</td>
<td>39</td>
<td>M</td>
<td>M.Sc. ENERGY ECONOMICS AND POLICY</td>
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**Training and experience**

Sunday Barka Ambuno is an economist in the Research Department of the Central Bank of Nigeria. He holds a Bachelor of Science degree in Economics from Ahmadu Bello University, Zaria and a Master’s degree in Energy Economics and Policy from the University of Surrey in the United Kingdom. Prior to his recent position at the Central Bank of Nigeria, he was a Planning Officer at the National Population Commission. He has cognate experience in research as well as the intricacies of policy making and national planning in Nigeria.

**Expected capacity building**

The project would enable him to acquaint with the use of CGE modeling for policy analysis. He would also gain new insights into
2.2. **List of past, current or pending (non-PEP) projects in related areas involving team members, including resulting publications (if any)**

Indicate the funding institution, the title of the project and related publications, and list the team members involved.

<table>
<thead>
<tr>
<th>Name of institutions</th>
<th>Funding institutions</th>
<th>Title of projects and related publications (link)</th>
<th>Team member(s) involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Council for the Development of Social Research in Africa (CODESRIA)</td>
<td></td>
<td>Title: ESSAYS ON ALTERNATIVE ENERGY OPTIONS, ENVIRONMENT AND ECONOMIC GROWTH: THE CASE STUDY OF NIGERIA</td>
<td>Emily Edoisa Ikhide</td>
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<td>Publication (reference): Final report yet to be submitted</td>
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2.3. **List of past or current PEP-supported projects involving team members, including resulting publications**

<table>
<thead>
<tr>
<th>Project code (e.g. PMMA-12345)</th>
<th>Title of project and related external (non-PEP) publications, if any</th>
<th>Team member(s) involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPIA 20261</td>
<td>Title: Assessing the macroeconomic impacts of the financing options for renewable energy policy in Nigeria: Insights from a CGE model</td>
<td>Emily E. Ikhide</td>
</tr>
</tbody>
</table>
SECTION III – RESEARCH, METHOD AND DATA

This section should be completed by the team leader and/or research members

3.1. Literature review (1000 to 1500 words)

Explain the specific gaps in the existing literature that your research aims to fill. You might want to explain whether this question has been previously addressed in this context (including key references), and if so, what you intend to achieve by examining the question again. Be sure to include literature that provides conceptual foundations for the gender analysis to be undertaken in your research.

Literature explaining the relationship between agricultural productivity, gender equality and economic growth is not straightforward. The relationship between economic growth and agricultural productivity is mixed (McArthur, 2015; Ecker and Qaim, 2011; Breisinger et al., 2012). The impacts of agricultural productivity on gender equality or inequality is even more complex. FAO (2011a) shows that rural women play a crucial role in small scale agriculture in developing countries. FAO (2011b) also argues that the underperformance of agriculture in developing countries is partly as a result of the constraints faced by women in the agriculture sector. In terms of empirical evidence, studies have found that reducing gender inequality contributes to agricultural growth and food and nutritional security (FAO, 2011c; World Bank, 2014). Further studies also find that women empowerment is essential for narrowing the gender gap in agricultural productivity (Akire et al, 2013). Abdelali-Martini (2011), on the other hand, shows that women can be empowered in rural labour force through agricultural employment.

Given the relationship between agriculture and women empowerment, the Federal Government of Nigeria established the Women in Agriculture (WIA) extension programme to enable women assess agricultural information and resources. In the Nigerian context, women contribute a large share of agricultural labour, with about 80% in agricultural marketing and processing and 70% of small scale agro-business (Auta, 2004). Okubor et al. (2015) also find evidence of gender inequality in the agriculture sector in Nigeria. The gendered employment in our study draws from this hypothesis that women plays an important role in the sector and enhancing the productivity of the sector could boost the women participation and employment in the sector.

In the same vein, some studies have related the impact of public investment in agriculture on growth and poverty reduction. Due to differences in methodological specification and data used in assessing
the impacts, there exist huge gap in empirical findings on the magnitude and direction of impacts (Gunawardena, 2012; Yango and Mukoko, 2016). Furthermore, very little evidence exist on the impact of public investments in agricultural productivity in developing countries, particularly in Nigeria. There is a limitation in that studies have narrowly focus on a single economic indicator such as GDP and agricultural production (Awoyemi, et al. 2017), and fails to capture economy-wide effects and sectoral interactions and changes. This study is different as it focuses on specific government intervention in the agriculture sector and the economy-wide impacts.

To overcome the key limitations mentioned above, CGE models can be used to estimate the macroeconomic and overall effects of national food security policies. In understanding the effect of public investment on agricultural productivity, Boulanger et al., (2016) applied CGE using a desegregated version of a 2014 Social Accounting Matrix (SAM) developed for Kenya to address the impacts of three input policy options with reference to increases in fertiliser use, seed quality and irrigation investment. The study showed overall improvement of main food security indicators in Kenya. Mitik and Engida (2013) also used a dynamic CGE model to measure the impact of public investment in small-scale irrigation and training for farmers on growth and agriculture-led development, food security, and poverty in Ethiopia. Two types of technologies were utilized in agriculture to produce the same crop: a more productive technology that is intensive in skilled labor and irrigated land and a less productive technology that is intensive in unskilled labor and non-irrigated land. The less productive technology is a prominent feature of women agriculture productivity. The study showed that the Ethiopian government policy strategy regarding agriculture sector development has a great potential for reducing poverty and food insecurity.

Das and Rout (2014) applied Computable General Equilibrium (CGE) modelling based on India’s Social Accounting Matrix (SAM) to study the impacts of trade liberalisation and food subsidy policies on macroeconomic variables. The study found that subsidy policy in basic food crops like, paddy, wheat and coarse cereals along with some reallocation of budgetary expenditures in other developmental activities reduces food insecurity, destitution and hunger among the targeted population. The implementation of this policy increases the overall social welfare as in the whole process of food transfer mechanism. In another study for India, Naranpanawa (2015) developed the first ever state-level “bottom-up” CGE model to analyze the linkage between agricultural productivity and pro-poor regional growth. Overall, the study suggested that, in the long run, improvement in agricultural productivity has a beneficial impact on agricultural states.

In line with the poverty orientation of our study, some existing analysis in the literature use a macro-micro simulation technique to analyse the impact of agriculture policy. For example, Beyene et al., (2016) assessed the potential impacts from the introduction of high yielding and drought tolerant varieties of major food staples (wheat and maize) in Ethiopia using a dynamic CGE model with a micro-simulation module. The study found that the introduction of improved varieties of these food staples is likely to boost the cereal sector in the country. While this study does not incorporate gender dimension, women have limited access to agriculture technologies including improved varieties. Also (Arguello et al., 2012) used an agriculture specialized static CGE model, along with a microsimulation model to examine the poverty impacts of agricultural policy adjustments in an open economy. The study showed that sectoral impacts of the implemented program tends to be small and varies considerably across crops and that these policies do not reduce poverty as impacts are small and tend to be concentrated mostly in rural households toward the middle of the household income distribution.

At the domestic front, studies on macroeconomic impacts of public investment in agriculture and food security policies in Nigeria are rare and significant gaps exist in the literature. Among the available studies, Diao et al. (2012) estimate the impact of public investment in the agriculture sector using a
dynamic CGE model. Due to data limitation on public investment in agriculture items, the simulation is based on an elasticity that relates agricultural total factor productivity to public agriculture spending. Okodua (2017) also examines the economy-wide impacts of rice sector policy reforms, which focuses on tariff on imported rice and increase domestic production, using a static CGE model. The study finds that domestic rice production will increase while rice importation will reduce. There will also be considerable employment gains across all sectors of the economy. However, while the studies focus on economy-wide impacts, less emphasis is placed on how the policy affects agriculture and food production, household income and food consumption. Moreover, the gender impacts of these agricultural and food security policies are not considered. These gaps will be filled in this study. Further advancing these existing studies for Nigeria, the current study aims to include a micro simulation to examine the micro-level impacts of the NFSP.

References
3.2. **Methodology** (1200 to 1600 words)

Present the specific techniques that will be used to answer the research questions and how exactly they will be used to do so.

- Explain whether you will use a particular technique normally used in other contexts or whether you intend to extend a particular method and how you will do so.
- Explain if these methods have already been used in the context you are interested in (including key references).
- Explain how these methods incorporate and/or are appropriate for addressing gender considerations in your research.

- **For PMMA (microeconomic analysis) proposals only:** It is generally expected that the proposed methodology aims to empirically estimate a causal relationship. In such a case, you should explain potential sources of endogeneity in the context of your research and how the proposed technique(s) would allow the identification of the relevant parameters. You are strongly encouraged to discuss the potential impact mechanisms i.e., the channel(s) through which the “treatment” impacts on your outcome(s). Also, make sure you clearly present the outcome(s), the “treatment” and the sample used in the analysis.

The broad objective of this study is to evaluate the macroeconomic impacts of the National Food Security Programme in Nigeria. Given the economy-wide focus of the study, the proposed methodology is the computable general equilibrium modeling (CGE models). CGE models are a set of macroeconomic and behavioural simultaneous equations that link the activities and different agents in the economy (Hofgren, Harris, and Robinson, 2002). They consider the inter-agents and inter-sectoral interactions in a stable framework. A typical CGE model is based on neo-classical economic theory with the objective functions of each agent based on optimization techniques, intermediated by prices and market conditions. In the models, consumers seek to maximise utility while producers want to minimise costs in order to maximise profits.

CGE models are suitable tools for macroeconomic modeling and have been applied to economic analysis of environmental, fiscal, trade and other public policies (Wajsman, 1995). Several CGE models have been developed to examine the economic impacts of different policies. However, this study will adopt the PEP CGE model developed by Decaluwe, Lemelin, Robichaud and Maisonnaive (2013). Single-country PEP models include the static (PEP-1-1) and dynamic (PEP-1-t) models. However, given the dynamic nature of the issues advanced in this research, the PEP-1-t model will be adopted. The PEP-1-t model is a dynamic single country model. It can model economic policy in a country and does take into cooperation the changes in the impact over time. The PEP-1-t model can show the economy-wide impacts of the program on production, intersectoral changes, consumption, factors prices and demand, household income and welfare, etc at various stages or time interval of the program’s implementation.
In the model, output is produced by a combination of intermediate consumption and value added through a Leontief function. The intermediate consumption of each commodity are expressed as a fixed proportion by a Leontief function. On the other hand, value added is a combination of all the factors of production by a constant elasticity of substitution (CES) function. In other words, labour and capital are combined to form value added via a CES function. Combining this with the Nigerian SAM, value added will be made of land, labour and capital, and land is used only in the agriculture sector. Producers will be able to substitute among production factors based on relative price with a view to minimise production costs. Due to the objective of this study in investigating how the programme will impact employment from a gender perspective, the labour factor will be disaggregated into male and female labour using a constant elasticity of substitution (CES) function.

Also, domestic absorption in the model is a combination of locally produced commodity and imported commodities. Consumers can either buy from local producers or imports and this relationship is governed by a constant elasticity of substitution (CES) function. It is assumed that locally produced goods and imports are not perfect substitute, and this is reflected by the Amington hypothesis (Amington, 1969). Similarly, locally produced goods are consumed locally or exported and this is depicted by a constant elasticity of transformation (CET) function. Total supply of commodities is consumed by households, government, investment and intermediate demands and net exports. Household demand for commodities is governed by a linear expenditure system (LES) function which assumed that household seeks to optimize welfare subject to its budgets. For the model, Nigeria is assumed to be a small economy and cannot influence the world prices of commodities.

The PEP-1-t CGE model will be used to calibrate Nigeria’s social accounting matrix to examine the impact of the national programme on food security on GDP, labour market, welfare, gender, and other macroeconomic indicators. To apply the method, the study will follow the idea of Mitik and Engida (2013) with some adjustments. In the study, they disaggregate the factors used in the agriculture sector into productive and less productive factors. The composite productive factor is disaggregated into skilled agriculture labour and irrigated land. On the other hand, the less production factor comprises of unskilled agriculture labour and non-irrigated land. They did not, however, disaggregate the labour factor based on gender. In our study, land will be disaggregated into irrigated and non-irrigated land and will be combined with other production factors. In terms of simulations, public investment in the agriculture sector will be introduced as an increase in the capital stock. We will also simulate an increase in total factor productivity in the production of some agricultural commodities prioritised in the NFSP, based on Beyene, et al. (2016).

References


3.3. **Data requirements and sources** (1000 to 1300 words)

This is a critical part of the proposal. Explain the reason for your choice of particular databases. You must establish that they are ideal for the policy question you wish to address (including in terms of gender analysis) and that you have or will have access to these data before your project begins. Please consult the “Guide for designing a research project proposals” for more detail.

The empirical application of the proposed research project intends to investigate the macroeconomic impacts of the National Food Security Program (NFSP) using a computable general equilibrium (CGE) model. The benchmark data for the analysis is the social accounting matrix (SAM) of Nigeria, as it is the core data used in CGE modelling. The SAM is a matrix that shows the flow of resources and allocation of production factors in the economy. It presents a tabular description of the economy of a country, showing the receipts and payments to all economic agents. The SAM also shows the intersectoral dependencies among the sectors of the economy as it describes the flow of resources among sectors (Breisinger et al., 2009). This part of the SAM is known as the supply and use table. It is the section that shows the connections and intersections among all the sectors. For example, it shows the amount of agriculture commodities that is used in other sectors as intermediate inputs and vice versa. Other key macroeconomic data such as public and tax revenue, government expenditure, gross fixed capital accumulation, gross savings and investment, imports and exports and household consumption are also contained in the SAM. The SAM is calibrated by a standard CGE model to investigate the impact of a public policy intervention.

For this study, the baseline data is the 2006 social accounting matrix for Nigeria. The SAM was developed by Nwafor, et al. (2010). The SAM was based on data from 2006 economic year, and the data are collected from Ministries, government agencies and the National Bureau of Statistics of Nigeria. The SAM contains 61 activities and 62 commodities, 4 economic agents, 3 factors of production, four types of taxes, twelve households, and one enterprise modules. The four economic agents include households, firms/enterprises, government and the rest of the world while the three production factors include land, labour and capital. The labour factor will be disaggregated into male and female labour to ascertain the induced impacts of policy actions on gender-based employment. Other parts of the SAM include savings-investment, transaction costs and the total column and rows.

The agriculture activities and commodities in the SAM are of special interest in this study. Of the 61 activities and 62 commodities in the SAM, 40 are agriculture-related. Though the National Program on Food Security encompasses all agriculture activities, specific focus and priority is given to certain grain crops such as wheat, maize, sorghum, cereal, millet, etc. Thus, these activities and commodities are key in our SAM. The 12 household categories in the SAM are based on the six geopolitical zones of Nigeria and rural urban divide. For this study, the 12 household categories will be aggregated into rural and urban households in order to examine the relative impacts of the NPFS on rural and urban household income, consumption and welfare.
There is only one enterprise in the SAM and this can be disaggregated based on the specific objective and focus of the study. The government module in the SAM reflects public revenue and expenditure. In the Nigerian SAM, government revenue comes from taxes, capital income and income from abroad. The tax incomes mainly consist of activity tax, direct tax, indirect tax and income tax. The direct tax comprises of individual income tax and corporate income tax. The expenditure of the government include government consumption of commodities, transfer to household in the form of social security and government savings. The rest of the world is an external agent that depicts the trade relationship between Nigeria and the rest of the world. This show the importation of commodities from the rest of the world and the exportation of Nigerian commodities to other countries. The relationship between the export and import in the SAM is depicted by the current account balance.

The Nigerian SAM has been formatted to the PEP standard. However, the SAM is developed with 2006 economic data. The data no longer reflect the current size and structure of the Nigeria economy as the economy has changed substantially since 2006. Moreover, the Nigerian economy has been re-based and is now the largest economy in Africa. Hence the SAM by Nwafor, et al. (2010) will not be used for this analysis. Rather, the SAM will be updated using the cross-entropy method, which will be implemented by SAMBAL GAMS code. The SAMBAL GAMS code for implementing the cross-entropy method, developed by Lemelin, Fofana and Cockbum (2013), used existing data and optimisation method to balance a SAM. The benchmark data for updating the SAM is available and has been obtained from the Statistical Bulletin of the Central Bank of Nigeria. Thus, the final data (SAM) that will be used in this study is the updated SAM.

In addition to the social accounting matrix, we will also use some survey data for the analysis. For example, the survey data will be used to disaggregate the matrix. The labour factor for all the sectors will be disaggregated into male and female labour. This is of particular interest in our study due to evidence of gender-based patterns in agricultural employment (UNCTAD, 2015). The data for disaggregating the labour factor in all sectors to male and female categories has been obtained from the Nigeria’s National Bureau of Statistics Survey (NBS, 2013). Furthermore, the NBS survey data will also be used to disaggregate the agriculture sector into gender basis. Hence, the SAM will have male and female-owned agriculture sectors and the data to achieve this is obtained from the NBS’ Agriculture Export Survey 2016-2017. In another variation of the model, the agriculture sector will be disaggregated into commercial and small-scale. Lastly, a macro-micro simulation could be conducted to ascertain the poverty and micro-level impacts of the program. This will be done using the National Living Standard Survey of the World Bank. The results from the CGE model will be fed into a micro-simulation model as shown in Cockbum, Savard and Tiberti (2015).

References


SECTION IV – INFORMING POLICY

This section should be completed by the government-affiliated members, and validated by the head of their institution (to be confirmed in the required acknowledgement letter).

4.1. Government affiliation

a) Name the government institution at which you are employed, and describe its general mandate

N.B. This does not engage the institution itself to sanction, take part in and/or sponsor the proposed research project, other than authorizing the employees identified in section 2.1 (and below) to take part in the related work on a personal basis.

The Central Bank of Nigeria is the apex monetary institution in Nigeria, charged with the responsibility of monetary stability. The Central Bank of Nigeria, over the past few years, have also taken up the role of development functions through its Development Finance Department.

The Federal Ministry of Agriculture and Rural Development (FMARD) is a Ministry of the Nigerian government that regulates agricultural research, agriculture and natural resources, forestry and veterinary research in Nigeria. It is responsible for developing policies for the agriculture sector, with a view to growing the sector, and transforming the economy.

b) What is/are your specific role(s)(as employees) in the institution

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<td>Title/position</td>
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<tr>
<td>Role/responsibilities</td>
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<table>
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<tr>
<th>Government official/officer #2</th>
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<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Title/position</td>
</tr>
</tbody>
</table>
Role/responsibilities

Provide administrative support to the Research and Planning Department of the Ministry. She is also responsible for stakeholders’ engagements in respect of the departments work and outreaches.

4.2. Describe the policy context and needs (300 words)

a) Describe the specific policy issue(s), questions or needs faced by your institution and that the research project aims to inform - both in terms of socioeconomic outcomes (identify the target/beneficiary population), and the related policy processes (whether it is at the stage of debate, decision, design, implementation, review, reform, etc.).

Explain why the evidence to be produced with this research is important/useful to inform decision-making, especially with regard to your institution’s specific mandate and strategies.

The Nigerian economy remained highly dependent on crude oil. However, recent plunges in global oil prices, which puts the economy in a recession, has necessitated the need for diversification of the economy towards the real sector, especially agriculture and manufacturing. Despite the agriculture sector enjoying significant attention in all the National Development Plans in Nigeria, food security has also been a problem due to poor policies, inadequate investment, infrastructure deficiency, low manpower capacity, among others. The current administration recognizes agriculture as a major engine of growth and vehicle for poverty reduction as stipulated in the Economic Recovery and Growth Plan (ERGP). One of the major policy interventions to achieve the agriculture transformation goals of the government is the National Food Security Program (NFSP), which is co-managed by the Ministry of Agriculture and the Central Bank of Nigeria. Over the past three years (since 2016 that the program was initiated), the government through the Central Bank has invested massively in the program, and there is yet to be an independent evaluation of the effectiveness and impacts of the programme. At the Central Bank, there is currently the need for an independent scientific evaluation of the program to ascertain its impacts and effectiveness. Our department in the central bank will therefore benefit from the findings of this project. The findings of this study will help us at the Central Bank and our partners at the Ministry of Agriculture to determine if the program is achieving its stated goals, including whether it is contributing to the attainment of national gender policy objectives (as agriculture development is a key strategic part of the national gender policy). Furthermore, we will get insights into how the program can be revised or improved to achieve optimum economic and development objectives. This will help in the periodic review of the program.

b) What are the current policy options/scenarios, faced by (or available to) decision-makers - in terms of potential interventions, approaches, etc. - in relation to this particular issue?

If possible, also provide a brief history of policy initiatives (and related reforms, if any) implemented in the past to address the issue, indicating generally what worked and what didn’t (i.e., why is this still an issue?).

Max 400 words

Agriculture has been the mainstay of the Nigerian economy prior to the discovery of oil. The Federal Ministry of Agriculture and Rural Development over the years had formulated policies to ensure increased domestic food productivity. Yet, domestic production of food still lags demand, leading to a rise in food price inflation, while food importation remains high and constituted 11.3% of total import
in 2018. As a result, more efforts are being put in place to improve agricultural production in Nigeria under the current special real sector intervention programs of government, and to strengthen the National Food Security Programs (NFSP). In 2011-2015 the Agricultural Transformation Agenda (ATA) which sought to reintroduce the Nigerian economy to sustainable agriculture, and the recent Federal Agricultural Promotion Policy (APP), formulated to focus on ensuring increased productivity and improved standards for Nigerian food production are major policy reforms. Even though the government has recognised the importance of the sector in national development, there has been limited interventions in the sector due to the over-reliance on the oil sector. The current interventions and attention enjoyed by the sector are borne out of the significant negative impacts of recent oil price slumps and the increasing urgency to diversify the economy.

Other scenarios, including what was the current scenario before the programme was launched, include massive food importation to address the food shortage in the country. This has implications for foreign exchange and macroeconomic stability. Thus, the options available to the government include continuing with the status quo of food importation or strengthening local agricultural production through massive investment in the sector and harnessing the important role of women and small scale farmers. This research is based on the latter option/scenario.

c) How do you expect this evidence will be used/assimilated effectively into the relevant policy decision/advisory processes? Be as precise as possible, indicating the specific decisions or recommendations that have to be made by your institution.

Are you aware of any cost- or budget-related considerations that should be taken into account in the context of these policy decision/advisory processes?

Also, justify the timing of the proposed research project - how does it fit with the calendar of the related policy decision/advisory processes?

The results of this research will come up with specific contributions on the effectiveness and impacts of the National Food Security Program. This evidence will be presented to the top management of the Central Bank of Nigeria and other relevant stake holders. In the case of the Central Bank, the management will use the evidence to revise the program to better suit the objectives and outcomes. The bank will decide whether to continue, end or revise the program. More so, the evidence could also help the bank to determine the appropriateness of the current approach of the program’s focus on supporting women and small scale farmers. For the Ministry of Agriculture, the evidence from this research will help the top management to decide if subsequent agriculture policy interventions should follow the pattern of the NFSP.

We do not envisage any budget constraint in the course of implementation of decisions arrived from this project. Also, the timeline of the proposed research project is appropriate in view of need for periodic review of the program. The findings of the project will be timely for the next phase of the review of the program.

4.3. Stakeholder mapping and dissemination
List all other potential stakeholder institutions, i.e., institutions that you consider as potential users of the same research evidence (other than your own). These can include other ministries and government agencies, as well as civil society organizations, NGOs, private sector, etc.

<table>
<thead>
<tr>
<th>Name of institution/organization #1</th>
<th>Federal Ministry of Women Affairs</th>
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<tbody>
<tr>
<td>List the key representatives or target research users (policy makers or influencers)</td>
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<tr>
<td>- Name, title/position Hajiya Aisha Abubakar/Minister</td>
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<tr>
<td>- Name, title/position Mrs Ifeoma Anabogwu/Permanent Secretary</td>
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</table>

Describe briefly why and how you believe this institution could use the evidence

One of the key objectives of the program is to enhance the participation and employment of women in the agriculture sector. The evidence from this study could be used to integrate the program and other agriculture-oriented policies with the national gender policy. This stakeholder will be largely interested in how the program promotes women empowerment.

<table>
<thead>
<tr>
<th>Name of institution/organization #2</th>
<th>National Programme for Food Security (supported by the World Bank and FAO)</th>
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<tbody>
<tr>
<td>List the key representatives or target research users (policy makers or influencers)</td>
<td></td>
</tr>
<tr>
<td>- Name, title/position Dr. Oyebanji, Programme Manager</td>
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</table>

Describe briefly why and how you believe this institution could use the evidence

The programme which is supported by the World Bank and Food and agriculture Organisation of the UN will find the results of this study useful to determine the impacts of the government food security and agriculture programmes. The Programme could use the results to enhance its strategies and approaches to the issue of food security in Nigeria. The specific aspect of the results that may be of interest to the Programme include such outcomes as food production, food imports and exports, food prices and consumption by households.

<table>
<thead>
<tr>
<th>Name of institution/organization #3</th>
<th>The Senate Committee on Agriculture</th>
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<tr>
<td>List the key representatives or target research users (policy makers or influencers)</td>
<td></td>
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<tr>
<td>- Senator Abdullahi Adamu/ Chairman of the Senate Committee on Agriculture</td>
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<tr>
<td>- Dr. Adeyemi Fajingbesi/Director Research and Training Department (NILDS)</td>
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</tr>
</tbody>
</table>

Describe briefly why and how you believe this institution could use the evidence

As part of its plans to address food security and promote industrial growth, the Senate and House of Representatives Committees on Agriculture have over the years and continued to formulate policies to improve crop production and strengthen agriculture sector in collaboration with relevant agencies. The findings of this research will be useful for the parliamentarians and the committees to create evidence-based legislation that support the country’s agriculture policies. The specific outcome of interest for this stakeholder may be the cost and impacts of the policy.

4.4. Outline your engagement/dissemination strategy

Describe how you intend to engage with these other stakeholder institutions (listed in 4.3) to ensure that they:
1) Contribute to informing the research work (i.e. consultations) 
2) Are kept informed of the research progress and findings

From the beginning of the project, we intend to have consultations with the stakeholders to intimate them of our research. From these consultations, we can get their ideas and inputs and incorporate them into the research. This will be followed up with periodic meetings and updates to intimate them of the progress of the research. Following the interim results, we will also organise working sessions, meetings to disseminate the results and obtain comments. After the final results have been approved by PEP, we will work with the stakeholders to organise a national policy conference where the results of the research project will be presented to the public. Other forms of dissemination will also include policy briefs, newspaper articles, blog posts, etc.

SECTION V - OTHER CONSIDERATIONS

5.1. Describe any ethical, social, gender or environmental issues or risks that should be noted in relation to your proposed research project.

No ethical issues, social, gender or environmental risks are envisaged in the course of this research work.

5.2. References and plagiarism:

Applicants should be very careful to avoid any appearance of plagiarism. Any text of five or more consecutive words that is borrowed from another source should be carefully contained between quotation marks with a reference to the source (including page number) immediately following the quotation. It is essential that we be able to distinguish what you have written yourself from what you have borrowed from elsewhere.

Note also that copying large extracts (such as several paragraphs) from other texts is not a good practice, and is usually unacceptable. For a fuller description of plagiarism, please refer, for example, to the following website:

- http://writing.yalecollege.yale.edu/advice-students/using-sources/understanding-and-avoiding-plagiarism

PEP will be using a software program to detect cases of plagiarism.