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Review

Smallholder agricultural finance in Nigeria: The research gap

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The aim of this paper is to first and foremost review various literatures on agricultural financing in Nigeria and study the various streams and impact of financing that are available to the smallholder farmers, and secondly, to propose a direction for future research in enhancing the utilization of these funds for sustainable development of smallholder farming in Nigeria. This paper is based on review of articles identified using the following search algorithm: “agricultural” (“finance” or “funding” or “credit”), “Africa”, and “Nigeria” published between 2015 to 2017. The author identified 146 articles from the Emerald Insight database and 722 articles from the ScienceDirect database. After removing the duplicates and carrying out a thorough analysis based on the problem studied, 59 papers were included in this study. The framework for evaluating the need for smallholder farming financing in Nigeria was studied based on the use of modern farming technology, the level of farm productivity and the livelihood of the farmers. The definition of the term agricultural financing in this article was defined from the perspective of the provision of credit for agricultural activities by the smallholder farmers. While, several literatures that were reviewed indicated that there has been funding provided to the smallholder farming industry in Nigeria, but the impact of these funds in terms of level of farm productivity, use of modern farming technology and the livelihood of the farmers is yet to be experienced. To the best of the author’s knowledge, there is limited study on the evaluation of institutional sector financing.

Key words: Agricultural finance, agricultural credit, agricultural finance impact, smallholder farmers, smallholder farming.

INTRODUCTION

Globally, agriculture has been identified as a major component in the achievement of the second millennium development goals - to eradicate extreme poverty and hunger (Kersten et al., 2017; United Nations, 2015), and as such the world’s government has placed

so much focus on the development of agriculture across the world. If the focus of the world is to eradicate poverty using agriculture as a medium, new investments in agricultural research, and perhaps, technological developments directed towards enhanced agricultural

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farming systems are required (Jones and Ejeta, 2016).

About three-quarter of the world's poor live in rural areas that are majorly involved in agricultural activities (Marris, 2018; World Bank, 2014). Furthermore, the agricultural products from these rural areas account for majority of the agricultural products in terms of crops and animal produce consumed in the cities across the world. To be able to continue with the production of agricultural products to match up with the world's increasing population, which is put at an annual growth rate of 1.7% (World Bank, 2016), it is inherent that these smallholder farmers move from the traditional method of farming to a more developed and improved technological way of farming (Fadeyi, 2014). Across the world, smallholder farming has been rediscovered as important in the eradication of poverty, creation of employment and provision of food for sustenance of the population (Röttger, 2015), and as such, nations are now focusing on the sector. A shift from the rural agricultural farming method to the modern agricultural farming method requires the flow of a consistent level of funding (Fadeyi, 2014; Miller and Jones, 2010; Olomola, 2010). Hence, a steady and consistent access to finance by the smallholder farmers is critical for the much-required growth needed in the agricultural sector, hence agricultural financing.

The financing of agricultural activities, otherwise referred to as agricultural financing has been identified as an essential and crucial aspect of agriculture, as it is an important precursor needed to determine the quantity and quality of inputs in terms of technology, materials, and labour that can be used on the farm (Fadeyi, 2014; Miller and Jones, 2010).

Various authors have given various definitions from different perspectives to agricultural finance; however, for this research, agricultural finance will be highlighted as it refers to the financial services provided for agricultural production, processing, and marketing (IFC, 2011); ranging from the institutional/formal and non-institutional/informal financial sources, to short term, medium term, and long term loans, to leasing. Agricultural finance "is a process of obtaining control over the use of money, goods and services (for agricultural purposes) in the present in exchange for a promise to repay an agreed amount at a future date" (Ejiogu, 2018: 10). It is also having access to credit for use to improve the efficiency of farm production and as a means of adopting better technology (IFC, 2011). A combination of the two definitions of agricultural finance indicates that agricultural finance entails the availability of a source of finance, the accessibility to the fund, utilization of the fund for agricultural purpose, and a plan to repay the fund in the future.

In African economies, agriculture has been identified as the largest sector in the provision of employment, supply of food and generation of earnings from export (Dercon and Gollin, 2014) which are all part of the MDGs. Africa countries are also characterised by high

population density, giving rise to the need to continually meet the feeding demands of the increasing population and create an advanced technique for agricultural improvement. The above precursors serve as indicators to the importance of agriculture in Africa (Diao and McMillan, 2017). Contrary to developed countries, agriculture in developing countries, mostly in Africa, is still characterised by low productivity, which, without an urgent intervention targeted towards the growth of the sector, agriculture will not attain its full potential (IFC, 2011; Olajide et al., 2012). In many African countries, the government spending on agriculture is below the target set by the Comprehensive African Agriculture Development Program (CAADP), Maputo declaration of July 2003, where it was agreed upon that each government will allocate 10% of its state yearly budget to agriculture (Ali et al., 2016). The deficit in the supply of the funds needed by the smallholder farmer forms the basis on which this research paper is done.

METHODOLOGY

This literature review examines journals and papers dealing with the study of agricultural financing, particularly, financing for smallholder farmers, mainly published between 2015 and 2017; however, several articles have been published before 2015 that have addressed some specific solutions to agricultural financing (Iwuchukwu and Igbokwe, 2012). For this study, emphasis was placed on the financing of smallholder farmers in Nigeria in the twenty-first century (Adesina, 2013). The several contributions focused on institutional agricultural financing to the smallholder farmers in Nigeria, and specifically the impact of these finances on the smallholder farming sector in terms of the use of modern farming techniques, increase in farm productivity, and livelihood of the smallholder farmers. Furthermore, different papers that addressed the topic of "Agricultural Credit", "Impact of Credit on Agriculture", "Agricultural finance" and "Rural Finance", have been incorporated in this study, on the basis that, there is at least some contributions made with relevance to the impact of finance on smallholder farming activities. Specifically, contributions relating to the sourcing, distribution and use of farm credit were included (Evbuomwan, 2016).

Article selection

The process involved in the selection of the articles reviewed can be categorized into two stages. In stage one, a search was conducted using two major library databases - Emerald Insight and ScienceDirect; and multiple keywords and strings - "agricultural", ("finance" or "funding" or "credit"), "Africa", and "Nigeria"; they were checked for in the titles, abstracts as well as in the main

body of the paper. Using this method, major agricultural finance and agricultural research journals were examined – World Development, Journal of Development Economics, International Journal of Social Economics, Agricultural Finance review, and African Journal of Agricultural Research. Additionally, the search also included international conference journals and published books. Articles that specified agricultural finance as well as agricultural credit just in the introductory comments or as a by-inquire were disposed of - these included articles that placed emphasis on poverty alleviation and rural development.

Papers were carefully studied. Finally, 59 papers published between 2015 to 2017 were chosen for in-depth examination. In the second stage, the entirety of the work in the first selected set of sample of 868 journals were compiled and studied in order to identify those that are relevant to the study which were omitted in the keywords search carried out in stage one (Harris et al., 2009). This led to the identification of 160 articles, which were put aside based solely on the title, methodology, or context. From these, 45 more articles were discarded because they were found to be reports or working papers and lack the in-depth analysis needed for this study. Ultimately, 115 papers were selected for this study.

In summary, 59 papers were selected, which were all published between 2015 to 2017; 35 were published in international journals, 1 is a working paper, while the remainder are book chapters, and books.

Review method

Several review methods used in papers being studied were examined (Kersten et al., 2017; Mattia et al., 2016). For this literature review and in line with Mattia et al. (2016), the papers were categorized using the two-pronged approach. The articles were examined and grouped based on the research methodology used in the research and their content. The general agricultural finance and agricultural credit literature were analysed first to identify topics being examined, and any relevant solutions included. Following this, articles relating to the solution were studied and the papers were categorized according to the concept and definition of agricultural finance, types, sources and advantages of agricultural finance, and the current positions of agricultural finance. These papers were studied, reviewed and summarized using established criteria to identify the patterns of relationship between the studied papers and the topic and as well as to reveal possible research gaps.

Smallholder finance: Findings from the literature

This section contains a brief of the features and content of the reviewed 59 papers. This section discusses a brief

introduction, a view point of the research method, and the other subsections addresses the topics highlighted in the preceding section.

Research method

As categorized by Mattia et al. (2016), the analysis categorizes the reviewed papers according to five research methods which include the analytical models, theoretical framework, case studies, interviews and surveys (Table 1).

A high number of the reviewed articles were based on the use of analytical models, while the others involved the use of a combination of theoretical frameworks and conceptual studies. Analytical models have been used in general by most of the authors to identify the scope of smallholder farming finance and its relevance. Afolabi (2010), Evbuomwan (2016), Taiwo and Olurinola (2016) all used the analytical modelling to demonstrate the effects and relationship of micro-finance/credit and agricultural finance/credit to smallholder farmers. Martin and Clapp (2015) and Orebiyi et al. (2011), on the other hand, used analytical modelling to identify the need and demand for agricultural finance to smallholder farmers; Akinola (2013) and Okoro and Nwali (2017) also used the analytical model to identify the problems of agricultural financing; Coker and Audu (2015) and Fadeyi (2013) used the analytical method to demonstrate how agricultural finance can be utilized by smallholder farmers and also proffer valuable contributions as to how agricultural finance can be better administered and better utilized for enhanced development of smallholder farms.

The articles reviewed that used the theoretical framework with regards to microfinance and agricultural finance focused on defining the scope of this study. Though, many of the conceptual papers reviewed focused on the prevalence of the need for finance and credit for the smallholder farmers rather than the solutions to the smallholder financing structure. However, Omorogiuwa et al. (2014) provided a detailed study of the stakeholders involved in the financing system of smallholder farmers in Nigeria who provide funds to the smallholder farmers and their perception towards the repayment of the provided funds. In addition, Tersoo (2014) provided insights on how the adequate and accessible finance can affect smallholder farming activities. With regard to the methodologies of empirical research, the literatures that were reviewed presented a feature of the use of surveys and statistical analyses data as studied by previous works (Afolabi, 2010; Falola et al., 2014). For instance, Coker and Audu (2015) carried out a survey in Minna, Nigeria, while Afolabi (2010) conducted a survey in Oyo, Nigeria with a purpose to identify the effect of agricultural micro-credit on smallholder farming and the attitude of the beneficiary

Table 1. Research methodology summary.

S/N	Methodology	Number
i	Analytical models	32
ii	Theoretical frameworks	16
lii	Case studies	5
iv	Interviews	0
v	Surveys	6

Table 2. Definitions of agricultural finance.

S/N	Article	Definition
1.	Coker and Audu (2015)	Investments made by developing countries in agriculture - but also in rural infrastructure, health, and education—are both pro-growth and pro-poor.
2.	Kersten et al. (2017)	The provision of various types of financial products, including (subsidized) loans, credit lines, fiscal credit, guarantees, matching grants, priority-lending regulation, and overdraft facilities. In some cases, the aim of SME finance was to promote R&D and innovation (e.g., product development).
3.	Mattia et al. (2016)	Agricultural credit is the provision of credit which is crucial to the development of the farming sector.
4.	Ali et al. (2016)	Agricultural credit is the financial credit that should be made available to farmers so that they can purchase new equipment and mechanize their farms.
5.	Lowder, Carisma, and Skoet (2012)	It involves giving up something today in order to accumulate assets that generates increased income or other benefits in the future.

Table 3. Classifications of interest rates of agricultural finance.

S/N	Provider	Repayment Interest rate	Repayment interest level
1.	Banks	Yes	High
2.	Government	Yes	Low
3.	Donor Agencies/Countries	No	Not Applicable

smallholder farmers to repayment. Notably, Afolabi (2010) utilized the statistical method to review the attitude of beneficiary farmers to the repayment of credit.

Concepts of agricultural finance

This section discusses the various definitions of agricultural finance as given in the various reviewed papers; these are then summarized in Table 2. The various definitions give a clarity of the current state of agricultural finance and the viewpoint of the various authors as they have approached this topic.

To categorize the various given definitions of agricultural finance, two factors were considered, and these are the role of the finance providers and smallholder farmers, and the perspective from the authors' viewpoint. Some of the articles reviewed opine that agricultural finance can be regarded as a set short-term financial solution provided by the financial

providers, some considered it as a long-term financial solution provided to smallholder farmers; while some consider it as a financial aid provided by donor countries or organizations. Overall, the involvement of the financial provider is considered as the provision of solution to agricultural activities of the smallholder farmers. Furthermore, the term agricultural finance was furthermore classified on their repayment rate based on the provider of the finance (Table 3). A major characteristic of all the papers reviewed highlighted that agricultural finance involves the provision of finance, or otherwise referred to as credit, to smallholder farmers, either on a short term, medium term or long term basis (Central Bank of Nigeria, 2018; Valentina et al., 2015) for use on the farm, while the second main characteristic of the reviewed articles identify that farmers have the obligation to repay the fund at a later date (Afolabi, 2010), except where the fund is identified as grant or aid which requires no repayment (Fløgstad and Hagen, 2017).

Financing agriculture in Nigeria

Nigeria, located in the western part of Africa, shares from the several attributes of the factors that affects agriculture in Africa. Nigeria is a country with an agrarian climatic condition through the year, which is favourable for agricultural activities. The country has great potential to contribute to the global production and export of agricultural products like groundnut, cocoa, cassava, yam and maize because of its vast arable land, and as such many international countries, organizations and the government are interested in investing in the growth of agriculture in Nigeria; hence, financial aids and supports are being channelled to the agricultural sector in Nigeria. Also, with the realization that over 60% of the Nigerian population are employed in agriculture and food activities (Chukwuma Sr, 2014), the Nigerian Government has over the years continually provided funding to the agricultural sector, so also have the banks and donor agencies. However, this fund has been argued to be inadequate for the needed development required in the agricultural sector in Nigeria (Evbomwan, 2016) as the smallholder farming system is still characterised with local farming technologies. With over 50 years of funding from international organizations averaging at about USD185 million per year as at 2001 (Okotie, 2018) and USD15,870 million as at 2015 (OECD, 2018), and with an average government funding of USD48,621million as at 2001 and USD41,245 million in 2015 (Mogues and Dillon, 2018), while banks have also committed 1.4% of their credit portfolio in 2008 to agriculture, and this increased to 1.7% in 2010 (Ofoegbu, 2015), agriculture development in Nigeria among the smallholder farmers still remains in the crude state.

Agriculture is an important and integral aspect of the Nigerian economy and its contribution to the country's gross domestic product (GDP) cannot be undermined. In 2006, agriculture contributed 32% to the GDP of the Nigerian economy, 32.71% in 2007, 32.85% in 2008, and 37.05% in 2009 (National Bureau of Statistics, 2017; Trading Economics, 2018; World Bank, 2018). These figures represent a decline in its contribution of 67.5% in 1957 (National Bureau of Statistics, 2017). Agriculture has undoubtedly been the main pillar of the Nigerian economy long before the discovery of crude oil in the country. Aside from its contribution to the GDP of the country, agriculture has also contributed to the creation of employment. About 48% of the nation's workforce was engaged in agriculture in 2006, 49% in 2007, with a gradual decline in 2008 to 44%, 31% in 2010, and eventually 27% in 2015 (National Bureau of Statistics, 2017; Trading Economics, 2018; World Bank, 2014). With the several importance of agriculture to the Nigeria's economy, and its dwindling state, its restoration can only be achieved by empowering the people and facilitating their access to the various factors of production, especially credit (Fadeyi, 2014; Yahaya

and Osemene, 2011), hence the need for financial interventions.

The sources of agricultural finance in Nigeria

In Nigeria, there are basically two major sources of funding available to smallholder farmers for their agricultural activities. These funds can be obtained from either the non- institutional/informal financial sector or the institutional/formal financial sector.

The non-institutional/informal sources of agricultural finance in Nigeria

The non-institutional/informal financial sector is characterised by funds from lending activities from cooperative societies, otherwise called *esusu*, borrowings from families or from money lenders. The non-institutional/informal financial market is dominated by monopolistic money lenders who charge exploitative interest rates. They also make demands for collaterals from the farmers. Such collaterals are often personal belongings.

The cooperative society or credit thrift society form of non-institutional/informal finance, otherwise called the *esusu* is a form of contribution among people of like minds. The contribution can be daily, weekly, or monthly. There are two ways of administering this form of finance. First, the money can be given to the members of the society on rotational basis at the end of every week or month, or secondly, the money can be pooled together and given to the member that makes a request for a need at a defined interest rate (Afolabi, 2010). The money lenders are a form of local bank, though not instituted. They provide finance to the rural dwellers in short notices, but this type of fund is characterised but high interest rate. The repayment interest in some cases can be as high as 10 to 15% per month (Afolabi, 2010). Except where necessary, to be able to drive a successful farming business, it is best that such non-institutional/informal forms of agricultural funding be avoided, as agricultural process itself requires some few months of gestation before the crops planted can be harvested or the animal being reared can be sold, during which period the farmer would have been paying interest on the loan. If proper care is not taken, the interest been repaid on the loan can erode the profit of the farmer, as well as his capital.

The Institutional/Formal Sources of Agricultural Finance in Nigeria

Nigeria has the capacity to unleash its potential agricultural productivity to provide for the high demands of both the local and international market. However,

this potential cannot be fully achieved except with adequate financing structure in place. The provision of structured agricultural finances could be the solution, and these structured funds are often obtained majorly from three sources, which are the Government, Banks, and International agencies/countries.

Government funding

The major involvement of a nation's government in the agricultural sector of the country is a needed precursor to the development of agriculture and the overall economic progress of the country (Bezemer and Headey, 2008). In Nigeria, the government has over time come up with various tools, programmes and agencies through which they aim to provide funds to the smallholder farmers. However, the funding of the government to the agricultural sector since the early 1980s has been on a variable pattern and is inconsistent. In 2013, only 1.70% of the whole budget was allocated to agricultural development. This declined in 2014 to 1.47%, then 0.90% in 2015 (Budget Office, 2018; World Bank, 2018). In 2016, there was a positive change in the government allocation to agriculture as the percentage of the budget allocation to agriculture increased from 1.25 and 1.26% in 2017, and 1.38% in 2018. However, this is still below the mandatory 10% mandatory budgetary allocation for agricultural as recommended in the 2015 Comprehensive Africa Agriculture Development Program (CAADP) (Budget Office, 2018; Ofoegbu, 2015).

Banks' funding

Banks form the larger part of the Nigerian financial industry, rendering financial services to the teeming Nigeria populace (Iwuchukwu and Igboke, 2012). These services include but not limited to receiving deposits from customers, contract and local purchase order financing, and borrowing funds to the deficit sector. The smallholder farmers form part of the deficit sector that the banks provide financing activities for. The advantages of banks are derived from their adversities, competitiveness, flexibility, lending competence, and high speed of response to customers' request (Coker and Audu, 2015; Taiwo and Olurinola, 2016); it is however, doubtful if this sort of diversity is still obtainable in the context of the Nigerian banking industry. Nigerian banks are competent in the generation of credit deposits. Despite their potential to be a huge source of providing finances for agricultural loans, their portfolio of loans to agriculture is less when compared to that of the loans provided to the other sectors of the economy. Bank's credit portfolio to agriculture was 1.4% in 2008, 1.4% as well in 2009, and this increased to 1.7% in 2010 (Ofoegbu, 2015). There was however a high bank

credit to the agricultural sector in 2011 of 3.5%, as the government attempted to place more emphasis on agriculture (Central Bank of Nigeria, 2017; Eluhaiwe, 2014; Okoro and Nwali, 2017).

International donor funding

Since the early 1950s, international governments and donor agencies have disbursed large amounts of funds on agricultural credit programs to Nigeria. Between mid-1950s to the late-1980s, the World Bank, as an agency, has committed over US\$16 billion to these efforts while other donors have also spent substantial amounts (Pardey et al., 2016) globally towards the development of agriculture across the globe especially in developing countries.

Nigeria, like many developing countries receives grants, financial aids and interventions, and donation from numerous external organizations, and donor countries. These funds are targeted towards the improvement of agriculture in developing countries for sustenance of agricultural productivity (OECD, 2018). It is aimed to assist countries with high number of smallholder farmers meet the needed food production in their respective countries. The funds from the external agencies, organizations and donor countries are pooled together by the government and later disbursed to the smallholder farmers through a structured process with no repayment interest rate. The integrity of the disbursement of these funds is often a bone of contention as the administrators of these funds often prioritize the request of beneficiaries that they have personal benefits from. It has also been alleged that many of the beneficiaries of this fund, knowing that they are not required to repay, often collect the funds and do not invest it in farming activities (Akinola, 2013; Eluhaiwe, 2014).

For instance, since 1985, International Fund for Agricultural Development (IFAD) invested a total of USD317.6million in 10 projects in Nigeria (IFAD, 2018), between 2007-2009, Nigeria received agriculture related international aid of an average of USD212.7million, USD205.7million between 2010 – 2012, and a high of USD348.9million between 2013 – 2015 (National Bureau of Statistics, 2007; OECD, 2018). Of these funds, some came from the Food and Agricultural Organization, the World Bank, the International Centre for Agricultural Research in the Dry Areas, the International Water and Sanitation Centre and the Department for International Development (Okoro and Nwali, 2017).

Expected benefits

From the viewpoint of financial providers, the benefits

accruable to the smallholder farmers from having access to agricultural finance and use of agricultural finance for their farming activities cannot be over emphasized (Hartarska et al., 2015). These benefits are well known and identified in studies that access the benefits of finance to farmers (Bezemer and Headey, 2008; OECD, 2016). These benefits include but not limited to access to improved farm inputs (Gbandi and Amisah, 2014), access to advanced and expensive technology (Olajide et al., 2012), and access to knowledgeable experts (Tersoo, 2014). However, these mentioned benefits are not the only benefits accruable to smallholder farmers who have access to funding, credit and/or aids (Fløgstad and Hagen, 2017), other benefits include the low repayment interest rates (United Nations, 2015), as well as the convenience of the duration when the fund is to be repaid (Afolabi, 2010). The benefits of agricultural finance are not limited to the performance of the farming activities only, but also extend to, and have an effect on the personal life of the smallholder farmers (Evbuomwan, 2016), whose livelihoods are impacted upon by the resultant changes of the agricultural credit on their farming activities. Eze et al. (2010), Daneji (2011) and Iwuchukwu and Igbokwe (2012) reviewed the benefits of government's funding of the smallholder farming sector and how it has affected the success of smallholder farming, while Birthal et al. (2017), Okoro and Nwali (2017), and Yahaya and Osemene (2011) focused their study on the benefits of banks' funds to smallholder farmers and how it has been of advantage to the beneficiary farmers over their counterpart. On the other hand, Ndikumana and Pickbourn (2017) and Eicher (2003) concentrated their study on the impact of aids and grants from donor organizations and donor countries. In general, the other articles reviewed highlighted the benefits of adequate funding and access to credit for smallholder farmers but, Coker and Audu (2015) and Afolabi (2010) raised concern about the attitude of beneficiary farmers to the repayment of the credit/funds that they have benefited from.

Finally, a summary of the reviewed articles noted that for agricultural finance to be successfully for smallholder farmers, there is need for an enhancement of the funds from the various sources through adequate collaboration between the providers of the funds and the beneficiary farmers (Fløgstad and Hagen, 2017; Olajide et al., 2012).

Agricultural finance projects

Overall, several attempts have been made by the various authors - whose papers were reviewed, to research on agricultural finance project, and these papers can be broadly classified into two categories based on the purpose of the paper. Some of the articles reviewed were descriptive and presented the case studies of smallholder farmers who have successfully benefitted

from credit for use on their farms; while the other articles reviewed were exploratory, presenting a set of strategies which are related to the utilization of agricultural finance for farming purpose. The purpose of the descriptive articles was first to highlight cases of the successful implementation of agricultural finance and present a descriptive analysis of the cases studied as a contribution to the paper, or as a support to the concept been utilized. Examples of the case study of the use of descriptive method include articles by Okoro and Nwali (2017), Eluhaiwe (2014), and Adesugba and Mavrotas (2016).

Some other articles were based on the use of exploratory methods to present a set plan towards the adoption and utilization of agricultural finance. These exploratory articles include articles by Falola et al. (2014), Afolabi (2010); Orebiyi et al. (2011); Taiwo and Olurinola (2016) and Yahaya and Osemene (2011). These articles adopted the use of several methodologies, empirical models and contextual variables which affect the decisions for the acquisition and utilization of credit by beneficiary farmers.

The research gap and future research

Historically, after the era of colonization and at the start of the independence of several African countries such as Sudan in 1956, Ghana in 1957, and 16 other countries in 1960 – including Nigeria, Africa and Nigeria were a modest exporter of agricultural commodities like cotton, oil palm, cocoa, and groundnut (Eicher, 2003). But with the discovery of crude oil and a shift in the attention of the government from agriculture, coupled with the high population growth rate of about 2.7% as at 2012 (World Bank, 2018), agriculture was neglected (Adesina, 2013) and its activities were stagnated.

However, with the increasing and high demand for agricultural commodities to feed the population, Nigeria which was once an exporter of agricultural commodities became an importer of food commodities. This posed a challenge to the government, and successive government introduced several schemes, policies and programs to arrest the declining agricultural state of the country (Röttger, 2015). However, after several years on investing in agriculture by the government, international agencies and banks, the impact of these investment on the development in the agricultural sector seemingly does not justify the investments that have been made, whereas this situation might be made worse in the near future as the population is projected to be about 410million in 2050 (World Bank, 2018). This therefore brings to fore the call for the evaluation of the impact of the institutional finance on smallholder farming in Nigeria.

Most existing studies focused on the need to acquire funding for agricultural activities in Nigeria (Adesugba

and Mavrotas, 2016); other studies have examined the various funding programs and policies in Nigeria (Gbandi and Amisshah, 2014), but limited studies have been carried out to access the impact of institutional finance on smallholder farming activities in Nigeria.

As at present, the shape, dimension and scope of agricultural funding to the smallholder farmers by the institutional sector in Nigeria majorly come from the government, international donor agencies and commercial banks. With so much funds coming from the institutional sector, it will be expected that there should be a corresponding growth in the level of farming techniques, agricultural production, state of technology and an eventual hype in the contribution of agriculture to the gross domestic product of the country, but these expected impacts are yet to be seen in the smallholder farming industry. The state of agriculture remains at almost its status quo of over 50 years characterized by crude techniques of farming with mechanization still at its barest minimum.

Conclusion

The contribution of this literature review is to primarily present a review of agricultural finance as a topic and serve as a guide for both researchers and practitioners on the subject of agricultural finance in Nigeria. It is also aimed at highlighting the perspectives of researchers who have previously studied this subject, the identifiable benefits of agricultural finance, and the methodology used in conducting the research. Secondly, this paper aims to pinpoint opportunities for future research.

Overall, the literature review has revealed that the subject of agricultural finance has been addressed from the perspective of the finance provider as well as from the viewpoint of the beneficiary farmers. From the perspective of the beneficiary smallholder farmers, the literature review revealed that there are tangible benefits accruable to the smallholder farmers who benefits from the funds provided. These benefits include but not limited to the ability of the smallholder farmer to be able to acquire modern machinery, purchase improved varieties of farms inputs, and employ the necessary experienced hands. On the other hand, the literature review which focused on the viewpoint of the financial providers identifies the concerns of the financial providers of the ability of the smallholder farmers to be able to repay the funds advanced to them by banks and government agencies, and for those that benefited from aids, the concerns are that the beneficiary smallholder farmers are able to utilize the funds appropriately for their farming activities, while having the knowledge that they might not be required to repay the funds. In terms of the methodologies, the review shows that most studies focusing on the general scope of agricultural finance

are conceptual, while those focusing on the provision of finance for agricultural purpose utilize analytical models. Further, the review reveals that there are several gaps in the reviewed literature which presents a direction for future research in the area of provision of finance for agricultural use in Nigeria.

First, there is the need to develop a broader theory as regards to agricultural finance in Nigeria, as the funds are provided by different providers and different term of funding applies. Secondly, the results of the empirical methods used to study the use of agricultural finance by smallholder farmers is weak as it only studies the relation between smallholder farmers and their use of the provided funding for agricultural development. However, it should be noted that the smallholder farmers do not operate as a single entity; rather, they are affected by several other factors which constitute a system within which the farmers operate; hence, the study needs to consider the ripple effect of the funds provided to the farmers. Thirdly, many smallholder farmers are not literate and therefore have poor record keeping technique in place. Finally, there are only few smallholder farmers who are willing to voluntarily disclose facts and figures about their finances except when they are sure that there is a benefit attached to it.

This study however has a limitation. While concerted effort was made to ensure that this review is comprehensive and inclusive of the relevant papers, it is however possible that some related research works in this area may have been overlooked. However, the author believes that this literature review is an accurate representation of the body of research on agricultural finance in Nigeria published during the understudied time frame.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Full Length Research Paper

Cost and returns of soybean production in Assosa Zone of Benishangul Gumuz Region of Ethiopia

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In Ethiopia, the demand for soybean product is increasing as a result of increasing population growth, agro-processing and urbanization. Research needs to provide farm level evidence that could guide informed production decision-making. This research was conducted to assess costs and patterns of input use and determine the profitability of soybean production in Assosa zone of Benishangul-Gumuz region. Data for the study were collected from 59 randomly selected soybean farmers using a well-structured questionnaire. Descriptive statistics and enterprise budgets are used to analyze the data. Results of the gross margin analysis showed that total gross revenue of Birr 10566.38 ha⁻¹ is generated from sales of soybean grain. The average variable cost incurred is 6634.43 Birr/ha. The gross margin and net-farm income was estimated to be 3931.956 and 3629.956 Birr/ha, respectively. The benefit cost ratio amounted to 1.52 which implies for every Birr incurred in costs, the farmer can expect a benefit of 1.52 Birr. Moreover, the sensitivity analysis indicated that profitability of soybean production is more sensitive to reduction in price than to increases in yield. The study therefore concluded that soybean production in Assosa Zone of Benishangul-Gumuz region is profitable enterprise. It is suggested that consistent government policies that would favor soybean production and market linkage between producers and soybean agro-industries in the area would attract investors and small-scale farmers would gain reasonable economic benefits from soybean production in Assosa zone.

Key words: Soybean, production, profitability, costs, returns, Benishangul-Gumuz.

INTRODUCTION

More than 70% of the sub-Saharan African (SSA) population is directly involved in agriculture as the primary source of income and food security (Adebayo, 2013). However, SSA agriculture productivity and the per capita value of agriculture output is the lowest in the world (FARA, 2006).

In Ethiopia, same as SSA, poverty and food insecurity still remain the major development challenges. The

incidence of poverty is estimated at about 29.6% (MoFED, 2012). Furthermore, some nutrition and health indicators reveal the prevalence of high level of food insecurity problems in the country. Cognizant of these facts, Ethiopian development plans including the current growth transformation plan (GTP) have focused on greater commercialization of smallholder agriculture by promoting the production and marketing of industrial

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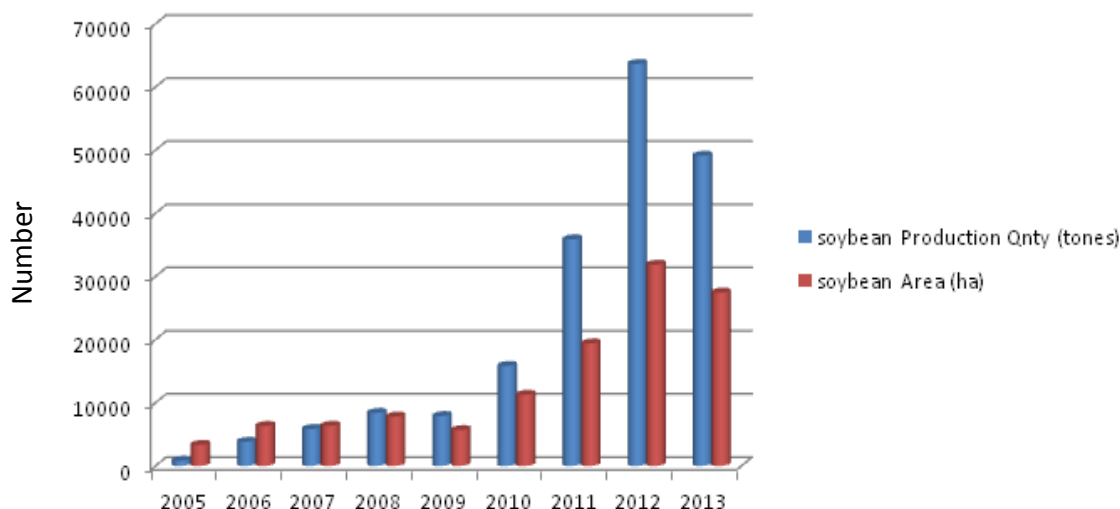


Figure 1. Soybean production and area covered in Ethiopia.
Source: Computed from FAO STAT (2014).

commodities that are competitive in local and export markets.

Soybean (*Glycine max*) is one of the most important food plants of the world and seems to be growing in importance as industrial and multipurpose crop. In Ethiopia, soybean is a multipurpose most nutritionally rich crop as its dry seed contains the highest protein and oil content. Thus, production of soybean in Ethiopia is very essential to overcome malnutrition and partially compensate the expensive source of animal proteins and as a source of income for small holder farmers. Production of this crop is indispensable in the country to enrich the staple cereal based food with sufficient and high-quality protein (Mekonnen and Kaleb, 2014).

Soybean is a drought tolerant crop that requires warm climates and is suitable for low to medium altitudes (Ogema et al., 1988; Urgessa, 2015). Since its introduction in Ethiopia in the early 1950s soybean has become one of the most important lowland grain legumes in the country that is highly adapted to diverse agro-ecological conditions including areas of marginal to the production of most of other crops. Furthermore, soybean is the primary source of edible oil globally with the highest gross output of vegetable oil among the cultivated crops with total cultivated area of 117.7 million ha and total production of 308.4 million tons (FAOSTAT, 2015).

In recent years, production and area cultivated under soybean in the country has increased trend (Figure 1). One of the reasons for soybean production increase is policy measures taken by the government. For example, GTP II plan has given focus for soybean production as industrial crop and its production is expected to increase from 0.72 million quintals in 2015 to 1.2 million quintals by the year 2020 to meet the market demand by creating a linkage with the industry and export market (GTP II, 2015). Soybean is one of the legume crops introduced to

Benishangul-Gumuz region during the resettlement program in 1986. Predominantly, the crop is produced by smallholder and some commercial levels in the region with productivity potential of 16 to 17 qt/ha (BoARD, 2014). The productivity level of the crop is nearest to the national average yield which is around 17.2 qt/ha. The crop grows widely in those zones of the region mainly for its economic advantage in the local market and household consumption (AsARC, 2006).

Despite the significance of soybean to address food and nutrition insecurity problems prevailing in the country, little is known about the return to investment in soybean production to promote it as a profitable business to the farmers. However, Ayalew et al. (2018) has conducted analysis of cost and return of soybean production under smallholder farmers in Pawe district, North Western Ethiopia. Information on costs associated with soybean production and profit gained in potential soybean growing areas like Assosa zone is critical. Therefore, this study focused to examine the status of production, cost and benefits of soybean with a purpose of generating information that help understand and evaluate soybean production performance of commercial oriented smallholder farmers at Assosa zone.

The information is designed to enhance informed decision making of smallholders directly and commercial farming system indirectly and improve the competitiveness of the soybean sub-sector in Assosa zone of Benishangul-Gumuz region.

METHODOLOGY

Description of the study area

The study area is located in the Benishangul-Gumuz Regional State. Benishangul-Gumuz Regional State is found at 687 km away

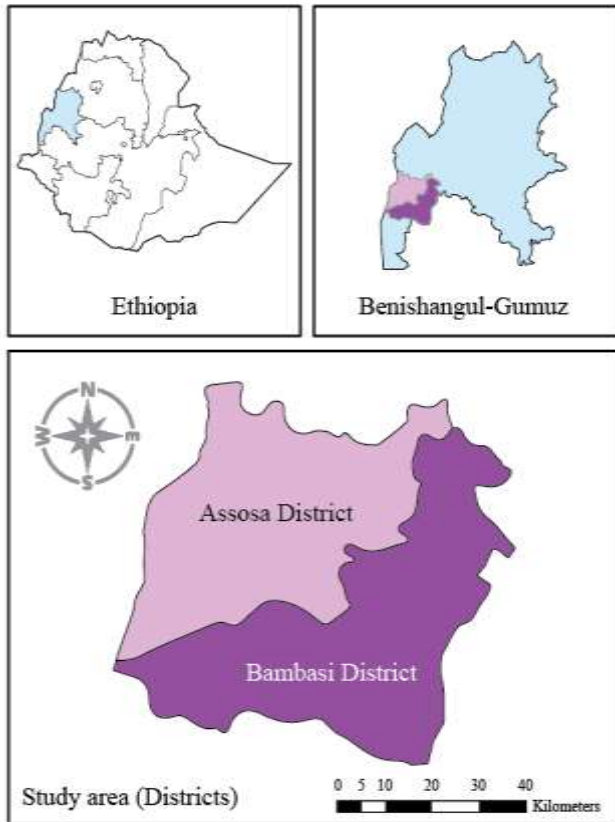


Figure 2. Map of the study areas.

from the capital city of the country, Addis Ababa, in the west. It is located at 9°30' - 11°30' latitude and 34°20' - 36°30' longitude. The region is bordered with the Sudan in the west, Amhara Regional state in the east and north, Oromiya Regional state in the east and south east and Gambella Regional state in the south. It covers a total area of about 5,038,100 ha. Plain undulating slopes and mountains characterize the topography of the region. The altitude of the region ranges mainly between 580 and 2731 masl. The agro-climatic zonation of the region can be categorized as 75% Kola, 24% Woina Dega, and 1% Dega. Major crops grown include: sorghum, maize, teff, soybean, groundnut, finger-millet, wheat, rice, noug, and sesame.

In Benishangul Gumuz region, there are three zones and one special district. However, the major soybean growing zones are Metekel and Assosa zones and soybean is produced by 31248 smallholders and covered an estimated area of 12806 ha (CSA, 2016) and almost half of the growers are from Assosa zone. Assosa zone was selected purposively on the basis of being a prominent soybean producing area. Three step sampling procedure was adopted in the choice of sample household heads for this study. The first step involved the purposive selection of two soybean producing districts, these are: Bambasi and Assosa districts. In the second stage, two and three soybean producing kebeles were randomly selected from Assosa and Bambasi each districts, respectively. In the third stage, a total of 59 soybean producing farmers with farm sizes of 0.5 ha and above in the two soybean producing districts, were selected with the help of Agricultural and Rural Development office experts and extension agents. Hence, 28 (47.46%) and 31 (52.54%) of the sampled households were from Assosa and Bambasi districts, respectively (Figure 2).

Data collection and analysis

A cross-sectional data was collected from 59 farm households located at five Kebele Associations (KAs) located in Assosa and Babmassi districts in 2015/2016 cropping season.

Primary data related to costs and income of the selected farmers was collected and generated using farm calendar hired enumerators at each Kebele and field observations collected from households based on their daily activity on soybean production. In addition, a well designed and pre tested semi-structured questions interview was conducted on the same households. Secondary data was also collected from all relevant organizations like Food and Agriculture Organization of the United Nations (FAO) and published and unpublished regional and Woreda level documents.

Descriptive statistical and quantitative methods were used to analyze the data collected. The descriptive statistics used were frequency distribution, mean, standard deviation, minimum and maximum. Enterprise budgeting method was followed and net returns analysis was used to determine the level of soybean profitability.

To determine the cost and returns of soybean production the gross margin (GM) analysis was employed. The gross margin is the difference between the total revenue (TR) and the average total variable cost (TVC). The total revenue is the product of soybean quantity in qt/ha and its price/qt. The total cost is given by sum of the total fixed cost (TFC) and the TVC (Katungi et al., 2011). Mathematically:

$$GM = GR - TVC \quad (1)$$

where GM = Gross Margin Birr/ha, Gr = Average Gross Return/ha, and TVC= Total Variable Costs (Birr/ha).

The net return was calculated to determine the level of profitability by:

$$NR = TR - TC \quad (2)$$

where NR = net return, TR = TR = Yield × price is total returns calculated as the product of yield (qt/ha) × field price per unit, TC=total costs, defined as the sum of total variable and fixed costs.

In order to ascertain the profitability of this venture, the benefit cost ratio was used as stated:

$$\text{Benefit Cost Ratio} = \frac{\text{Total Benefit (TR)}}{\text{Total Cost (TC)}} \quad (3)$$

Break-even analysis was also employed as a useful tool in enterprise analysis (Rod Sharp and Dennis Kaan, 2001). Break-even analysis can help you answer questions like: "What are the break-even prices at various yields?" and, similarly, "What is break-even yields at given prices?"

The break-even formulas employed in this study are:

$$\text{Break Even Sale Price} = \frac{\text{Average Total Costs}}{\text{Average Total Production(Yield)}} \quad (4)$$

$$\text{Break Even Yield} = \frac{\text{Average Total Costs}}{\text{Break Even Sale Price}} \quad (5)$$

Finally, a sensitivity analysis using the estimated economic benefit was undertaken to incorporate uncertainty into economic evaluation. To assess the stability of profitability of soybean production, the price of soybean grain was reduced by 10 and 30% and new gross margins were computed. Another scenario for

Table 1. Estimated variable costs of soybean production in Assosa zone of Benishangul-Gumuz in 2016 (in Birr).

Cost item	Average cost (Birr ha ⁻¹)	Std. Dev.	Min.	Max.	Total cost (%)
Cost of materials					22.87
Fertilizer	942.39	405.59	0.00	1251.50	14.20
Seed	420.00	-	-	-	6.33
Bags	155.00	69.34	-	-	2.34
Cost of field operations					77.13
Land preparation	520.59	491.39	16.60	2000.00	7.85
Ploughing	1107.90	878.69	144.00	3180.00	16.70
Planting	365.65	193.95	66.00	1000.00	5.51
Row planting	194.57	174.42	0.00	933.33	2.93
Fertilizer application	187.44	138.37	0.00	600.00	2.83
Cultivation/thinning	717.75	428.76	120.00	1733.33	10.82
Weeding	902.66	674.03	0.00	4000.00	13.61
Harvesting	542.36	261.52	99.60	1312.50	8.17
Threshing cost	578.20	255.97	166.60	1160.00	8.72
Average Total Variable Cost	6634.43	1973.03	3685	10366.5	100.00

Author's Computation (2016).

simulation was done for yield to assess the likely impact of a varietal improvement and or actual management as the average yield of soybean deviates by 40% from the mean for 1 ha of land.

RESULTS AND DISCUSSION

Breakdown of costs of soybean production

According to the field data, the farm size allocated for soybean on average was 0.56 ha. Table 1 shows the materials and operation costs incurred by smallholder farmers on soybean production. The average variable cost of producing soybean was Birr 6634.43 ha⁻¹. The variable cost constitutes both cost of materials and operation. Consequently, about 23 and 77% of the variable costs were cost of materials and field operations, respectively.

The cost of operation includes land clearing, ploughing, planting, fertilization application, cultivation/thinning, weeding, harvesting and threshing costs and accounted for about 77% of the soybean production cost. Among the operational costs, ploughing, weeding and cultivation costs were the major ones and constitute about 16.7, 13.61 and 10.82%, respectively as indicated in Table 1. This indicates that these are the major operational activities in the soybean production systems and have greater share of operational costs.

When the materials cost is look at, fertilizer cost has 14.20% share of the average variable cost. This could be due to the fact that the price of fertilizer was high. The seed and packing materials cost takes the remaining share as indicated in Table 1.

Labour cost for weeding, land preparation, sowing

in soybean production takes the lion's share. Harvesting cost, threshing cost, input cost like fertilizer and basic seed, rent of oxen, the cost of packaging materials and the cost of capital are also the costs incurred for soybean production.

Profitability of soybean production

The average soybean yield was estimated at 1550.28 kg/ha in the study area, which is far below the average yield of improved soybean varieties which give 32 qt ha⁻¹ at research field. Due to different agronomic practices of smallholder farmers, biotic and abiotic factors, soybean yield differs from 600 to 4000 kg ha⁻¹. This indicates that there is an option to double the yield of soybean per hectare at small scale level by adopting improved varieties, improving the management practices and employing recommended agronomic practices.

The average selling price of soybean grain was Birr 6.78 kg⁻¹ with the minimum and maximum price of Birr 6.50 and 8.00 kg⁻¹, respectively. The price fluctuation is mainly due to seasonal variations and the farmers sold at low price at time of harvest and high price at sowing time. This implies that smallholder farmers may maximize their return by storing and selling their produce at summer seasons when the price increased.

The computed gross margin indicated that a total of Birr 3931.96 ha⁻¹, constituting 29.76% of the total revenue, was obtained under the smallholders' soybean production system (Table 2). This indicates that soybean production is a profitable enterprise for smallholders' commercialization in Assosa zone of Benishangul Gumuz districts.

Table 2. Yield, unit price and total revenue of soybean production in Assosa zone of Benishangul Gumuz.

Variable	Mean	Std. Dev.	Min.	Max.
Total harvest (kg)/ha	1550.282	695.0082	600	4000
Per kg price of soybean (Birr)	6.78	0.29	6.5	8.00
Total revenue	10566.38	4931.175	3900	28000

Author's Computation (2016).

Table 3. Cost and returns from soybean production in Assosa zone of Benishangul Gumuz region.

Variable	Mean value	Min.	Max.	SD
Total revenue	10566.38	3,900.00	28,000.00	4,931.175
Total cost	6936.428	3922.5	10,604.00	2002.031
Total variable cost	6634.428	1973.031	10,366.5	1973.031
Total fixed cost	302.00	180	1,396.5	224.96
Gross margin	3931.956	(830)	20,213.33	3931.956
Profit margin/ha (%)	29.76	(21.28)	72.19	22.51
Net benefit/ha (Net profit)	3629.956	(1067.5)	19975.83	4288.632

Author's Computation (2016).

The break-even analysis

The breakeven point analysis revealed that, the breakeven sale price to cover operating costs and materials for soybean production in the study area was Birr 4.28 kg⁻¹. Furthermore, the breakeven yield to cover all variable costs was 978.53 kg/ha. Therefore, to minimize risk (loss) the smallholder farmers should produce at least 9.78 qt/ha and/or the minimum price of soybean above Birr 4.28 on average to cover the variable costs (Table 3).

Sensitivity analysis

Agricultural production is unpredictable due its gamble nature under environment. However, simulation may help to minimize risk and uncertainties in many cases. Table 4 shows the sensitivity analysis of soybean production in Assosa zone of Benishangul Gumuz region. Thus, 10% decrease in price would cause 7% decrease in profit whereas a 10% increase in yield would lead to 5.72% increase in profit. The results revealed that soybean production is highly sensitive to price reduction than to yield increase.

Further, as price decreased by 30%, the profitability of soybean production decreases by 26.9%, while 40% increase in yield increases the profit of the soybean production enterprise by 18.95%. The implication is that soybean profitability is highly sensitive to price decrease than to the increase in yield.

Gender role on soybean production and costs

The role of gender on soybean production is shown

in Table 5. The results indicate that most of the activities of soybean production were made by men. Threshing is completely made by men followed by harvesting and ploughing accounts for 93.14 and 89.97%, respectively. However, women contribute for about 10 and 6.86% of the remaining activity during ploughing and harvesting time. However, the total cost for ploughing is higher even than the cost of weeding. As indicated in Table 5 and Figure 3, the large share of women was during planting followed by land preparation, cultivation/thinning, and weeding. The difference in cost for ploughing was due to some of the costs incurred was for rent of tractor and other materials.

Conclusion

Soybean production contributes to the livelihood of smallholder farmers in Benishangul Gumuz region due to the versatile nature and use of the crop. Soybean is the major source of income for smallholder farmers and source of protein. Hence, production of the crop would create job opportunities in the rural communities and contributes to economic growth. It has also been learned that the productivity level of soybean is by far below the potential in the area and can be doubled by applying appropriate packages. Thus, based on the present finding from the net return and margin analysis, the smallholders' commercialization in soybean production is promising and profitable enterprise in the study area even under the existing low productivity scenario. The study therefore suggests that policy directed towards market linkage among soybean producers and agro industries and wider adoption of improved varieties with its

Table 4. Sensitivity analysis of soybean production in Assosa zone of Benishangul gumuz region.

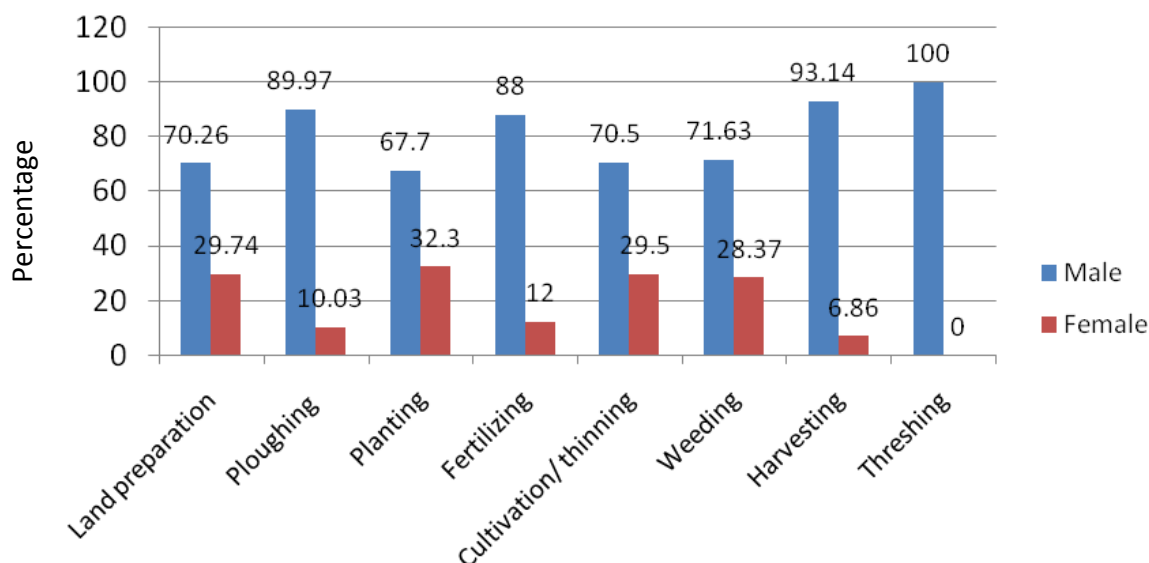
Description	Original	10% reduction in price	30% reduction in price	10% increase in yield	40% increase in yield
Total harvest (kg)	1550.28	1550.28	1550.28	1705.308	2170.392
Quantity of soybean sold (kg)	1550.28	1550.28	1550.28	1705.308	2170.392
Unit price (Birr) of soybean sold (kg)	6.78	6.102	4.746	6.78	6.78
Total revenue	10566.38	9509.75	7396.47	11623.02	14792.94
Profit (Birr)	3931.956	2875.32	762.04	4988.59	8158.51
Profit as % of total revenue	37.2	30.20	10.3	42.92	55.15

Author's Computation (2016).

Table 5. Farmers' labor use pattern and costs (Birr/ha).

Type of operation	Family		Total labor cost
	Male	Female	
Land preparation	5.67	2.4	520.59
Ploughing	10.05	1.12	976.39
Planting	9.16	4.37	560.12
Fertilizing	4.18	0.57	187.44
Cultivation/Thinning	10.06	4.21	717.75
Weeding	12.65	5.01	902.66
Harvesting	10.04	0.74	542.36
Threshing	6.61	0.00	578.20
Total	68.44	21.89	4985.51

Author's Computation (2016).

**Figure 3.** Total labor share of soybean production in Assosa zone of Benishangul gumuz region.

recommended agronomic practices by smallholder farmers would bring soybean profitability to a higher level

than the current low input scenario in Assosa zone of Benishangul-Gumuz regional state.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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