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Salam as Banking Financing for Agriculture in Developing Countries: Lessons from Sudan

Salih Mustafa Ahmed Mualley[1], Issa Salim Moh'd[2]*

*) Corresponding email: issasmohd@mum.ac.tz

Abstract

This study aims to measure the impact of commercial bank financing via the Salam mode of finance on Sudanese agricultural production and determine whether the Salam mode is suitable for financing agriculture. For the analysis, the ordinary least squares method (OLS) was applied to a log-linear form of a simple regression model, with time series data on Sudan's total annual agricultural production as a sepensent variable and the commercial bank's total annual financing via Salam as the explanatory variable. The empirical result revealed that the Salam mode of finance is appropriate for financing agriculture in Sudan due to its significant effects on agricultural production, with a significant and positive relationship. In addition, the agricultural sector contributed highly to the country's economy during the study period and was positively elastic to bank financing. However, it is hindered by heavy direct and indirect taxes, high marketing costs, long distances with poor rural infrastructure, and weak agricultural returns. Therefore, relevant policy implications for both agriculture and bank financing are required. Hence, the study's results suggest that banks should increase the provision for Salam mode for high agricultural production, reduce tax burdens, renovate the infrastructure, and facilitate financing procedures for the agricultural sector.

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[1] Faculty of Business Studies, University of Gezira, Sudan. Visiting Professor, Muslim University of Morogoro, Tanzania
[2] Faculty of Business Administration, Muslim University of Morogoro, Tanzania

I.   Introduction

1.1   Background

Agriculture plays a vital role in economic development and has features that make it a unique instrument for development. It contributes to development as an economic activity, as a livelihood, and as a provider of environmental services, making the sector a unique instrument for development (The International Bank for Reconstruction and Development, 2007). In sub-Saharan Africa, more than 750 million people who live in dire poverty (earning less than US$1 per day) rely on subsistence agriculture as their primary source of food and income, and about two-thirds (2/3) of the people depend on farming for their livelihood (Havnevik, Bryceson, Matondi, & Beyene, 2007; Rosegrant & Hazell, 2000). In practice, agriculture in most African countries is the backbone of their economy, considered a key sector for African development. It is also deemed a driving sector for improving income and purchasing power (Havnevik et al. 2007).

For example, Ahmed and Elsaied (2017) argued that agriculture plays a particularly crucial role in the Sudan economy, where more than 70% of the population is engaged directly or indirectly in agricultural activities. Sudan also earns 45% of its GDP from agriculture. They presented an evolution of agricultural statistical activities since 1903 and found that, although all professionals and beneficiaries of agricultural information in Sudan understood its vital role, there is still a gap between understanding, adoption, and application in practices.

Kanu et al. (2013) also revealed that over the years, agriculture in Sudan has been exposed to heavy direct and indirect taxes and has become the primary government revenue source. However, the sector faces high marketing costs, tax fees caused by the intermediaries, and the long distance with poor rural infrastructure. In addition, the central bank of Sudan's annual reports (Central Bank of Sudan [CBOS], 2019) asserted the importance of the agricultural sector in terms of plants and animals and traditional and mechanized agriculture in the Sudanese economy. It is because the sector provides the country with food, such as millet, corn, wheat, and many oilseeds like peanuts, sesame, and sunflower. Besides, the sector also provides cash crops, such as cotton and gum Arabic.

Similarly, the sector provides various animal products, such as meat, dairy, leather, eggs, and others. According to these Central Bank's annual reports, the sector contributed, on average, 30% to Sudan's real gross domestic product (GDP) from 2001 to 2019. In this study, Figure 1 summarizes the agricultural sector's importance to Sudan's economy in terms of its annual percentage average on the real gross domestic product from 2001 to 2019.
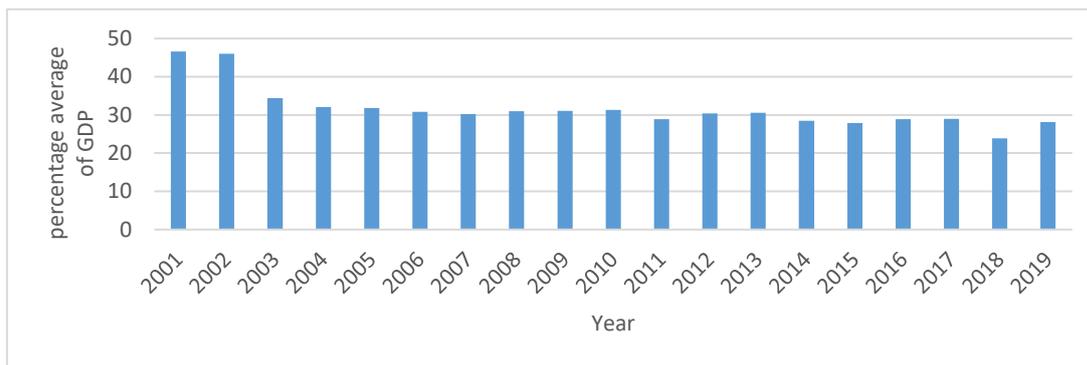
Figure 1. Sudan Agricultural Sector Annual Percentage Share in GDP in %

Source: CBOS (2019)

According to its importance, agricultural advancement is necessary for improving the supply of raw materials for agro-based industries, especially in developing countries. The shortage of agricultural goods impacts industrial production and a consequent increase in the general price level (Praburaj, 2018). Hence, modern agriculture is possible when farmers are provided credit for purchasing modern inputs (Schultz, 1964; Zuberi, 1989; Saleem and Jan, 2011).

Moreover, Sudan has adopted Islamic banking and financing since 1984 and has vast experience in financing the agricultural sector using the Salam mode of finance as a suitable mode for the agricultural sector. It has also pushed the authors to study this experience. For example, the central bank of Sudan (2001 -2019) revealed that the Salam finance for agriculture was very low compared with the total bank financing; it varied between 0.75% and 4.99% from 2001 to 2019. Figure 2 displays the general overview of the total bank financing for Sudan's agricultural sector via Salam during this period.
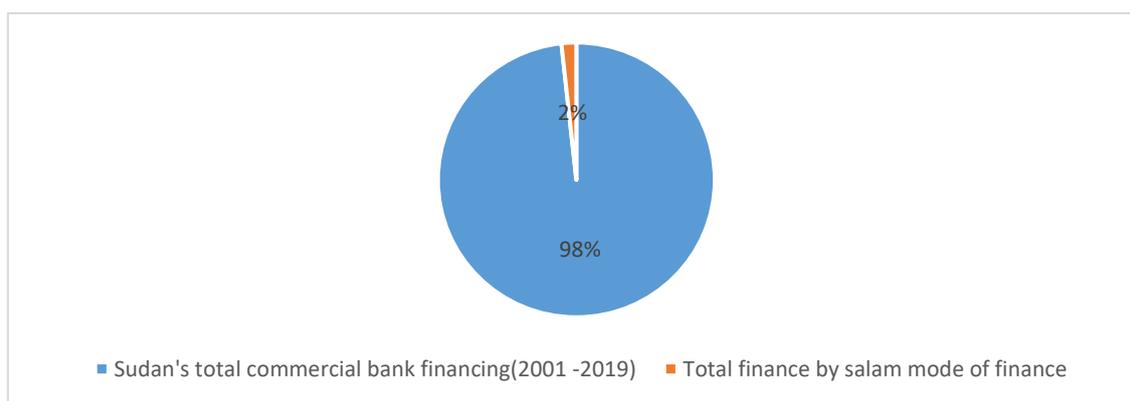

Figure 2. The Ratio of *Salam* Mode of Finance for Agriculture to the Total Commercial Bank Finance in Sudan (2001 -2019)

Few empirical studies have covered the impact of Islamic finance on Sudanese agricultural production. Mohammed El- Ameen (2021) found that the

Agricultural Bank of Sudan (ABS) positively influenced the agricultural rotation's crop from 2010 to 2020. Mohammed, Mawhubi, and Gondi (2021) also uncovered that bank financing only positively impacted Sudan's agricultural production in the long run. These studies either covered the impact of part of the Sudanese commercial banks on agricultural production or dealt with the impact of bank financing on agricultural production. Also, these studies were general and did not focus on the impact of the specific mode of finance on agricultural production. For this reason, this study attempts to cover the previous studies' gap.

1.2 Objectives

Therefore, the main objective of this study is to examine the impact of commercial bank financing via the Salam mode of finance for the agricultural sector in Sudan from 2001 to 2019. However, the specific objectives of this study are as follows:

1. To identify whether Salam mode of finance is a suitable mode for agriculture in Sudan or not
2. To analyze the real contribution of the bank financing to the Sudan agricultural sector
3. To determine the relationship between agricultural production and bank financing
4. To investigate the opportunities and challenges facing the agricultural sector in Sudan and those facing banking financing for agriculture as well

The study will help the policymakers in Sudan to adopt the right, relevant, effective, and productive policies to support the agricultural sector as the backbone sector of the economy. In addition, commercial banks may benefit by providing more finance based on the Salam mode to the agricultural sector. It will also help farmers increase their production, employment, GDP, and economic revenues to the Sudanese. Further, this study focuses on the impact of bank financing by Salam mode of finance on agricultural production in Sudan to determine whether it is an appropriate mode for financing agriculture or not, and therefore it is more specialized than the previous studies. Also, it will be additional literature on Islamic finance and economics empirical studies.

The rest of the study is organized as follows. While section two reviews the literature, section three highlights the methodology adopted in the study, and section four emphasizes the results and analysis. Finally, section five summarizes the conclusion.

II. Literature Review

2.1 Agriculture and Economy

Agriculture is vital for human welfare and economic growth (Bravo-ortega & Lederman 2005; Ghosh et al. 2010). According to De Soysa, Gledditsch, Gibson, & Sollenberg (1999), agriculture has a significant global economic contribution. Rosegrant & Hazell (2000) and M. Ahmed & Lorica (2002) noted that agriculture significantly impacted employment, income, purchasing power improvement, and development, transforming the rural economies of many countries, especially developing ones. On the same note, Gollin, Parente, & Rogerson (2002) argued that agricultural productivity substantially contributed to industrialization. In fact, even in big nations like America, agriculture plays a vital role in industrialization (Lobao & Meyer, (2010).

It is similarly true that increasing agricultural output needs adopting modern ways. In addition, employing modern agriculture is possible when farmers are provided with credit for purchasing modern inputs (Schultz, 1964; Saleem and Jan, 2011). Therefore, maximizing agricultural production is a function of financing and how it flows from investors, cooperative societies, and financial institutions to agricultural production units that need money (Okwuchukwu, 2022). Furthermore, affordable and accessible financial services are necessary to improve the productivity of the agricultural sector (Zakaria, Junand, and Khan, (2019). Moreover, agricultural credit appears to be an essential input along with modern technology for higher productivity (Das, Senapati, and John, 2009). Hence, access to rural financial services can make a difference in agricultural productivity, food security, and poverty reduction (Stephen,1995; Tenaw and Islam, 2009).

In this case, agricultural financing refers to providing funds necessary to carry out production and finance all related activities, such as storage, transportation, marketing, selling, and others. Alternatively, it means using limited financial resources to meet unlimited agricultural needs and is concerned with the development of agriculture and the improvement of the farmer's standard of living (Ali, 2022; Irungu, 2013). On the other hand, banks are one of the credit sources for agriculture and other investment activities. Banks in the modern financial industry are of two types: conventional and Islamic. Both types provide banking activities. Apart from the traditional banking activities that are also accepted within Islamic guidelines, Islamic banking provides a wide range of modes of finance that include modes based on sales, such as *Murabaha, Salam, Istesnaa, Moqawla,* and share-based modes of finance, such as *musharakah, mudarabah, muzara'ah,* and

musaqah. Specifically, *Salam* is one of the appropriate and relevant modes of financing for the agricultural sector.

Literally, *Salam* and *Salaf* have similar meanings, but *Salaf also* means a loan (Al-Harawi, 270 AH; *Al-Samarkandi,* 540 AH). However, with regards to the Islamic Fiqh of transactions, *Salam* means the sale of a deferred commodity at an immediate price; the deferred is the commodity, and the immediate is the capital [(Ibn Abidin, 252 AH), (Ibn Qudamah al-Maqdisi, died: 620 AH), (AL-Dhareer, 1967)]. In addition, buying debt is not a type of *Salam* selling (Al-Hattab (died 925 AH). *Salam* is also permissible in the Qur'an and Sunnah of the prophet (S.A.W.). For example, Allah says in the Qur-an: *"……. oh, you who believe! When you contract a debt for a fixed period, write it down…)* (2:282). In the interpretation of this verse, Ibn Abbas said, *"I bear witness that the guaranteed advances for a specified term have been permitted by Allah."* From the Sunnah, Ibn Abbas also said, *"The Prophet, may Allah bless him and grant him peace, came to Madinah and they were offering dates for advances two and three years, and he said: Whoever advances in something, then it is in a known measure, and a known weight, for a known term)"* (Al-Bukhari, 2240).

عَنِ ابْنِ عَبَّاسٍ رَضِيَ اللَّهُ عَنْهُمَا، قَالَ: قَدِمَ النَّبِيُّ صَلَّى اللهُ عَلَيْهِ وَسَلَّمَ المَدِينَةَ وَهُمْ يُسْلِفُونَ بِالتَّمْرِ السَّنَتَيْنِ وَالثَّلَاثَ، فَقَالَ: «مَنْ أَسْلَفَ فِي شَيْءٍ، فَفِي كَيْلٍ مَعْلُومٍ، وَوَزْنٍ مَعْلُومٍ، إِلَى أَجَلٍ مَعْلُومٍ»، حَدَّثَنَا عَلِيٌّ، حَدَّثَنَا سُفْيَانُ، قَالَ: حَدَّثَنِي ابْنُ أَبِي نَجِيحٍ، وَقَالَ: «فَلْيُسْلِفْ فِي كَيْلٍ مَعْلُومٍ، إِلَى أَجَلٍ مَعْلُومٍ» " البخاري، 2240).

Apart from the general conditions of sale, *Salam* has special conditions that can be summarized as the capital and the sale be what is valid for deferment, postponed the sale or *Muslam Fihih,* specifying the weight, quantity, number, and character of *Muslam fih*i. In addition, there is the presence of the **Muslim fihi** at the time of delivery. Moreover, there is the delivery of the capital (**Muslam)** at the time of the contract or not delayed for a long time [Ibn Rushd, (died, 595 AH) and Al-Dhair, 1967]. More conditions have been stated by AAIOFI (2001), such as that *Salam* must be for fungible goods under the general condition; no *Riba* (usury) ensues, and it is not permitted for anything specific like "this car." It is also not for anything for which the seller may not be held responsible, like land, buildings, or trees; or for articles whose values change according to subjective assessment, like jewelers and antiques. Besides, it is not permissible to stipulate that *al-Muslam Fihi* must be from a specific piece of land. However, on the delivery date, the seller has to deliver to the buyer the *Muslam Fihi*, according to the specified specifications, without stipulating that it must be a product of his farm or factory.

Overall, *Salam* is a permissible sale, exempted from the prohibition of selling what one does not have because of the need for it and its necessity for each one of the contracting parties (Al-Nawawi (died: 676 AH), Ibn Muflih (884 AH),

Sabiq (1365 A.H), and The Supreme Authority for Sharia Supervision of Banks and Financial Institutions (1997)).

According to Mualley (2019), the *Salam* mode of finance should strongly link financing with the real sector and clearly direct the funding to the actual activities and productive sectors in the economy. These conditions aim to prevent usury and the consequent injustice in transactions. In addition, the contract creates excellent opportunities for investment and labor absorption, thus contributing to economic and social stability.

2.2 Sudan's Agricultural Sector

According to African Development Bank (1996), agriculture in Sudan provided (80 - 90%) of the population's livelihood (55%) of GDP and supplied (100%) of raw materials for the industrial sector in the 1980s. In addition, the sector employed about (76%) of the Sudanese labor force and secured about (95%) of the exported commodity, which is crucial for the payments of the imported good. On the same note, Ahmed and Elsaied (2017) emphasized that, since 1903, agriculture has significantly contributed to the Sudanese economy. It occupied more than 70% of the population directly or indirectly and contributed 45% of the Sudanese gross domestic product.

In addition, Suleiman (2013) and Mualley (2020) also stated that Sudan owns vast agricultural lands with an estimated area of about 84 million hectares, of which only 18 million hectares have been exploited for use. The agricultural lands in Sudan are also fertile, have good forest distribution, and have diverse climatic environments with rich sources of water, which allow the production of various agricultural products. On this note, Ahmed (2018) pointed out five agricultural systems in Sudan: traditional rain, mechanized rain, irrigation, livestock and fisheries, and the jungle system. Here, about (92%) of the cultivated area is in the traditional and mechanized rain-fed sector.

This importance has been indicated by the Central Bank of Sudan's annual reports (2001 to 2019). These reports showed that the sector contributed on average (30%) to real gross domestic product (GDP). According to Ahmed and Elsaied (2017), the source of irrigation also comes from the rivers and their tributaries using pumps, gravities, floods, and seasonal streams and rain.

Moreover, Kanu et al. (2013) revealed that over the years, agriculture in Sudan has been exposed to heavy direct and indirect taxes and has become the primary government revenue source. However, the sector is hindered by the high marketing cost, which, besides the tax fees, is caused by the intermediaries and the long distance with poor rural infrastructure. In addition, Ahmed et al. (2017) mentioned reasons that led to low productivity and weak agricultural returns in Sudan, such as poor use of agricultural inputs,

fertilizers, and improved seeds. Besides, the weakness and complexities of agricultural financing are limited to one bank. Moreover, the lack of clarity of vision, the agricultural plan for crops, and the state's neglect of this vital sector led to a lack of crop diversity. Lastly, neglecting irrigation canals and not using modern agricultural technology has also been considered a contributing factor to the low agricultural production in Sudan.

2.3 The Practice of Applying *Salam* Mode of Finance in Sudan

Despite the wide range of Islamic modes of finance applied by Sudanese banks, *Salam* mode financing was initially used as a financing mode for agriculture but was extended over time to cover most areas of investment, such as industry, trade, and services (Central bank of Sudan, 2018). Based on the jurisprudential guidelines, the process of *Bay'a al-salam* starts from *'Muslam ilayhi,'* who has to submit a financing request via the mode of *Salam* to the bank in a specific commodity, price, and the collaterals he provides. Then, the bank studies the customer, commodity, price, and collaterals and decides. In case of acceptance, the two parties sign the contract according to the form prepared by Sudan's Supreme Sharia Supervisory Board.

According to Abdullah (2015), *Salam* can be used even for manufactured goods, but most Sudanese banks use *Salam* mode in the agricultural sector. Theoretically, several types of risks are faced in the Salam mode of finance. These include the risk of commodity prices, the risk of damage or loss of the "delivered" commodity, the credit risk of not delivering the *'Muslam fihi'* in time, and ethical risks related to the customer's unwillingness to deliver the commodity (Khan and Ahmed, 2003). *Salam* financing may also be exposed to the profit margin risk (Abdullah, 2002). These risks may be caused by the climate, the customer, general economic conditions, changes in consumer preferences, or sharp price fluctuations (Bougheri, 2005).

In this respect, Sudan has pioneering experience in financing agriculture using *Salam*; however, the banks are exposed to several types of risk in their experience of using *Salam*. These risks comprise markup, liquidity, and operational risks due to the complex process of collecting, storing, and marketing the crops, quality, and credit risks (Adam, 2003; Abdullah, 2015; Mustafa and Ndir, 2019).

According to Mohammed El- Ameen (2021), the Agricultural Bank of Sudan (ABS) has a positive role in financing the agricultural rotation's crop from 2010 to 2020. In addition, Mohammed, Mawhubi, and Gondi (2021) investigated the impact of internal and external financing on Sudan's agricultural production in the short and long run (1998-2018). They found that bank financing only positively impacted agricultural production in the long run.

2.4 Previous Studies

Bamakhramah (2003) examined the experience of agricultural finance in Sudan (1991-2001) using Islamic finance. Based on extracted information from a sample survey of ten banks, four specialized and six commercials. He was also particularly interested in how successful the Islamic modes of finance in this sector were. He then concluded that Islamic finance offered great opportunities for developing Sudan's agriculture. However, factors like the nature of Islamic financing modes and structural, institutional, and organizational problems resulted in a relatively deficient performance of agricultural financing schemes over the period. Although this study, based on a survey, covered the supply side, it neglected the demand side to give the perspective of the two parties: financial institutions and the farmers.

On the same line, Abdel Aziz (2004) applied the descriptive analytical approach to data from a sample that covered seven commercial banks to investigate the reasons for the reluctance of commercial banks to finance the agricultural sector in Sudan. He found that the *Salam* mode of finance, due to its high risks, was not a preferred mode for commercial banks, and despite the decline ratio, it contributed significantly to the growth of Sudanese agriculture. Similar results were mentioned by Ibrahim (2006), Rahma (2008), Youssef (2009), and Musnad (2012). Therefore, they recommended the need for the Central Bank and the Ministry of Finance to devise a policy that motivates and encourages banks to finance the agricultural sector. In addition, determining a fair price for the two parties is necessary. Moreover, the creation of specialized channels for the sale of *Salam*, the establishment of a guarantee fund for agricultural lending, and advanced agricultural financing institutions at a possible cost, in addition to the provision of infrastructures, such as transport, communications, electricity, and water in the countryside, and the development of markets to link these areas with internal and external markets, are needed.

In addition, Abdullah (2015) identified the problems of agricultural financing by *Salam* mode in Sudan and ways to solve them, and he concluded that the most important problem of the *Salam* contract faced by the Sudanese banks was a significant fluctuation in the prices of agricultural crops in one year, which resulted from selling in the harvest season, even at unremunerative prices for the farmer. Moreover, the difference between the *Salam* price and the general prices for some agricultural crops in the same year is enormous, reaching in some years to (200%). Along with the above studies, he recommended the need for direct government intervention in the marketing of agricultural crops through a public institution for marketing agricultural crops. Nevertheless, this study neglected the role of *Salam* in Agricultural output.

Then, Ogunbado and Ahmed (2015) and Mohammed, Ogunbado, and Aziz (2016) theoretically investigated *Salam's* financial instrument and assessed how it could achieve agricultural sustainability in Nigeria and Kano states, respectively. By applying a qualitative research methodology, they explored the origin of *bay'salam*, its legality from sharia, and justified its usefulness in enhancing agricultural production standards in this most populous African country. They then revealed that before discovering petrol, Nigeria was predominantly agriculturist. In their seeking to contribute to the development of Islamic finance and banking in the country, they expected that the adoption of *Salam* would sustain agricultural production in Nigeria, improve farmer's income and standard of living, boost food security, and enhance exportation, which all will consequently benefit the country economy in general. Nevertheless, these two studies only reviewed the literature and based all their expectations on the theoretical foundation of the *Salam* contract. As such, these theoretical arguments need to be proven through applied studies.

Moreover, in their attempt to understand the bankers' view to solve the limitation problem that faces farmers' access to agricultural finance, Kaleem and Ahmad (2016) stated that easy access to formal credit is vital in reducing poverty in agricultural societies. Thus, it improves the farmers' overall productivity and social Indicator in the long run. They also argued that agricultural financing, generally and in Pakistan, is described as risky and low-return finance. Therefore, by the end of 2002, it was only about (3.5%) of the total bank financing in Pakistan. In addition, they revealed that bankers were more comfortable with credit facilities than with forwarded contracts. Due to that, by the end of 2009, *Salam's* mode of finance ratio to the total Islamic financing was only (3.6%); despite this low rate, they argued that *Salam* could help government and local donor agencies to reduce poverty in Pakistan. The conclusion of this study was also based on theory more than practical investigation.

Besides, Saiti, Afghan, and Noordin (2018) explored the potential of adopting *Salam*-based crowdfunding to finance the agricultural sector in Afghanistan. They adopted a triangulation approach, consisting of several methods to gather relevant information about Afghanistan's agricultural sector, the concept of crowdfunding, and *salam* (forward sale) contracts. Their findings uncovered that *Salam*-based crowdfunding is a viable Sharia-compliant investment platform, which may offer some advantages for both potential investors and farmers or entrepreneurs. In their study, they also mentioned some concerns for future studies; like the treatment of investors and investors' protection against fluctuations of commodity market prices, credit and liquidity risk management, and related Sharia issues, investigating the public acceptance and perception of *Salam*-based crowdfunding in Afghanistan to gain further insights on its feasibility.

In Indonesia, Hudaifah, Tutuko, and Awarjuwono (2019) also studied the implementation of the *Salam* contract for agriculture financing through Islamic-corporate social responsibility, a case study of paddy farmers in Tuban Regency. They argued that *Salam* financing was designed especially for agriculture. However, it faced many problems in its implementation, especially concerning risk management for financial institutions, and concluded that the key to the implementation of the *Salam* contract regarding improving the welfare of farmers in Tuban Regency is through the availability of cost-effective and flexible funds, which must be managed professionally and productively through the sharia economic institutions that are actively functional. They also recommended that more detailed and measurable experimental research is needed so that funds can be examined with the involvement of real funds as the pilot project. When a conceptual experiment is conducted in a given period involving limited funds within a year, which is 2-3 times the planting season, possible obstacles can further be identified.

On the same line, Rahma (2020) attempted to construct a new model of *Salam* sales for agricultural development finance based on the structural equation model and the descriptive statistical data analysis results. She concluded that farmers preferred cash financing via the traditional *Salam* mode of finance rather than the other modes, but that harmed the societies with many different risks, such as increasing inflation rates, high unemployment rates, default, and difficulty in paying cash debts in its exact time. It then pushed the banks, other financial institutions, and input suppliers to stop their leading role in agricultural financing. Therefore, she suggested a new model of *Salam* for developing agricultural finance, thus by granting producers real production inputs instead of cash loans.

In summary, although it faces several problems and risks, all these studies have unanimously agreed that banking financing for agriculture by the *Salam* mode of finance is a crucial factor in improving agriculture, and therefore, it is not preferred as a financing form for banks. Many of these studies have also theoretically indicated the positive impact of *Salam* on agricultural production, but they did not investigate this role from an empirical point of view. In addition, the empirical ones investigated *Salam's* problems rather than their impact on agricultural output and its comfortability for agriculture; hence, the current study bridges this gap.

III. Methodology

3.1 Data

The data in this study covered Sudan's agricultural sector output's annual market value from 2001 to 2019 (see appendix 1) and the Sudanese bank's total financing for the agricultural sector by Salam mode of finance for the

same period (see Appendix 2). Hence, the agricultural production value included parts, plants, and animals. Meanwhile, financing data comprised the Salam financing flowing from all commercial banks operating in Sudan to the agricultural sector. Both variables were from the Central Bank of Sudan's annual reports from 2001 to 2019.

3.2 Model Development

An econometrics two-variable linear model or simple regression analysis was used for testing hypotheses about the relationship between a dependent variable Y and an independent or explanatory variable X and prediction ((Salvatore and Reagle, 2001). In such models, it is assumed implicitly that causal relationships, if any, between the dependent and explanatory variables flow in one direction only, i.e., from the explanatory variables to the dependent variable in the (two-variables) classical normal linear regression model. It is also a model that assumes that the random dependent variable follows the normal probability distribution (Gujarati, 2004).

In addition, a random disturbance, error, or stochastic term must be included under the following assumptions; normally distributed, with zero expected value or mean—besides a constant variance. Further, the error terms are uncorrelated or unrelated to each other, and the explanatory variable assumes fixed values in repeated sampling (so that X_i and u_i are also uncorrelated) (Salvatore and Reagle (2001).

Table. 1 Data and Variables

Variables	Description	Source
Dependent Variable, **ATP**	The annual total market value of agricultural production	CBOS annual reports
Independent variable, **TBSA**	The total annual market value of bank financing for agriculture in *Salam* mode	CBOS annual reports

According to Gujarati & Porter (1978) and Salvatore and Reagle (2001), if the expected value of the dependent variable $E(Y \mid X_i)$ is assumed to be linear in the explanatory X_i, it may be written as

$$Y_i = E(Y \mid X_i) + u_i = \beta_1 + \beta_2 X_i + u_i \qquad (1)$$

Hence, the term (u_i) is a surrogate or proxy for all the omitted or neglected variables that may affect Y but are not (or cannot be) included in the regression model.

A set of empirical studies has linked agricultural output with the credit for agriculture, like Malik, Mushtaq, and Gill (1991). They argued that, traditionally, the agricultural production function is a function of the credit

provided by various financial institutions used in all agricultural production operations. Ogbuabor and Nwosu (2017) also indicated that most empirical literature showed a positive relationship between agric credits and agric productivity in Nigeria, Tanzanian, Pakistan, Ghana, South Africa, and Chile, though sometimes not significant.

Moreover, Ammani (2012) developed an empirical aggregate crop sector's output credit model to capture the effects of credit on the Nigerian aggregate agricultural production of the various sub-sectors, consisting of capital, labor, management practices, and technical progress as factors of production. Then, he took credit as the variable of interest for his study and dropped the other variables from his equation. Assuming that capital consists essentially of savings and credit, he also assumed the absence of savings for most farmers; therefore, credit was taken as the only form of capital available for agricultural production. Then, his function became as follows:

$$GDPC_t = \beta_0 + \beta_1 CrC_t + \mu_t \qquad (2)$$

Where GDPCt is the aggregate output of the crop sector of Nigerian agriculture in year t (in millions of Naira), and CrCt is the total amount of formal credit made available to the crop sector in year t (in millions of Naira). In addition, Udoka, Mbat & Duke (2016) specified agricultural production as a linear function of credit disbursed by commercial banks to the agricultural sector. Moreover, Florence and Nathan (2020) specified a linear empirical model relating commercial bank credit and agriculture output. In the model, the researchers also controlled for two (interest rates and inflation) factors affecting agriculture production.

Following Amanni (2012), Udoka, Mbat, and Duke (2016), and Florence and Nathan (2020), the interest of this study was to investigate the impact of Sudanese bank financing by Salam on agricultural output. Based on that, the setting of the variables is described in Table 1 in a simple linear regression model, which can be presented in the following equation:

$$\boldsymbol{ATP}it = \beta_0 + \beta_1 \textbf{TBSA}it + \mu i \qquad (3)$$

$$where, \quad \beta_0 \ \& \ \beta_1 > 0 \qquad (4)$$

Where equation (2) suggests that the dependent variable; the Sudanese total agricultural production annual market value (t) is a function of the bank's total annual financing for agriculture; equation (3) reflects the intercept β_0 and the slope β_1 of the bank financing to represent the effect of the bank financing on agricultural output.

Besides, equations 1 and equation 2 are econometrics's linear population regression function. Some alternative expressions used in the literature are linear population regression models or simply linear population regression. Also, $\beta 0$ and $\beta 1$ are unknown, but fixed parameters are known as the regression coefficients. $\beta 1$ and $\beta 2$ are also known as intercept and slope coefficients, respectively, and the researchers must estimate their values based on the given data for the dependent and independent variables to analyze the exact relation (Gujarati, 2004).

3.3 Method

One of the data types in econometrics is time series data, a set of observations on the values that a variable takes separately. Such data may be collected at regular time intervals, such as daily, e.g., stock prices, weather reports, weekly, e.g., money supply figures, monthly, e.g., the unemployment rate, the Consumer Price Index (CPI), quarterly (e.g., GDP), annually (Gujarati, 2004). According to Gujarati and Porter (1978), the Gauss–Markov theorem states that, given the assumptions of the classical linear regression model, an (OLS) estimator $\hat{\beta}2$ is said to be the best linear unbiased estimator (BLUE). Therefore, based on this study's time series data and the developed model, the ordinary least-squire method (OLS) was utilized to estimate the impact of banking finance via Salam on the Sudanese agricultural output.

IV. Results and Analysis

4.1 Results

This section aims to analyze the data and variables used to investigate the impact of the Sudanese banks' salaam financing on their agricultural output from 2001 to 2019. Econometricians usually use plots for the observations of dependent, and independent variables in scatter diagrams to show the linearity between the two variables (Salvatore and Reagle (2001)). Therefore, Figure 3 summarizes approximately the linearity between the Sudanese annual total agricultural production market value as a dependent variable and the total annual bank financing via Salam mode of finance as an explanatory variable over the study period.

Thus, most points fell on or near the linearity line, indicating that the two variables were linearly correlated. Following the value of R2 [91%), there was a high positive linear correlation between Sudan's agricultural output and bank financing by Salam mode over this period. Therefore, the linear model was the appropriate function to show the impact.
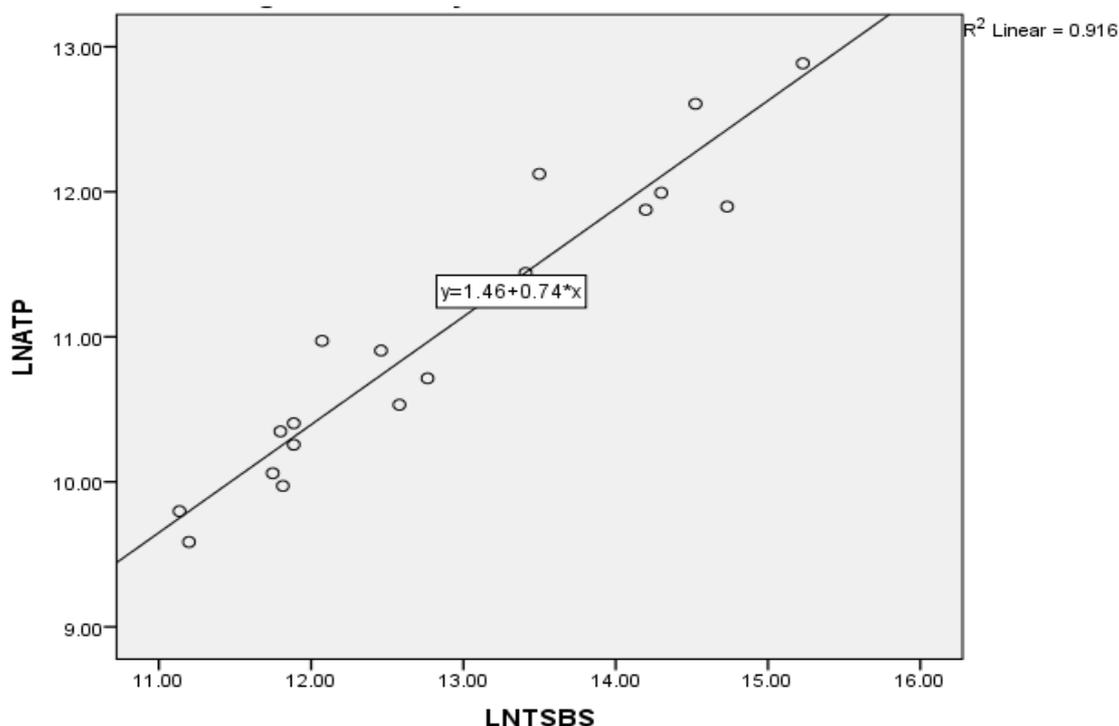
Figure 3. Linearity between The Model Variables

In Table 2, about the residual statistics for the two variables in terms of their mean, minimum, maximum, and standard deviation, the study investigated the data's goodness and ensured some outliers on the explanatory variable. Thus, the data were transformed into the natural logarithm to avoid the outlier's leverage. However, outliers were not removed because their removal could dramatically affect the regression line, as suggested by Gujarati (2004).

Table 2. Residuals Statistics[a] of The Model Variables

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	9.7505	12.7999	11.0322	0.93637	19
Residual	-.53146-	.61222	.00000	0.28319	19
Std. Predicted Value	-1.369-	1.888	.000	1.000	19
Std. Residual	-1.824-	2.101	.000	0.972	19

a. Dependent Variable: LNATP
Source: Authors' calculations.

Table 3. The Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.957[a]	0.916	0.911	0.29140	1.757

a. Predictors: (Constant), LNTSBS
b. Dependent Variable: LNATP

In Table 3, the Durban Watson test showed the independence of the observations by examining the independence errors. Therefore, Table 3 shows the model summary, the (D.W) statistics in the table close to (1.8), which lies between 1; thus, the observations were independent.

Figures 4, 5, and 6 reveal the normality of the variables. Figure 4 depicts the normality of residuals because the dots were generally distributed around the 45 lines. Figure 5 displays the dependent variable of the market value of the annual total agricultural output, which was normally distributed, while Figure 6 presents that the scatter plots of the standard residuals against the predicted values of the dependent variable were elliptical.

Figure 4. Normal P-P Plot of Regression Standarized Residual

The correlation value shown in Table 4 shows the correlation between the Sudanese agricultural output as a dependent variable on the one hand and the bank financing by *Salam* mode of finance as an independent variable on the other hand, over the period (2001 -2019). The result indicated a strong and positive correlation between the two variables used to be about (96%).

Figure 5. Histogram

Figure 6. Scatterplot

Table 4. Correlations between The Model Variables

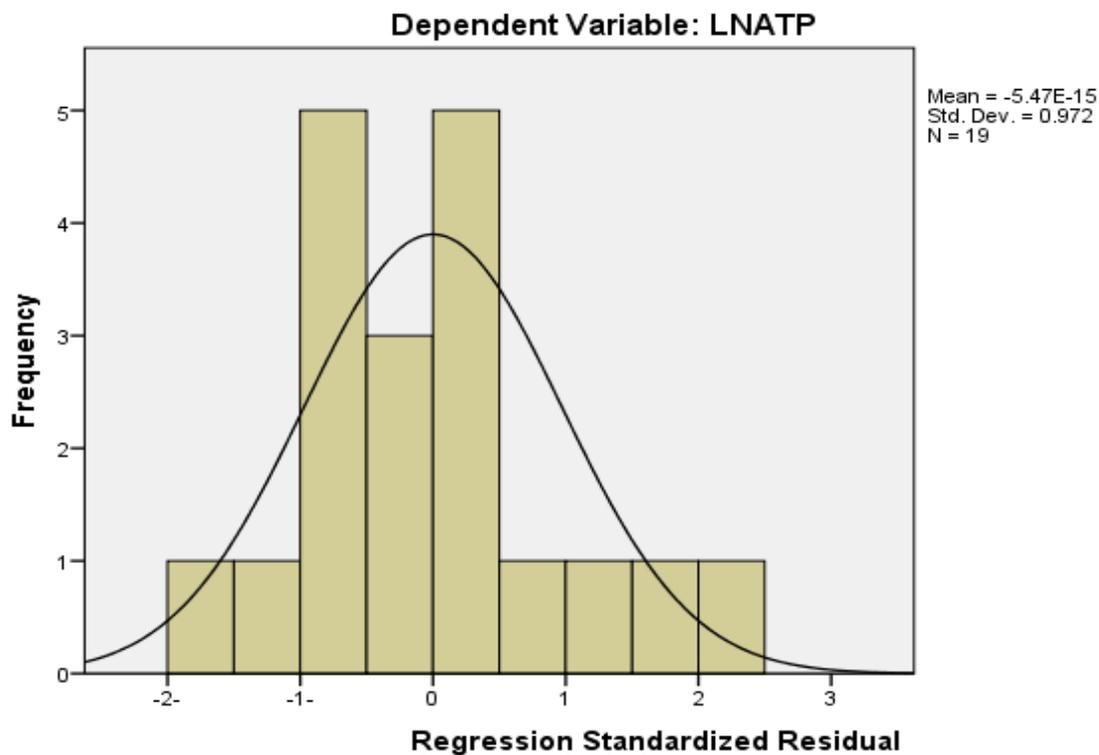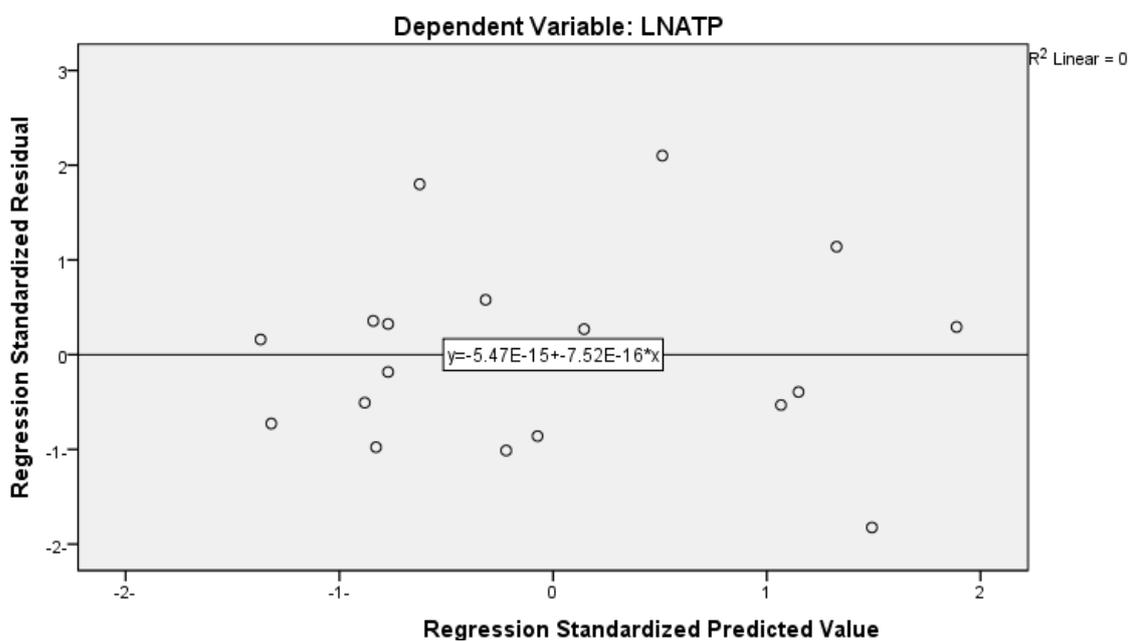|		LNATP	LNTSBS
Pearson Correlation	LNATP	1.000	.957
	LNTSBS	.957	1.000
Sig. (1-tailed)	LNATP	.	.000
	LNTSBS	.000	.
N	LNATP	19	19
	LNTSBS	19	19

Table 5. ANOVA[a] Analysis

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.782	1	15.782	185.856	.000[b]
	Residual	1.444	17	.085		
	Total	17.226	18			

a. Dependent Variable: LNATP
b. Predictors: (Constant), LNTSBS

Table 5 presents the summary of the ANOVA analysis used as a part of the linear regression analysis. Thus, with (5%) degrees of freedom, the value of (F) calculated according to its significance (0.000) indicated that the model was more appropriate for calculating the relation between the two variables than using the mean. It is also noted that there was a significant linear relationship between Sudanese agricultural annual production and bank financing by Salam. On the same line, the model calculated (F) ration confirms this fact because it was found to be greater than the reported one at (5%) with (1) and (17) degrees of freedom.

Table 6 represents the estimated coefficients of the model; hence, it represents the intercept and slope of the Sudanese agricultural marginal productivity regarding the bank financing by Salam mode of finance. Similarly, it was observed that there was a positive relationship between the two variables. Exactly, the value of the slope of the bank financing was found to be (0.745). It signifies that if the Sudanese bank financing increased by one unit, their agricultural production would increase by (0.745) accordingly. In addition, the standardized coefficients Beta for the bank financing by Salam mode of finance, again with the same value of Pearson correlation, showed a high correlation between the variables (.957). It denotes that when the standard deviation of the bank financing via Salam increased by one, the Sudanese agricultural production standard deviation would increase by (0.957). Regarding the statistical significance of the intercept and the slope (B0 and B1), the significance reported in Table 6 shows that both were statistically significant.

Moreover, their significance was specific by comparing their calculated (t) ratios, as shown in Table 6. In addition, the tabular one for both under (17) degrees of freedom showed that the calculated (t) was more significant than the tabular one, which was found to be (1.74). Finally, the values of R Square and adjusted R Square [0.916 and 0.911) respectively showed that the change in the annual total of bank financing from Sudanese banks in the Salam mode of finance explained (92%) and (91%) of the change in the annual total market value of Sudanese agricultural production during the period (2001-2019). According to this study's data transforming into the natural log, the Sudanese agricultural production was highly elastic to bank financing facilities during this period.

Table 6. Estimated Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.456	.706		2.064	.055	-.032-	2.945
	LNTSBS	.745	.055	.957	13.633	.000	.630	.860

Notes: Dependent Variable: LNATP

4.2 Analysis

Based on the regression results in previous sections and discussion, Sudan's agricultural production was susceptible to the commercial banks' Islamic financing. In other words, the Sudanese commercial banks play a significant role in Sudan's agricultural production. On the other hand, despite all the problems and challenges facing the agricultural sector in Sudan, the low ratio of commercial banks using the Salam mode of finance, and the wide range of risks exposed to the use of the Salam mode of finance during the study time, Salam mode of finance and the commercial banks financing had outstanding contributions and a positive impact on the Sudanese agricultural sector production as suggested by Abdullah (2002), Adam (2003), Bougheri (2005), Abdullah (2015), Central Bank of Sudan (2018), Mustafa and Nadir (2019), Mohammed El- Ameen, 2021), and Mawhubi and Gondi (2021).

In addition, the regression results are consistent with the economic theory, stating that credit accessibility for farmers is crucial for transforming traditional agriculture into modern to increase productivity since agricultural production is a function of credit and financing (Schultz, 1964; Saleem and Jan, 2011, Stephen, 1995, Das, Senapati, and John, 2009, Tenaw and Islam, 2009, Okwuchukwu, 2022, Zakaria, Jun and Khan, 2019).

The reason behind this result of the high response to the agricultural production by banks financing the agricultural sector via the Salam mode of

finance is that financing by Salam in Sudanese banks has been used to finance the agricultural sector and no other production sectors in the economy. Therefore, one can conclude that, over the time series period of this study, the Salam mode of finance is a prorate mode for financing agriculture in Sudan, and to maximize agricultural production, more resources are needed from the banks. This mode of finance also addresses all the obstacles and challenges facing the banks and agriculture in the country.

V. Conclusion and Recommendation

5.1. Conclusion

Based on the simple linear regression, empirical results of this study indicated that the Sudanese commercial banks' total annual financing via the *Salam* mode of finance affected their agricultural sector production's total annual market value, with a significant and strong positive relationship. Commercial bank financing flowed by *Salam* mode of finance ratio to the total bank financing was also found to be very low during the study time. Therefore, *Salam* was not the preferred mode for commercial banks in Sudan. In addition, the procedures for obtaining bank financing were complicated. Moreover, commercial banks in Sudan faced several risks in dealing with the *Salam* mode of finance.

On the other hand, despite the several problems and challenges hindering the agricultural sector in the country like heavy direct and indirect tax, high marketing costs, the long distance with poor rural infrastructure, weak agricultural returns, poor use of agricultural inputs and modern agricultural technology, the lack of clarity of vision and the agricultural plan for crops, and the state's neglect of this vital sector and complexities of agricultural financing limited to one bank, Sudan agricultural sector highly contributed to the country economy during the study period. Also, the agricultural production in Sudan was highly positive, elastic to bank financing by the *Salam* mode during the study period. Furthermore, despite all these challenges and problems, bank financing was the most important explanation for changes in agricultural output over the study period.

5.2 Recommendations

The results of this study require relevant policy implications for both the agricultural sector and bank financing. Due to its importance in financing the agricultural sector, commercial banks are required to increase the provision for financing via Salam mode. In addition, reducing the tax burden on the agricultural sector is necessary to achieve more success and more attention to constructing new roads and maintaining old ones between markets and production areas. Moreover, maximizing interest in maintaining irrigation

canals and infrastructure for agricultural projects is needed. Increasing bank financing for agriculture and simplifying the procedures for granting financing are also required. Finally, more research and empirical studies are needed to reach the best ways and optimal financing for this vital sector and investigate the real reasons behind the decreasing ratio of the Salam mode of finance to the overall bank financing.

References

Abdel Aziz, S. A. (2004). Agricultural finance in the form of peace: an analytical study of the experience of Sudanese banks (M.Sc. Thesis). Sudan University of Science and Technology. Author. Retrieved on August 18, 2022, from http://repository.sustech.edu/handle/123456789/8536.

Abdullah, A. (2015). Agricultural finance by Salam mode, problems, and solutions. *Journal oF Al- masrifi,* (76), 30-63. Author. Retrieved on August 18, 2022, from http://search.mandumah.com/Record/728026.

Adam, B.E. (2003). On the experience of Islamic Agricultural finance in Sudan: challenges and sustainability (1st, ed.). Jeddah: The Islamic Research and Training Institute.

African Development Bank. (1996). Sudan Agricultural rehabilitation programme, 1(Project completion report). Author. Retrieved on April 19, 2021, from https://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/ADB-BD-IF-96-184-EN-SUDAN-AGRICUL-REPORT.PDF.

Ahmed, A. (2018, May). Lecture on the Historical Narrative of the Agricultural Sector in Sudan. Paper presented in Workshop on Challenges Facing the Agricultural Sector. Ministry of Agriculture and Forests, Khartoum.

Ahmed, M., & Lorica, M.H. (2002). Improving developing country food security through aquaculture development—lessons from Asia. *Food Policy*, 27(2), 125–141.

Ammani, A.A. (2012). An Investigation into the Relationship between Agricultural Production and Formal Credit Supply in Nigeria. International Journal of Agriculture and Forestry. 2(1): 46-52. Author. Retrieved on August 22, 2021, from http://article.sapub.org/10.5923.j.ijaf.20120201.08.html.

Al-Desouki, M. A. (1230 AH). El-Desouki's footnote to the great explanation (2ed ed.). Beirut: Dar Al-Fikr.

Al-Harawi, M. A. (270 AH). Refinement of the language (1st ed.). Beirut: Arab Heritage Revival House.

Al-Hilali, M., & Khan, M. (1404). English Translation of the Meanings of the Noble Qur'an in the English Language (1st ed). Madinah Munawwarah: King Fahad Complex for Printing of the Holy Qur'n.

Al-Samarqandi, M. A. (540 AH). Tuhfat al-Fuqaha (2nd Edition. 1994 AD). Beirut: Dar al-Kutub al-Ilmiyya.

Arabi, M. H. (2018). Challenges Facing the Agricultural Sector. *Journal of* Al-*masrifi*. (88), 39 - 43.

Bamakhramah, A.S. (2003). Book Review: On the Experience of Islamic Agricultural Finance in Sudan: Challenges and Sustainability. *Journal of King Abdulaziz University: Islamic Economics*. 18(2), 63 -65. Author. Retrieved on August 18, 2022, from https://ssrn.com/abstract=3102336.

Bravo-Ortega, C., & Lederman, D. (2005). Agriculture and National Welfare Around the World: Causality and International Heterogeneity Since 1960. (Working Paper No. 3499). Washington, DC: World Bank. Author. Retrieved October 13, 2021, from https://openknowledge.worldbank.org/handle/10986/8903 License: CC BY 3.0 IGO.

Bougheri, A. p. a. (2005). The Risks of Islamic Commercial Financing Formulas in Saudi Banks (Doctoral thesis). Mecca: Umm Al-Qura University. Author. Retrieved on August 18, 2022, from http://iefpedia.com/arab/wp-content/uploads/2011/01/-مخاطر-صيغ التمويل-التجارية-الإسلامية-في-البنوك-السعودية-رسالة-دكتوراه-—د.-عادل-بن-عبد-الرحمن-بوقري.pdf

Central Bank of Sudan. (2001-2019). Annual Reports. Retrived from https://cbos.gov.sd/en/publication-type/annual-reports. Khartoum: Sudan Coin Press Limited.

Ciat, B.L.M., & Ilri, B.L. (2013, June). Enhancing dairy-based livelihoods in India and Tanzania through feed innovation and value chain development approaches Assessing the dairy value chain and potential to enhance productivity through improved feeding in Pemba Island of Zanzibar. Paper presented at a conference. Nairobi. Author. Retrieved December 2021, from https://cgspace.cgiar.org/bitstream/handle/10568/51748/2013_MilkiIT_FEAST_Pemba.pdf;sequence=1.

Das, A. Senapati, M., & John, J. (2009). Impact of Agricultural Credit on Agriculture Production. *Reserve Bank of India Occasional Papers*. 30(2), 74-107.

De Soysa, I., Gleditsch, N. P., Gibson,M., & Sollenberg , M. (1999). To Cultivate Peace: Agriculture in a World of Conflict. *Environmental Change & Security Project Report*. 5, 15–25.

Florence, N., and Nathan, S. (2020). The Effect of Commercial Banks' Agricultural Credit on Agricultural growth in Uganda. African Journal of Economic Review. 8(I), 162-175. Author. Retrieved on August 22, 2021, from https://www.ajol.info/index.php/ajer/article/view/192203.

Furuholt, B., & Matotay, E. (2011). The Developmental Contribution from Mobile Phones Across the Agricultural Value Chain In Rural Africa. EJSDC. 48(7), 1–16. Author. Retrieved on August 9, 2022, from

https://onlinelibrary.wiley.com/doi/epdf/10.1002/j.1681-4835.2011.tb00343.x.

Gollin, D., Stephen P., & Rogerson, R. (2002). The Role of Agriculture in Development *American Economic Review*. 92 (2): 160 -164.

Gujarati, D. N., and Porter. D.C., (1978). Basic econometrics (5th ed.). New York: MC Graw-Hill.

Gujarati, D.N. (2004). *Basic Econometrics* (4th Ed.). New York: The McGraw–Hill Companies.

Havnevik, K. Bryceson, D. Birgegård, L. Matondi, P. & Beyene, A. (2007, March). African Agriculture and The World Bank, Development or Impoverishment*? (A workshop Report).* Stockholm: The Nordic Africa Institute and funding from the Swedish International Development Cooperation Agency. Author. Retrieved on August 19, 2022, from https://www.diva-portal.org/smash/get/diva2:275867/FULLTEXT01.pdf

Hudaifah, A., Tutuko, B., & awarjuwono, T. (2019). The Implementation of Salam-Contract for Agriculture Financing Through Islamic-Corporate Social Responsibility, Case Study of Paddy Farmers in Tuban Regency Indonesia. *Journal of Islamic Economics*. 11 (2), 223 – 246.

Kanu, E., Frimpong, K., Mpofu, N., & Rimal, P. (2013). An Overview of Sudan's Current Food and Agricultural Policies and Possible Reform Proposals. Author. Retrieved on August 11, 2022, from https://www.researchgate.net/publication/282565741_An_Overview _of_Sudan%27s_agriculture_and_Food_Policy_and_their_Current_Re forms.

Ibn Abidin, M. A. O. (1252 AH). Al-Muhtar's response to Al-Durr Al-Mukhtar (2nd Edition). Beirut: Dar Al-Fikr.

Ibn Majah, A. A. M. (273 AH). Sunan Ibn Majah. House of Revival of Arabic Books.

Ibn Muflih, I. M. (884 AH). The Creator in Explanation of the Persuasive (1st Edi.,). Beirut: Dar al-Kutub al-Ilmiyya

Ibn Rushd, M. A. (520 AH). The preambles (1st ed). Dar al-Gharb al-Islami.

Ibrahim, M. M. A. (2006). The effect of using financing formulas in developing production in the Sudanese agricultural sector: A case study of the Sudanese Agricultural Bank in Khartoum State for the period 2002-2006 (M.Sc. Thesis). Al-neelin University. Author. Retrieved on August 18, 2022, from http://search.mandumah.com/Record/829992.

Ibrahim, M. M. A. (2016). The Impact of Agricultural Financing on Economic Development in Sudan: Sudanese Agricultural Bank as Case Study from

Period 1995 – 2015(M.Sc. Thesis). Omdurman Islamic University. Author. Retrieved on August 18, 2022, from http://search.mandumah.com/Record/788762.

Irungu, J. W. (2013). Relationship between Agricultural Credit Financing and Financial Performance: A Case of Small Scale Farmers in Kiria Division in Muranga County (Doctoral Thesis). The University of Nairobi.

Kaleem, A., & Ahmad, S. (2016). Bankers' Perception towards Bai Salam Method for Agriculture Financing in Pakistan. In: Harrison, T. & Ibrahim, E. (eds) Islamic Finance. Author. Retrieved on August 18, 2022, from https://doi.org/10.1007/978-3-319-30918-7_5.

Lobao, L., & Meyer, K. (2010). The Great Agricultural Transition: Crisis, Change, and Social Consequences of Twentieth Century US Farming. *Annual Review of Sociology*. 27 (2001), 103-124.

Magigi, W. (2008). Improving Urban Land Governance with Emphasis on Integrating Agriculture Based Livelihoods in Spatial Land Use Planning Practise in Tanzania (Doctoral Thesis). Albert-Ludwigs-Universität.

Malik, Mushtaq, and Gill, (1991). The role of institutional credit in the agricultural development of Pakistan. The Pakistan Development Review. 4(2), 1039-1048. Author. Retrieved on August 22, 2021, from https://www.pide.org.pk/pdf/PDR/1991/Volume4/1039-1048.pdf.

Mnenwa, B.R., & Maliti, E. (2010). *A Comparative Analysis of Poverty Incidence in Farming Systems of Tanzania (Special Paper 10/4)*. Author. Retrieved on November 10, 2021, from https://www.repoa.or.tz/wp-content/uploads/2020/07/10-4_web-1.pdf.

Mohammed El- Ameen, S.M.M. (2021). The Role of Agricultural Bank in Financing Agricultural Rotation's Crop in New Halfa Agricultural Scheme, Kassala State, Sudan. An Applied Study During the Period 2010- 2020. *El - Acil Journal for Economic and Administrative Research*. 5(1), 300-317.

Mohammed, A.I., Ogunbado, A. F., & Aziz, A. B. (2016). The viability of Salam finance in the growth of agricultural production in Kano State, Nigeria. *Asian Journal of Multidisciplinary Studies*. 4 (12),87-92.

Mohammed, K.A., Mawhubi, E., & Gondi, N. (2021). Analytical Study of Financing policies for the agricultural sector in Sudan (1998 -2018). *Les Cahiers du Cread,* 37 (02),239-275.

Mualley, S. M. A. (2019). Contemporary Risks of Islamic of finance, and Hedging Methods; A Case Study of Sudanese Banks,2002 – 2012, (1st ed). Khartoum: Ministry of Higher Education and Scientific Research.

Mualley, S.M. A. (2020). The Impact of Islamic Banks in Agricultural Sector Production in the Sudan (2000 - 2015). Journal of Islamic Sciences and Arabic Language. 6, 267-294.

Mustafa, E., & Ndir, T. (2019). The role of Islamic banks in financing the agricultural sector, case of Sudan. *Al-Bashaer Economic Magazine*: 5(2), 279-300.

Musnad, M.M. (2012). Financing the agricultural sector in Sudan: challenges, risks and ways to address them. New economy. 7(1), 96-117. Author. Retrieved on August 20, 2022, from https://www.asjp.cerist.dz/en/article/12669.

 Ogunbado, A. F., & Ahmed, U. (2015). Bay' Salam as an Islamic Financial Alternative for Agricultural Sustainability in Nigeria. *Journal of Islamic Economics Banking and Finance*. 11(4), 63-75.

Ogbuabor, J. E. and Nwosu, C. A., (2017). The Impact of Deposit Money Bank's Agricultural Credit on Agricultural Productivity in Nigeria: Evidence from an Error Correction Model. *International Journal of Economics and Financial Issues.* 7(2), 513-517. Author. Retrieved on August 22, 2021, from https://dergipark.org.tr/en/download/article-file/365910.

Okwuchukwu, O. (2022). Agricultural Financing and Agricultural Sector Output in a Developing Economy: The Nigerian Experience. *Amity Journal of Management Research*. 5(1), 36 -51.

Praburaj, L. (2018). Role of Agriculture in the Economic Development of a Country. *Shanlax International Journal of Commerce*. 6 (3), 1–5.

Rahma, A.A. (2008). The application of Salam mode in the rain-fed agricultural sector in Sudan: an evaluation study for the period 1990-2007 (M.Sc. thesis). Omdurman, Omdurman Islamic University. Author. Retrieved on August 20, 2022, from https://search.emarefa.net/ar/detail/BIM-353200.

Rosegrant, M.W., & Hazell, P.B.R. (2000). Transforming the Rural Economy in Asia: The Unfinished Revolution (1ˢᵗ ed.). New YORK: Oxford University Press INC.

Saiti, B., Afghan, M., & Noordin, N. (2018). Financing agricultural activities in Afghanistan: a proposed salam-based crowdfunding structure. *ISRA International Journal of Islamic Finance.* 10(1), 52-61. Author. Retrieved on August 9, 2022, from https://doi.org/10.1108/IJIF-09-2017-0029.

Saiti, B., Afghan, M., & Noordin, N.H. (2017). Financing agricultural activities in Afghanistan: a proposed Salam-based crowdfunding structure. *ISRA International Journal of Islamic Finance*. 10 (1), 52-61. Author. Retrieved on August 18, 2022, from https://doi.org/10.1108/IJIF-09-2017-0029.

Saleem, M. A., & Jan, F. A. (2011). The impact of agricultural credit on agricultural productivity in Dera Ismail Khan (District) Khyber Pakhtunkhwa Pakistan. *European Journal of Business and Management.* 3(2), 38-44.

Salvatore, D., & Reagle, R., (2001). Theory and Problems of Statistics and Econometrics (2ed ed.). New York: MC Graw-Hill.

Stephen L.H (1995). Capital accumulation and the growth of aggregate agricultural production. *Journal of Agricultural Economics.* 6(2), 129-157.

Suleiman, A. E. (2013). The Reality of Banking Financing for the Agricultural Sector in Sudan. Journal *of Al- masrifi*. 69, 8-17.

Supreme Authority for Sharia Supervision of Banks and Financial Institutions. (1997). Fiqh guides (1st ed.). Khartoum: Dar Al-Asala for Printing, Publishing and Distribution Ltd.

Tenaw, S., & Islam, K. Z. (2009). Rural financial services and effects of microfinance on agricultural productivity and on poverty. Discussion Papers no. 37. Helsinki: University of Helsinki. Author. Retrieved on August 11, 2022, from https://www.findevgateway.org/sites/default/files/publications/files/ mfg-en-paper-rural-financial-services-and-effects-of-microfinance-on-agricultural-productivity-and-on-poverty-2009.pdf.

The Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI). (2001). Sharia'ah standards (1st ed). Manama.

The International Bank for Reconstruction and Development. (2007). Agriculture for development. World development report,2008. Washington, Dc: World Bank. Author. Retrieved on August 19, 2022, from https://openknowledge.worldbank.org/bitstream/handle/10986/5990 /WDR%202008%20-%20English.pdf.

Udoka, C. O., Mbat, P. D. O., & Duke, S. B. (2016). The Effect of Commercial Banks' Credit on Agricultural Production in Nigeria. Journal of Finance and Accounting, *4*(1), 1-10. Author. Retrieved on August 22, 2021, from http://pubs.sciepub.com/jfa/4/1/1/.

Youssef, A. M. N. (2009). The impact of agricultural financing on agricultural production in West Darfur state: by application to the branches of the Sudanese Agricultural Bank - Zalingei - El Geneina - Karsala 2000 - 2007(M.Sc. Thesis). Omdurman Islamic University. Author. Retrieved on August 18, 2022, from http://search.mandumah.com/Record/565628.

Yusuf, A.J. (2017). Islamic economics and finance in Sudan: An overview (Report No. 4). Istanbul: Research Center for Islamic Economics.

Zakaria M., Jun W., & Khan M.F. (2019): Impact of financial development on agricultural productivity in South Asia. Agricultural Economics – Czech. 65, 232–239.

Appendixes

Appendix A: Sudan's Agricultural Output Value and (2001–2019) Million Pounds Share in GDP

NO.	YEAR	(1) Agricultural sector output annual market value	(2) Agricultural sector output annual real value	(3) Agricultural sector annual share in GDP%
1	2001	14,547.9	6.1	46.6
2	2002	17,986.3	6.1	46
3	2003	21,411	6.3	34.4
4	2004	23,369.4	6.2	32.1
5	2005	28,454.7	6.5	31.8
6	2006	31,190.8	6.9	30.8
7	2007	32,985.5	7.5	30.2
8	2008	37,480.6	7.7	31
9	2009	44,969.6	6.79	31.1
10	2010	54,456	7.59	31.3
11	2011	58,221	8.05	28.9
12	2012	76,626	8.77	30.4
13	2013	92,990	8.54	30.6
14	2014	143,775	9.36	28.5
15	2015	161,599	9.38	27.9
16	2016	146,931.4	9.18	28.9
17	2017	184,059.4	9.90	29
18	2018	298,430.8	10.30	23.9
19	2019	394,499.6	10.18	28.1

Source: Central Bank of Sudan Annual Reports (2001 – 2019).

Appendix B: Sudan's Total Banks Financing and Total Financing via *Salam* in Million Pounds

No.	Year	(1) Total banks financing	(2) Total financing flow in the *salam* mode	(3) The ratio of *Salam* mode to the total financing (%)
1	2001	1,463,820	72,990	4.99
2	2002	2,067,810	68,560	3.32
3	2003	2,819,256	135,211	4.80
4	2004	4,290,696	126,526	2.95
5	2005	6,953,683	145,157	2.09
6	2006	10,394,920	132,993	1.28
7	2007	12,587,285	145,157	1.15
8	2008	14,681,294	290,650	1.98
9	2009	15,659,786	349,618	2.23
10	2010	22,107,438	257,586	1.17
11	2011	23,329,187	174,806	0.75
12	2012	24,102,842	459,838	1.91
13	2013	33,822,488	665,257	1.97
14	2014	38,678,626	1,464,257	3.79
15	2015	54,193,276	1,622,869	2.99
16	2016	83,355,303	2,499,694	3.00
17	2017	125,091,319	728467	0.58
18	2018	144,686,256	2,030,221	1.40
19	2019	260,206,808	4,111,990	1.58

Source: Columns (1) and (2) Central Bank of Sudan Annual Reports (2001-2019). Column (3) Own Calculations Based on Columns 1 and 2.