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Policy Actors' Perceptions of Obstacles to Sudan's Policy of Wheat Self-Sufficiency Implementation

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Abstract

Agriculture policies in Sudan have undergone various policy regimes targeted at improving productivity and food self-sufficiency. Policies play a vital role in setting priorities and actions for achieving food self-sufficiency as one of the food security strategies of the country. The objective of this study is to look into how policy actors perceived the implementation of the wheat self-sufficiency policy that aims to increase domestic production of wheat and decrease its imports. The findings of the study highlight several barriers to the effective implementation of the wheat self-sufficiency policy in Sudan's agricultural sector. These barriers were identified through interviews with 45 stakeholders representing various levels of government, farmers, industry representatives, and experts. The study employed thematic analysis to analyse the interview data. The main barriers to policy implementation identified by the policy actors are ineffective administrative measures, ineffective planning, technical risks, ineffective policy instruments, financial challenges, high production costs, ineffective governance, and foreign restrictions. The study, overall, suggests that the agricultural sector in Sudan faces significant challenges in implementing policies aimed at achieving wheat self-sufficiency. Addressing these barriers will require attention to administrative processes, improved planning, addressing technical risks, designing effective policy instruments, securing sufficient financial resources, reducing production costs, strengthening governance structures, and addressing foreign restrictions.

Keywords: Policy Implementation, Wheat Self-Sufficiency, Wheat Production, Sudan

Introduction

The sustainable availability of food and the eradication of hunger in the world represent an on-going challenge for humanity, whereas ending hunger and achieving food security is the second goal of the United Nations Sustainable Development Goals (SDGs). In light of the world population's exponential growth and the rise in food demand, there is a clear need for

food, and many nations, particularly developing ones, import it to meet their populations' needs. The cereal grain represents the most important food component in most of the different regions of the world. According to FAO, food security currently depends on the increased production of three cereals: wheat, rice, and maize (FAOSTAT, 2012a; FAO, 2017).

Further, throughout the world, wheat production and trading have many political and economic implications. According to Ijaimi (2009), the wheat crop is gaining increasing importance in today's world, and it is considered a strategic crop and a weapon that has economic, political, and social repercussions for many nations. According to FAO data, the majority of the world's wheat production comes from a small number of countries, and its international trade is greater than all other crops combined (WEF, 2022). The size of the world's wheat trade was valued at US$331.27 billion in 2022, and it is predicted that it will increase to reach US$502.88 billion in 2030 (Research And Markets, 2023). The main wheat-producing countries based on the total production from 2000–2020 are China, India, Russia, the USA, France, Australia, Canada, Pakistan, Ukraine, and Germany (World et al., 2020). Also, the main exporting countries are Russia, the USA, Canada, France, Australia, Argentina, Ukraine, Romania, Germany, and Kazakhstan (CIA, 2020). Hence, these countries control the global wheat trade and determine its prices globally.

Likewise, the United States Department of Agriculture (USDA) report states that there has been a gradual change in the major regions that import wheat, leading to a significant increase in the global wheat trade over the past ten years. According to the report, the Middle East and North Africa, along with Sub-Saharan Africa and Southeast Asia, were consistent importers because their production was insufficient to meet consumption (USDA, 2019). Further, Africa spends 17.7 billion USD annually on wheat imports alone; 59% of this importing bill is particularly concentrated in Northern African countries, including Sudan (FAO, 2021; Silva et al., 2023). In addition, due to population growth, urbanisation, and a decline in the consumption of coarse grains, Africa's wheat import bill has been rising over the past 20 years at a rate of 9% annually (Noort et al., 2022; Silva et al., 2023).

Along with its importance on the map of global business activity, wheat has great variability in its contents and combinations of beneficial ingredients. The FAO data show that wheat is a key cereal crop for global food security as it constitutes an important source of nutrients for around 40% of the world's population in more than 80 countries. It is the most basic ingredient of daily life, accounting for 95% of daily consumption per capita in the developing world, is the leading source of vegetable protein in human food that has a protein content of about 13%–15%, and is one of the primary sources of dietary energy, which is responsible for 13%–57% of calorie intake, depending on the country (Ijaimi, 2009; Chaves et al., 2013; Shewry & Hey, 2015; Grote et al., 2021; Iqbal et al., 2022). Thus, the demand for it has increased remarkably, and many countries, especially developing countries like Sudan, have imported it from the international market to meet their food needs.

According to the Food and Agriculture Organisation, "the concept of food self-sufficiency is generally taken to mean the country's ability to meet consumption needs, particularly of staple foods, from its own domestic production, such as basic cereals and root crops. Given the recent volatility in food prices, developing countries now place a high priority on achieving food self-sufficiency. Following the global food crises of 2007–2008, where countries sought to protect themselves from the fluctuations of the global food markets; it has attracted more attention in a number of nations (Tanaka, 2018). Accordingly, staple food self-sufficiency can provide governments with a contingency against food insecurity, supply

disruptions that may arise in the context of war, a decline in the availability of food, or volatile food prices on international markets (FAO, 2017).

The status of wheat as one of the most important crops on the international trade map and the growing demand for it as one of the main nutrient foods have made self-sufficiency in it a strategic goal for many countries of the world, due to its importance in preserving the sovereignty of nations as well as the position of countries in the balance of superpowers.

Wheat has been known as a food crop in northern Sudan since ancient times, but it has gained national importance in the modern era after the great shift that occurred in the dietary pattern and resulted in a continuous increase in the consumption of wheat in the country and increased the demand for it. Thus, wheat became the most important commodity on the Sudanese imports list in light of the scarcity of foreign currency to import wheat. Thus, national sovereignty became the most important crop for maintaining national sovereignty and the exploitation of national decisions. This reality has led Sudan to seek to develop domestic wheat production via a wheat self-sufficiency policy as one of its strategies for achieving food security. Further, it has played a central role in the country's political economy throughout the country's post-independence history. Therefore, the government considered both the production and availability of this commodity as part of the national security component (Mustafa et al., 2013; Chebil et al., 2016).

The challenge is that, despite Sudan's agricultural natural resources, such as fertile arable land and abundant water resources, and the policies and programs that were conducted with the main goal of reaching wheat self-sufficiency in order to achieve food security and reduce wheat import bills, there is a continuous and widening gap between the annual domestic wheat production and the annual population needs. According to FAO data, the average annual domestic wheat production in Sudan covers only about 15%–20% of the average annual wheat consumption needs of the population, and at the same time, demand for wheat increased by 2.7% annually (FAO, 2014; World Bank, 2020). Further, some Sudanese studies have highlighted that wheat consumption has increased at a higher rate than domestic production since the 1980s due to rising consumer demand for wheat along with low domestic production (Mustafa et al., 2013; Adam, 2016; Alkhidir, 2017). This is a surprising situation for an agricultural country like Sudan, which was classified as having one of the third-largest global strategic food reserves.

In addition, the cost of importing wheat into Sudan increased year after year as a result of higher consumption rates brought on by the decline in domestic production. The average annual amount of wheat and wheat flour imported by Sudan during the period from 2012 to 2022 was 2.312 million metric tonnes, and the average annual value of the quantities imported was US$ 892.110 million (CBoS, 2012–2022). Since the government began subsidising wheat imports in 2010, the annual import bill for wheat and wheat flour has been a significant burden on Sudan's foreign exchange reserves and its budget. This has had an impact on the Sudanese people, who suffer from an increasing poverty rate and unemployment. However, reliance on imported wheat is becoming more problematic in light of recent anthropogenic and natural catastrophes that have upended the world trade system and production networks, particularly for a developing nation like Sudan, which has policies to achieve wheat self-sufficiency and at the same time has all the natural resources necessary for its production.

One of the main objectives of public policy is to solve public problems, and its implementation by a certain government institute in collaboration with other government

institutions to achieve the goals of the respective policy shows the complexity of public policy implementation (Pressman & Wildavsky, 1984; Goggin & Stelmach, 1990). Policy implementation is one of the stages in the public policy process that seeks to realise policy objectives. Policy implementation has been defined by many scholars from various perspectives; the founding fathers of the implementation process(Pressmann & Wildavsky, 1973) highlighted that Policy implementation is the carrying out of a basic policy decision, which involves translating policy decisions (goals and objectives) into on-the-ground actions, often supported by statutes. As the process consists of outputs (laws, regulations, and organisations created to address a policy problem) and policy outcomes (practical management actions stipulated by outputs to address the problem(Leventon & Antypas, 2012).

According to the Sabatier and Mazmanian approach (1995), central to implementation analysis is identifying factors that affect the implementation of policy goals. As the implementation proceeds, deficits occur when there are shortfalls between the goals embodied in particular directives and their practical effects. A policy deficit arises either from the failure to meet delineated policy goals or from the failure of policy goals to sufficiently tackle policy problems (Sabatier & Mazmanian, 1995). Poor policy implementation has been highlighted as a key problem, particularly in developing countries (Kalaba, 2016).

This study focuses on the implementation of the wheat self-sufficiency policy in Sudan, which is a public policy, to identify obstacles facing its implementation as perceived by policy actors from all levels (national to local). Understanding factors that hinder policy implementation is crucial to addressing drivers of wheat production and providing insights for improving domestic wheat productivity and increasing production to enhance wheat self-sufficiency as one of the strategies to ensure food security in Sudan.

Research Methodology

As there is limited information regarding the challenges facing the implementation process and the key factors affecting the implementation of the wheat self-sufficiency policy in Sudan's agricultural sector, it is critical to utilise qualitative research to provide a deep understanding of knowledge about the phenomena under study to gain insight and richness of information. This method explores the opinions of different policy actors and stakeholders, which is important in understanding the policy implementation process. The policies considered in this study were wheat self-sufficiency policies.

In this study, interviews were conducted with policy actors at various levels of governance (national, state, and local) to provide policy implementation lessons across different sectors and governance levels. Interviewees were chosen by first identifying the main stakeholders through the process of stakeholder analysis, based on a wider analysis of policies, government institutions, farmers and their leaders, related industries, and academics based on the prior knowledge and experience of the researcher. The study then used purposive sampling for initial interviews, which was combined with snowball sampling. The researcher used semi-structured interviews. However, the interviews were flexible and pursued the issues that were raised by participants. A total of 49 interviews were conducted, distributed as summarised below in Table 1.

Table 1
Summary of interview participants

Category	Description of participants	Number of participants
Government institutes	Federal Ministry of Agriculture (Department of policies and planning, General Administration of Extension services, General Administration of Agricultural Production and National Projects, Department of Food Security and National Wheat Production Program) , Ministry of Agriculture, Gezira State, Ministry of Agriculture, Northern State, Ministry of Irrigation , Federal Ministry of Finance, Gezira Scheme , Agricultural Bank Agricultural Research Corporation and National Council of Strategic planning	20 (national 10, state 8, locality 2)
Civil society (Wheat producers)	Wheat farmers and their association leaders	17 (locality)
Relevant Industries	From milling companies , certified seeds propagation companies and agricultural insurance companies	4 (national 2, state 2)
Academics & consultants in agriculture, policy and management	Researchers from local universities and national research institutes in disciplines of agriculture, policy and management.	4

The Findings

Policy Actor's Perception on the Policy Goals

The findings demonstrated that there is a gap in the implementation process of the wheat self-sufficiency policy. The majority of the policy actors from the national to local levels revealed that there are disparities between what is included in the policies and their implementation, resulting in implementation deficits. For example, despite the great focus of policies on increasing wheat productivity by using specific agricultural strategies and technologies in addition to expanding the wheat-cultivated areas, particularly in the upper gear areas in the Northern and River Nile states, evidence on the ground revealed poor implementation.

> *"The wheat self-sufficiency policy and plans are laid out in a good way, but their problems are in the implementation, there is a wide gap in the implementation process" (Federal Ministry of Agriculture, director of general administration of policies and planning).*

"we do not have policies that are applied and implemented as intended, so that till now, we have not been able to achieve self-sufficiency in wheat except in the year 1992, and at the same time, we have the largest wheat import bill" (Federal Ministry of Agriculture , manager of Department of Food Security).
"In Sudan we have agricultural policies, the agricultural wheat self-sufficiency policies exist, but the problem is in their implementation on the ground" (Researcher-Khartoum University).
"Setting policies is not a problem; the policies of wheat self-sufficiency in general are very good that they have clear and specific objectives, but the problem is in their implementation" (Milling companies).
"On the ground, the implementation of agricultural policies, including wheat self-sufficiency policies and plans, is problematic (wheat farmers and president of one agricultural cooperative association).

Policy Actors' Perceptions of Barriers to Policy Implementation

According to the interviewees' perceptions, the following factors are the main obstacles to the implementation of policies intended to achieve wheat self-sufficiency: 1) ineffective administrative measures; 2) ineffective planning; 3) technical risks; 4) ineffective policy instruments; 5) Financial difficulties; 6) high production costs; 7) ineffective governance; and 8) foreign constraints.

Ineffective Administrative Measures

The participants highlighted "administrative shortcoming in the institutional actions" as one of the barriers that challenges or impedes the respective policy implementation. According to them, ineffective administrative processes can be a shortcoming of institutional operations, a weakness of follow-up, monitoring, and evaluation processes, or a weakness in irrigation system management.

They pointed out that there are important issues behind the shortcoming of institutional actions, such as a lack of proper coordination and collaboration, the absence of institutional work, overstepping jurisdiction at and between different levels of government, weak human capacity building, and the absence of accountability, which adversely affected the implementation of wheat production plans.

The participants highlighted that the follow-up process is very weak, and the monitoring system for the implementation of plans is very weak at all levels, as is the performance measurement. In addition, there are no post-implementation impact measurement indicators. According to their perspectives, the lack of effective follow-up, monitoring, and evaluation of the implementation process at each of its various stages negatively affected the final result of the implementation of the policy of achieving WSS.

The participants emphasised how inadequate the follow-up process, monitoring system, and performance measurement are at all levels for plan implementation. Indicators for post-implementation impact measurement are also absent. According to their viewpoints, the implementation of the policy to achieve WSS suffered from a lack of effective follow-up, monitoring, and evaluation at each of its various stages.

Given that irrigation is the primary input for growing wheat, the participants drew attention to a number of statuses that showed management shortcomings in irrigation systems, particularly in the Gezira scheme, which is one of the biggest projects that cultivated

wheat in the winter season. For instance, there is a problem with the main doors of the canals that distribute irrigation water because there are no regulators to control the flow of water to the farms, no routine rehabilitation process for the canals, an accumulation of weeds and silt that is not cleaned promptly, poor maintenance operations, and a lack of funding for maintaining and rehabilitating the infrastructure. Thus, these circumstances led to an imbalance in the water distribution process for irrigating farms, especially in the tail-end areas, which have always struggled with delayed irrigation and occasionally thirst.

In addition, one of the difficulties is that there have been on-going power supply outages in the northern region of Sudan, particularly since 2019, which has caused irrigation operations to be disrupted in wheat farms that depend on electricity to operate irrigation systems, especially large agricultural projects, as well as a shortage of pump spare parts.

> *"There are administrative imbalances, as there is no specific and clear system for the administrative process, upon implementation of the wheat self-sufficiency policy, there is no link between the executive's performance and the actual plan" (Government official, Ministry of Agriculture).*

> *"Unfortunately, there is poor coordination between the different ministries in the same government that are related to wheat self-sufficiency policy. Sometimes, every minister works alone without coordination with other relevant parties (Government official, Agricultural Research Corporation).*

Ineffective Planning

Ineffective planning according to the participants' perceptions indicated some statues including, Lack of policies integration and consistency and weak infrastructure.

The participants mentioned that there is no comprehensive policy for the wheat commodity from cultivation, production, marketing, storage, and manufacturing, as well as no integration between agricultural policies and financial policies that support wheat production. Furthermore, there is no integration of agricultural policies with higher education policies to direct research towards supporting agricultural policy.

Further, some of the participants raised up the lack of a national strategy for locally producing production inputs in Sudan, particularly "fertilisers, as one of the statuses of lack of policies and plans integration, which affected the provision of these production inputs because they depended on importation from the international market, resulting in high production costs that have adversely impacted policy implementation. Thus, low returns for the farmers resulted in farmers' unwillingness to cultivate wheat, and therefore there will be a decrease in the wheat-cultivated areas next season, which negatively impacted policy implementation.

Additionally, some participants called attention to a flaw in the investment policy that showed a lack of policies integration and negatively impacted the implementation of the wheat self-sufficiency policy because it constrained the opportunity for horizontal expansion of wheat-cultivated areas, which is one of the main goals of the WSS policy.

Furthermore, some participants mentioned that some government policies, such as the policy of subsidising wheat imports, the policy of lifting subsidies on fuel and electricity, the policy of reducing government spending, as well as changes and amendments to some economic policies that occasionally take place after the start of the agricultural season, have contradictions and intersections that negatively affected the implementation of the WSS policy. The result of these circumstances was an increase in production costs that adversely impacted wheat farmers' returns, which in turn impacted their willingness to cultivate and, ultimately, resulted in a decrease in the wheat-cultivated areas.

The issue of a lack of agricultural machinery, particularly in the Northern State, was the main focus of the majority of the interview data that identified the weak infrastructure as one of the obstacles that negatively affected the implementation of WSS policy. It was noted that there are various kinds of machinery shortages, such as a lack of equipment for ploughing the ground in preparation for planting, a lack of drills for planting, a lack of combines for harvesting, or a mix of two or all of these. The data elaborated how the lack of ploughs caused improper or delayed land preparation, which postponed the sowing date, which resulted in low productivity, and consequently indirectly impacted farmers who wanted to cultivate the cultivated area, despite the fact that a lack of planters (drillers).

The data also highlighted that a shortage of harvesting equipment delayed the harvesting process or forced farmers to do manual harvesting, which all resulted in higher harvesting losses and a lower return for farmers, made them reluctant to cultivate, and ultimately led to their abandonment of cultivation, which had a detrimental effect on the expansion of cultivated areas.

Moreover, inadequate infrastructure, such as irrigation systems, lack of electrification in agricultural projects, and roads, increased production costs and, as a result, reduced farmer revenues, which had a detrimental effect on wheat farmers who wanted to cultivate the crop.

> *"One of the main problems facing policy implementation in Sudan, including the policy of wheat self-sufficiency, is that Sudan does not yet have a written and documented approach that defines the national approach on how to prepare policies, plans, or strategic planning for the country, there is no national strategy for the production of fertilizers, pesticides, and seeds; there is no bank for certified seeds; there is no bank for fertilizers; and Sudan is a candidate country to be the food basket of the world. The lack of a sound approach for strategic planning made it difficult to achieve national integration and this is what harmed the Sudan National Plans" (Government official, National council for Strategic Planning).*

Ineffective Policy Instruments

According to the participants' views, an ineffective policy instrument is one of the constraining factors facing the implementation of the wheat self-sufficiency policy, which was indicated by weak and fluctuating incentive policy tools used by the government to motivate the implementation of the wheat self-sufficiency policy.

The majority of the participants focused on economic-based incentive tools, specifically the concentrate price policy for purchasing wheat from farmers (a type of subsidised price used as an economic-based incentive policy tool by the Sudanese government to encourage farmers to cultivate wheat). They stressed that the concentrated price policy is sometimes unremunerated in comparison to high production costs as well as the low competitiveness of

wheat crops compared to other winter crops. Some of those participants pointed out that the concentrated price setting ignores production costs.

Additionally, some participants talked about the delay in the announcement of the wheat concentrated price policy. They claimed that this delay caused two issues: first, some farmers lost interest in growing wheat, which had a negative impact on the total area of wheat-cultivated land; second, some farmers delayed the sowing date, which led to low wheat productivity, which also had a negative impact on the implementation of policy.

Some participants brought up the lack of a voluntary incentive policy tool as one of the difficulties with implementing WSS policy in regards to the other incentive policy tools. They stated that all stakeholder groups, especially at lower levels, were not involved in the planning process for implementing wheat self-sufficiency policy, which negatively affected their effective participation in the implementation process.

With respect to the lack of regulatory incentive policy tools as one of the constraints, some participants talked about the absence of any law or rule to control issues related to increasing wheat productivity or increasing wheat-cultivated areas to enhance the implementation of the WSS policy, such as regulation to ensure the application of technical agricultural packages for wheat cultivation or regulation to ensure farmers compliance with agricultural rotation.

> *"The concentrated price for purchasing wheat in most cases as one of the government incentive tools is not profitable for us as a farmer, particularly in the last four years since 2018, therefore we turned to planting alternative crops in the winter season, such as broad beans and humus, which are more economically efficient than wheat cultivation, so these crops have become a strong competitor to wheat" (Wheat farmer).*
>
> *"The incentive policy tools offered by the government to the wheat farmers are not remunerative from their point of view, so they have no desire to increase the wheat-cultivated areas "(Researcher, research Centre).*

Technical Risks

The technical risk appears in two aspects: the technical knowledge gap and the technical application gap. The participants highlighted that there is a shortage of knowledge about the technical agricultural executive packages for wheat cultivation and their application on the ground.

According to the participants, the overarching situation was that there was a large gap in knowledge about the agricultural executive technological packages that are required to upgrade the farmers' technical skills in order to improve wheat productivity, as well as no modern innovative agricultural technologies, which subsequently led to low wheat productivity. This situation led to low farmer revenue and thus affected farmers willing to cultivate wheat, which then adversely affected the total wheat-cultivated areas.

The participants acknowledged that the technical knowledge gap has numerous underlying causes, some of which are related to financial shortages, others to poor research and development efforts, the professional competition between the agricultural extension agencies and the Agricultural Research Corporation despite their different roles, as well as the effect of economic sanctions against Sudan, which prevented the country from obtaining advanced technologies.

Regarding the technical application gap, the participant raised the issue of farmers' non-compliance with the technical agricultural package, which took many different forms, including improper land preparation, delaying the sowing date from the appropriate time, using uncertified seeds, not adhering to the precise irrigation process required for wheat, failing to add fertiliser at the proper time, and using an insufficient quantity of production inputs that are required. Thus, a significant decline in wheat productivity resulted in lower farmer returns, which had a negative impact on both their willingness to grow wheat and the total area under cultivation of wheat the following growing season.

On the other side, some participants highlighted that non-compliance with agricultural rotation and determinants of crop composition has adverse effects on the distribution of irrigation water and constitutes a fertile environment for the transmission of diseases and weeds, which led to low wheat productivity and therefore low farmer returns, which adversely affected their willingness to cultivate wheat.

> *"Also, among the obstacles, there is a weakness in providing agricultural extension services due to insufficient financial resources and facilities, which negatively affect the wheat production" (Wheat farmer).*
> *"Weak wheat productivity and the large differences in wheat productivity between adjacent farms are due to a lack of commitment to planting at the proper time as well as poor preparation of agricultural operations, there is no compliance with agricultural technical recommendation for wheat cultivation" (Wheat farmer and president of one of agricultural cooperative association).*
> *"Unfortunately, there is no continued innovation in agricultural techniques; therefore, there is no significant improvement in wheat productivity in order to achieve self-sufficiency" (Consultant, Research Centre).*

Financial Difficulties

According to the participants' perspectives, financial difficulties undermine the implementation of proposed activities to increase wheat productivity and wheat-cultivated areas. These financial difficulties appear in many statutes, such as inadequate and delayed financing, delayed production input provision, providing inadequate production inputs, and complicated funding approval procedures.

These statutes affected the process of providing adequate funds and production inputs at the appropriate time, particularly certified seeds, fertilisers, and fuel, as well as funds for other cultivation processes such as land preparation, sowing, and harvesting. All of these situations negatively affected wheat productivity; thus, low returns resulted in farmers being unwilling to cultivate, which then negatively affected wheat-cultivated areas.

> *"The biggest challenge facing wheat cultivation to achieve self-sufficiency is financing; the problem is that the Ministry of Finance does not set priorities in a proper manner. The reality is that financial resources are limited, and sometimes decisions come to them from above to change the order of spending priorities, financing is importance for providing production inputs and agricultural services, which affect wheat productivity and production" (official, Milling Company, Industry).*

"The government's failure to provide adequate funds and production inputs defeated the implementation of the policy of achieving wheat self-sufficiency" (Wheat farmer).

High Production Costs

The participants highlighted the high production costs as one of the obstacles affecting the implementation of the policy under study. They emphasised that high production costs, particularly for certified seeds and fertilisers, resulted in low farmer returns, which adversely impacted farmers who wanted to grow wheat, which in turn adversely impacted wheat-cultivated. They elaborated that the high production costs were due to some economic difficulties and depending on importation to provide them, which led to a very large increase in prices on a continuous basis that was not compatible with the increase in exchange.

They explained that some farmers chose to use low-quality uncertified seeds or reduce the seed rate due to the high cost of certified seeds, both of which resulted in low productivity and a low return. Additionally, some farmers reduced their application dozes of fertiliser due to their high cost, which resulted in low productivity and a consequently low return.

Likewise, they emphasised that high fuel prices affected the process of preparing the land for cultivation, which caused some farmers to not do it well because it was expensive, which then caused low productivity and low returns, while others were careful and did the process well, but it cost them a lot of expenses, which also caused low returns. Also, high fuel prices and electricity increased the cost of the irrigation process, particularly in the Northern State, which led to low farmer returns.

"One of the problems facing wheat self-sufficiency is the high cost of production inputs in general, due to the unstable economic conditions because all production inputs are imported from outside Sudan " (government official, Gezira Scheme).

Ineffective Governance

Ineffective governance was identified as one of the main barriers hindering the implementation of the wheat self-sufficiency policy. According to the participants' views, the status of Ineffective governance includes unethical behaviour, ineffective leadership, weak political will, and politicisation of policy implementation. They elaborated on how each of these statutes adversely affected the implementation of wheat self-sufficiency.

The participants claimed that unethical behaviour, which took many different forms, such as conflict of interests and corruption, caused a decline in morals and ethics, including financial morality (nepotism and favouritism), which is caused by a lack of accountability and a lack of patriotism. These problems had a detrimental effect on how policies were implemented because they undermined the integrity and efficiency of institutions and systems and had severe adverse effects on the entire policy-implementation process.

According to the participants' perspective, one of the main obstacles is weak political will; they sought strong political will as the dynamic engine that provided the implementation requirements. Due to the timing-sensitive nature of agriculture, the absence of strong political support had a negative impact on other factors that were essential to the process of growing wheat, such as the provision of production inputs for wheat cultivation in sufficient quantities and at the proper time, as well as the adoption of appropriate measures to address any issues that arose during the implementation process at any point. Therefore, it caused a

lot of shortfall situations that led to low productivity and low returns, which negatively impacted farmers willing to cultivate wheat and wheat-cultivated areas.

Some participants stressed that poor leadership was primarily cause behind some other obstacles to the implementation of the WSS policy, particularly improper coordination and collaboration as well as political and economic instability. They claimed that the plans are not actionable due to the lack of a true leader who brings together all the stakeholders and drives accountability from the top to implement policy and plans. They argued that the lack of a true leader who unites all the stakeholders and can successfully influence and support a team or group of people is due to the ineffective leader's short-sightedness regarding the importance of achieving self-sufficiency in all areas of security, economic, political, and social.

> *"Unfortunately, corruption is related to all difficulties facing wheat production; for example, there is corruption in gasoline that is allocated for wheat cultivation; as its price is subsidized, it is sold for use for other purposes, although it is allocated for wheat cultivation purposes, which has an impact on good preparation and harvesting "(Government official).*
> *"Also, among obstacles facing wheat self-sufficiency, some politicians interfered politically with technical professional activities, which had a detrimental effect on how policies were implemented" (Government official).*

Foreign Challenges and Constraints

Foreign challenges and constraints were identified as one of the most prominent constraining factors impeding the implementation of the wheat self-sufficiency policy. The participants' perspective indicated two forms of foreign constraints facing the implementation of WSS policy: conflict of interest associated with international agendas and economic sanctions against Sudan.

According to the participants, strange things are happening that make farmers hate growing wheat, and the only explanation for them is that there are foreign parties who do not want Sudan to be successful in producing its own food, particularly wheat.

As it is in the interests of some nations that Sudan doesn’t consume its share of the Nile Basin water according to the 1959 agreement, some participants also reported that strange acts indicated the presence of unseen forces that have a plan to sabotage Sudan's domestic wheat production. An act of sabotage, for instance, severely disrupted one of the major investment projects in northern Sudan that had been set up to expand wheat cultivation. As a result, the project had to be suspended entirely.

Additionally, some participants mentioned that the attack on some investors in northern Sudan by some local citizens strengthened the possibility that there are covert forces controlling these citizens because these projects involved growing wheat to achieve self-sufficiency and exporting the surplus because some regional nations view any agricultural expansion in Sudan as not being in their interests in order to avoid exploitation of its share of the Nile's resources.

The participants who raised the issue of economic sanctions emphasised that these sanctions resulted in a decline in productivity because they prevented the country from obtaining international financing loans for the establishment or restoration of infrastructure and from importing modern technologies that might have increased wheat productivity, as well as affecting the availability of spare parts for some irrigation pumps, which negatively

affected the irrigation process and adversely affected both wheat productivity and wheat-cultivated areas.

> *"When a policy is set and its implementation requirements are not provided, it reflects that there are hidden hands or unseen forces that move things so that they do not go in the right direction, and also the decision-making process in the country, has different centers of power working on their mood, and sometimes they may clash or conflict, some of which are for personal, some for party, and some for external interests" (Official, seeds propagation company, Industry).*
> *"As for the problems of irrigation in the Northern State, the majority of irrigation in the Northern State is by pumps,…… but there is a lack of spare parts as a result of the economic sanctions that Sudan has been subjected to, so many pumps have been stopped, which has negatively affected the whole agricultural production, including wheat" (Government official, Ministry of Irrigation).*

Discussions and Conclusion

The aim of this study was to analyse obstacles to policy implementation that prevent achieving wheat self-sufficiency in Sudan. In most developing nations, increasing domestic food production continues to be a major challenge. The production of food—particularly staple foods—has increased over the past few decades in an effort to achieve self-sufficiency, reduce poverty, and ultimately achieve food security.

Findings of this study about barriers to policy implementation range from mismanagement, including ineffective administrative measures, ineffective planning, technical risks, and ineffective policy instruments, to economic difficulties, including financial difficulties and high production costs, along with ineffective governance and foreign constraints. These findings complement earlier literature that highlights policy implementation as being hindered by a number of factors, among them limited institutional capacity and a lack of cooperation among different sectors Ambali & Murana, 2017; Tesfagabir (2017); Ville et al (2017); Letswa (2018); Dezhman & Daneshfard (2021), a lack of sufficient funding and production inputs (Resnick et al., 2018; Munene, 2020; Schiller et al., 2020), limited agricultural technical know-how, weak agricultural research and weak extension services (Kamarulzaman, 2017; Bamoi & Yilmaz, 2021) , and a lack of good governance (Mahesh, 2021).

The findings showed that there are ineffective administrative measures at various levels of government institutions, which are reflected in a variety of statuses, including weak institutional operations, weak follow-up, monitoring, and evaluation processes, and weak management of irrigation systems. These circumstances result from improper coordination and collaboration between the relevant policy actors and stakeholders who were in charge of the implementation, overstepping jurisdiction at and between different levels of government, persistent failure to address the implementation's challenges improper use of financial resources, and from a lack of accountability. These study's findings are in line with numerous studies conducted in Africa and Southeast Asia, which identified institutional weaknesses as one of the major barriers to the implementation of agricultural food production policies for a number of reasons, including bureaucracy, limited institutional and human capacity at various levels, weak administration and management challenges, a lack of

accountability, a lack of awareness about policies and plans, and others (Letswa, 2018; Arko, 2020; Dezhman & Daneshfard, 2021).

Findings from this study have further highlighted the lack of institutional coordination and collaboration between the agricultural sector and related sectors such as the water and irrigation sector, the financial sector, and the energy sector. Implementation of certain measures to increase domestic wheat production in the policy document requires the participation of other sectors. Lack of coordination, particularly inter-sectorial coordination, is more pronounced at state and local levels. The findings regarding this issue coincide with many other studies, as many scholars have stated that this is one of the main obstacles affecting the implementation of agricultural policies in some African and Asian countries, such as Malawi, Saint Lucia, and Indonesia (Masangano et al., 2017; Ville et al., 2017; Alwi et al., 2019).

The objectives of the policy and how it will be implemented may not be fully understood by policy actors without good coordination, communication, and transparency. This may result in misunderstandings and disputes that obstruct the implementation of the policy. It should be noted that having all the resources necessary for policy implementation in place does not ensure success; the issue of implementation may still exist if there are ineffective administrative safeguards.

The findings shed light on the technical risks, which encompassed two elements: the technical knowledge gap and the technical application gap. According to the findings, the knowledge gap is caused by a flaw in the dissemination of these packages for several reasons, some connected to the poor financing and limited facilitating resources of the agricultural extension services, others connected to professional conflicts between the institutes responsible for producing the technical knowledge and the institutes responsible for their dissemination, as well as the lack of on-going research to produce new advanced agricultural technologies. These findings are in line with earlier research that identified technical knowledge and its application as a critical factor that affects the success of agricultural policies and programs. The absence of robust technical advisory and extension services was one of the challenges that Nigeria's successive administrations encountered when implementing agricultural policies and programs, according to(Ambali & Murana, 2017). Additionally, the study of (Ajitha et al., 2021) identified non-adoption of the recommended agronomic practices and a lack of adequate extension personnel as among the social factors that hindered the implementation of the wheat production policy in Nigeria.

The findings regarding ineffective incentive policy instruments, which indicated that the current government's interventions through specific incentive tools have limited motivation for policy actors, particularly farmers, to cultivate wheat, as a result of which they are unwilling to increase the wheat-cultivated area, are consistent with the findings of some studies that emphasised the issue of weak incentive policy instruments in general as a challenge facing the implementation of agricultural food production policies, leading to farmers' reluctance to cultivate because the suggested instruments were insufficient to meet the policy program's targets (Xie & Wu, 2019).

According to the findings, the financial difficulties resulted in an insufficient budget allocated for the WSS policy to cover all the expenses required to implement the policy effectively. Limited funding hampered the implementation of agricultural policies, including the wheat self-sufficiency policy, causing delays in carrying out necessary activities such as providing agricultural inputs and doing cultivation operations, which negatively affected

wheat cultivation and ultimately led to a decrease in productivity and production. These are consistent with some studies that elaborated that inadequate financial resources allocated to provide production inputs and services for agricultural policy implementation were one of the most influential constraints that affected their implementation, particularly in some developing countries (Kalaba, 2016; Munene, 2020).

Policy implementation deficits are further compounded by high production costs due to dependence on importation, which adversely affected the implementation of the policy. These findings are supported by the study outcome conducted in Nigeria, which claimed that high-cost farm inputs are the main obstacle to agricultural policy implementation in Nigeria (Ambali & Murana, 2017).

According to the participants' perspectives, ineffective governance signs such as confusion in decision-making and shortcomings in governance processes, institutions, and practises led to a lack of transparency, accountability, responsibility, and responsiveness, which ultimately resulted in a lack of effective implementation of the policy. This is in line with the study, which stated that lack of good governance, lack of transparency, corruption, and degradation of values and ethics, including financial morality (nepotism and favouritism), as fake farmers supported by political leaders and commissioned by government officials, are critical issues for the effective implementation of agricultural policies and programs in Nepal (Mahesh, 2021).

Furthermore, these are foreign challenges and barriers, as external factors that appeared in some statutes encompassed economic difficulties that negatively affected the implementation of the respective policy. This finding is in line with Ajitha et al.(2021), who reported that the implementation of the Accelerated Wheat Production Programme in Nigeria (AWPP) failed as a result of pressure from international wheat-trade-interested nations that are consistently working against wheat production advances in Nigeria. Additionally, (Oates et al., 2017) pointed out international sanctions and international isolation in the form of suspended loans and long-term development aid as external factors that negatively shaped the practise and performance of irrigation policy programs in Tanzania.

Even though policies are being developed to increase domestic wheat production in Sudan by boosting wheat productivity and expanding wheat-cultivated areas, these policies are still not being implemented well. The study findings have demonstrated that domestic wheat production increase strategies are not being implemented effectively.

The study's findings highlight the complex and interrelated nature of the barriers and challenges that affected the implementation of the WSS policy in Sudan's agricultural sector. These identified barriers had an adverse effect on wheat productivity in some cases, wheat-cultivated areas in others, and sometimes both. Any obstacle that reduces productivity undoubtedly has an impact on the farmer's income, which in turn has a negative impact on the farmer's willingness to carry on wheat farming in the future. Consequently, less land will be planted with wheat in the coming seasons as farmers are reluctant to do so.

In summary, having a self-sufficiency policy in staple foods like wheat and rice and its effective implementation to attain the intended goals can enable governments, particularly in developing and least developed countries, to face and address food insecurity, supply disruptions that may arise in the context of war or any political conflict, a decline in the availability of food, and a fluctuation of food prices on international markets, which may occur for several reasons either due to natural conditions or artificial conditions.

To ensure effective implementation of WSS policy in Sudan, there is a need for a comprehensive, multi-dimensional approach focused on addressing all these barriers and obstacles. This approach would require commitment from the government and private sector to invest in institutional capacity-building and human capital, promote patriotism, increase the engagement of policy actors and stakeholders, particularly in policy formulation and implementation, review the policies of all related sectors, and have a long-term perspective that takes into consideration the policy's impact on the agricultural sector, which requires effective governance.

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