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Sudan's Government Interventions: A Review Article On How To Overcome The Gap Between Wheat Production And Consumption

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Abstract

Agriculture is considered the mainstay of Sudan's economy and the livelihood of the majority of the population. It has contributed an annual average of 32 % of GDP for the last 10 years. Wheat is a strategic and political crop in Sudan and has played a central role in the country's economy during successive regimes. This review paper aims to highlight the status of wheat production and consumption in Sudan in line with government interventions in the local and imported wheat sectors over the past few decades to ensure adequate grain supplies for domestic consumption. The Sudan government's official national-level statistics data and the government policy documents related to wheat production and consumption are used to conduct this paper. Despite the agricultural potential and ingredients available in Sudan, as well as government interventions via policies and plans oriented towards achieving wheat self-sufficiency, domestic production does not meet the population's needs and only covers an average of domestic consumption, which does not exceed 24%. Therefore, the Sudanese government has been importing wheat to bridge this gap, which was a great burden on its budget previously, and from this year (2022), this will be a great burden on the Sudanese citizens as the government completely lifted subsidies for wheat imports. This situation, in line with the world prices of wheat, which have surged since February 2022 and reached an all-time high level not seen since 2008 as the Russian invasion of Ukraine triggered supply disruption from two of the world's largest wheat producers, requires evaluation of previous government interventions to determine what the real problem is, with a focus in the background of the commitments of the Millennium Development Goals and the Sustainable Development Goals (SDG) to enhance the policies on "No Poverty," "Zero Hunger," and "Good Health and Well-being."

Keywords: self-sufficiency, agricultural policies, wheat production, wheat consumption Sudan

■ 1.0 INTRODUCTION

In certain nations, where it must be taken for granted, food security is not given much priority. Few nations, nevertheless, are fortunate enough to be able to make this claim, particularly in many developing nations where poverty, hunger, and malnutrition are pervasive. Environmental issues, such as climate change (changes in temperature, rainfall, humidity, and other elements under different climate scenarios), which endanger agricultural output and raise food prices, are linked to the sensitivity of food security in Africa. Crop production can be significantly impacted negatively by even a minor increase in global mean temperature (GMT) of 1 to 2°C, especially in the tropics (Stevanovi et al. 2016). Consequently, the effects of climate change on agriculture and subsequent productivity change. Therefore, the effects of climate change on agriculture and the resulting changes in production patterns and prices affect both producers and consumers, changing the profitability of agricultural production and the share of income spent on food; poverty and lack of access to food; demographic and economic factors (such as population growth and urbanization; Gaiser et al. 2011); and political failures in adjustment and market liberalization reforms (Shiferaw et al. 2011). Sudan, one of the African sub-Saharan regions most impacted by climate change, has productive agricultural production practices.

Food self-sufficiency has become a high-priority policy agenda for developing countries in conjunction with food price volatility in recent years. It has gained increased attention in many countries in the wake of the

2007–08 international food crises, as countries sought to buffer themselves from volatility in world food markets (Tanaka, 2018). The reason behind this is that self-sufficiency in staple food can provide governments with a contingency against food supply disruptions that may arise in the context of war, a decline in the availability of food on international markets, or volatile food prices on international markets (FAO, 2017). Some countries have also historically considered self-sufficiency as a politically expedient policy stance, as dependence on others for their food supply can leave a country in a vulnerable position on the world political stage, especially if food exporting countries threaten to withhold food supply for any political reason. Countries may also prioritize food self-sufficiency as a means to strengthen their farm sectors and support overall economic growth and development. (Clapp, 2017).

It is estimated that global food demand will rise by 60 % by the year 2050 as compared to 2005–2007. Sub-Saharan African regions face the greatest food security risk, as their populations grow at a 2.5% annual rate and demand for cereals, particularly wheat, triples by 2050 (ADB, 2015). Hence, if food prices increase because of climate change impacts, households will not only have to spend more income on food consumption but also could face a risk of nutritional shortage and insufficient access to food (ADB, 2015).

Food security policies, including food self-sufficiency, will be a paramount concern for the economic development of many countries for at least the next two decades. In general, the challenges facing the development of food production are associated with high population growth, limited natural resources and changing soil agricultural functions, insufficient food sector infrastructure, and increased competition with imported goods in the market (Mukadasi, 2018). Since the population rate is increasing dramatically in the world, especially in developing countries, as well as their consumption patterns are changing, governments are trying to address their food problems via good analysis and implementation of development policies. Sudan, as one of the developing countries facing the same problems, therefore focusing on a food self-sufficiency policy, particularly in wheat, which is the main staple food, is one of the strategies for attaining food security.

To conduct this review paper, I used the Sudan government's official national-level statistics data on wheat production and consumption, which I reviewed from the annual reports on the food security situation in Sudan—the Federal Ministry of Agriculture and Natural Resources/the Agricultural Statistics Department, and the annual reports of the Foreign Trade Statistical Digest—the Central Bank of Sudan during the period from 2013–2021. Besides that, I reviewed policy documents related to wheat production and consumption in Sudan in particular. Then I used the descriptive historical method to present the collected data, in addition to the previous studies related to this issue.

■ 2.0 LITERATURE REVIEW

■ 2.1 Wheat crop

Wheat is considered the main food crop as it is a cereal grain and originates from the Levant region nearer to East Africa and the Ethiopian highlands. All across the world, wheat is cultivated and considered an important food crop. In 2007, global wheat crop production was 607 MT, making wheat the third most-produced cereal after maize (784 MT) and rice (651 MT) (Aziz, 2013). Wheat production increased to 682 MT in 2009, and it was grown on 220 million hectares worldwide (Fapri, 2011). In the years 2018 and 2019, the worldwide production was 728.3 MT and 734.74 MT, respectively (FAO, 2019).

The main wheat-producing countries are China, India, the USA, Russia, France, Australia, Canada, Pakistan, Ukraine, and Germany (World atlas, 2020). Whereas the major exporting nations include Kazakhstan, Russia, the United States, Canada, France, Australia, Argentina, Ukraine, Romania, and Germany (CIA, 2020). Hence, these countries control the wheat trade and determine its prices globally. The most import-oriented regions include those in Northern Africa, the Middle East, and Eastern Asia, particularly Egypt, Brasilia, Japan, and Algeria (FAO, 2019).

Today's world places an increasing amount of emphasis on wheat, which is regarded as a strategic crop and a weapon with implications for most people's economic, political, and social well-being. It is the most essential component of everyday living and, in the developing world, accounts for 95% of daily consumption per capita, making it the most significant agricultural crop in terms of global trade. As a result, wheat is now used to exert economic influence over the political decisions of many countries around the world, particularly the United States and the European Union. (Ijaimi, 2009).

■ 2.2 Wheat production and consumption in Sudan

Sudan is a large African country with an area of 1,886,068 square kilometers and an estimated population of 41,800,000 (World Bank, 2018). Agriculture is considered the mainstay of Sudan's economy and the livelihood of the majority of the population. It has contributed an annual average of 22–34 % of GDP between 2011 and 2019 and employed 38-45 % of the labor force (World Bank, 2020). It provides about 80 % of the country's exports (excluding petroleum) and almost all of Sudan's foreign exchange earnings and provides 50–60% of the raw materials for the industrial sector (FAO/GIEWS, 2015). The major crops of Sudan are sorghum, wheat, cotton, millet, and peanuts (FAO/GIEWS, 2015). The major staple food crops are wheat, sorghum, and millet, respectively. Although the agricultural sector in Sudan has an important role to play in achieving food self-sustainability and food security by increasing food production and providing employment opportunities in the rural areas (Mubarak et al., 2011; Adam, 2016). Indeed, Sudan has the agricultural capabilities and ingredients that qualify it to play this role.

In Sudan, wheat is one of the major cereal crops produced and consumed in Sudan and ranked third after sorghum and millet in terms of production. In Sudan, wheat has become the main staple food crop, especially in urban areas. Wheat production in Sudan is grown mainly under irrigation production systems in different locations, particularly in Gezira, River Nile, Northern, White Nile, and the Kassala States. About 90% of the wheat area in Sudan is found in these states (M o A F, 2013). Research highlights that 75% of Sudan's wheat is cultivated by public irrigation schemes, whereas distribution and allocation are determined by fixed crop rotation (Siddig, 2011, Mustafa et al., 2013; Chebili et al., 2016). Wheat is produced in two distinct sectors; first, the large-scale public national irrigated schemes. The biggest of these schemes is the Gezira Scheme, which covers slightly more than 0.84 million ha. The small-scale schemes are scattered around the Nile and its tributaries, especially in the northern region of Sudan. These schemes cover an area of about 588,000 ha adjacent to the banks of the Nile. However, the productivity of this sector is higher than that of the large-scale schemes, mainly due to the colder weather in winter and the fact that the farmers in the northern part are more familiar with wheat production (Elsheikh et al.,2015).

Wheat production in Sudan is highly variable due to variability in both the cultivated area and the yield of the grain (productivity). The wheat cultivation land area in Sudan is very small, but there is remarkable potential for improvement. At present, only 41 million feddans of land in Sudan are cultivated, which is equivalent to about 20 % of potentially arable land. Over the last 20 years, yields in the northern region were estimated to be 2.3 metric tonnes per acre, compared to 1.3 metric tonnes per acre in the Central Plains (ASS, 2006). This is because northern Sudan has a comparatively longer winter and farmers are familiar with wheat crops, which results in a higher yield of wheat production as compared to the Clay Central Plains. Wheat yield (productivity) in Sudan is very low compared with the internationally attained level. For instance, in 2010, the average yield was 1794 kg/ha, whereas the world average yield was 3007 kg/ha (FAO, 2012). According to MoAF (2021) data, the average national yield of the wheat grain is low, at around two tonnes per hectare, and can frequently be lower (ICARDA, 2015). Increasing the cultivated area of wheat is possible but would have important trade-offs with other high-value agricultural goods.

The wheat situation in Sudan has been characterized by rapid growth in consumption and a continuous and variable deficit between annual domestic production and annual consumption needs. Wheat consumption has grown rapidly at a higher rate than domestic production since the 1980s (Ahmed2015; Abdallal et al., 2015; Adam, 2016; and Alkhidir, 2017), especially in the last 15-20 years, which is mainly driven by continuous population growth, urbanization, and changing consumer preferences for bread and other wheat products, in addition to fluctuations in cultivated areas and poor productivity, leading to a continuous increase in the wheat food gap. Per capita, wheat consumption has increased from 10 kg in 1970 to about 63 kg in 2012 (FAOSTAT, 2012), mainly due to changes in dietary patterns and urbanization since the 1980s. Therefore, the demand for wheat and wheat products increased.

The wheat cultivated area, production, yield productivity, consumption, and self-sufficiency rate during 2012–2021 in Sudan are presented in Table 1, according to the data the researcher collected from the Ministry of Agriculture and Forests-Sudan and the Ministry of Finance and Economic Planning-Sudan. From 2012 to 2021, the annual average wheat cultivated area in Sudan was approximately 571.500thousand feddanas. The wheat area has shown variation during the last decades. Between 2012 and 2021, the average wheat production per year was 589.522 thousand tons in Sudan. According to Table 1.1, wheat cultivated area and annual domestic production in Sudan have shown clear fluctuations, and this could be attributed to factors such as government political commitment and support; crop prices and producers' expectations; availability and cost of production inputs; and weather conditions.

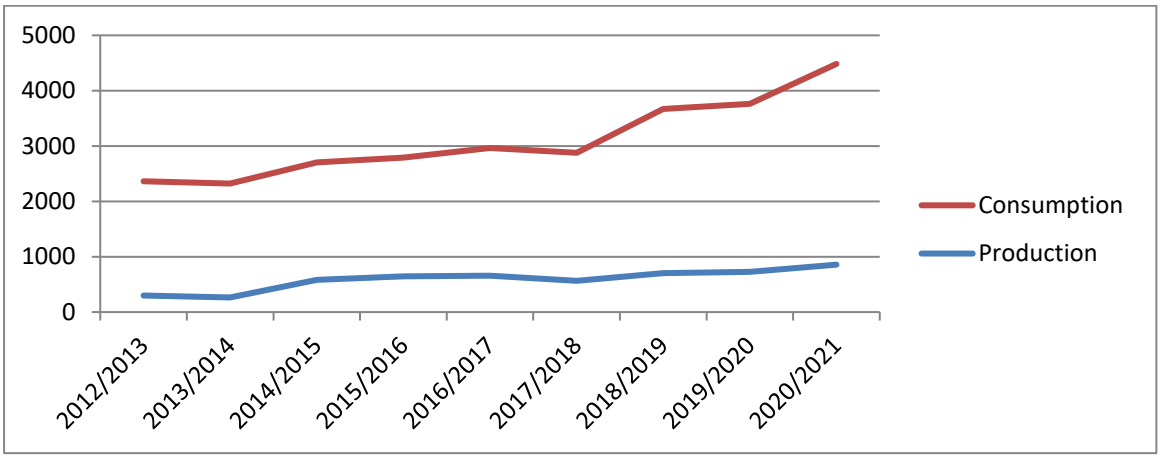
Table 1: The trend of cultivated areas, production, productivity, consumption, and self-sufficiency of wheat in Sudan from 2012–2021

Season	Cultivated area (Thousand Feddans)	Production (1000 metric tons)	Productivity (Metric tonnes /feddan)	Consumption (1000 metric tons)	SSR %
2012/2013	311.400	301.124	0.967	2061.700	14.61
2013/2014	311.000	264.350	0.850	2058.000	12.85
2014/2015	520.000	582.400	1.12	2123.000	27.43
2015/2016	546.900	648.624	1.186	2144.000	30.25
2016/2017	627.200	659.900	1.100	2306.000	29.92
2017/2018	478.200	564.000	1.200	2312.000	24.82
2018/2019	722.200	702.200	1.210	2967.400	29.33
2019/ 2020	747.900	726.000	1.005	3039.200	24.73
2020/ 2021	878.700	857.100	1.000	3626.700	23.63
Total	5143.5	5305.698	9.638	22638.000	217.57
Annual mean	571.500	589.522	1.071	2515.33	24.18

Source: Researcher reviewed data from Ministry of Agriculture and Natural resources - Sudan and Ministry of Finance and Economic planning – Sudan annual reports and come out with the above table

The continuously widening gap between domestic wheat production and consumption needs has forced the government to import wheat from international markets to bridge the gap to secure enough wheat supply and create a trade balance. Wheat imports continued to rise at an upward rate year after year due to the increase in consumption rates in light of the deterioration of domestic production (MFN – Sudan, 2018). Figure 1: illustrates the trends of wheat production and consumption in Sudan from 2012 to 2021.

Figure 1: shows the trends of wheat production and consumption in Sudan from 2012 to 2021.



The main causes of poor domestic production, according to Abdallal et al. (2015), Adam (2016), and Alkhidir (2017), are insufficient funds, low productivity, a policy of price subsidies, and low tariffs on imported wheat and its flour. As a result, the majority of farmers stopped growing wheat. The Ministry of Finance and National Economy-Sudan (2009) said that the development of the agriculture sector was hampered by the usual obstacles to wheat production in Sudan. The industry is hampered by inadequate infrastructure, low productivity, inadequate services offered in the input and output markets, social unrest, and political instability.

■ 2.3 Wheat importation pattern

Table 2 depicts the trend in the total annual quantity of wheat and wheat flour imported in thousands of metric tons annually and their corresponding values in US dollars from 2012 to 2020. The researcher collected the data from the Ministry of Finance and Economic Planning-Sudan and the Central Bank of Sudan.

Table 2: The trend of Sudan's imported quantities of wheat and flour and their cost Prices from 2012 to 2020

year	Quantity imported (1000 metric tons)	price of imported quantity ((million dollars)
2012	2100.39	835.454
2013	2054.00	1042.246
2014	2712.90	1082.397
2015	1964.20	755.751
2016	1952.10	736.334
2017	2467.26	789.250
2018	2891.83	945.900
2019	2696.56	1085.9
2020	2769.60	917.00
Total	21608.84	8190.232
Annual mean	2400.98	910.026

Source: Researcher reviewed data from Sudan Central Bank Annual reports and come out with the above table

Wheat consumption increased from 750 thousand tons in 1995 to two million tons in 2005 (Ijaimi, 2009) and has continued to rise (CBOS, 2020). Whereas the average annual domestic wheat production covers only about 24% of the average annual wheat consumption needs, at the same time, wheat demand increased by 2.7% annually, in light of domestic production deterioration (FAO, 2014). According to the Central Bank of Sudan's foreign trade statistics reports, Sudan's total imports of wheat and wheat flour in the years 2017, 2018, 2019, and 2020 amounted to about 2467.26, 2891.83, 2696.56, and 2769.60 million metric tons, with a total value of US$789.25 million, US$945.90 million, US$1085.9 million, and US$917.00 million, respectively. Therefore, the annual import bill of wheat and wheat flour is a great burden on Sudan's foreign exchange resources and budget. The last government of Sudan indeed started a program to gradually lift subsidies for importing wheat and flour, but the government of the transitional period decided this year 2022 to completely lift subsidies on imported wheat and flour. As a result, the import bill has fallen entirely on Sudanese citizens, who are suffering from rising poverty and unemployment. The world prices of wheat surged in February 2022 and reached an all-time high level not seen since 2008, as the Russian invasion of Ukraine triggered supply disruption from two of the world's largest wheat producers. Amid heavy sanctions and restrictive measures from western economies, exports from the Black Sea have nearly halted. Therefore, the dependence of Arab countries on wheat imported from Russia and Ukraine puts them in a bad situation, especially the Sudan, whose local wheat production covers less than 30% of its consumption, thus overcoming the deficit from export with an average of 90.8 from Russia and 1.8% from Ukraine (Arab-reform, 2022). So this situation may increase food insecurity, which may lead to hunger among the poor and may trigger food riots.

■ 2. 3 Wheat production and import policies in Sudan

Sudan's wheat policy has significant effects on both political stability and food security. In addition to being the main staple food in urban households in Sudan, wheat also plays a significant political role, as shown by the widespread protests that followed recent adjustments to the subsidized price of flatbread. Major government interventions in the costs and prices of production inputs have been made in Sudan's wheat policies at every stage of the value chain, from grain production to purchasing the crop production from farmers via the Sudanese Agricultural Bank-Strategic Stock, and management to milling into flour (Dorosh, 2021). Also, prices and incentives for production and consumption have been impacted by trade and exchange rate regulations at every stage.

■ 2.3.1 Wheat production policy

Since its independence, successive Sudanese governments have placed self-sufficiency for agricultural products on the major political agenda. This policy particularly applies to the main staple foods for Sudanese people, such as wheat, sorghum, and millet. While Sudan scores high for wheat consumption per capita, it still relies on wheat imports from other countries to secure its domestic supply. Accordingly, the government has set up various plans to be self-sufficient in wheat (Ijaimi, 2009; Siddig et al., 2011; Elgali et al., 2017). Sudan's government started adopting a food self-sufficiency policy during the 1940s by establishing mechanized rain-fed schemes. However, it further focused on it during the 1990s due to economic sanctions. Achieving self-sufficiency in wheat remained a strategic goal in all successive development policies and plans, including the first economic rescue conference, held in the first nineties, during which the Sudanese government formed policy plans and programs. The main objective of this policy was to achieve self-sufficiency in wheat in the year 2001 and then begin to export in the year 2002 (Siddig & Grethe, 2015).

The Sudan National Quarter Century Strategic Plan (2007-2032), is a directional policy that was approved by the national parliament in the year 2006. It consists of four main strategies, namely: the strategy of sovereign affairs; the strategy of the economy; the strategy of capacity-building and community development; and the strategy of social services. Each strategy included themes for its specializations; agriculture is a major component of the economic strategy as agriculture in Sudan occupies the forefront in terms of contribution to local production. According to this Strategic Plan (2007-2032), the main objective of the agricultural sector strategy is to achieve sustainable agricultural development through achieving balanced agricultural and rural growth, sustainable development, and food security alongside poverty alleviation. This strategic plan was conducted as a directional policy consisting of six main five-year plans: the first from 2007–2011; the second from (2012–2016); the third from (2017–2021); the fourth from (2022–2026); the fifth from (2027–2031); and the final is from (2032–2037). From this strategy and according to the political situation associated with the negotiations and signing up of the Comprehensive Peace Agreement 2005, which is a reflection of the economic status, the government conducted many policies as follows:

- Al Nafrah Agricultural Program (2002-2007)-strategic policy;
- the Executive Agriculture Revival Program (2008-2011)-strategic policy ;
- The Three-Year Crash Program (2011–2013) as an operational policy plan
- The Three-Year Economic Program (2012-2014) as an operational policy plan
- The Five-Year Economic Reform Program (2015–2019)-strategic policy ;

In line with these national policies, and the background of the commitments of the Millennium Development Goal and the Sustainable Development Goals (SDG) to enhance the policy on "No Poverty", "Zero Hunger", and "Good Health and Well-being" there were three national operational policies regarding wheat self-sufficient were conducted namely: The Three-Year wheat production plan) 2012-2014); The Vertical and Horizontal Expansion Wheat Production Plan (2016-2019); The Triple Wheat Production Program (2019-2021) .

The Three-Year Wheat Production Plan (2012–2014) was conducted as an operational policy according to the Three-Year Economic Program (2012–2014) and in line with the National Quarter Century Strategic Plan (2007–2032). Then the government launched the Five-year Economic Reform Program (2015–2019) as a strategic policy for all economic sectors. The five-year program aims to increase production and productivity in the agricultural sector, bridge the gap in the trade balance by increasing exports and replacing imports and achieve a significant increase in the total food commodity supply to achieve price stability and improve citizens' income, which will reduce the burden of living. This policy program showed great seriousness in dealing with the agricultural sector, focusing on wheat production as the main objective to achieve high rates of self-sufficiency. According to this policy program and in line with the National Quarter Century Strategic Plan (2007–2021), the Vertical and Horizontal Expansion Wheat Production Plan (2016–2019) was developed in pursuit of the central goal of the five-year program for state reform by increasing production and productivity and replacing imports of wheat by increasing production. After that and before the end of the Five-year Economic Reform Program, the Federal Ministry of Agriculture conducted another operational policy, consisting of a three-year plan as follows: Plan for Wheat Self-Sufficiency (2019-2021): The main objectives of this plan are to optimize the available agricultural resources for self-sufficiency in wheat to achieve food security and substitution of imports, through using the best technologies to raise productivity and follow modern agricultural systems.

The central objective of all these policies regarding wheat production is to achieve wheat self-sufficiency by both horizontally expanding by increasing the cultivated areas and vertically expanding via increasing the productivity of a unit area (feddan) to support attaining food security and to avoid the risk of dependence on the global food market and the policies of wheat exporting countries (MAF-Sudan, 2018). Accordingly, the National

Wheat Production Project was initiated in 2007 as a coordinating body under the Federal Ministry of Agriculture, with the responsibility to follow up and evaluate the implementation of these policies and plans. The process of wheat production in Sudan was affected by both the policy of wheat marketing and wheat import policies.

According to the Federal Ministry of Agriculture annual reports in 2017 and 2018, the government of Sudan has made an appreciated effort to localize wheat production by working to generate hybrid new varieties more suitable for growing in Sudan's climate, as well as expanding its cultivation in higher gears in the Northern and River Nile States and using modern technologies to increase productivity, especially in the irrigated sector, to bridge the gap between production and consumption to reduce the burden on the government's budget and avoid the risk of relying on other countries trade policies, which may have their special agenda. Despite all these policies and plans, the government's conducted to achieve wheat self-sufficiency. However, it did not achieve its intended goals, except in two seasons. According to the official annual reports of the Federal Ministry of Agriculture and Forests in Sudan in 2017 and 2018, these policies have been a great success in only three seasons; First, in the season 1991–92, wheat production represented 90% of self-sufficiency, as about 900,000 tons were produced due to strong political will and harmony between ministries and agencies involved in wheat production; providing sufficient financing, agricultural inputs, and certified seeds as required in the plan; early announcement of a good concentrated price to purchase wheat from farmers (the first week of August), as well as identifying the purchasers; and follow-up and coordination through agreed follow-up mechanisms. Second, in the season 2006-2007, about 700,000 metric tons were produced, due to the adoption of clear policy instruments at the appropriate time.

■ 2.3.2 Sudan's wheat import policy

To meet its multiple objectives of stabilizing wheat prices, providing incentives for domestic production, securing imports, and subsidizing poor consumers, government policies over the past several decades have included interventions throughout the wheat value chain, including controls on imports and controlling prices of wheat grain, wheat flour and flatbread (Dorosh,2021). The political settlement in Sudan provides an important context for how wheat value chains are structured. Due to high consumer demand and low domestic wheat productivity, the government has imported wheat to bridge the gap. Wheat imports were controlled by the government until 1996 when they were allocated to 20 little-known milling firms via a quota system. When wheat milling was liberalized in 1996, three companies— Seeqa, Weta, and Seen"—began to dominate imports, milling, and distribution (FEWS NET 2015).

The policy of subsidizing wheat imports in Sudan began in 2010 as a result of the rise in international wheat prices and, consequently, the increase in the cost of wheat flour production, which necessitated the need for state interference to reduce this problem and ease the burden on the citizen states. According to the documents of the Ministry of Finance and Economic Planning in Sudan and it is an official report, the process of subsidizing the import of wheat has gone through several ways according to the requirements of the economic situation as follows: during the period 2010-2011, the mechanism used to subsidies the wheat import was a direct subsidy for the mills operating in this field by fixing the price of the flour sack at a rate of 95 Sudanese pounds and the government bearing the price difference, which was about 15 Sudanese pounds/sack. This is in addition to the indirect support for imported wheat, which is represented by: reducing customs duties; exempting apostasy from value-added tax; reducing the fees of the Maritime Ports Authority; reducing the fees of the Standardization and Metrology Organization; reducing plant quarantine fees. This policy resulted in positive aspects, the most important of which was the availability and flow of wheat flour and the stability of bread prices despite the high prices globally. This policy continued until the end of 2011 and stopped at the beginning of 2012 as a result of the stability of world wheat prices. In contrast, in the 2012 budget, the exchange rate was adjusted from 2.9 pounds to 4.42 pounds, which affected the cost of importing wheat and, consequently, the rise in wheat flour and bread prices. As a result, the wheat commodity subsidy policy was changed from direct subsidy to wheat import exchange rate subsidy, and the Ministry of Finance and Economic Planning beard the payment of the exchange rate difference to the Central Bank of Sudan, amounting to 1.52 Sudanese pounds per dollar. Also in August 2015, the Sudanese government allowed the import of wheat and bread flour for all mills, ending a monopoly by three mills in the country, "Seeqa, Weta, and Seen". Also, the government raised the customs tariff on wheat imports in August 2015. These continued until the year 2017, with an adjustment in the exchange rate subsidy from time to time. But this policy has emerged with negative aspects, especially after the rise in the exchange rate, which was represented by increasing the burden on the government's budget by incurring large sums of wheat subsidies and creating distortions in the Sudanese economy in general and in the currency markets in particular.

During the period 2015–2017, the state tended to import wheat commodities through the Sudanese Agricultural Bank/Strategic Inventory Management to fill the gap in local production that resulted from the scarcity of foreign exchange. This added a new burden to the budget because the state must bear the cost of

importing in addition to other expenses such as commissions for opening letters of credit and stamps, clearance expenses, deportation, and administrative costs. In the year 2017, the exchange rate for importing wheat used for making bread was amended to become the official price of the Central Bank of Sudan "without incentives."

The 2018 budget came in line with the implementation of the state's policy to achieve economic reform following the directives of the Five-Year Program for Economic Reform (2015–2019) and the National Dialogue Document, and the policy of liberalizing, the import of wheat is one of the reforms included in the 2018 budget. Necessary arrangements were put in place to implement this policy flexibly to mitigate its economic and social effects on the citizens, so the application was made gradually, with the importation of provision quantities through the Strategic Reserve Corporation to fill the shortfall in case the mills are unable. In January 2018, the exchange rate of the dollar against the Sudanese pound rose dramatically, which led to an increase in the cost of importing wheat and thus the cost of producing wheat flour and bread. As a result, a new mechanism was developed in agreement with the mill owners. The mills hand over the flour sacks to bakeries for 550 Sudanese pounds, and the government bears an amount of 100 Sudanese pounds for each wheat flour sack as a subsidy so that the price of the loaf does not exceed 1 Sudanese pound, but it market price is 2,300 pounds, which makes it vulnerable to leakage to the markets and smuggling to take advantage of the large difference between the two prices. This agreement was extended until June 2018. As of July 23, 2018, the cost of producing a sack of wheat flour was adjusted to 700 Sudanese pounds per sack so that the subsidy became 150 Sudanese pounds per sack as of July 23, 2018, and as a result of the exchange rate escalation, the subsidy was modified during the year 2018.

In February 2019, an agreement was signed with mill owners to purchase their quantities of wheat, whose banking procedures were not completed, for $270 per ton, provided that the mills bear the cost of grinding, and the mills benefit from the sale of this agreement will continue until the end of the year 2019. The agreement with the mills was amended to purchase quantities of wheat at a price to be agreed upon later, provided that the mills bear the cost of milling and the mills benefit from the sale of the wheat; the Ministry of Finance recovered an amount of 300 Sudanese pounds for each flour sack; the mills shall be committed to distributing 100,000 sacks of flour daily in Khartoum and the states. At the beginning of the year 2022, the government of Sudan announced the final lifting of any kind of subsidy on wheat, and it is flour (CBOS, 2022). The government has finally exited the wheat commodity market, which has become subject to the fluctuations of the free market. In line with this new policy, the government refrained from purchasing wheat production from farmers for the season 2021–2022.

The majority of imported wheat was transported to Khartoum for milling into wheat flour before being distributed by wholesale traders or flour agents of the milling enterprises after arriving at Port Sudan (FEWS NET 2015). Each state would receive a certain quota of wheat flour, determined by historical consumption data and population size. Wheat flour subsidies remained set at a specific rate, but because of the expense of transportation, they fluctuated between states. Due to the possibility of flour agents and bakeries selling some of the subsidized flour on the black market and smuggling it both domestically and abroad to other retail establishments, this arrangement increased the risk of leakage (Siddig, 2015).

■ 3.0 DISCUSSION AND CONCLUSION

Wheat and its flour have played a central role in Sudan's political economy throughout the country's post-independence history, which has been crucial to the nation's economy under successive regimes. Disruptions in the wheat value chain in Sudan frequently have negative effects on politics, prices, and bread availability. To ensure a sufficient wheat grain supply for local consumption, Sudan's government has made many interventions in the local and imported wheat sectors during the past few decades to ensure adequate grain supplies for domestic use. The majority of interventions have concentrated on and sought to increase local production while ensuring a steady flow of wheat imports to overcome the low domestic production. According to many reviews, there are many challenges facing the agricultural sector that directly affect domestic wheat production, such as weaknesses in infrastructure, low productivity, poor services available in the input and output markets, as well as social and political instability.

During the last 10 years, the average total area that was cultivated with wheat in all production states in Sudan was about 571 thousand feddans (see table 2), which is a very small area compared with the total arable fertile land available in Sudan, which indicates that wheat cultivation is not a preferable choice for farmers in the winter season. Therefore to significantly improve domestic wheat production, there are two key requirements: Firstly, the government must provide farmers, with incentive policies that will encourage them to cultivate more land. These incentive measures include concentrated price policies, the provision of credit finance, as well as providing production inputs at low prices. Although all these incentive policies are not new, the problem is with their implementation on the ground, as many farmers complain regarding these issues. Therefore, there is a need to re-evaluate and review these incentive policies. Secondly, is the attainment of a significant increase in

productivity, which is also linked with the first point, as achieving good productivity requires the application of specific agricultural technical packages, which needs innovation of new farming techniques, producing new wheat varieties that are adapted to Sudan's climate, and creative dissemination methods. According to the Agricultural Research Corporation, to achieve profitable and sustainable production of wheat under heat stress conditions, it is always recommended to follow the Integrated Crop Management (ICM) for the wheat crop, which takes into account the entire value chain, which includes: following the agricultural rotation system; appropriate and timely application of various agricultural practices (soil management, water management, fertilizers, pests, and weeds management); taking into account the social, economic, and environmental factors that can mitigate the negative impact of heat stress on the crop and its quality for the final use (ARC,2020).

However, since 2017, significant real exchange rate instability, the sharp depreciation in the value of the Sudanese pound, and high macroeconomic inflation have all contributed to new pricing distortions. As a result, the wheat subsidy policy has grown more problematic. The previous subsidy provided by the Sudanese government to the wheat commodity importation was equal to all the Sudanese people as well as all the foreigners in Sudan. The government completely removed the subsidy on wheat imports beginning in 2022, in addition to the removal of the subsidy on fuel and electricity, which affected production costs and, as a result, domestic wheat production. Therefore it would have been preferable to apply some economic remedies that would have taken into account the circumstances of the underprivileged Sudanese communities to adjust the government subsidy before lifting it completely at the beginning of this year 2022. Thus, the policies by which the Sudanese economy is managed today need a comprehensive review to be straight and based on sound economic logic, rationality, and justice, so as not to waste resources on useless matters.

This review paper recommends the creation of innovative incentive systems to encourage farmers to increase their targeted area that is cultivated with wheat and increase productivity, as the government completely lifted the subsidy on wheat imports and consequently refrained from purchasing wheat from wheat farmers according to the announced concentrated price policy. Besides that, the government completely lifted the subsidies on fuel and electricity, which affected the production costs and consequently affected domestic wheat production. So the result of these new policies is a heavy burden on Sudanese citizens. The removal of these, without any other measures to mitigate their impacts, will lead to an increase in national Poverty, and poor Health and Well-being. Also Sudan, as one of the African sub-Saharan regions most impacted by climate change, has productive agricultural production practices. Therefore to adapt to future climate change, agricultural policy and water management practices must be reviewed.

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