

Research Article

The Kenyan Agricultural Policy Reforms and Insights from Global Agricultural-Led Economic Transformation Success Stories

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Abstract

Agriculture is the bedrock of the economy. The sector supports greatly the economy of many nations globally. Digitalization of agriculture and investment in research and development have been key in the transformation of the sector. Brazil has been able to transform the agriculture and animal husbandry sector to achieve great levels of success. The Amazonian rain forest, favourable climatic conditions, a great wealth of natural resources, availability of potential arable land for expansion, and investment in research and development have contributed to the success story of Brazil. France is another country in the world that has achieved great levels of success in the agriculture sector. Despite the growth, the sector contributes a low percentage of employment opportunities. The geographical conditions in Africa favour agriculture. The continent boasts of the longest river in the world, the largest and second deepest river in the world, and the longest fresh-water lake, Lake Tanganyika. Yet, the continent is food insecure. This presents a paradox. Kenya needs to learn from the success stories of the countries that have transformed their economies through agriculture. Good policy governance, investment in research and development, advancement in infrastructure facilities, and collaboration of the county and national government with the agricultural research institutions are crucial toward the growth of the sector. This will result in exports surpassing the imports in the country. The budget has focused on the sector by setting finances to help in the improvement of production. The change in policy framework from the pre-colonial period up to the present has played a crucial role. The regimes have experienced a change in land ownership from the Europeans to the African farmers, which has helped in the intensification of agriculture. Different policies have been developed aimed at transforming agriculture, with the agricultural sector transformation and growth strategy being the current policy document.

Keywords

Bedrock, Digitalization, Paradox and Transformation

1. Introduction

The global growth rate of the economy in 2022 is 4.4%, down from 5.9% in 2021 [1]. In 2020, it was 3.1%, mainly due to the impingement of the global covid-19 pandemic. Despite

the moderate growth rate, it encounters some threats given the conflict between Russia and Ukraine in Eastern Europe. Despite the covid-19 shocks to the Kenyan economy, measures

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which were taken such as reopening of the economy and the easing of the covid-19 rules, the domestic economy experienced a 9.9% recovery in the third quarter of 2021. Despite the contraction of 0.3% of the economy in 2020, projections indicate a stable economy at 6.0%. The main sectors crucial towards this stability are: agriculture sector, industry sector and service sector. The horticulture and tea sub sectors contributions in export earnings help reduce the shocks in the foreign exchange market, despite the risk of adverse climatic changes in the country [2]. Inflation is a major threat which can be attributed to the increasing global oil prices and the perturbations of supply chains due to the conflict. The rapid rise in fuel prices has an effect on the different sectors of the economy. For instance, with a greater percentage of Kenyan farmers relying greatly on irrigation agriculture, the high costs imply increased production costs. Even, some of them lack affordability or access to the fuel to support agricultural productivity. The result is declined agricultural productivity and high incidences of food insecurity. There were some deliberate actions by the government to subsidize the oil prices so that the consumers don't feel much burden. However, with the change of the government, the new government has eradicated the subsidies, terming the program as not being sustainable. This implies that the consumers cater for the high fuel prices without any support.

Given the fact that the agriculture sector is the greatest contributor to Kenya's GDP, and much focus being placed on food and nutritional security as one of the big four agenda, efforts have been put in place to support the sector [3]. There has been put in place measures to subsidize the fertilizer to the farmers. During the 2021/2022 financial year budget, Kshs 3.0 billion was set aside for subsidy programs in the current production season. In addition, Kshs 2.7 billion has been set for cushioning the farmers while sustaining food production during the short rains of the period between October and December, 2022. Also, drought resistant and climate sensitive seed varieties, which mature early, have been introduced in those regions likely to be experiencing low rainfall. These measures increase access to agricultural inputs and encourage increased productivity of staple food crops. For purposes of ensuring increased agricultural productivity in these climate change risk prone areas, Kshs 147 million in the 2022/2023 FY has been allocated for climate smart agricultural productivity project. This will create resilience to drought and curb the drought emergencies in the country.

The inauspicious results of climate change have also made the commercial banks put in place climate related risks in to their overall risk management frameworks. In the 2022/2023 FY, Kshs 6.1 billion has been set aside to help address the effects of climate change. This will be done through implementation of a 10-year financing program known as the 'financing locally-led climate action program' in the counties within the country. Majority of the people have access to formal financial services, with the Fin Access survey in 2021 over the counties indicating 83.7% access to financial services.

This is an increase from 82.9% in 2019. One of the reasons for the increase is the introduction of mobile banking.

1.1. A review of a Global Agriculture Success of Brazil

Agriculture sector is an important driver to economies of many nations in the world. Among the European Union member countries, France is the leading agricultural producing country. However, it creates a small percentage to the employment opportunities. It concentrates in the production of agricultural commodities such as wheat, corn (maize), vines, fruits, vegetables, dairy and livestock [4]. For the growth of the economy of countries, modernization of agriculture sector is crucial.

In Latin America, Brazil which is a member of the BRIC countries i.e., Brazil, Russia, India and China, is one of the greatest agricultural exporters in the world. Brazil's economy has greatly been boosted by agriculture as over 25% of the Brazil's GDP over the last two decades has been constituted by agriculture and animal husbandry. The economy of Brazil has been able to expand greatly due to concentration in the importance of agricultural productivity [5]. Brazil has a very strong base of natural resources with vast areas of fertile, productive lands. The country has an area of 47 million hectares which are being utilized for agricultural purposes, having an additional 100 hectares estimated to be brought under cultivation without destroying the Amazonian rain forest through deforestation programs [6]. Brazil is a suitable country for food security due to its abundance of land and water, with 13.5% of the world's comparable potential arable land and 15.2% of the world's renewable water resources. The improvement of agricultural productivity has been made possible through the creation of new lands into productive lands and putting much emphasis in improvement and advancement of scientific research. The Brazilian national agricultural research institute (EMBRAPA) has played a crucial role in the transformation of the cerrado into fertile and productive lands from being infertile and unproductive through investments in agriculture [7]. To ensure continued agricultural development and increased productivity, the Brazilian government also works in collaboration with the private sector by establishing a large number of laboratories and research institutes. Through the research and development institutes, new seed varieties favouring the climatic conditions of Brazil are introduced which as a result lead to higher yields, and as a result increased agricultural productivity. This was done in 1970s and it has borne fruits as it has been able to turn itself from a net food importer to become a net exporter of agricultural produce. It is the top exporter of ethanol, coffee, sugarcane, orange juice, and poultry in the entire world. Despite the tremendous improvements, it still is the second largest exporter of soya beans with the United States of America being the leading exporter. With regards to the Statistica Research Department Statistics in January 2022, soya

beans in Brazil contributed to a value almost 35% of the country's agricultural production in 2019, making them to be the most crucial crop in Brazil. The creation of new lands into agricultural lands has caused critics to Brazil as they claim that the improvement of agricultural production has been made possible only through the clearing of the Amazonian tropical rain forest, with which some of the rain forest has been cleared, but most of the new agricultural land is located in the savannah cerrado. Despite the critics, statistics show that Brazil did deforestation of an area of 9.840 km² between 2010 and 2015. It is through this practice that has contributed for half of Brazil's carbon emissions; making it to be ranked as the sixth largest carbon emitter in the world. However, despite the tremendous improvement in agricultural productivity in Brazil, there is need for Brazil to reduce the deforestation rate so as to reduce the rate of emission of carbon; and as a result, increase reforestation programs. With the current projections of the world population expected to rise to 9.6 billion by 2050, and also with the expectations of food consumption to rise from 60% to 110% over the next 30 years, it creates the essence of improvement of agricultural food production [8]. However, it should not be done at the expense of the environmental degradation and carrying out deforestation programs. This has been evidenced in the case of Brazil where several studies indicate that rainfall in other parts of Brazil could reduce as a result of the collapse of the Amazon water cycle as a result of deforestation. The impact of this is that agricultural activities will decline in the long run, which affects food security. Deforestation activities also contribute to climatic changes hence chances of extreme climatic events not limited to severe floods and drought, which adversely affects agriculture.

1.1.1. Brazil's Agricultural Experience

The majority of countries are concerned with food security to feed the projected rising population of the world. Initially, it was believed that the Brazil's temperate regions to be the most effective regions for a competitive agriculture. However, the improvement in agricultural productivity in Brazil up to the level of making it one of the world's largest exporters of several agricultural products such as poultry, coffee, sugarcane, orange juice and ethanol has been greatly attributed to much emphasis and concentration in scientific research. Through advances in scientific research, it has been able also to tailor agricultural activities to not only suit the temperate areas but also the tropical regions. This is because the scientific researchers have been able to develop new crop and forage varieties which suit well those climates. The ability of Brazil to be in a position to transform its economy from being a net food importer to become a net food exporter in less than 30 years has sired vivid concern from other developing countries such as Latin America, Africa, and the Caribbean countries, as they do want to learn how Brazil has turned its fortunes in such a short period of time to become one of the most competitive in the world.

1.1.2. Brazilian Agriculture's Development

Initially, Brazilian economy relied greatly on agricultural commodities which were mainly for the foreign market since the 16th century during the colonial times. It has been a net food importer up to 1980s, whereby it used to receive food aids from abroad.

Industrialization process

Between 1960s and early 1980s, Brazil was experiencing industrialization which was characterized by a rapidly expanding population with higher income and a rapid urbanization process. That period was characterized by extensive migration of people from the rural areas in to the urban centres i.e., cities; which as a result created a favourable environment for improvement in agricultural activities and also modernization of agriculture. During the industrialization process, much emphasis was placed on cities, and investment in modern agriculture e.g., health and housing facilities was rapid. The prices of agricultural commodities were kept low so as to avert pressure on urban salaries, hence avoid wage inflation. The better salaries in the cities were the main contributors of the rural-urban migration. Also, there was a political power shift from the rural areas to the urban areas. This led to the agribusiness exports being seen as an opportunity to generate funds so as to finance technological and capital assets imports for the rising industrial sector.

Traditional agriculture

The pressures which were exerted on the agricultural sector in order to finance for technological and capital assets, became of little essence due to the limitations of expansion of the traditional agriculture. The improvement of the agriculture sector to be sustainable and be in a position to finance the technological and capital assets imports then required the transformation of traditional agriculture in to modern agriculture.

Period of scientific advancements in agriculture

Due to the inability of the traditional agriculture to finance the rising industrial sector, the need for scientific research advancements in agriculture became crucial. The advancement and improvement of agricultural productivity has made possible increased productivity in to the already the Amazonian tropical rain forest and also through the transformation of the unproductive cerrado in to a more productive land.

1.2. Conditions Favouring Brazilian Agriculture

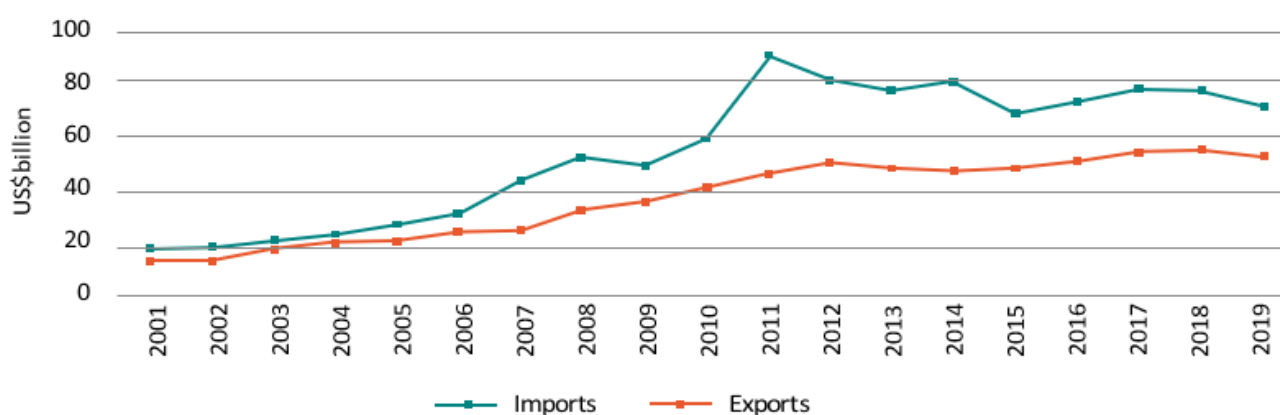
- 1) Brazil has the world's largest and most diverse rain forests as well as one of the largest renewable fresh water reserves.
- 2) Favourable climatic conditions supporting commercial agriculture and also livestock farming.
- 3) A very strong base of natural resources with a vast area of fertile, productive lands.

2. Africa's Agricultural Experience

Geographical factors in Africa favour the expansion and improvement of the agriculture sector. Despite the favourable conditions, majority of the people in the continent are food insecure. Various constraints such as economic instability, conflict, climate change, and low agricultural productivity have made Africa unable to sustain healthy diets to its population. Africa has the highest percentage of malnutrition among its population. Greater than 20 percent (257 million people) are undernourished. More than 20 million people have faced severe food shortage in the continent [9]. The continent has the world's largest amount of arable land, but only 12% of the land is put under cultivation. It constitutes to over 60% of the world's uncultivated land. The continent also boasts of the vast and rich water basins in the World, with the river Nile being the longest in the world. It also has the largest and the second deepest river in the world, River Congo and the longest fresh water lake, Lake Tanganyika. Despite the favourable conditions, there exists a paradox. The continent

spends 62% of its foreign exchange earnings in imports of food commodities.

On imports of agricultural commodities, United Nations Economic Commission for Africa (ECA) projects them to increase by a factor of seven from USD 15 billion in 2018 to USD 110 billion by 2025 (ECA, 2021). Figure 1 shows the food trade in Africa for the period 2001-2019. The imports of the agricultural commodities in the continent are much higher than the exports. Between the period 2009-2011, the continent experienced a rapid growth in the food imports. Some of the reasons for this rapid growth could be the rapid economic growth experienced in the continent. The exports are lower than the imports due to low prices of those agricultural commodities exported. This is due to the reasons that the exports are traded in raw form and then imported back as finished products at high prices [10]. The decline in agricultural productivity, low investments in agriculture, rapid population growth and lack/poor implementation of policies have caused this trend.



Source: ITC Trade Map

Figure 1. Food trade in Africa, 2001-2019.

There is need for formulation and implementation of agricultural food policies which will help combat this paradox. The major food imports are mainly cereals and its products, vegetable oils, sugar, dairy and meat products. With Africa being an importer of cereals, the Sub-Saharan Africa imports 37 percent of its cereals from Russia and Ukraine [11]. The current political impasse between the two countries adversely affects food security. Despite the imports in Africa, there still are some economies in the continent that have experienced rapid growth from the agriculture sector. South Africa is one of the examples.

South Africa has the most high-tech, successful, and diverse agricultural industry in Africa. In South Africa, agriculture generates about 5% of the nation's official employment, which is a low percentage compared to other African countries and is still declining. The sector accounts for about

2.6% of the country's GDP. The high potential land in South Africa accounts only for 3%, with only 13.5% of the country's land being suitable for agricultural production [12]. The main crucial crop in the country is grains and cereals, accounting for the greatest percentage of hectare under crop production. The production statistics of 2018 showed the production of sugarcane to be at 19.3 million tonnes, being the 14th largest producer in the world market. Maize production was 12.5 million tonnes, being the 12th largest producer in the world. The country is also a major producer of grapes, wine, oranges, pears, corn, wheat, soybeans and apples [13]. The well-established commercial farming industry, which in 2020 saw the strongest growth rate of all economic sectors at 13.1%, is the cornerstone of South Africa's agricultural economy. About \$10 billion of South Africa's overall export revenues in the year 2020 originated from the agricultural industry. The

highest value exports were citrus, wine, table grapes, corn, and apples. The imports from the agriculture sector during that year were \$6.3 billion. Thus, the value from exports were much higher than those spend in importation of the agricultural food commodities. The suitable climate experienced in the country favours agricultural production, with the country experiencing subtropical to Mediterranean climatic conditions. South Africa has adopted modern technology in agriculture. Such technologies include the use of drones, artificial intelligence, tractors, combined harvesters, investment in irrigation and automation of the farming operations.

Despite the country boasting of the most modern agricultural technologies in Africa, there still exists some threats in the sector such as the changing climatic conditions, challenges on land reforms, policy uncertainties, down grade on credit ratings, volatile exchange market rates and the global Covid-19 pandemic, which presently affected the sector. The country also imports the agricultural equipment from Latin America, Europe and the United States. There is need to address the issues of policy uncertainty, production input costs and credit costs to help ensure the economy is not negatively affected.

3. Agriculture Sector in Kenya

Kenya reckons on the agriculture sector as the bedrock of the economy. It contributes up to 24% of the GDP directly through agricultural production. It also contributes to an addition of 3% through agricultural manufacturing. Agriculture sector creates job or employment opportunities to more than 40% of the total population and 80% of the rural people in the country. The sector comprises of six sub-sectors namely; industrial crops, food crops, horticulture, livestock, fisheries, and agroforestry. With Kenya being one of the arid and semi-arid countries, the agriculture sector is also entitled with the responsibility of developing the arid and semi-arid areas. Kenya is a youthful population, with the 2019 population and census reports indicating that 75% (35.7 million) of the total population being below the age of 35 years. The elderly population, above the age of 65 years, accounted for 3.9%, representing a total of 1, 870,493 persons. This presents an opportunity for the growth of the agriculture sector. This is because the youth are considered to be energetic and can play a crucial role towards the prosperity of the sector. Despite this opportunity, there still exists a paradox. With the youth in the range of 18-35 years consisting of more than 35% of Kenya's population, less than 10 percent are involved directly in agricultural activities. They face the challenge of credit access. According to the ministry of agriculture reports, the average age of the farmers in the country is 60 years. This makes the process of adoption of modern technology towards the achievement of transformation difficult and costly especially given the fact that it is difficult for the elderly to gain

knowledge which is acquired through learning from extension service providers. The sector also provides employment opportunities to 75 percent of the women in comparison to 51 percent of the men. Yet, just half percent of the women have possession of their own farms. This creates difficulties in access to credit in formal financial institutions because most of them lack the collateral inform of land title deeds to secure credit. Through lack of credit, and hence insufficient credit, there arises a productivity gap between the women and men in the final agricultural output of up to 20-30 percent.

The government of Kenya through the ministry of agriculture has the aim to provide food security to all the nationals in the country. With the population estimated to be 47,564,296 people according to the statistics released by the KNBS after the last census in 2019, there is need to place much emphasis on the agriculture sector so as to be in a position to feed the rapidly increasing population. Around 10% of Kenya's arable land comprises of the high rainfall areas and produce 70% of the national commercial agricultural output [14].

The small-scale farmers are the main drivers as they dominate the agriculture sector. They contribute to 75% of the total agricultural produce and 70% of the agricultural produce which is marketed [15]. Small-scale farmers are those who operate farms with an average size of 0.2 to 3 hectares for producing purposes. However, their production is mainly for domestic consumption, though a proportion of their production is sold. Middle-scale farmers carry out production on farms averaging from 3-49 hectares and tend to be open to new technologies. Their production is mainly for commercial purposes. Farms with an average of 50 hectares for crops and 30,000 hectares for ranches are considered to be operated by large-scale farmers. They are mainly concerned with commercial production and accounts for 30% of the marketed produce.

The food trade in Kenya from 2019-2023 is represented in Figure 2. Just like in Africa, where the imports are greater than the exports, the imports are higher than exports in Kenya. Despite the overreliance on imports, there has been an increase in the value of exports in the country for the period under consideration. Kenya is an exporter of various agricultural commodities such as; coffee, tea, spices, mineral fuels and oils, edible vegetables and fruits. There have been fluctuations in the value of imports in Kenya for the period under consideration. The highest values of imports were recorded in 2022, and the lowest in the year 2020. Kenya's main imports are; mineral fuels and oils, industrial machinery, vehicle parts and accessories, iron and steel, electronics, vegetable fats and oils, and cereals. The top three countries which imports their products in Kenya are China, United Arab Emirates, and India, while the top three exporters of Keyan products are Uganda, Pakistan, and Netherlands respectively.



Figure 2. Food trade in Kenya, 2019-2023.

Figure 3 presents the agricultural output in Kenya over a period of five years from 2019-2023. The agricultural output has been increasing from 2019 up to 2021. In the year 2022, there was a slight decline in agricultural output which could have been attributed to drought in most parts of the country and depressed rainfall, resulting in decline in the production of various agricultural commodities. There was a great re-

covery in agricultural output in 2023, with the highest output level being realized during that year. The sector's performance increased in 2023 over 2022, in part due to government intervention in the form of fertilizer subsidies and the generally good climatic conditions that were seen across various parts of the country.

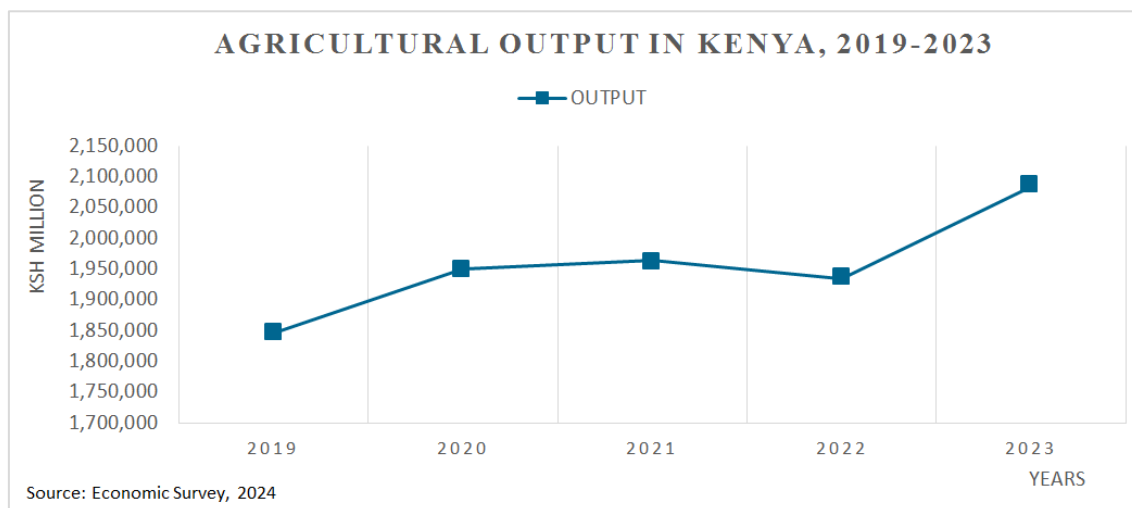


Figure 3. Agricultural output in Kenya, 2019-2023.

4. Agriculture Based Policy Reforms in Kenya

Good policy reforms are key for growth of a competitive agricultural country economy [16]. The policy reforms need not only to be formulated but also be implemented and put into action. The government of Kenya should set deliberate

government policies and strategies which will help diversify the economy and also boost in building competitive industries. From the experience of countries which have had a positive growth rate in agriculture such as Brazil, and which have turned their fortunes from being net food importers to becoming net food exporters within a short period of time, the government should formulate and implement policies which will help build up the manufacturing industries. This is attributed to the fact that the raw agricultural produce/ the semi

processed agricultural produce with which Kenya exports mainly are less competitive and yield low returns as those commodities are later imported back in to the country at high prices. If the agriculture sector grows, but with a constant or declining growth rate of industries, the agriculture sector will still remain under performing with regards to economies with rapid growth in industries. The GoK should focus on policies of scientific and technological advancements in agriculture as it is through advancements of these technologies and modernization of agriculture that improvement in productivity will be achieved.

4.1. Sessional Paper No. 10 of 1965 on African Socialism and Its Application to Planning in Kenya

It focused on prioritization of the agriculture sector in the country. Emphasis was shifted from concentration of the limited acreage under European settlement in to areas with great potential in African areas. The paper also focused on the land tenure system which aimed at ensuring that the ownership of the land was under the majority and not concentrated in the hands of the minority. It aimed at restricting the purchase of land by the netizens, other than for reasons in which the government made the approval. The economy transitioned from a subsistence economy to a monetary economy as the government had control over the natural resources and they were shifted from benefitting the Europeans to benefit the Africans. It aimed at political democracy and mutual social responsibility. The implication was that each person in the country is equal and not anyone would be in a position to have powers which would have an impact on the state. The concept of mutual social responsibility requires cooperation among the citizens for the prosperity of the country.

4.2. Economic Recovery Strategy for Wealth and Employment Creation (2004)

It was launched in the year 2004, following years of stagnation and negative growth with the major objectives of achieving economic growth, creating wealth, and employment opportunities. Through this, food security would be achieved and also eradication of poverty as people who were living below poverty level were estimated to be around 46.8% in the year 2005/2006. For economic recovery, ERS placed agriculture at the fore front for economic recovery and also placed great importance on the revival of agricultural institutions and also in investment in agricultural research and extension. Since majority of the poor people living in the rural areas depended majorly on agriculture, the highest priority was placed on the agriculture sector since through the improvement of agricultural productivity, poverty rate would decline and as a result, the economy would experience a positive growth.

4.3. Strategy for Revitalizing Agriculture (2004)

With the ERS focusing on the economic recovery and recognizing the importance of the agricultural sector in the recovery of the economy, SRA was implemented. The SRA outlined the government's vision for transforming Kenya's agriculture into a successful, commercially focused, and regionally and globally competitive economic sector that would offer Kenyans high-quality, meaningful employment. This was to be achieved through improved agricultural productivity with much emphasis on the conservation of the land resources and preservation of the environment. The SRA growth target of the agriculture sector was of 3.1% annually for the period 2003-2007 and to exceed 5% by 2007, but the sector exceeded the target as it reached 6.1% a positive of 3% in 2007. Post-election violence, global rise of fuel and fertilizer prices, financial crises, and global food crises however in 2008, disrupted this positive growth rate of the sector.

Interventions of SRA

- 1) Formulation of food security policies and programs
- 2) Improvement of access to both domestic and foreign markets
- 3) Improvement of access to quality inputs and financial services
- 4) Improvement of research, extension and advisory services
- 5) Evaluate and synchronize the institutional, legal, and regulatory frameworks
- 6) Restructuring and privatization of core functions of parastatals

With one of the ERS objectives being to revive agricultural institutions, this was achieved in the SRA as agricultural institutions which were on the verge of collapsing such as the KMC, AFC, Kenya Seed Company and Agricultural Development Corporations were revived. The successful implementation of SRA has indicated the need for private sector in agriculture sector, as sub-sectors which had little involvement of the government e.g., horticulture were resilient to external shocks and grew rapidly and also the essence of infrastructure development.

4.4. Vision 2030 (2008)

Following the expiration of the ERS in the fiscal year 2007–2008, the government introduced Vision 2030 in June 2008, with the goal of creating a nation that is competitive globally, prosperous, and has a high standard of living by the year 2030. Its goal is to make Kenya a newly industrializing, middle-income nation that offers all of its residents a high quality of life in a safe and secure environment. Kenya Vision 2030 has three main pillars: economic, social, and political. The economic pillar seeks to achieve and maintain an annual economic growth rate of 10%; the social pillar seeks to foster a just, cohesive, and equitable social development in a clean and secure environment; and the political pillar seeks to realize an issue-based, people-centered, and participatory po-

litical system. With the economic pillar aiming at achievement of an annual growth rate of 10% up to 2030, the vision 2030 has singled agriculture as one of the important sectors to attain the envisaged growth rate. The small-scale farmers therefore, need to be transformed from subsistence farming to start practicing commercial agriculture so as to achieve the growth rate needed.

Main Challenges Facing Agriculture Sector with Regard to Vision 2030

Productivity. The levels of productivity for many crops are below potential, while for some others it is declining or remains at a constant rate. Also, for some sub-sectors of the agriculture sector, such as fish and livestock sub-sectors, their productivity is below potential. With the rising population of the people in the country, there has been a rise in human-wildlife conflict. This is because people carry out deforestation programs by clearing forests so as to create new lands for settlement and for agricultural farming.

Land use. The under-exploitation of land for agricultural production both in high and medium potential areas, and also in arid and semi-arid lands remains a great challenge facing the agriculture sector. For instance, the rural people, who are majorly involved in agriculture use only 60% of their land for agricultural production, showing the underutilization of the land for agriculture.

Markets. The challenge of accessing the input markets and the lack of post-harvest services are some of the challenges which are faced in the agriculture sector resulting to low productivity. In order to increase Kenya's bargaining power in the world agricultural markets, the vision 2030 calls for efforts to create new markets and also maintain the existing markets.

Value addition. It is critical to ensure the competitiveness of the agricultural commodities in our country. The lack of value addition reduces the competitiveness of agricultural commodities and this is a challenge facing agriculture sector in Kenya as 91% of agricultural commodities exported to other countries are semi processed.

4.5. Agriculture Sector Development Strategy (2010-2020)

It is a national policy document for all stake holders in the sector ministries in the country. The ASDS outlines the characteristics, vision, mission, opportunities and interventions to be undertaken to move the agricultural sector to the future. As a result of the success of SRA, the ASDS has included the lessons from the success of SRA to provide a suitable frame work to propel agricultural growth and development. The ASDS proposes policies which should be adhered to by all stake holders to ensure agricultural potential is achieved. The main goal of the strategy is to reduce the unemployment and poverty levels, while at the same time achieve food security. Commercialization of agricultural produce, increasing agricultural commodities and the com-

petitiveness of the products are other objectives. The Strategy places a strong emphasis on agricultural economic growth and considers regional and global initiatives like the Comprehensive African Agricultural Development Programme (CAADP), which acknowledges the role of agriculture in accelerating economic growth in African nations. It also focuses on improving access for farmers to financing and affordable inputs [17].

Strategic areas of intervention in agriculture sector

- 1) To strengthen the institutional framework
- 2) Creation of a favourable environment for commercial activities
- 3) Identification of public and private sector roles in improvement and supporting services delivery
- 4) Strengthen market efficiency
- 5) Mainstreaming planning for agriculture development in other sectors

4.6. Agricultural Sector Transformation and Growth Strategy (2019-2029)

The ASTGS is a 10-year strategy which reviews the present status of agriculture through review of data, lessons from successful agricultural countries in the world, and even in the local environment. Through this, advancements will be made towards achievement of food security. Food security involves the ability of the citizens to have access to affordable nutritious and sufficient food. This is with regards to the constitution of Kenya which states that every citizen has a right to food and nutrition security. It also states that they are free from hunger, and have access to adequate food of acceptable quality. Countries have transformed themselves to upper middle-income status countries through transformation of their agriculture sector, with exception of Singapore and Hong Kong. And with millions of Kenyan citizens relying on agriculture to boost their income levels and achieve food security, it calls the need for transformation and modernization of the sector. The ASTGS has been formulated to transform the country into a powerhouse and eliminate the paradox which exists in the country. The ASTGS is based on the idea that a thriving, competitive, and modern agricultural industry is necessary for ensuring food security in a sustainable manner. Food security will be achieved through investments in the agriculture sector. The strategy is anchored into achieving the following goals within the first five years of implementation: increment of small-scale farmer, pastoralist and fisherfolk incomes, raise the output of agricultural produce and value addition, increment of house hold food resilience by reducing the number of the food insecure Kenyans from 2.7 million to zero. Under the three anchors, there are nine flagships which support them. With the many value chains produced in the country, the ASTGS focuses on analyzing the value chains with regards to their income potential and their ability to help attain food security. This is based on the fact that different value chains generate different levels of incomes; so, their

potential differs. Some of the main value chains with high potential of generating income and dietary diversity are horticulture, potatoes and poultry. The process of identifying the best value chains involves identifying what Kenya currently grows well and also what can be grown well. The ASTGS identified 13 value chains to achieve agricultural transformation namely staples (maize, potatoes, rice and beans), horticulture (fruits and vegetables), livestock and fish (beef, poultry, camels, sheep/goats, fish and dairy). Despite few farmers being involved in production of cash crops, the ASTGS places great significance on various cash crops to achieve the transformation in the agriculture sector [18].

The ASTGS focuses on agricultural productivity and market access for the small-scale farmers. The strategy also addresses the issue of food security and nutrition towards ensuring a healthy population adaptable to the climatic change conditions and fluctuations in food prices. Agricultural transformation involves the change of farmers from farming in to more productive jobs i.e., in agricultural value chains or away from agriculture and the change in the demand of agricultural products to consumption of more processed foods, proteins and fruits and vegetables. To achieve agricultural transformation in the country, the strategy calls for the need for coordination in agricultural policy reforms between the national and county government and mobilization of resources in agricultural research and extension services. The strategy presupposes that 2 percent of the GDP should be dedicated to research and innovation. In order to achieve the transformation, the ASTGS has outlined the following ministries to help achieve it:

- 1) Ministry of agriculture, livestock, fisheries and irrigation
- 2) Ministry of devolution and ASAL areas
- 3) Ministry of environment and forestry
- 4) Ministry of industry, trade and cooperatives
- 5) Ministry of lands and physical planning
- 6) Ministry of transport, infrastructure, housing and urban development
- 7) Ministry of water and sanitation
- 8) The national treasury

Challenges facing agricultural transformation

Low budget allocations in the agriculture sector

Agriculture sector is an important sector towards its contribution to the GDP of the country. The sector accounts for more than a third of the GDP. In the 2022/2023 financial year, 46.7 billion out of a budget of 3.31 trillion was allocated towards the achievement of food security. This value was relatively low in comparison to the contribution of the sector towards the overall GDP of the country.

- 1) Limited capability for performance management
- 2) Lack of accountability

A country will have achieved agricultural transformation if the income of its citizens rises, productivity increases, the national agricultural output increases and poverty rates declines.

5. Methodology

Qualitative research design was adopted. Different agricultural policy documents in the country have been used in the review of agricultural policies from the pre-colonial period up to the present. From the review, policy concerns and conclusions on what needs to be done to achieve agricultural transformation have been made.

6. Key Policy Concerns

- 1) Secure business environment and security of the citizens-The government should put in place measures which are aimed at achieving security to the citizens through creation of an enabling business environment. The secure environment will enable the farmers conduct their farming activities in a friendly environment. They will be free from external shocks which have a high potential for causing declined productivity.
- 2) Development of infrastructure-Given the perishability nature of most of the agricultural commodities, well developed infrastructure facilities are crucial towards avoidance of spoilage of the produce. Good roads, railways, air and water transport are key towards the prosperity of the agriculture sector. The roads connect the farmers to the market. Through well-developed infrastructure, the farmers can easily access the farm inputs in the market. In addition, the produce will move efficiently and easily to the final destination where consumers are.
- 3) Transformation of key sectors-Transformation of key sectors requires modernization of the key sectors such as agriculture, industry and service sectors. Through this, maximum productivity gains will be achieved.
- 4) Climate change policies-Climate change policies aimed at conservation of the environment and the achievement of required forest cover as per the Kenyan constitution. The present percentage of forest cover in the country is 7.2%, which is below the 10% required by the constitution. To help achieve this percentage, there is need for coordination between the national and county governments to help ensure more land is set aside for forest cover. The government intends to plant five billion trees in the next five years. In order to achieve this target, Kshs 10.2 billion has been set for conservation of forests and the water towers in the country during the 2022/2023 financial year.
- 5) Support of devolved government system-This will be achieved through timely disbursement of funds. This is crucial as the devolved governments will focus mainly on their key areas with great potential of generating income, hence high levels of growth. Effective monitoring and evaluation reports should be made on how the resources are used to help ensure no embezzlement of funds.
- 6) Research and development-Research and development in the agriculture sector is crucial towards increased

agricultural productivity. The government, through the ministry of agriculture, should focus on research, by providing support to the research institutes such as KALRO. Through this, seeds favouring the climatic conditions can be introduced causing increased productivity. Investments in research and development can help also in chemical spraying, through introduction of drones. In addition, farm machinery can be help in the purchase of modern farm machinery such as tractors for tilling the land.

7. Conclusion

Implementation of the good agricultural policies is crucial towards boosting the agriculture sector. The implementation will help in the achievement of the goals on food security to the citizens in the country. Food security has been presently a point of concern especially given the rising concerns of climate change. With the adverse effects of climate change, vulnerability of the people will be increased. This is exacerbated by the fact that ASALS regions constitute of almost 89 percent of the land area. These areas are mostly underutilized and in order for the regions to reach their maximum potential, irrigation agriculture should be encouraged. Policies focusing on irrigation agriculture should be formulated and implemented. Quick measures should be taken, given that only 11 percent of the small-scale farmers have access to irrigation farming. With the current policy document focusing on the transformation of the agriculture sector, agricultural processing industries should be developed. Also, those which exist and are on the verge of collapsing or have already collapsed should be revived. Good accountability should be made a priority to help ensure that value addition is made possible. Through agricultural value addition, the agricultural produce will attract higher prices. Thus, the contribution of the sector in the GDP of the country will increase.

Abbreviations

FY	Financial Year
ERS	Economic Recovery Strategy
SRA	Strategy for Revitalizing Agriculture
ASDS	Agriculture Sector Development Strategy
ASTGS	Agricultural Sector Transformation and Growth Strategy
KALRO	Kenya Agricultural and Livestock Research Organization
ASALS	Arid and Semi-Arid Lands
GDP	Gross Domestic Product

Author Contributions

Wambua Samuel Muuo: Formal Analysis, Investigation, Methodology, Visualization, Writing – original draft

Samwel Wambua Katungu: Conceptualization, Data curation, Resources, Validation, Writing – review & editing

Conflicts of Interest

The authors declare no conflict of interest.

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