

EXPERIMENTAL RESEARCH

Comparative analysis of China and Nigeria agricultural reforms in the advancement of food sustainability on a national scale

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Due to the rapidly growing population of China and Nigeria, a top government objective is ensuring food security. Dietary security is the ideal in which everyone has physical, social, and economic access to adequate requirements and food preferences for a healthy and active life, according to the Food and Agriculture Organization of the United States (1). The differences and similarities in reforms regarding agricultural policies, programs, and structure of Chinese and Nigerian nations are discussed and analyzed. This study also correlates the findings between the two countries. It investigates, enhances, and deepens the understanding of various reforms in the countries. Its strengths, weaknesses, and impacts on agricultural production were also appraised; a conclusion and recommendations were drawn as a result. The data source method was purely secondary, and the theoretical modernization framework was adopted to deepen the understanding of the social edifice.

Keywords: comparative politics, agriculture, reforms, food security, China, Nigeria

Introduction

Since the 1949 Revolution, when Mao Zedong Tse-Tong transformed China from an Agrarian society to an industrialized economy, the idea of actualizing food security has always been a mirage. Urbanization due to technological advancement in China in the 1960s caused a decline in production. Still, in the early 1980s, several reforms had further enabled farmers to embark on the farming profession to raise productivity (2). After the Household Responsibility System was introduced, the collective farming policy was discarded. In 1978, Deng Xiaoping, the Communist Party leader, initiated China's Rural Reforms to boost agricultural output, allow enterprises to use farm labor, reduce poverty, and improve the quality and amount of food consumed. The particular plan comprises promoting additional rural financial growth, supporting land transfer, and providing technical help to farmers, particularly those in rural areas who were wholly engaged in agriculture. The policy reform has aided in revitalizing and shaping the agricultural sector.

For Nigeria, the activities of the colonialists in the early 19th century disarticulated the traditional society commonly characterized by food crop production and little cash crop production for barter trade to mainly cash crop production in the quest to get a cheap and steady supply of raw material for the industries in the colonialist countries (3). In the colonial era, over 75% of Nigeria's annual revenue was accrued from agricultural export commodities such as oil palm, cocoa, groundnut, and rubber Ekpo and Egwaikhide (4).

Food crop production is at a crossroads to ensure food security in the two countries. Several policies and programs have been initiated from pre-colonial to post-colonial times. The strands of programs include the Tax and Quota policy, Farm Settlement Scheme, Green Revolution, Operation Feed the Nation, Fadama program, National Special Programme for Food Security, Agricultural Transformation Agenda, and Agricultural Promotion Policy. Still, at one time or another, a few programs have been initiated by both governments to improve productivity. Apart from the policies that distorted food crop production in the 1970s, the emergence of the oil

boom further caused a decline in agricultural output due to neglect of the sector. The discovery and exploration of oil in commercial quantities in 1958 was another event that caused negligence in both food and cash crop production. Some third-world countries, such as Singapore and Malaysia, once rated in the same strata and strength as Nigeria, now have a more prolific output and have contributed massively to their respective economies' economic growth (5).

Review of empirical literature

Why reforms in the sector?

China's population exceeds 1.36 billion; in Nigeria, over 200 million people consider feeding their people the most important goal for the country's economic and social growth (6). As mentioned earlier, both countries' agricultural sectors continue to modernize in the quest to actualize the goal. As countries develop, the attention allocated to agriculture should be transformed to suit contemporary demand. With this effect, changing the sector is very consequential with the view that some fundamental problems with the structure and mechanism must be fixed to curb the emerging challenges to usher in the desired result. To increase output, farmers need to have the necessary abilities, from subsistence to a commercialized level, to increase commodity production and generate economic revenues.

Reforms in the sector

Land tenure reform

Land reforms involve changing land ownership laws, regulations, or customs (7). This comprises property redistribution on agricultural land that is initiated or supported by the government. Agricultural activities have moved from labor-intensive to capital-intensive modes of production (8). In China, villages and subvillage levels collectively control their rural land. Typically, it is categorized based on its purpose, importance, and availability. Among the factors of production, land has various uses. Fertile arable lands are mainly used for agricultural commodity production. Land could also be used for other purposes, such as infrastructural development. The government of China has sought to promote large-scale farms Central Committee of the Community Party and the State Council (9). Farmland is consolidated into large plots to allow for greater automation and more efficient use of resources, and this aim can only be achieved by taking steps to promote the development of the market for the transfer of rural land rights for agricultural outputs.

The land size allocation is dependent on the size of the household or the availability of labor, with land usage

confined to agricultural uses. The initial length of land allocations/contracts was 5 years, followed by extensions of 15 years in 1984 and 30 years in the late 1990s (10). In China, land allocation is characterized by inequitable distribution of land holdings, a process that has created a number of problems for agricultural goods. China started implementing governmental measures to ensure food security, including a "red line" requiring farmlands to remain above 120 million hectares to fulfill the goal of 95% grain self-sufficiency.

Table 1 and Figures 1–5 shows that the stipulated size of China's average farm is between 0.5 and 0.6 hectares compared to other countries of the world. In 2012, China had 0.6 hectares, the smallest average farm size compared to some countries under a government experiment. To consolidate at least 5,000 farmer cooperative associations, Hukou Reform provided subsidies and hectares of arable farm-land, which was able to sustain 95% grain self-sufficiency; this, in turn, increased the income of the farmer, both the smallholders and commercial farmers concerning the forces of demand and supply (12). But Nigeria is lagging in food grain production except for rice grain production (13). In 2014, the rice production measured 6.2–7.5 million metric tons; in 2017, the production reduced to 6.61 mmt; in 2018, it recorded 6.81 mmt; and in 2019, it stepped down to 5.1 mmt; compared to its production capacity of 2.5 mmt in 2006 (11).

The statistical report showed that periods recorded applaudable production and confirmed reductions in productivity at one time or the other.

Hukou reform

FAO (11) reported that China has the smallest farm size per hectare; as such, it has initiated the Hukou reform

TABLE 1 | Table of farm size.

Country	Average farm size (hectares)
Brazil	73
Columbia	25
Ghana	1.6
India	1.3
Indonesia	0.8
Japan	1.2
Kenya	0.5
Malawi	0.4
Niger	2.9
Nigeria	0.5
Thailand	3.2
Turkey	3.2
Uganda	0.5
Vietnam	0.7

Country average farm size (hectares).
Source: FAO (11); Huang et al. (10).

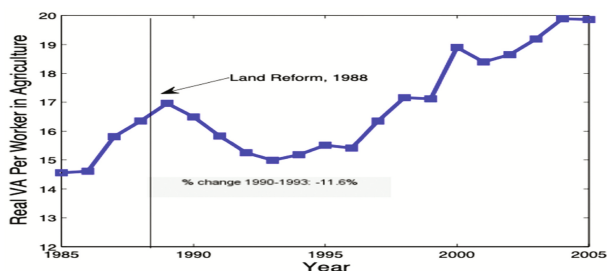


FIGURE 1 | The effects of land reforms on farm size and agricultural productivity.



FIGURE 2 | Indigenous crops: a lucrative business for some, an unaffordable luxury for others.



FIGURE 3 | Smart farming. Growing crops and harvesting plants with futuristic technologies, drones on field and GPS vehicles.

to improve land resource allocation by promoting the rural adjustment process to reduce the migration rate. Rural laborers who wanted to relocate to urban areas were subjected to discrimination under China's household registration system (Hukou) centers and scrambled for white-collar jobs, abandoning farm work due to a lack of basic social amenities (14).

More than half of the migrant workers in China in 2013 lacked an employment contract. The Hukou system increased disparities between urban and rural areas by restricting urban migration and encouraging infrastructural investment in rural areas. One significant challenge of the Hukou reform was that it "funded" no new provision of public service and infrastructure to the rural dwellers; consequently, the reform could not achieve its statements.

A land tenure system is a manner in which a party occupies or holds some areas of land; it entails land access or control of

land through land ownership. This practice varies within or among communities, regions, and countries (15). Although in Nigeria, the 1978 Property Use Act nevertheless protects the current title and rights to possession of the land, it offers a new standard tenure structure. The government's mantra is to diversify agriculture and optimize the value chain in the agricultural sector. The Nigeria land system has been compounded by the Property Use Act of 1978 to distribute arable land to users for agriculture and other purposes (16).

Redistribution of land from an individual to a group, community, or person is the most prevalent sort of reform (17). According to the Act, a landowner may own the property for a maximum of 99 years. Land ownership can raise the scale of operation by expanding or contracting the farm; expansion means either adding to the holding or consolidating the scattered arable land, or vice versa. Redistribution's effects vary according to its structure and the limitations placed on it. This redistribution tool's drawback is that it can result in small-scale farms, which might impede advancements in technology, capital investment, and diversity.

Comparing the reforms in land distribution and acquisitions, the period of acquiring and use of land in Nigeria is 99 years. At the same time, China's land allocation and utilization have been reformed from 15 to 30 years. Despite the elongated timeline for land acquisition and use, its impact on the Nigerian agricultural sector is not much felt due to several impeding factors.

Subsidy on farm inputs

Farm inputs are required in farm production and are classified as fertilizer and chemicals, seeds and planting materials, and machinery and equipment. In comparison to Nigeria, China uses more nitrogen fertilizers per unit of arable land. Because of government incentives, such as the exemption from the value-added tax on nearly all fertilizer products and grants for fertilizer transportation, artificial manure is likely used excessively in China (10). Small-scale farming, a lack of technological know-how, and an increase in agricultural farmers are further causes of overuse; this has also shot up the cost of production. Furthermore, land policies that encouraged land transfer from mediocre farmers to specialized agriculture producers were introduced to reduce the excessive use of fertilizer. Technical assistance for farmers and a hike in price distribution from the fertilizer market were also introduced to curb the challenge.

In response to rising concerns for farm income and food security, China has initiated a direct seed subsidy program, traditionally given to seed producers in order to create premium or innovative seed varieties. The seed variety subsidy policies aimed to offset the rising production cost to grain producers. It can be adjusted based on the principle of demand and supply of agricultural inputs and

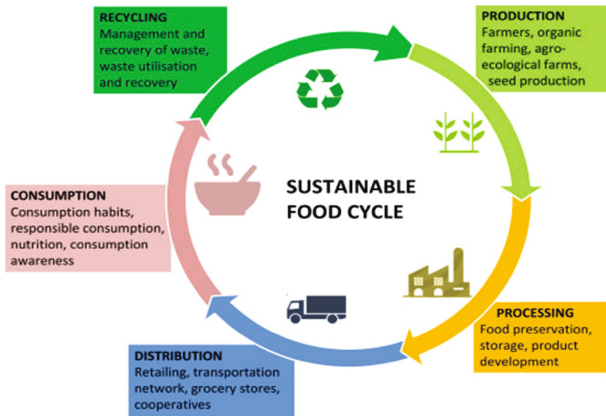


FIGURE 5 | Sustainable food cycle and its components.

outputs. Several policies have encouraged the modernization of agricultural production and supported earnings in rural areas, including subsidies for new crop varieties and machinery purchases. According to the machine purchase subsidy, buyers get a 30% discount on approved equipment, albeit the amount they may spend on the item cannot be more than 50,000 RMB (18); the list of these products is changed every 3 years.

Oseni and Winters (19) asserted that low agricultural productivity had been attributed to everyday fertilizer use. In 2017, the International Fertilizer Development Centre predicted an exponential increase in fertilizer consumption by Nigerian farmers by 63%, rising from 954,364 metric tons in 2016 to 1,564,816 metric tons because of a remarkable improvement in the local blending of the input subsidy under the Presidential Fertilizer Initiative (PFI) of the government (11). The rise in fertilizer usage is linked to the Federal Government’s PFI program, which was designed to increase local manufacturing of fertilizer through the revival of the moribund blending plants and conceivably establishing new ones.

Farmers in Nigeria face significant hurdles in the usage of local seed systems on a large scale for better varieties developed through biotechnological methods. In many developing nations, informal seed networks, such as farm- saved seeds, farmer-to-farmer seed exchanges, and seeds acquired from local marketplaces, provide the majority of the seeds used in farming (20). The informal seed system, in most cases, plays a significant role in conservation. It meets the desire for inexpensive inputs while preserving regional landraces and other priceless genetic resources. However, the seed supply frequently falls short of expectations. Additionally, the seeds provided by the official production and distribution networks are usually more expensive and inaccessible to farmers with modest incomes. Government help in underdeveloped nations may take into account offering financial incentives (subsidies) to farmers to persuade them to plant higher-yielding varieties that will ultimately earn the farmer more money.

However, the allegation of corruption, abuse, and lack of benefits for the farmers has propelled the government to monetize the subsidies to farmers; as such, the value of improved seed subsidies has increased rapidly, rising ten times between 2004 and 2012 (21). However, this has promoted megafarm size and yields among farmers in developing nations.

Finance

Farmers need capital saved or made available for farming purposes to grow its value over time. The farmers in China’s agricultural sector are also embedded with the problem of accessing financial aid to boost production. Economic reforms in the industry have been evolutionary rather than revolutionary, characterized by pragmatism and gradualism. China’s 2009 Rural Policy Review highlighted the significance of continuing reform to increase funding available to boost agricultural products in rural areas (2).

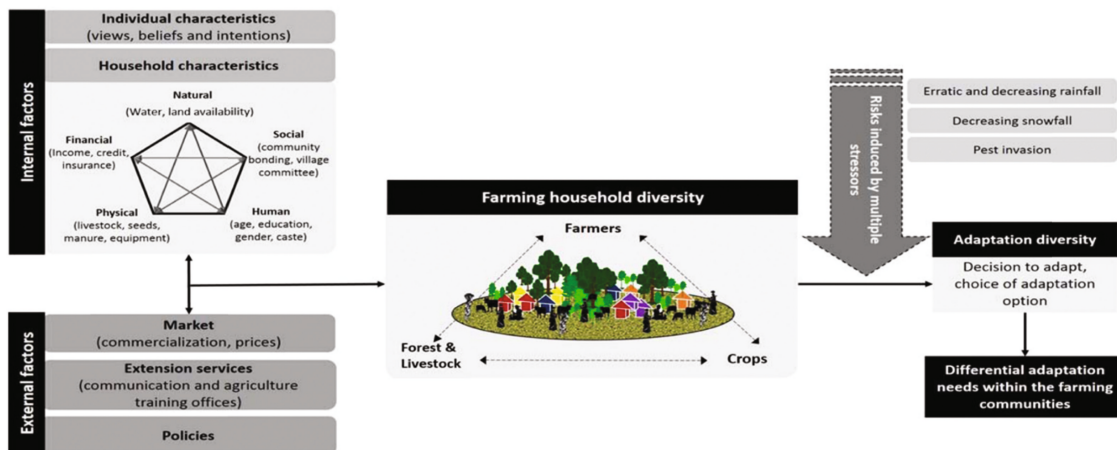


FIGURE 4 | Farmer typology to understand differentiated climate change adaptation in Nigeria.

The rural financial system has undergone a significant restructuring from 1978 to date. In China's provinces, the Rural Credit Cooperatives, which had dominated the lending industry during the pre-reform era, were progressively transformed into Rural Commercial Banks and Rural Cooperative Banks. These banks are required to provide a specific portion of their lending portfolios to agricultural goods (22).

Over the years, China has also introduced various microloan schemes to enhance financial regulating restrictions under the government to discourage non-secured lending (23). This scheme has provided funds to small and medium-scale farmers to accelerate production. However, the reform is bound by constraints like delay in securing the loan, bottlenecks in the bureaucratic process, fund misappropriations, and non-compliance with the payback period.

The evolutionary stages in Nigerian agriculture have called for reform in finances. Farmers in the feudal era could source funds from personal savings (owners' equity), friends, and relations. Aftermath, aside from individual efforts, Farmers' Cooperative Societies and local money lenders are another resort. Seemingly, in Nigeria's agricultural sector, farmers at all production levels need funds from the designated financial institutions, agricultural banks, and other stakeholders to support farming activities. The typical range of lending rates is still 10–30%. However, the borrower is still regarded as prime and has access to low-cost financing options offered by the government at a less than one-digit interest rate of 9% through government-designated policies, especially in conjunction with the Central Bank of Nigeria and the World Bank (24).

Farmers can now access loans or grants via agricultural banks, banks of industry, commercial banks, or microfinance and credit institutions. Most production systems are enshrined with inevitable lags between investments in the inputs (such as machinery, seeds, fertilizers, packaging, and stocks) and proceeds from the outputs. During these lag periods, some individuals or institutions must finance the investment. Farmers are constrained from financial aid from designated institutions due to strict lending conditions and requirements Eluhaiwe (25). The monetary policy reforms for both countries run in parallel and have similar characteristics; thus, financial institutions are involved in providing funds to farmers but are constrained by similar factors reported in the case of the farmers in China.

Contract farming

The reform in the farming system ushered in the contract farming model; this happens when a farmer and a buyer reach an agreement under which the farmer commits to produce a product in a specific manner and the buyer agrees to acquire it at a specific date. The farm's produce must

adhere to particular requirements, and the buyer frequently offers the farmer's inputs like fertilizer, loan options, and technical support.

First, it establishes a direct distribution route between farmers and the market. Second, it can relieve financial limitations by supplying inputs and loan options via a financial institution to confirm that a farmer has a reliable income. Third, extension services for farmers guarantee cutting-edge technology and best practices. Last but not least, it does increase food security by enforcing standards by the customer (26). Smallholder farmers make up a sizable portion of the farming population in China, and the government uses contracts to bridge the gap between their requirements and those of market farming. In contract farming agreements, the government frequently plays a crucial role in forming connections between the purchasing company and farmers. The participating businesses are required to offer technology and training, and they also get special benefits such as access to land and government loans (27). The government acquires food reserves to support local production in the event of a surplus.

In Nigeria, farming support is not readily available to reach farmers at the needed time and place. Nigeria's farming system has an iota of contract farming but has been appropriately defined as such; accessing assistance from the government is difficult except for a few off-takers who engage in this practice to actualize specific values. Farmer's involvement with firms and off-takers faces technical and institutional challenges, such as planting period, high production cost, and specifications. Difficulty in accessing funds and sometimes, on the part of the farmer, a breach of contract specifications due to "majeure force" could also result in low commodity productivity.

In China, the contract farming model is practiced mainly by the parties; thus, there is reasonable government participation in the farming arrangements via legislation to ensure sanity and transparency. However, this farming model is not commonly practiced in Nigeria. Several studies reviewed that farmers under contract farming are relatively better off regarding net production, returns, and welfare (28).

Innovation in China's agricultural sector

The productivity of China's agriculture industry has benefitted from policy environments that promote innovative capability in addition to changes that improve resource allocation. Innovations' potential to increase agricultural productivity has made a desirable impact. Agricultural invention also encompasses exposure to new foreign technologies and intelligent agriculture across the country-side in China. In the case of stored grains, technology has helped to fast-track the processes. These include sampling, weight measurement, and unloading (10). For instance, while Sinograin China Grain Reserve Company

has invested to ensure sound administration and high quality of China's Grain Reserve, more should be invested in scientific and technology research (artificial intelligence), the deployment of the Internet of Things, Big Data, and other technologies. China has also advanced in the fields of agricultural breeding, crop genetics, crop biotechnology, and crop evolution.

The Chinese nation transformed the traditional way of trading farm produce into e-commerce to build and support modern cold-chain logistics networks for fresh produce and quality agricultural products; it has shortened the chain from farm to fork. In this way, farmers can sell directly to consumers; knock off the involvement of intermediaries to maximize profit (3). Rural development has increased the presence of foreign investors; foreign direct investment has aided in providing modern technologies, facilities, and infrastructures to enhance production and encouraged entrepreneurial activities to reduce unemployment (29).

To effectively serve the requirements of the farmers, the conventional agricultural extension program must become more contemporary. The likelihood of food losses and product contamination will decrease as farming techniques become more advanced and new technology is more integrated into the food production process. Nations seek to diversify their economies; the advancement in agriculture has called for the use of biotechnology to improve crop seed production via genetically modified organisms (30). Therefore, technology uptake is an abiding concern for improving food security, even for small-scale farmers.

The Agricultural Transformation Agenda is a set of agricultural policies and programs that have supported Information Communication Technology (ICT) by promoting target impact subsidies through e-wallets. Its policy thrust supports e-commerce and trading to make agricultural marketing more efficient and communicate effectively (31). ICT has given rise to the global information highway and reduced the world to a global village. Electronic commerce/business systems are rapidly replacing the traditional modes of payment and business that involve personal contact between buyers and sellers. For example, the electronic payment system entails online financial transactions that utilize a digital financial device such as an e-token, e-cash, and checks (32).

Regarding technology, strands of the literature showed that China is more technologically advanced. As such, Nigeria needs to involve in systematic Research and Development (R&D) to create a positive change in the system via vital innovations. To buttress this point, Igwe (33) established that poor farming technology is another factor that has impeded the performance of the agricultural sector in Nigeria. This technological backwardness encompasses a lack of modern farming methods and storage facilities. In his argument, facts were gathered from existing literature; as the numeric values to supply information on the magnitude of

the poor technological impact were not given, the gap was somewhat generalized.

Food storage and safety

Given the efficient use of rural land, reducing food losses in agricultural goods will increase productivity and farm revenues. Inadequate agricultural storage, infrastructures, and capabilities frequently lead to production losses and food waste from the farmer to the consumer level. Over the past few decades, there have been multiple occasions when food safety issues have increased, including when residues of cancer-causing medications supplied by farmers in turbot were discovered in Beijing and Shanghai (12). Because customers believe they are harmful, the health risk has increased the rate at which alternatives for domestic items are imported. As an illustration, as a result of the widespread infant formula contamination in 2008, demand for imported baby formula products increased and began to displace domestic products. Consequently, farmer education and modernization of production may increase the market for Chinese agricultural producers and raise the dangers or after-effects of the technological enlightenment.

The recently proposed legislation will sort out such a challenge that will strengthen the responsibility for important activities involving food security and sustainability.

Statistics have shown that the pre-harvest losses of grain in China are often estimated to be approximately 7% of the overall production, with many losses related to pests and calamities. Losses after harvest are about 5% of the production (5). Due to poor handling and storage facilities, 7% of the outputs are lost (34). Farmers who do not understand effective pest management and seedling practices may experience pre-harvest losses. In contrast, inadequate or subpar storage facilities may be the cause of post-harvest losses. This statistical result reflects why the government and approved organizations handle most of China's grains.

The food loss in China can also be attributed to the overuse of chemical fertilizers in the production process against organic manure. The government's commodities can be protected amid food storage; the accommodation of governmental organizations like the China Grains Reserves Corporation (Sinograin) or commercial enterprises manage the reserves. Government subsidies cover the storage and operating expenses for these businesses to increase food security and ensure the availability of the commodity. In the case of a glut, the grains are purchased at a particular policy price to reduce price volatility in the agricultural market.

Such storage facilities are capital intensive to construct and manage because of their sensitive nature and characteristics in mechanical ventilation, interior temperature regulation, and electronic temperature measurement. A daily check, intelligence monitoring, and prediction of the safety of the

food stored would aid the continuous rotation of food crops with a drastic reduction in losses from infestation or moisture damage; this, in turn, increases the income of farmers. Consequently, hundreds of modern, high-calibrated agricultural technologies have been erected for smooth farming processes.

Guei et al. (35) argued that lack of knowledge, technical capability, and logistics for timely delivery of advice to farmers describe the majority of extension services in Africa; Nigeria is not an exception. Food storage is very imperative along the value chain to ensure safety in the harvested agricultural produce. Nigeria must quickly implement innovative storage solutions throughout its agricultural sector, given the post-harvest loss rates of up to 60% for perishable commodities that are now the norm. Nigeria recently spent 66 billion Naira to build 33 silo complexes, 25 grain aggregation facilities, and 9 Blumberg warehouses, which have now been privatized under a concession. The initiative seeks to hold 5% of the nation's production in storage, with varying degrees of completion or output (13); this will not guarantee food security throughout the year in Nigeria. This storage facility could be expensive for farmers to adopt against government-public enterprises.

The Nigeria Stored Products Research Institute (NSPRI) is saddled with the responsibility to enable better and more efficient agricultural storage facilities to curtail losses that farmers incur from improper handling and storage after harvest. Post-harvest losses in fruit and vegetables are about 50% annually (24). The institute developed the Evaporative Cooling System, a "self-chill solar cold-room" powered by solar, for storing fruits and vegetables for about 2 weeks. Another alternative to preserving fruits such as tiger nuts, dates, and vegetables to ensure availability all year round is by drying using the appropriate drying technology to avoid excessive loss of food value and nutrients. NSPRI has a patent on Inert Atmosphere silos, which store large quantities of grain over a long period of time. The institution also has a patent on NSPRIDUST (non-chemical pesticide), which could also be called bio-pesticides and is much safer than chemical pesticides, to ensure sustainable development in the sector.

The 60–7% gap in food loss between China and Nigeria is enormous. Nigeria's efforts to achieve adequate food storage and safety are pretty applaudable, but much must be done to improve the food value chain. China's technology in ensuring food safety is innovative-driven because of the use of artificial intelligence in monitoring the storage well-being of the products to ensure long-term food security and sustainable development. Innovative ideas and smart agriculture are worth rivaling to achieve the desired aim.

Factors impeding reforms in the agricultural sector

Environmental degradation

China's grasslands continue to deteriorate despite recent government reforms, which have an impact on long-term economic and ecological aspects. By acting as a carbon sink, vegetation reduces storms and soil erosion while also helping to balance greenhouse gas emissions. Recently, China implemented regulations, including the "Grassland Protection Mechanism," which aims to restore damaged grassland to lessen grazing and provide herders with remuneration (12). The sustainability of China's grassland resources is severely threatened by the issues of overgrazing, deforestation, and pests. More than one-sixth of the grassland in the nation was unusable in 2013. The pressure on grazing pastures might get worse in the next few years due to the rise in livestock output and the rising demand for animal products (2).

Reducing animal livestock and encouraging farmer education about proper species selection are crucial in relation to the problem of environmental degradation. The ability of a grassland patch to collect and store greenhouse gases may now be measured using new techniques (6). With the use of this innovative technique, farmers who restore grassland regions might get government compensation in exchange for the decrease in emissions that occurs in non-agricultural enterprises and agricultural tourism.

Soil acidity is another problem that led to the long-term use of inorganic manure for crop production. Subsequently, in the next few decades, the country is anticipated to increase its market share in aquatic creatures and fish because of nitrogen run-off that can influence lakes, rivers, and coastal waterways (6). The supply of drinking water may be potentially impacted by this pollution. In China, the chemical fertilizer sector has contributed to the release of air pollutants and greenhouse gases (36).

Infrastructural development

Infrastructural decay in Nigeria's agricultural sector, like China's, has posed many challenges to farmers. Inadequate infrastructures such as roads, electricity, and market and network systems have also impeded agricultural activities in China's agricultural sectors. Aside from supporting farming activities, it also helps to enhance the livelihood of rural dwellers. The central government mainly funds China's rural infrastructure; the unit cost tends to be lower when village elders manage the building themselves (36). The reforms on land can have much impact before the availability of social amenities to support youths venturing into a farming career. In the same vein, infrastructural access has caused unsteady poverty and food insecurity in Nigeria.

The Rural Dibao program in China has an institutional framework committed to modernizing agriculture and the rural economy by 2050, which attempts to increase income, usually by giving households a one-time payment in the amount of the gain plus a predetermined minimum. The number of beneficiaries increased to 50% between 2007 and 2010 and to 65% in 2013. According to Golan et al. (37), the instances of corruption reported in the administration sector have been logged, and as such, rigid policies have been outlined to control this threat. Nigeria's government is silent on rural revitalization to encourage a farming career in rural areas. Most of the nation's able-bodied youth migrate to city centers in search of menial or white-collar jobs to earn a living, abandoning farming due to a lack of modern farming implements and social amenities.

Conclusion

Modernization is a lengthy process that is evolutionary and not revolutionary; it may take generations or even centuries to be actualized; thus, this has brought about a paradigm shift in the development of traditional society. Modernity policies intend to raise the standard of living of the vulnerable, which often consists of disseminating knowledge and information about more efficient production techniques. For example, agriculture modernization involves encouraging farmers to try new crops, advancing production methods, embracing technology, and widening marketing skills Ellis and Biggs, (38). Agricultural practices are consequently considered contemporary when they exhibit particular pedigrees, and the degree to which they exhibit indicates the notch of modernity (39). Conclusively, aside from land reform, science and technological advancement is the key to China's agricultural development; in Nigeria, much work must be done to improve research and development to enhance technology.

Lesson for both countries

Subsidies on fertilizers for both countries should be regulated to reduce the overuse of such products by farmers and must be implemented to ensure sustainable development. Government agricultural extension services should be initiated to provide vital information, technologies, and assistance in seed and fertilizer selection. Land is a production factor that, when combined with capital and labor by an entrepreneur, forms a whole package that enhances business or production activities. It also regulates and provides more venues for open exchange of ownership rights to development land and the transfer of farming operations. The term of the agricultural contract right in rural areas can be increased from 30 to 70 years in China, and the contract is automatically renewable on expiration in Nigeria.

To improve the management of income assistance in rural regions, minimum prices must progressively be replaced and other agricultural products with direct payment to farmers and constructing viable storage facilities. There should be a collaboration between local units and the government to improve rural residents' quality of life by building affordable, high-quality infrastructure and encouraging robust production. In addition, expanding coverage for various poverty-alleviated areas and providing adequate funds to cater for vulnerable areas through the central government are imperatives. Notably, a sustainable food cycle should be adopted holistically to ensure the policy thrusts of the policies and reforms are actualized, as shown below.

As societies evolve, emerging challenges erupt. More advanced technologies should be developed and adopted in both countries to ensure food safety and nutrients, promote the value chain, and encourage food availability in and out of season for sustainability.

Author contributions

The author made substantial contributions in drafting the article or revising it critically for important intellectual content; submitted it to the current journal; gave final approval of the version to be published; and agreed to be accountable for all aspects of the work.

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