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[Wenjie Zhao](#), [Lili Zhu](#)^{*}, Lili Lu^{*}

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Article

China-Africa Agricultural Cooperation Towards Sustainable Development Goals: Present Situation, Challenges and Prospect

Wenjie Zhao ¹, Lili Zhu ^{1,*} and Lili Lu ^{2,*}

¹ College of International Development and Global Agriculture, China Agricultural University, Beijing 100083, China

² The China National Institute of Standardization, Beijing 100191, China

* Correspondence: ll.zhu@cau.edu.cn (L.Z.); lulili@cnis.ac.cn (L.L.)

Abstract

The agricultural cooperation between China and Africa serves as a pivotal example of international partnership, contributing to sustainable regional development and aligning with SDGs. This review article provides a comprehensive analysis of the state of China- Africa agricultural cooperation, highlighting its achievements, challenges, and prospects. Despite the progress made through technical support, financial aid, and infrastructure development, current efforts often lack a holistic approach to fully utilizing African agricultural resources for sustainable regional advancement. This study synthesizes existing literature, policy documents, and case studies to explore sustainable agricultural development pathways facilitated by regional cooperation with external partners. It delves into the dynamics and characteristics of China- Africa agricultural collaboration, identifies persistent challenges in resource integration, and proposes potential pathways for enhancing development. By highlighting the role of partnerships, this review provides valuable insights for policymakers and contributes to achieving sustainable agricultural development through practical international cooperation.

Keywords: China-Africa cooperation; agricultural development; Sustainable Development Goals (SDGs); regional development; international partnerships

1. Introduction

Influenced by a legacy of colonialism and an unequal global economic and political framework, many African nations had long been beset by poverty and hunger. In sub-Saharan Africa, 38.6% of the population lives below the international poverty line of \$ 2.15 per day (OPHI 2024). While within the present global development, the impacts of colonialism have not been completely eliminated, Africa continues to endure the significant influences of neocolonialism, characterized by political interference, cultural subjugation, and disparities in power, all of which may hinder the development of this continent (Winston 2013; Zhao 2014).

Most African countries are still agrarian economies; agriculture is a large contributor to GDP, food, income and nutrition security. However, according to estimates by the United Nations Food and Agriculture Organization (FAO), about 298 million people in Africa, or 20.4 percent of the population, face hunger (FAO 2024). Although African countries have prioritized agriculture, establishing regional and national development initiatives such as the Comprehensive African Agricultural Development Programme (CAADP) and the African Union's Agenda 2063, their agricultural sector remains primarily focused on primary production, occupying a low position in the global value chain which leaves them vulnerable to price fluctuations and lack their bargaining power in the global market (Li et al 2020; Huang et al 2020). Consequently, African nations struggle to transform and progress slowly (Carmody et al. 2022).

Agriculture has been a key area of focus for China's engagement with Africa (Modi & Cheru 2013), as agriculture is crucial for both China and most African nations, aligning with their shared development interests and prompting numerous innovative practices. Over the past two decades, since the establishment of the Forum on China-Africa Cooperation (FOCAC), China and African nations have increasingly worked to build a community of shared interests. Among the various areas of cooperation, agricultural production and rural development cooperation have consistently been a focal point. Every iteration of the FOCAC action plans and macro-policy documents, such as China's Africa Policy Paper and China's International Development Cooperation in the New Era, has prioritized agricultural cooperation with Africa (Euka 2011; Jakóbowski 2018; Zhou 2016; Zhou 2021). Under the backdrop of China's historic achievements in poverty reduction, developing nations have looked to China to share its developmental experiences more broadly with the world. China also actively participates in global poverty reduction and continually explores innovative and sustainable international development approaches.

However, there is a debate about China's fast-growing engagement and whether it pursued a "new colonialism". Africa's growing economic ties with China are considered "unsustainable" in the long term. Regarding the African colonial past, critics hold that Africa's historical economic experience with Europe dictates a need for caution when forming partnerships with other economies (Kirk 2009; Scoones et al. 2016; Ssozi et al. 2019). China is accused of grabbing Africa's natural resources (Cotula et al 2009; Hall 2011). On the other hand, adopting a stance of 'Chinese exceptionalism,' China insists that it engages with Africa as equals, without colonial intentions (Konings 2007). Many Africans hold a favorable view of China because, unlike Western investments and assistance that have not succeeded in lifting African countries out of poverty, China's approach to business offers an alternative opportunity for development (Ssozi et al. 2019). China-Africa agricultural cooperation supports the mutual development of both Africa and China. Reflected in the Chinese policies, mutual benefit outcomes are the focus of the contemporary China-Africa relations (Visser and Cezne, 2025). The infrastructure building (e.g., roads, railways, telecommunication) supported by China has opened the door for African countries to future sustainable development, which EU or US donors are hesitant to provide (Ssozi et al. 2019).

Whether it be traditional donor nations like the U.S. and Europe or emerging economies like China and Brazil (Kirk 2009; Scoones et al. 2016), there tends to be a narrow focus on agricultural development elements such as technical support, financial aid, infrastructure development, and market expansion in their cooperation with Africa. There is typically less attention given to agricultural partnership and development within African states. Additionally, there is a lack of a comprehensive knowledge network of how the China-Africa agricultural partnership cooperates and collaborates, what achievements it has made, and what challenges it brings about (positive or negative). This oversight may result in many development aid and agricultural cooperation projects yielding minimal results (Ssozi et al. 2019).

Thus, this study aims to create a knowledge system that neutrally presents the impacts of China-Africa cooperation. SDG 17 emphasizes strengthening global partnerships to support and achieve the 2030 Agenda for Sustainable Development Goals. It recognizes that strong international cooperation is essential to support countries in achieving SDGs. Countries can overcome challenges that hinder achieving SDGs by fostering effective partnerships, leveraging shared knowledge, and mobilizing resources. China-Africa cooperation benefits global poverty reduction and food security alleviation. The systematic analysis of China-Africa agricultural cooperation based on qualitative literature and documentary evidence may help both China and Africa policymakers and practitioners maximize such partnerships' positive externalities.

2. Materials and Methods

We employed qualitative research highlighting existing literature with sensitivity from the China-Africa agricultural partnership. We reviewed previously published China-Africa partnership

and cooperation studies and reports, mixed with a critical analysis, which reassesses prevailing studies and practices.

We conducted a comprehensive survey using databases such as Web of Science, Google Scholar, and official websites such as the Ministry of Commerce of China, the State Council Information Office of the People's Republic of China, and Food and Agriculture Organization of the United States (FAOSTAT), to inventory all peer-reviewed academic articles and (news) reports relevant to our research topic. We utilized keywords and their synonyms (e.g., Africa, African, Agriculture, China, Chinese, Sino, aid, co-operation, partnership, and sustainability) to filter publication titles, ensuring comprehensive coverage of pertinent papers and reports. This analysis was designed to sketch a detailed picture of China- Africa agricultural cooperation's current landscape and future prospects.

We reviewed over a hundred papers, published works, and databases, carefully synthesizing the gathered data with a particular focus on the complexities of China- Africa agricultural cooperation. Academic articles were the most prevalent among the sourced materials, followed by press/media outputs, reports, and books. Due to challenges in accessing data and literature specific to our focus area, we also selected certain African countries for case studies based on the authors' field investigations as complementary materials.

3. Evolution and Characteristics of China-Africa Agricultural Cooperation

Since 1959, when China began providing aid to Africa, agricultural cooperation between China and Africa has already started (Tang, 2013). Initially, it was primarily politically motivated and focused on unilateral aid development (Buckley 2013). Over time, it has developed into development cooperation at multiple levels, mixed with aid, investment, trade, and technical cooperation (Tan-Mullins et al 2010; Mohan &Lampert 2010), involving multiple actors, including governments, enterprises, and other entities, and it places equal emphasis on multilateral and bilateral engagements (Gu &Zhang 2016; Xu et al 2016; Amanor & Chichavas 2016).

Following the establishment of the Forum on China-Africa Cooperation (FOCAC) in 2000, agriculture has been a central focus of the Sino-African partnership (Chen et al. 2014). The mechanisms of the forum and subsequent actions have significantly propelled the rapid development of agricultural cooperation. Currently, China-Africa agricultural cooperation has four main characteristics.

3.1. Macro Guidance Through the FOCAC

The Forum on China-Africa Cooperation (FOCAC), established based on the shared aspirations of China and Africa, has played a crucial role in deepening their agricultural cooperation (Siméon et al. 2022; Ibonye 2022). Since its inception, the FOCAC mechanism has significantly enhanced the depth and scope of this cooperation (Jiang et al. 2016; Kuyvenhoven 2008).

Initially, the forum facilitated high-level communication and consultation between China and Africa, encapsulating a unified three-year action plan, which not only specify follow-up mechanisms and designate responsible entities to ensure the swift implementation of agreed-upon actions but also detail the primary principles, methods, and content of agricultural cooperation planned for the subsequent three years (Yuan 2022). Table 1 illustrates how these action plans are structured to align with the mutual interests of both China and Africa, aiming for mutual benefits and win-win outcomes.

Table 1. Agricultural Cooperation in Previous FOCAC Action Plans.

Year	Action Plan	Main Contents Related to Agriculture
2000	FOCAC Beijing Action Plan	Share agricultural development experience; recognize the importance of agriculture to poverty eradication and enhance food security; carry out triangular cooperation among China, Africa and the Food and Agriculture Organization of the United Nations (FAO)

2003	FOCAC Addis Ababa Action Plan (2004-2006)	Identify agriculture as a crucial sector for solving food security issues in Africa; formulate plans for comprehensive China-Africa agricultural cooperation; explore new measures for agricultural cooperation; encourage Chinese enterprises to carry out agricultural cooperation.
2006	FOCAC Beijing Action Plan (2007-2009)	Emphasize the importance of agriculture; explore new forms and ways of agricultural cooperation measures, including focusing more on agricultural technology; establish agricultural technology demonstration centers and expanding agricultural investment in Africa.
2009	FOCAC Sharm El Sheikh Action Plan (2010-2012)	Emphasize agriculture as a priority area; integrating CAADP strategies with action plans; focus on agriculture processing, storage and transportation; increase cooperation programs, including the agricultural technology demonstration centers in Africa.
2012	The Fifth Ministerial Conference of FOCAC Beijing Action Plan (2013-2015)	Continued emphasis on agriculture as a priority area of cooperation; carry out multi-level agricultural cooperation and exchanges; provide more agricultural assistance to Africa; strengthen financial support for agricultural cooperation between Chinese and African enterprises; start to address the development of the whole agricultural industry chain; emphasize the role of FAO.
2015	FOCAC Johannesburg Action Plan (2016-2018)	Reaffirm the prioritization of agriculture; introduce new cooperation measures such as agricultural policy consultation, and planning and design cooperation; encouraged Chinese investment in African agriculture. promote agricultural trade; continually focus on the development of the entire agricultural industry chain.
2018	FOCAC Beijing Action Plan (2019-2021)	Enhance Africa's capacity for food security; jointly formulate and implement China-Africa agricultural modernization cooperation plans and action plans to upgrade Africa's agriculture; focus on institutionalization of agricultural cooperation; cooperation direction in specific areas such as agricultural technical training, scientific research, cotton production, sugar industry and agricultural product processing.
2021	FOCAC Dakar Action Plan (2022-2024)	Continue to encourage investment in African agriculture; strengthen support for developing entire agricultural industry chain in Africa; develop new models such as the Internet plus agriculture model, promoting South-South and triangular cooperation; synergize development strategies of other countries; improve the mechanism for China-Africa agricultural cooperation.
2024	FOCAC Beijing Action Plan (2025-2027)	Support Africa in eliminating hunger, achieving food security, and promoting sustainable agricultural development; to engage in joint research on agricultural technologies tailored to local conditions in Africa; encourage enterprises to increase investments in Africa's agricultural sector; China will enhance agricultural technology sharing, achievement transformation, and personnel training with Africa; and to jointly participate in the in-depth reform of international institutions and institutional frameworks in the field of food and agricultural governance.

Furthermore, the forum has progressively enhanced the synchronization of China's and Africa's macro development plans, ensuring that agricultural cooperation is effectively tailored to the actual conditions of each country. Since 2009, there has been a clear directive that China-Africa agricultural cooperation should align with the CAADP (Moore & Baisch 2021). When the African Union's Agenda 2063 was introduced in 2015, it was promptly integrated into that year's FOCAC action plan, with a renewed emphasis on prioritizing agriculture due to the urgent development needs across many African nations (MFA 2024; FOCAC 2016-2018). The latest FOCAC (2025-2027) China will construct or upgrade 10 agricultural technology demonstration centers, establish no less than 100,000 mu (approximately 6,667 hectares) of overseas standardized agricultural demonstration zones, and

provide one billion RMB in emergency food assistance to African countries. Additionally, China will establish the China-Africa Agricultural Science and Technology Innovation Alliance, create 100 agricultural poverty reduction demonstration villages, dis-patch 500 agrarian experts to African countries, and train 1,000 agricultural entrepreneurship leaders. Furthermore, China will deepen the “Hundred Enterprises and Thousand Villages” initiative, implementing 500 public welfare projects in maternal and child health, education and training, rural development, and clean water access. Chinese enterprises operating in Africa are encouraged to create no fewer than 1 million local jobs.

Through the forum, both China and Africa have ensured the continuity and sustainability of their cooperation, drawing lessons from past experiences to enhance future interactions. For example, during the third FOCAC, a proposal was made to establish ten agricultural technology demonstration centers across Africa (FOCAC 2007-2009). Given the warm reception and successful implementation of these centers, the fourth FOCAC introduced measures to increase the number of these centers further, catering to Africa’s needs (FOCAC 2010-2012), thereby expanding their reach and impact on African agricultural development. Agriculture forms a pivotal component of the FOCAC mechanism. The evolution of agricultural cooperation through FOCAC has displayed significant characteristics: the growing prominence of agricultural issues, the shift towards more pragmatic cooperation content, and a transition from one-way assistance to reciprocal, mutually beneficial collaboration.

3.2. Diversified Chinese Agricultural Aid Modalities to Africa

Historically, China’s foreign aid has evolved into eight distinct forms, primarily encompassing emergency humanitarian assistance, technical cooperation, comprehensive project implementation, human resources development, the provision of general supplies, debt relief, medical team support, and the deployment of foreign aid volunteers (Luo 2020). While these modalities span various sectors, the first four dominate the agricultural context primarily (Amanor & Chichavas 2016; Zanella 2018). Reflecting the unique agricultural challenges and the international dynamics affecting China and Africa, China’s aid strategy particularly emphasizes addressing immediate agricultural needs through emergency food and technical assistance (Amanor & Chichavas 2016; Luo 2020; Rotberg 2009). Concurrently, there is a sustained focus on building long-term agricultural capacity by investing in personnel training and scientific and technological cooperation in agriculture (Li et al. 2020; Xu et al. 2016; Tugendlhat & Alemu 2016). These efforts are part of a broader initiative to explore and implement more diverse cooperation measures, thereby enhancing the effectiveness and sustainability of agricultural development in Africa (Scoones et al. 2016).

Food security remains a primary concern for many African nations. The prevalence of undernourishment has been rising, driven by armed conflicts, slow economic development, low level of agricultural productivity, climate change, and international food trade and market volatility (Bagwendeen et al. 2023). According to the FAO 2024, by 2030, Africa will replace Asia as the region accounting for more than half the undernourished people in the world (FAO/IFAD2024). Taking the key dimensions of food security—availability, access, utilization, and stability—into account (FAO 2023), food security in Africa appears dire (Sasson 2012; Marafa et al. 2020). China, though facing risks related to food security (Ghose 2014; Huang et al. 2017), has cooperated with Africa on food security at both the macro and micro levels (Buckley 2013), including multilateral and bilateral aid aimed at addressing food security issues in Africa (Rotberg 2009). China-Africa partnership has tried to improve recipient countries’ food security (Tan-Mullins et al. 2010).

First, China has delivered emergency food assistance to African nations confronting food crises via various bilateral and multilateral channels. Significantly, in 2015, China announced the creation of the South-South Cooperation Assistance Fund, which bolsters its capacity to collaborate with international organizations such as the World Food Programme (WFP) (CIDCA 2018). This strategic partnership has proven to be instrumental. By the end of 2023, it has delivered emergency food aid to over 30 African countries, implement over 50 food aid projects including Zimbabwe, Somalia, South Sudan, and Ethiopia, which alleviated local food and nutrition shortages to a certain extent (CIDCA 2024). During the simultaneous crises of COVID-19 and locust infestations across several

African nations, China swiftly augmented its support, providing emergency food assistance to more than ten countries within a year (Yu et al. 2020). China has been closely monitoring the severe drought and food shortage issues affecting Southern African countries in 2024, and it actively mobilizes resources to provide emergency food aid to over twenty African nations, including Zimbabwe, Malawi, and Zambia (MFA 2024). On a bilateral basis, China has also responded to specific emergencies, actively supporting relevant countries when they suffer from extreme weather, emergencies, and other special situations. Since 2016, China's emergency food aid efforts have extended to over 50 countries, benefiting more than 10 million people predominantly in Africa, demonstrating its commitment to mitigating food insecurity across the continent (Qu et al. 2024). Moreover, China is actively assisting African countries in enhancing their food sovereignty (Zhao 2014), aiming to fundamentally address food security issues in various countries, including Africa (MOC 2024). China places increasing importance on sharing poverty reduction and food security experiences with African nations. Through multilateral approaches such as the FOCAC—Poverty Reduction and Development Conference 2023, China offers African countries opportunities to voice their concerns on the international stage, conveying their urgent need for food security to the global community.

Second, China has consistently prioritized cooperation in agricultural production technology with its African partners. As early as the 1950s, China began dispatching agricultural experts to the continent to build large-scale farms. This early technical assistance has evolved significantly (Xu et al. 2016); with the improvement of China's domestic agricultural productivity, the Chinese government has also learned from initial problems such as poor sustainability of early agricultural technical assistance, limited benefits for small farmers, and too much reliance on Chinese technical experts. China has refined its approach to agricultural production technique cooperation to better meet the specific needs of recipient countries, which was included in the "Ten Cooperation Plans" proposed by President Xi Jinping at the FOCAC in December 2015 (FOCAC 2016-2018). Since the Belt and Road Initiative was put forward, China has intensified efforts to address poverty through enhanced agricultural technology support, focusing on both agriculture production technology improvements and public goods provision. For example, during the 2018 FOCAC, this engagement was deepened by pledging to implement 50 agricultural projects and deploy 500 senior agricultural experts to train African farmers, aiming to foster local agricultural leadership and entrepreneurship (SCIO of PRC 2021). Moreover, given the low productivity challenges faced by smallholder farmers in Africa, China has actively explored ways of promoting technology for small farmers. In cooperation with China Agricultural University, the International Poverty Reduction Center in China (IPRCC) has carried out a demonstration and promotion project on maize production technology for small farmers in Peyapeya village in Tanzania. Adapted to local conditions in which local farmers have limited economic resources and primitive agricultural production technology, the project promoted implementing labor-intensive, high-density planting techniques for ten years, which improved the maize yield by 50% to 180%. This initiative has since expanded to 10 neighboring villages, showcasing the potential of tailored agricultural interventions to enhance productivity and sustainability (Beijing News 2021). China's efforts in agricultural cooperation emphasize the dissemination of practical production technologies well-suited to smallholder farmers' productivity and agricultural standards and the transfer of advanced Chinese agrofood technology to Africa.

Third, China's agricultural assistance to Africa focuses on sustainable development through capacity building, which is predicated on "teaching people to fish" (SCIO of PRC 2021; CNR 2020). In recent years, the Chinese government has intensified efforts to foster advanced agricultural technology research collaboration with African nations, helping them progress in high-end agricultural technology. This initiative includes establishing multilateral and bilateral technology research and development centers, as well as mechanisms for technical cooperation and exchange. For example, in collaboration with the Food and Agriculture Organization of the United Nations, China has implemented projects to enhance sustainable soil management capabilities in Uganda and Rwanda, improving agricultural productivity and ensuring food security for the local populations

(CIDCA 2024). During the FOCAC in 2015, China pledged to carry out cooperation projects and provide technical support to African countries in food crop cultivation, storage, health, phytosanitary, animal husbandry, and agricultural product processing. These measures are designed to bolster long-term food security by enhancing local agricultural production and processing (FOCAC 2016-2018). During the 2018 FOCAC, China further committed to strengthening capacity building and transferring diverse agricultural technologies to Africa, including advanced methodologies such as molecular plant disease detection and seed testing and certification, facilitated through expert exchanges and other collaborative endeavors (FOCAC 2019-2021). These efforts also enhance the expertise of high-level agricultural professionals within Africa.

China has also undertaken initiatives to cultivate future leaders in agricultural research through the “10+10” cooperation model between Chinese and African agricultural research institutions. This includes the creation of a China-Africa Research Center for Green Agriculture aimed at promoting technological exchanges, joint research, and the extension of new agricultural technologies (FOCAC 2019-2021). In addition to these institutional efforts, China has also launched agricultural technology training courses in countries like Côte d'Ivoire, Uganda, Tanzania, Sudan, Zambia, and Nigeria, enhancing the skills of agricultural workers and maximizing the effect of foreign agricultural aid (Tugendhat & Alemu 2016; CNR 2020; FOCAC 2019-2021). Furthermore, China has played a pivotal role in establishing more than 20 Agricultural Technology Demonstration Centers (ATDCs) across Africa (Semeon et al 2022; Wang et al 2021). In Africa, many of the ATDCs are partnered with teams from various Chinese provinces, which draw Chinese experiences from a system known as *duikou zhiyuan* (对口支援, “twinning assistance”), where developed provinces provide support to less developed ones. This twinning approach is also utilized in China's foreign aid initiatives (Shi 2016). ATDCs placed more emphasis on aid performance and were a key institutional expression of this transformation of Chinese foreign aid. For China, the establishment of ATDCs is a strategic initiative to enhance the sustainability of its agricultural aid to Africa, which introduces over 300 simple advanced technologies such as maize cultivation, vegetable farming, and cassava propagation. These have been promoted, leading to a 30% to 60% increase in local crop yields. Take hybrid rice as an example. Rice breeding technology, one of the successful examples contributing to China's efforts to alleviate poverty and ensure food security, has been promoted to more than 30 countries (Ma & Yuan 2015). The ATDCs contributed to improved productivity and production of smallholder farmers farming systems. By combining aid with commercial operations, innovative agricultural practices have been developed, contributing to rice, cotton, aquaculture, and poultry production (Jakbowski 2018; Zhou 2016, 2021). Furthermore, ATDCs also served as a platform for China to expand its diplomatic cooperation with Africa, providing opportunities for exchanges in agriculture, human resources, and other areas (Xu et al. 2016).

3.3. Increasing Agricultural Investment and Trade

The Chinese interest free loans and technical assistance under the South-South solidarity increased trade and aid relations between China and Africa (Alden and Alves, 2008; Prybyla, 1964). Economic and trade exchanges between China and Africa have developed rapidly in recent years. Data show that the stock of Chinese direct investment in Africa has increased from \$7.80 billion in 2008 to \$47 billion by the end of 2022. According to the General Administration of Customs of the People's Republic of China, in 2023, China-Africa trade reached a historic peak of 282.1 billion, and trade in agricultural products between China and Africa is about \$9.3 billion (Xinhua 2024). China has maintained its position as Africa's largest trading partner for 15 consecutive years and has become the second-largest destination for African agricultural exports (Xinhua 2024). Abundant natural resources, cheap labor, and promising market prospects have attracted many Chinese enterprises to invest in Africa. China-Africa relations have changed from political interaction to shared political and economic prosperity (Gu et al. 2016). Many African countries enjoy good agricultural production conditions and a rich variety of agricultural products (Jun et al. 2013). Agriculture has gradually become important to China-Africa's economic and trade relations.

Since the 1990s, China's agricultural investment in Africa has experienced rapid and substantial growth, primarily driven by the continuous development of China's foreign aid program and the strategic implementation of its "going out" policy. This policy has encouraged Chinese enterprises to expand globally, with regions such as Africa and Latin America, which receive substantial Chinese aid, becoming key destinations for Chinese enterprises under the "Going Global" initiative (Huang et al. 2012; Qiang 2013).

The participation of an increasing number of Chinese agricultural enterprises bolsters agricultural production in African countries with large agrarian populations and drives local employment to a certain extent (Qiu et al. 2013). By the end of 2022, the stock of Chinese enterprises' agriculture-related investment in Africa is about 1.2 billion US dollars, and more than 200 enterprises have made agricultural investment in Africa (Zhang & Wang 2024). These investments span more than 30 African countries and cover a diverse range of agricultural activities, including the cultivation of staple food crops like wheat and corn and important cash crops such as cotton and sisal (Han et al. 2020).

A case in point is the Malawi branch of the China-Africa Cotton Development Co., LTD., which serves as a prime example of China's targeted agricultural investments. The author conducted a field investigation of the company in 2018 and 2020. Supported by the China-Africa Development Fund, this project, one of the critical projects to implement the follow-up actions of the FOCAC, implements a cooperative business model that engages local farmers directly. This "company + farmer" model significantly boosted the local cotton industry in Malawi. By providing contracted smallholder farmers with production materials and purchasing their cotton for the international market, the company has managed to procure more than 10,000 tons of seed cotton annually. This initiative has not only enhanced the productivity of local cotton farming. Still, it has also elevated the income levels of smallholder farmers, demonstrating the tangible benefits of China's investment in African agricultural development. Although there is no comprehensive statistical data on the employment impact of China-Africa agricultural cooperation, the authors filed an investigation of Malawi that also demonstrated how China-Africa agricultural cooperation contributes positively to local employment. During peak harvest, Chinese cotton companies in Malawi directly and indirectly employ over 2,000 temporary workers, with more than 120 long-term employees under fixed-term contracts.

Chinese private enterprises, such as the China-Africa Cotton Development Company, have facilitated the integration of African smallholder farmers into the global value chain to some extent. However, this model introduces potential risks for these farmers. Historical precedents set by European and American agricultural investments in Africa demonstrate that enterprises are susceptible to various influences, including political and market factors. For instance, the author's field research in Zimbabwe highlighted that around 2015, changes in the local business environment prompted companies like Cargill to gradually withdraw from the Zimbabwean cotton market, scaling back their operations significantly. This departure left many smallholder farmers, who had long relied on such companies, vulnerable and exposed to economic instability. Similarly, should Chinese enterprises exit the local market or reduce their activities, comparable adverse impacts on smallholder farmers could ensue. This presents a sustainability challenge that both Chinese governmental bodies and corporate stakeholders must address with diligence.

Recognizing the critical need to develop the entire agricultural industry chain in African countries, China has intensified its efforts to provide comprehensive agricultural investment and development projects across the continent. Since 2013, building on earlier assistance initiatives, China has supported the construction of significant projects like the Primary Processing Center for Agricultural Products in Cape Verde and the Corn Meal Processing Plant in Zambia (SCIO of PRC 2021). China has actively engaged in establishing ATDCs across Africa, fostering agricultural technology exchanges that enhance the entire agricultural value chain, from agricultural production, storage, and processing to sales, and support the agricultural ecological cycle and sustainable production of various countries (Xu et al. 2016). Moreover, China has tailored its investment to the

specific conditions and needs of local environments, focusing on specific crop production, improving local food security, and enhancing the sustainability of cooperation projects with innovative commercial operation models (Siméon et al. 2022; Zhou 2015). A prime example of this targeted investment is the Wan-Jin Agricultural project in Zimbabwe, a collaboration between the Anhui Agricultural Reclamation Group and the Zimbabwean government, effectively driving local agricultural development (MARA of PRC 2021). China has provided capital and technology as a shareholder, while Zimbabwe has provided land as a shareholder. This joint venture has cooperated in planting corn, soybean, wheat, tobacco, and other crops on nearly 12,000 hectares of previously abandoned farms in Zimbabwe (CHBN 2018). In 2021, this project alone yielded nearly 3,000 tons of wheat, all consumed within the local market, thus significantly bolstering local food security, which was especially critical during the COVID-19 pandemic. The project employed over 2,000 local people during its harvest season, contributing substantially to local employment and economic stability (CHBN 2018). At the same time, the project also upgraded the old grain primary processing and storage facilities of local farms. It provided agricultural product processing and agricultural technology training to surrounding farmers, which have received high acclaim from local governments and people for their impact on local agricultural development and sustainability (MARA of PRC 2021; CHBN 2018).

Since the establishment of the FOCAC, both parties have increasingly prioritized agricultural investment and trade. This commitment was evident at the sixth FOCAC in 2015, where it was explicitly stated that China would continue to expand trade in agricultural products (FOCAC 2016-2018). In 2018, the seventh Forum on China-Africa Cooperation (FOCAC) proposed a series of initiatives to promote the development of China-Africa trade, with more specific measures in agricultural trade. Both parties agreed to prioritize the processing and trade of cotton and sugarcane as key areas of cooperation, aiming to help Africa expand its share in the international cotton market and enhance the international competitiveness of African sugar products (FOCAC 2019-2021).

To facilitate trade dynamics, both parties have implemented a series of trade facilitation actions in line with the macro policies established by FOCAC: China has offered zero-tariff treatment to 97 percent of exports from 33 African least developed countries, reinforcing the trade relationship through improved product standards, quality inspections, and mutual recognition; China has established dedicated platforms such as the China-Africa Economic and Trade Expo and the Center for Distribution, Trade, and Processing of African Non-resource Products to support the marketing and distribution of African goods in China (SCIO of PRC 2021); China has set up a \$5 billion special trade financing fund to encourage Chinese enterprises to import more from Africa (SCIO of PRC 2021). China has established agricultural cooperation mechanisms with 23 African countries and regional organizations, and signed 72 bilateral and multilateral agricultural cooperation documents (NDRC 2024). The expansion of agricultural trade between China and Africa capitalizes on Africa's comparative advantages of labor-intensive farm products and supports the continent in developing high-value-added agricultural production, showing the potential of enhancing the overall economic well-being of the African region (Siméon et al. 2022).

3.4. *Triangular Cooperation and Financial Guarantee*

The development of global agricultural governance is facing increasingly complex problems and challenges that cannot be effectively addressed by bilateral cooperation alone. As the geopolitical dynamics shift, with emerging countries ascending and traditional donors from the United States and Europe showing a relative decline in engagement, the necessity for a more robust and diversified approach to international development cooperation has become apparent (Scoones et al. 2016; Amanor & Chichava 2016). In response to these evolving needs, the triangular cooperation model has gained prominence as a strategic framework to tackle global development issues.

China's agricultural assistance in Africa, facilitated through triangular cooperation, is characterized by its diversity and structured around the distinct attributes of the participating partners. This assistance can be classified into three primary models.

The first model of triangular cooperation is with traditional Western developed countries, where financial resources from developed countries are leveraged to enhance agricultural productivity in Africa (Tang 2019). Examples include China and the UK - Malawi triangular agriculture cooperation, China - the UK - Uganda agricultural cooperation, China - Germany - African agriculture triangular cooperation, and so on (Tang 2019). These collaborations focus on transferring China's practical agrarian technologies to improve smallholder farmers' productivity levels in African nations (Amanor & Chichava 2016).

The second model of triangular cooperation is collaboration with the private sector (Shen 2015). In partnership with entities like the Bill and Melinda Gates Foundation, this model harnesses the private sector's fundraising capabilities and expertise in grassroots development. For example, the triangular cooperation between China, the Bill and Melinda Gates Foundation, and Mozambique (OECD 2030) secures more effective aid to grassroots communities and substantial development.

The third type is triangular cooperation with international multilateral institutions, exhibiting more institutionalized and systematic features. China engages with the World Bank and the Food and Agriculture Organization (FAO) to implement projects like the China-World Bank-Senegal and China-FAO-African countries agriculture South-South cooperation (Tang 2019), which benefit from the neutral and structured management capabilities of international organizations.

This triangular cooperation has demonstrated successful cases. For example, the UK supports China and Brazil in agricultural cooperation projects in Mozambique, Ghana, Zimbabwe, and Ethiopia (Amanor & Chichava 2016). Researchers from seven countries have worked together to investigate China and Brazil's agrarian cooperation in Africa, assessing the impact and scalability of shared agricultural technologies and development strategies. They analyze the challenges of South-South cooperation and the sharing experience of agrarian technology among developing countries (Amanor & Chichava 2016). The Ghana/Zambia "Renewable Energy Technology Transfer" (RETT) project, funded by Denmark, with technology and expertise provided by China and project management and implementation by the United Nations Development Programme (UNDP), shares China's practical technologies in solar, wind, hydropower, and biogas with the beneficiary countries, which not only capitalizes on the financial capabilities of developed countries and the project management expertise of international organizations but also facilitates the sharing of Chinese knowledge, experience, and lessons with developing countries (Zou et al 2021).

The essence of triangular cooperation is that China provides agricultural production technology and experience to developing countries like African countries; a third-party organization can provide coordination, management, or financial support. This synergy endeavors to secure the effective utilization of each party's strengths, leading to sustainable agricultural development in recipient countries (OECD 2030).

China has actively established and expanded various development funds to enhance the sustainability and relevance of its agricultural cooperation initiatives in recent years (Tiboris 2019). For instance, since its inception in 2007, the \$10 billion Chi-na-Africa Development Fund and the \$40 billion Silk Road Fund established in 2014 have supported corporate investments, fostering regional economic and social development, with agriculture being one of the key investment sectors. Take the China-Africa Development Fund as an example. Its investment in a sisal farm in Tanzania employs over 700 permanent and 300 temporary local workers, not only promoting the development of the Tanzanian sisal industry but also providing stable employment opportunities for the locals. In countries like Malawi and Mozambique, the China-Africa Cotton Company, utilizing a "company +farmers" contract farming model, supplies inputs for cotton cultivation and purchases the cotton from local smallholders, enhancing the incomes of these cotton farmers.

In addition to these investment-focused funds, China has also begun establishing aid-type funds. For example, at the 2015 United Nations South-South Cooperation Roundtable, the Chinese government pledged \$2 billion to set up the South-South Co-operation Assistance Fund to support developing countries in implementing the 2030 Sustainable Development Agenda and contribute an additional \$1 billion to this fund in 2017, bringing the total to \$3 billion (CIDCA 2018), based on which

Chinese government added another \$1 billion and upgrade it to Global Development and South-South Cooperation Assistance Fund (Cui 2023). This fund has already been used to execute and facilitate many emergency humanitarian aid projects (CIDCA 2018). Among them, cooperation projects in food security and green development will focus on Africa. In 2008, the Chinese government donated \$30 million to establish a trust fund with the FAO, the China-FAO South-South Cooperation Trust Fund and made additional contributions of \$50 million in both 2014 and 2020(MARA of PRC). With the support of the Fund, China and FAO have carried out a number of agricultural cooperation projects in Uganda and other African countries, focusing on addressing food security issues in Africa. Such triangular cooperation with international organizations like the FAO in funding could leverage their expertise in project management— compensating for China’s lack of specialized foreign aid management and coordination agencies in the recipient countries—but also help to reduce the political uncertainty associated with bilateral negotiations, better ensuring political non-interference in the internal affairs of other countries (Jiang 2021; Tan-Mullins & Mohan 2010).

4. Challenges in China-Africa Agricultural Cooperation

Despite the significant achievements and international acclaim of China-Africa agricultural cooperation, several persistent challenges underscore the complexity of these initiatives (Siméon et al 2022; Jiang 2020). The partnership exhibits considerable potential for further growth and improvement.

4.1. Driving Effect on the Comprehensive Regional Development

While agriculture forms a critical foundation for economic and social development in most African countries, playing a pivotal role in poverty alleviation and food security, the agricultural cooperation between China and Africa yields mutual benefits and fosters win-win outcomes for both parties (Buckley 2013; Ssozi et al. 2019; Siméon et al. 2022). Despite the increasing scale and diversity of agricultural assistance projects from China to Africa, which have indeed made significant achievements in various domains, there remains a crucial gap in their ability to drive comprehensive regional development.

Many agricultural aid projects predominantly focus on specific facets of agricultural improvement, such as enhancing agricultural technology, increasing farmers’ productivity, and boosting food production (Xu et al. 2016; Amanor & Chichava 2016; Jiang 2020). These initiatives, while beneficial in their targeted areas, may overlook how such cooperation can promote overall regional development on this basis. According to the author’s interview, a Chinese government official who has long been involved in China-Africa agricultural cooperation stated, “The absolute volume of our agricultural cooperation with Africa is continuously increasing, but the relative proportion has not changed significantly”. The scale of cooperation projects is relatively small. While they may have a positive impact at the village level, achieving a scale effect still requires further exploration. Promoting the integration of African agriculture with other industries remains a direction we need to strive for in the future”.

While agriculture is the foundation of Africa’s development, progress in Africa cannot rely solely on enhanced agricultural productivity. How can gains in agricultural productivity be translated into wider economic and social benefits (Li et al. 2013)? Critical issues for China-Africa agricultural cooperation, and broader China-Africa development cooperation, include how to leverage development in agriculture and other primary industries to improve labor quality (Tugendhat & Alem 2016), how to provide better raw material support for the industrial and service sectors, and how to foster the accumulation of human capital in Africa.

4.2. Negative Impacts on Food Security

The structure of agricultural trade between China and Africa reveals a pattern where China predominantly imports primary agricultural products such as timber, cotton, oil crops, and tobacco

from Africa; in contrast, Africa imports industrial finished products, including machinery, transportation tools, and building materials from China, where trade pattern reflects the differing industrial structures and resource endowments of the two regions (CATRC 2021). However, this dynamic has sparked concerns about the sustainability and fairness of China-Africa trade, particularly regarding its impact on agricultural development and food security in Africa. Some critics argue that the trade structure between China and Africa remains a traditional and extractive international trade model, where one party supplies raw materials and the other supplies manufactured goods. This structure has not disrupted the international economic order and is relatively unlikely to have a structural impact on Africa's development (Melber 2013).

The focus on cash crops for export to markets like China can skew local agricultural priorities, potentially detracting from food production. This shift raises substantial concerns about food security in Africa, as local farmers may prioritize cash crops that are economically lucrative over staple food crops that are vital for local consumption. In contrast, providing better conditions for agricultural export along with some moderate restrictions on the export of natural luxury goods can increase the incentive to develop sectors with higher growth potential in African countries (Azamert 2014, 2018). The phenomenon where local production is geared toward international markets rather than domestic needs has led some observers and stakeholders within Africa to question whether the benefits of trade with China truly support agricultural development and food security (Siméon et al. 2022; Jiang 2020; Tan-Mullina & Mohan 2010). Moreover, the trade relationship has been scrutinized under the lens of "neo-colonialism" and "re-resource grab" debates. Critics have argued that the pattern of trade where African countries export raw materials in exchange for finished goods from more industrially developed partners like China could perpetuate economic dependencies and underdevelopment (Tull 2006; Zafar 2007; Wang 2014; Alden 2005). Such critiques suggest that rather than fostering equitable development, the current trade structure might limit Africa's economic sovereignty and ability to develop a more diversified and self-sufficient industrial base.

Some scholars argue that the trade relationship between China and Africa exemplifies a typical asymmetrical trade model, where Africa exchanges raw materials for China's value-added industrial products. This trade pattern is criticized for failing to promote adjustments or transformations in the global economic structure and lacking a substantive positive impact on local industrial development (Brautigam, 2011; Taylor, 2014).

Some studies have raised critical concerns from an African perspective, particularly regarding China's resource acquisition in Africa. For instance, survey data analyses indicate that some African populations perceive that Sino-African trade may not contribute positively to Africa's development. China's large-scale extraction of energy and resources has generated dissatisfaction among local communities, especially in countries that prioritize human rights and governance, where China's role is viewed less favorably (Mohan & Lampert, 2013; Corkin, 2016).

Furthermore, scholars have critiqued the Chinese government's active promotion of agricultural trade, aid, and investment in Africa, arguing that these initiatives have not fundamentally altered the imbalanced trade dynamics between China and African nations. Despite China's significant resource extraction from Africa, these efforts have not delivered genuinely constructive outcomes for African development (Alden & Alves, 2017; Chen et al., 2018; Xu et al., 2016). Critics emphasize that China's agricultural cooperation with Africa should prioritize long-term sustainability and substantially contribute to local economic and social development rather than focusing solely on short-term resource gains.

4.3. Ineffective Resource Utilization in Regional Agricultural Development

African agriculture is characterized by its remarkable diversity, with over 50 countries exhibiting significant variations in climate, land resources, geographical positioning, resource endowments, and technical and market conditions (Brautigam & Tang 2012; FAO 2021). This diversity, combined with the uneven nature of international agricultural cooperation, presents substantial challenges to the success and impact of agricultural projects (Moyo 2016). Historically, international aid and

cooperation initiatives in African agriculture have often failed to achieve their intended outcomes, demonstrating limited influence on regional development and constraining the overall effectiveness of agricultural cooperation (Eicher 2003; Haggblade & Hazell 2016).

Despite these efforts, current agricultural cooperation between China and Africa frequently fails to effectively harness and leverage the advantageous resources available for local agricultural development. There remains a significant gap in collecting and utilizing Africa's diverse agricultural assets and integrating these with global resource and capability advantages (Xu et al., 2016). This shortfall has resulted in agricultural cooperation that, while beneficial in isolated instances, generally plays a limited role in catalyzing the comprehensive development of the region (Chen et al. 2018).

Research into Chinese governmental policies on ATDCs reveals that these initiatives were primarily established in response to direct requests from African nations. The inaugural center, constructed in Mozambique in 2007, was a direct outcome of Mozambique's acute need for practical agricultural technologies (Brautigam 2015). Subsequently, other African countries expressed similar requests to China, highlighting a widespread demand for such infrastructure (Xu et al. 2016). Despite potential international critiques, China has consistently upheld principles of sovereignty and autonomy, asserting that the ultimate goal is for recipient countries to independently manage these facilities. For instance, the demonstration center in South Africa has transitioned to being fully managed by the local government (Alden & Alves 2009).

However, due to limited capacity in some countries, most ATDCs continue to be jointly operated by Chinese enterprises, re-search institutions, universities, and the governments of recipient nations. For example, the Zimbabwean government has expressed a preference for China to provide ongoing operational support for its ATDC, believing that this approach enhances bilateral agricultural technology cooperation and maximizes the center's positive impact. Nevertheless, this model risks fostering long-term dependency on Chinese assistance, potentially hindering the innovative and self-sustaining role of these centers (Mohan & Lampert 2013; Corkin 2016).

4.4. Accusation of "Resource Grab"

China-Africa agricultural cooperation has achieved significant milestones and has been positively portrayed in many African countries. However, it continues to face criticism and scrutiny from various quarters. Within the traditional framework of international relations, Africa has long been regarded as a strategic partner by European nations and the United States, playing an indispensable role in global governance. As China deepens its ties with Africa through international agricultural cooperation, some countries perceive this as a challenge to their traditional spheres of influence, leading to criticism of China's agricultural policies and practices in Africa (Brautigam 2011; Taylor 2014; Alden & Alves 2009).

Within Africa, perspectives on China-Africa agricultural cooperation are not entirely uniform. Given the historical inefficiencies of post-war Western aid and incidents of land grabbing by certain countries, African nations have adopted a cautiously optimistic stance toward China-Africa agricultural cooperation (Moyo 2016; Mohan & Lampert 2013). Some critics, however, express concerns that China's agricultural investments and cooperation may involve the "appropriation" of African arable land, a viewpoint that cannot be overlooked (Cotula et al. 2009; Hall 2011).

China-Africa agricultural cooperation, particularly Chinese agricultural investments in Africa, often faces allegations of land grabbing and resource exploitation (Cotula et al. 2009; Hall 2011). Moreover, despite China's active promotion of agricultural trade, aid, and investment in Africa, some scholars argue that these efforts have not sufficiently addressed the trade imbalance. They maintain that China continues to extract significant resources from Africa without yielding genuinely beneficial outcomes for African nations (Chen et al. 2018; Xu et al. 2016; Alden & Alves 2009).

Additionally, the scarcity of publicly available data on these partnerships complicates the assessment of their effectiveness and contributes to cautious or critical perspectives among some researchers regarding the impact and ethics of China-Africa agricultural investment and trade (Brautigam 2015; Corkin 2016).

For China, these criticisms and concerns represent challenges that must be addressed as it advances agricultural cooperation with Africa. How to maintain the achievements of cooperation while effectively responding to these concerns and promoting a more equitable and transparent cooperation model has become a critical issue for China to consider in its agricultural engagement with Africa.

5. Prospects for China-Africa Partnership

The review of achievements and challenges within China-Africa agricultural cooperation underscores the need for future collaborations to establish more diversified and impactful partnerships. Such partnerships hold significant potential to advance the achievement of key Sustainable Development Goals (SDGs), particularly SDG 1 (No Poverty), SDG 2 (Zero Hunger) and SDG 10 (Reduced Inequalities) through the implementation of constructive and mutually beneficial agricultural practices (United Nations 2015; Brautigam 2015).

The experiences of major donor countries, particularly those within the Organization for Economic Co-operation and Development (OECD), reveal that reliance solely on aid rarely yields substantial results in the short term, especially in terms of accelerating the comprehensive economic and social development of recipient countries (Easterly, 2006; Moyo, 2016). As China positions itself as a developing country, the scale of its agricultural cooperation with Africa remains relatively modest. Within the complex global context of agricultural development and considering the unique developmental characteristics of both China and Africa, advancing the SDGs through agricultural cooperation requires addressing numerous criticisms and challenges. This necessitates the adoption of more precisely tailored and context-specific measures (Xu et al. 2016; Chen et al. 2018).

5.1. *Enhancing the Role of the African Agricultural Technology Demonstration Center*

China has built more than 20 agricultural technology demonstration centers in Africa, and each of these centers has benefited from significant investment in personnel, financial and material resources during project establishment, site selection, design, construction and operation (Simeon 2022). From inception to operation, these centers have seen substantial investments (Jiang 2020)—initial infrastructure alone costs between 20 and 30 million RMB (Xu et al. 2016), with at least an additional 15 million RMB dedicated to subsequent technical cooperation. Moreover, these centers are granted high political status by both China and the host African nations. China typically sends top-tier agricultural experts to provide technical support (Scoones et al 2016; Xu et al 2016; Simeon 2022; Tang 2019; Li 2010), and African countries often deliver the centers with diplomatic, economic, and trade facilitation at the national level (Siméon et al 2022). However, current cooperation mechanisms often fall short of fully utilizing their potential.

To better leverage these centers in the future, strategic enhancements can be considered, further harnessing their platform advantage in agricultural cooperation. First, the centers could adopt the “company + farmer” model used by other agricultural enterprises to better disseminate advanced agricultural technologies to surrounding farmers. Second, more diverse corporate operational models should be introduced that cater to local market demands in Africa for crops such as grains and vegetables while also supplying high-quality food and cash crops to both Chinese domestic and international markets (Xu et al. 2016; Tugendhat & Alemu 2016). Third, enhancing the educational role of these centers by offering tailored agricultural higher education and vocational training programs can address local needs and build a skilled workforce. Utilizing these centers as platforms for talent cultivation would help in nurturing the next generation of agricultural professionals and leaders in Africa (Scoones et al. 2016; Simeon 2022). Fourth, the centers could serve as hubs for broader international cooperation by partnering with global organizations to import best practices and advanced technologies (Xu et al. 2016). This collaborative approach would facilitate the sharing of international agricultural experiences and innovations, enriching local agricultural practices and supporting sustainable development.

5.2. *Enhancing Support for the Development of the Entire Agricultural Industry Chain*

African nations have a relatively high level of participation in the global agricultural value chain, particularly in the Sub-Saharan region. However, these countries are more involved in the upstream, such as the production of raw materials, and less in downstream activities like food processing and distribution (Custers & Matthysem 2009). This reflects the role of African nations primarily as suppliers of raw materials in the global food production system (Custers & Matthysem 2009).

In recent years, China's agricultural investment in Africa has boosted agricultural development in Africa to a certain extent, especially helping small farmers integrate into the global market. However, the history of China's agricultural investment in Africa is relatively short (Simeon 2022). At present, most Chinese enterprises are still limited to crop planting, acquisition, and primary processing and have little involvement in crop breeding, agricultural machinery, and deep processing of agricultural products.

There is substantial potential for China to undertake more expansive agricultural investment projects in Africa (Amanor 2013). Investments can be strategically aligned with the natural resources and environmental conditions of different African countries, leveraging their low pollution levels and favorable conditions for green agriculture.

Furthermore, enhancing brand development is essential for promoting deep-processed agricultural products globally (Yuan 2022). Strengthening branding not only improves market penetration but also supports the overall development of the agricultural value chain. However, building an agricultural value chain and establishing brand recognition are long-term endeavors that often require years of sustained effort and investment, particularly in land restoration and brand positioning—it would be beneficial to further leverage support from developmental funds (CIDCA 2023) like the China-Africa Development Fund to provide necessary capital influx. Additionally, maximizing the use of various China-Africa trade platforms would facilitate brand publicity and product promotion, further enhancing the visibility and competitiveness of African agricultural products in the global market.

5.3. *Exploring New Models of Cooperation: Internet Plus Agriculture*

Expanding the "Internet Plus Agriculture" initiative could thus serve as a critical lever in modernizing Africa's agricultural frameworks, enhancing productivity, and opening new channels for economic growth and development. The rapid development of information technology has created more opportunities for the advancement of agricultural technologies. International organizations, such as the FAO, have initiated the promotion of "Internet Plus Agriculture" and agricultural information systems in several African countries. Practical evidence shows that providing local smallholders, farm owners, and agricultural enterprises with internet-based agricultural technologies, market conditions, and natural disaster early warnings can significantly enhance the precision and flexibility of agricultural production (Siméon et al 2022).

China, as a major exporter of electronics, machinery, and equipment to Africa (Brautigam, 2015), alongside its extensive contributions to infrastructure developments such as communication and transportation system, is uniquely positioned to support this digital transformation in African agriculture (Li 2010). Leveraging the existing China-Africa trade and investment frameworks, there is a compelling case for China to extend additional support in the form of internet-based technologies and information systems. This could be achieved through assistance programs or even zero-profit sales of relevant technological equipment, fostering a more robust adoption of digital tools among local agricultural technicians, researchers, and small-scale farmers.

Moreover, the potential for online platforms to revolutionize market access for African agricultural products has been vividly illustrated during the COVID-19 pandemic. For instance, Alibaba's successful facilitation of a live-streaming sale (FAO & ZJU 2021), moving 1.5 tons of Rwandan coffee beans in mere seconds, underscores the vast potential of high-quality African agricultural products in the global marketplace (PDRC 2020). This example not only highlights the effectiveness of digital platforms in bridging the gap between local producers and global consumers

but also suggests a scalable model of China-Africa agricultural cooperation that could significantly expand market opportunities through the strategic use of Internet technologies.

5.4. Exploring Regional Agricultural Cooperation and Development Paths

In reviewing the history of international development cooperation post-World War II, it is evident that developed economies, particularly those in the United States and Europe, have undertaken numerous initiatives in aid to Africa. Although these efforts have received both praise and critics. A comparison of agricultural cooperation between Africa and other global powers, such as the U.S. and Europe, with China's approach highlights distinct advantages and challenges that can inform more effective policy recommendations (Brautigam, 2011; Taylor, 2014).

Western powers, with their historical legacies of enslavement, colonization, and military intervention in Africa, often face skepticism and resistance from African nations. In contrast, China, which lacks a colonial history in Africa, positions itself as a more neutral and favorable partner. This absence of a colonial past enables China to establish relationships based on mutual respect and partnership, free from the historical burdens that complicate Western interactions in the region (Mohan & Lampert, 2013; Alden & Alves, 2009).

China's policy of non-interference in the domestic affairs of its African partners stands in stark contrast to the Western approach, where companies and governments frequently impose political and ethical conditions as prerequisites for cooperation. Western partners, under pressure from shareholders and regulators, often demand adherence to high standards regarding human rights, environmental protection, and good governance. While these standards are important, they can sometimes be perceived as intrusive or paternalistic by African nations. In contrast, China's non-conditional approach provides a sense of relief to these countries, allowing for more flexible and pragmatic cooperation agreements (Corkin 2016; Chen et al. 2018).

Furthermore, China's proactive role in addressing Africa's infrastructure deficit has been a significant contributor to the continent's development. As OECD countries face budgetary constraints and increasing public skepticism, their capacity to provide substantial development finance has diminished. China's investments have not only filled critical funding gaps but have also stimulated local economies by providing essential infrastructure. This support is crucial, as inadequate infrastructure remains a major barrier to growth and development in many African countries. Unlike Western investors, who have often overlooked this critical sector, China's focus on infrastructure has been instrumental in fostering economic development (Xu et al., 2016; Acker et al., 2020). However, it is undeniable that Western countries have accumulated substantial experience and achieved some positive outcomes, both theoretically and practically, in their agricultural cooperation with Africa. In this regard, the successful experiences of the U.S. and Europe offer valuable insights for China to enhance the efficiency and depth of its agricultural cooperation with Africa (Easterly 2006; Moyo 2016).

6. Results

This review article has examined the dynamics of China-Africa agricultural cooperation, emphasizing its alignment with Sustainable Development Goals (SDGs), particularly SDG 17. It has systematically analyzed the multifaceted nature of agricultural cooperation between China and Africa, exploring its achievements and challenges within the context of cross-border development and sustainability. It underscores the potential of enhanced Sino-African cooperation to boost African agricultural development, thereby advancing the achievement of SDG 1 (No Poverty), SDG 2 (Zero Hunger) and SDG 10 (Reduced Inequalities), among others.

This analysis has revealed how this cooperation has evolved from basic technical assistance to a comprehensive framework incorporating aid, investment, and trade, demonstrating four key characteristics. First, a macro coordination mechanism has been established through the Forum on China-Africa Cooperation (FOCAC). Second, China's agricultural assistance to Africa has been diversified. Third, China and Africa are increasingly active in agricultural investment and trade, with

a growing emphasis on the development of the entire agricultural value chain. Fourth, there has been a continuous exploration of triangular cooperation models involving third-party countries and international organizations, which has been complemented by strengthened financial support mechanisms.

Despite these advancements, challenges persist, particularly in effectively integrating resources to stimulate regional growth. Projects often have limited regional impact and are sometimes misaligned with sustainable developmental goals, highlighting the critical need for a more integrated and strategic approach. The establishment of agricultural technology demonstration centers, while significant, has not yet fully realized its potential in driving local agricultural innovation and broader economic development. Furthermore, the innovative triangular cooperation models, though promising, require further refinement and broader stakeholder engagement to enhance their efficacy and sustainability.

China-Africa agricultural partnership is poised to contribute to global poverty reduction, food security, and economic development. As a model of effective South-South cooperation, it offers valuable experiences and strategies for global development initiatives. They provide a reference for China and emerging market countries to explore sustainable cooperation paths, particularly in diversifying agricultural cooperation. The evolution of these partnerships reflects a deepening commitment to the principles of mutual benefit and respect for local conditions. However, cautious or critical perspectives regarding the impact and ethics of China-Africa agricultural investment and trade persist. For future directions, this study advocates for continuously enhancing the China-Africa agricultural cooperation model, emphasizing sustainable practices. It suggests that policymakers can develop a balanced and comprehensive framework for agricultural cooperation that addresses the unique challenges and opportunities in Africa. China can draw on other global powers and integrate the strengths of different approaches to support the long-term development and prosperity of African agriculture, ensuring that cooperation projects contribute positively to the well-being of African societies, aligning with the SDGs.

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