

Rising Powers and Rice in Ghana: China, Brazil and African agricultural development

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This Working Paper series emerges from the China and Brazil in African Agriculture (CBAA) programme of the Future Agricultures Consortium. This is supported by the UK Economic and Social Research Council's 'Rising Powers and Interdependent Futures' programme (www.risingpowers.net). We expect 24 papers to be published during 2015, each linked to short videos presented by the lead authors.

The CBAA team is based in Brazil (University of Brasilia, Gertulio Vargas Foundation, and Universidade Federal do ABC), China (China Agricultural University, Beijing), Ethiopia (Ethiopian Agricultural Research Institute, Addis Ababa), Ghana (University of Ghana at Legon), Mozambique (Instituto de Estudos Sociais e Económicos, Maputo), Zimbabwe (Research and Development Trust, Harare), the UK (the Institute of Development Studies, the International Institute for Environment and Development and the Overseas Development Institute).

The team includes 25 researchers coming from a range of disciplines including development studies, economics, international relations, political science, social anthropology and sociology, but all with a commitment to cross-disciplinary working. Most papers are thus the result of collaborative research, involving people from different countries and from different backgrounds. The papers are the preliminary results of this dialogue, debate, sharing and learning.

As Working Papers they are not final products, but each has been discussed in project workshops and reviewed by other team members. At this stage, we are keen to share the results so far in order to gain feedback, and also because there is massive interest in the role of Brazil and China in Africa. Much of the commentary on such engagements are inaccurate and misleading, or presented in broad-brush generalities. Our project aimed to get behind these simplistic representations and find out what was really happening on the ground, and how this is being shaped by wider political and policy processes.

The papers fall broadly into two groups, with many overlaps. The first is a set of papers looking at the political economy context in Brazil and China. We argue that historical experiences in agriculture and poverty programmes, combine with domestic political economy dynamics, involving different political, commercial and diplomatic interests, to shape development cooperation engagements in Africa. How such narratives of agriculture and development – about for example food security, appropriate technology, policy models and so on - travel to and from Africa is important in our analysis.

The second, larger set of papers focuses on case studies of development cooperation. They take a broadly-defined 'ethnographic' stance, looking at how such engagements unfold in detail, while setting this in an understanding of the wider political economy in the particular African settings. There are, for example, major contrasts between how Brazilian and Chinese engagements unfold in Ethiopia, Ghana, Mozambique and Zimbabwe, dependant on historical experiences with economic reform, agricultural sector restructuring, aid commitments, as well as national political priorities and stances. These contrasts come out strikingly when reading across the papers.

The cases also highlight the diversity of engagements grouped under 'development cooperation' in agriculture. Some focus on state-facilitated commercial investments; others are more akin to 'aid projects', but often with a business element; some focus on building platforms for developing capacity through a range of training centres and programmes; while others are 'below-the-radar' investments in agriculture by diaspora networks in Africa. The blurring of boundaries is a common theme, as is the complex relationships between state and business interests in new configurations.

This Working Paper series is one step in our research effort and collective analysis. Work is continuing, deepening and extending the cases, but also drawing out comparative and synthetic insights from the rich material presented in this series.

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Abstract

This paper examines the nature of Chinese and Brazilian investments in agricultural development by focusing on the irrigated rice sector in Ghana. It examines this through a historic perspective that traces policy towards the rice sector in Ghana, and the influence of various actors in developing this sector. Investment in the development of commercial rice originated in the 1970s when China developed smallholder demonstration rice projects and the government of Ghana pursued a policy of promoting large scale commercial rice production and smallholder contract farming on irrigation projects, tied to inputs suppliers and food marketers and processors. The paper then traces the changing fortunes of the irrigated rice sector under structural adjustment and government support for private sector investment in irrigated rice development in the late 1990s and early 2000s. This resulted in new investors entering rice production in Ghana, including Brazilian interests, and renewed interests from Chinese investors. It argues that the main trends in commercial rice production have been towards contractual relations in which accumulation occurs through control over supplies of inputs and marketing and that these are defined by the policies of the Ghanaian government. Although Brazilian companies have contributed towards innovation in this sector, they lack support from Brazilian agribusiness and agricultural development institutions. As a result of this their access to technology is constrained by the nature of Ghanaian markets and research establishments, and the lack of institutional embedding of Brazilian technologies within these. However, there are attempt by the Brazilian state to build up markets for machinery and develop joint research, although this occurs outside of rice. Although Chinese companies are absent from the development of rice, they have expressed interests in its future developments and are attempting to build up interactions between inputs supply, seed development and production, which will effectively embed Chinese technologies within Ghanaian research institutions and markets. The future of commercial rice production by these rising powers is likely to develop through expansion of seed development, inputs and machinery markets, and food trading and processing, rather than through a dramatic expansion in large estates. In this Chinese and Brazilian interventions are not markedly different from other agribusiness models.

Introduction

Much of the literature on rising powers in Africa and South-South cooperation is polarised around debates about whether this constitutes a new imperialism, based on a scramble for natural resources by these powers to meet the demands of industrialisation within their home markets and the rising standards of living of their people (Carmody 2011). The contrary argument is that South-South cooperation constitutes an alternative

development framework to neoliberalism, enabling a more complementary relationship between African nations and the new purveyors of development. This new relationship does not impose conditionalities; it explores frameworks for technical and economic cooperation that are of mutual interest; and it brings the state back into development (Cheru et al. 2014).

One problem with this debate is its tendency to essentialise African, emerging Southern and Northern states, and to assume that each category represents and is defined by unitary and integral interests. This depiction of a new model of development (whether negative of positive) operating in Africa and associated with new powers assumes that African states have no agency (Scoones et al. 2013a), vision or history outside of external powers. In one version the future interests of Africa lie with 'Western development'. In the other, African states and actors have integral interests that lie outside of neoliberal reforms – there are no internal coalitions with neoliberal interests. The nature of participation of African states and the ruling classes in the reforms carried out by the state and their interests in the processes of neoliberalism and capital accumulation are not examined or problematised. While it was relatively easy to define national interests under import substitution industrialisation and state capitalism,¹ this becomes more difficult under globalisation, with the increasing freedom of capital to move and even acquire former state enterprises in foreign markets. The constitution of national capital and the relationship between private capital and the state in defining national interests under the conditions of globalisation, flexible accumulation and the free movement of capital are somewhat problematic.

This is particularly pertinent in the case of Brazil, where foreign investment has been important in shaping the development of Brazilian agribusiness and joint venture capital, and where Brazilian forays into international agricultural development have often been carried out through frameworks of trilateral cooperation with the participation of European and Japanese donors or of international development agencies. What constitutes a Brazilian private company is also problematic given that the founders of enterprises may have migrated to Brazil, and may access foreign capital in their ventures. For instance, the company African Plantations for Sustainable Development (APSD) in Ghana is classified as a Norwegian company, mainly because it networks into Norwegian capital. However, while its founder Erling Lorentzen originates from Oslo, Norway, he settled in Brazil as a young man where he pursued his family interests in shipping and petroleum gas. Realising the great potential for rapid tree growing in Brazil he moved into eucalyptus plantations, establishing Aracruz Cellulose, which emerged as the world's largest short fibre pulp mill. Recently he has established APSD in Ghana to develop eucalyptus plantations for thermoelectric power generation and for pulp mills. However, despite living most his life in Brazil, within Ghana his company

is classified as a Norwegian initiative since it is associated with Norwegian capital investment and development initiatives of the Norwegian state (Harvard Business School undated).

The development of the agricultural sectors in China and Brazil has been influenced by the opening of their agricultural markets to foreign investment and technology. This has shaped the configuration of private sector companies, the commodification of public research and the relations between national agricultural research, private companies and global agribusiness. In this context it is difficult to discern what in the approach and strategy of a rising power is peculiar or integral to it, as opposed to what constitutes a part of the process of capital accumulation under globalised markets. This notion of integrity is also problematic, given the considerable economic transformations that have occurred over the last 40 years in both African and emerging market economies. The relations between Brazil, China and African countries preceded these transformations and have been embedded within them. South-South cooperation takes place as a part of this historical process, which transforms the relations between China, Brazil and African countries within a neoliberal context. These relations need to be analysed historically and dynamically within notions of changing frameworks of development and accumulation.

This research examines Chinese and Brazilian development cooperation within a Ghanaian development context using an actor network framework. Rather than deducing a particular Chinese or Brazilian philosophy of development, which is then enacted within Ghana, it searches for development sectors within Ghana in which Chinese and Brazilian actors have participated, and examines this participation in the context of the history of development and development intent within that sector. However, these networks are also embedded in particular forms of accumulation and interests in accumulation, and these political-economic interests are important in shaping the development of actor networks. Thus the study seeks to understand the underlying patterns of accumulation and the struggles to control and shape accumulation, which involve relations between domestic and international capital and between smallholders, private sectors and states.

The sector chosen here is commercial rice production, which has occupied a central position in agricultural development frameworks in Ghana since the beginning of the 1970s. The failures of the commercial rice sector in the 1970s had large ramifications for the Ghanaian state and were instrumental in exacerbating a national banking crisis that resulted in Ghana's resort to structural adjustment. As rice imports have expanded in recent years, there has been a resurgence of interest in promoting domestic production of commercial rice and foreign investment in rice production. China has participated in the development of rice in Ghana since the 1970s. In recent years there has been a retreat in

Chinese support for rice cultivation in Ghana, but with recent private sector commercial opportunities this is now changing. Although there is no official technical cooperation in the rice sector between the Ghanaian and Brazilian governments, one Brazilian company, Brazil Agro Business Group, is among the pioneer companies developing the commercial potential of rice in Ghana.

The research is based on interviews with relevant officials working in rice and irrigation development within the Ghanaian Ministry of Food and Agriculture; Brazilian and Chinese actors involved in agricultural development; private companies within the rice sector; and farmers cultivating rice projects in the Greater Accra and Volta Regions. This includes interviews with old farmers and retired staff who worked on Chinese rice demonstration farms during the 1970s. The research is complemented by secondary material, newspaper reports and archival sources examining the history of development of commercial rice production.

The first section of this paper provides a background to the presence of China and Brazil in agricultural sector development in Ghana. The second section examines the agrarian policies, strategies and political economy of the agrarian sector in Ghana. The third section traces the early interventions in rice prior to structural adjustment, focusing on Chinese interventions. The fourth section traces the impact of structural adjustment on commercial rice and the involvement of international capital in rice development, including Chinese and Brazilian initiatives.

China and Brazil in Ghana

China and Brazil have a significant presence in Ghana. In 2011 China established a regional branch of the China Africa Development Fund (CADFund) in Accra to facilitate Chinese investment in West Africa. In recent years China has made substantial loans to Ghana for the development of infrastructure, estimated to be equivalent to US\$13bn. When the International Monetary Fund (IMF) attempted to prevent Ghana from receiving a US\$3bn loan from China in 2011, the then President of Ghana, John Evans Atta Mills, threatened to walk out of the IMF, resulting in an IMF climb-down and approval of new loan conditions for Ghana. Chinese investments and loans included road infrastructure development; building and construction including marketplaces; hydro-electric dam construction; irrigation; petroleum and gas sector developments; education; and telecommunications. In addition, there is a significant presence of Chinese citizens in the retail trading, deep sea fishing, small-scale mining and timber sectors, much of it conducted outside the law and without proper registration.² However, Chinese investment in the agricultural sector has been low, constituting about 4 percent of total investment (ACET 2009). The largest proportion of agricultural investment has been expended on rice irrigation projects. Most of this investment occurred in the past and there are presently no Chinese demonstration farms operating with Chinese

technical staff. Most Chinese interventions in the irrigation sector in recent years have been in the maintenance and reconstruction of irrigation facilities. Nevertheless, China still maintains an interest and presence in this sector, and the decline of this presence is not necessarily from lack of interest. Beyond this, the most significant presence of China in agriculture is in the trade in agrochemicals. Over 90 percent of agrochemicals marketed by agrodealers originate from Chinese companies, and one company, Wynca Sunshine, has established an assembly plant on the outskirts of Kumasi (Lerong et al. 2015). Although China has a small footprint in terms of physical projects, China has a sizeable presence in the Ministry of Food and Agriculture (MOFA), which is maintained through training and educational visits to China (Tugendhat 2015). Through these visits agricultural officers are introduced to Chinese technology and seeds and encouraged to experiment with samples on their return. This serves to create an interest in Chinese technology and an initial assessment of its performance and potential under Ghanaian conditions, and establishes an evolving framework for future research. The technical exchange programmes have a long history, originating in the 1970s and 1980s, and have become institutionalised within MOFA.

Although the Brazilian presence in the Ghanaian economy is much smaller than that of China, it is growing and significant. Similarly to China, most Brazilian investment is in civil engineering, in the construction of roads and intersections and in airport construction. Within the agricultural sector Ghana has been established as one of the five pioneers in the More Food International programme, and credit of US\$98m has been provided for the importation of subsidised agricultural machinery, mainly tractors, to Ghana. There have been considerable delays in implementing this programme as a result of logistic problems on both sides. Embrapa has also established an office in Accra. Originally this was conceived as an African regional office, but with realisation of the travel and communication constraints within Africa, this is no longer the case. The Embrapa office in Accra has a very small staff, with only one Brazilian technical officer. It is situated in the Council for Scientific and Industrial Research (CSIR) complex in Accra, where it shares premises with the Alliance for a Green Revolution in Africa (AGRA) and International Food Policy Research Institute (IFPRI). This existence of a network of international agricultural agencies in Accra dealing with policy issues may have influenced locating the Embrapa office in Ghana. Embrapa also works with the Forum for Agricultural Research in Africa (FARA). One of the main initiatives of Embrapa in Africa has been to build the Africa-Brazil Agricultural Innovation Marketplace, which seeks to promote research partnerships between African and Brazilian institutions by sponsoring joint research between agricultural development institutions located in Africa and Brazil. The objective of the partnership is to support partnerships between researchers working in

Africa and Brazil in agricultural development institutions, with the aims of strengthening agricultural technology development in Africa and Brazilian involvement in this process. The marketplace is implemented in partnership with FARA and the Inter-American Institute for Cooperation on Agriculture (IICA), with support from the UK Department for International Development (DFID), International Fund for Agricultural Development (IFAD), Bill and Melinda Gates Foundation (BMGF), UN Food and Agriculture Organization (FAO) and International Center for Tropical Agriculture (CIAT). This has funded projects in Ghana, Uganda, Tanzania, Mozambique, Ethiopia, Malawi, Senegal and Burkina Faso, looking at cotton, rice, banana and plantain varietal improvement and management practices; irrigation and water conservation; rangeland rehabilitation; food tree species utilisation; and cassava harvesting tools. Sponsored research in Ghana has examined cassava harvesting tools, cashew fruit processing, feed for aquaculture, edible mushrooms, cowpea and groundnut inoculants, and biochar production. These initiatives enable Brazilian agricultural research institutions to respond to problems identified by African researchers and to begin to build research products through which Brazilian technology and science can gain access to African markets.³

Beyond these research initiatives Embrapa does not implement any other projects in Ghana, unlike in Senegal where it has been involved in developing rice varieties and rice cultivation techniques; or in the Cotton-4 project in Mali, Chad, Burkina Faso and Benin, concerned with introducing Brazilian cotton varieties and cultivation techniques; or the ProSavana programme in Mozambique, concerned with replicating Brazilian commercial agricultural techniques in savannah woodlands.

Within commercial agriculture there is also a limited Brazilian presence. Although the media is replete with references to Brazilian land grabbing and investment in large-scale agriculture in Africa, particularly around biofuels, many of these projects have either failed to materialise or are mythical (Scoones et al. 2013b), including a supposed US\$300m loan from the Brazilian Development Bank (BNDES) to Northern Sugar to build an ethanol complex in Northern Ghana with the participation of Constran S/A of Brazil.⁴ However, these mythical projects serve to heighten and amplify a discourse about the relevance of Brazilian agricultural technology for Africa and of Brazilian interventions within Africa. Existing private sector agricultural ventures include a cashew processing plant on the Accra Plains and an irrigated rice farm in the Volta Region.

Unlike China, Brazil does not have a history of involvement within the agricultural sector in Ghana. It is attempting to build an interface and a discourse to shape future policy.

Agricultural Development Policy in Ghana

Over the last 30 years there has been a major transformation in Ghanaian agricultural policy. In the early independence period agricultural policy was based on state-led industrialisation with an emphasis on agro-processing industries. During the 1970s the state supported both large-scale private sector capitalist agriculture and smallholder agriculture integrated into government sponsored schemes with parastatal control over input supplies, marketing and processing. Following structural adjustment in the early 1980s the major emphasis was on privatisation of agricultural services, export-oriented agriculture and farmer integration into agribusiness value chains. From the mid 2000s the value chain approach has been extended from export crops into food production, with the state agencies working closely with the private sector to encourage the uptake of inputs supplied by the private sector and to support the increasing penetration of agribusiness and commercial input suppliers into the agricultural economy.

Ghana entered independence with a monocrop economy that was excessively dependent upon cocoa exports and an agricultural sector dominated by smallholder farmers. There was a noticeable lack of large commercial estates. During the colonial period little investment was made in agricultural research. It was not until the late 1950s, on the eve of independence, that the colonial government began to put in place an agricultural research infrastructure with experimental stations and research institutions. Following independence, the two major thrusts of agricultural policy were to create a state research infrastructure closely linked with state farms, and to diversify away from cocoa towards agro-industrial production based on cultivating raw materials for industrial processing. This did not displace the smallholder cocoa sector, but augmented it: cocoa was concentrated in the high forest zone and new initiatives opening new frontiers were initiated in the transition and northern savannah zones. The state farms largely drew upon Soviet and Eastern European technical cooperation. They were mainly experimental in nature, attempting to adapt agricultural mechanised technologies developed in temperate conditions to the Ghanaian environment (Hutchful 2002; Konings 1986; Miracle and Seidman 1968). During this period the Soviet Union was involved in the construction of several irrigation projects, which later became significant in rice production.

Following the overthrow of Nkrumah in 1966, agricultural policy was brought in line with the dominant US institutional arrangements in Africa based on the land grant system. This focused on building extension services within the Ministry of Agriculture that cultivated a select cadre of progressive capitalist farmers, whose uptake of new technology would eventually trickle down to smallholders. The government promoted large-scale

capitalist rice cultivation within the north, providing a clientele of farmers often with close links to the political regime and military with soft loans and subsidised inputs and machinery. By the mid 1980s there was a notable shift in agricultural policy to support for contract farming arrangements between smallholder farmers and state organisations, based on the World Bank smallholder model. This mainly occurred in irrigated agriculture and oil palm estates (Amanor 1999; Daddieh 1994; Konings 1986). The Ministry of Agriculture supplied farmers with inputs, credits and land, in return for which farmers had to follow particular cultivation regimes and sell their produce to the marketing authority.

The turn to smallholder outgrower schemes resulted from the disappointing performance of the large rice farmers, who as a group had failed to provide sufficient yield to meet domestic urban food requirements. The main developments in commercial rice production did not take place on irrigated land, which was limited, but in valley-bottom lands in the north. During the Sahelian drought of the mid 1970s, the vagaries of weather resulted in erratic yields and destruction of farms by fire, and many of the large farms became bankrupt. Since the national banks had overextended their loans to rice farmers, the collapse of this sector exacerbated the economic and banking crisis of the late 1970s. This resulted in both political instability (the June 4th Revolution of junior military officers) and the eventual establishment of the Provisional National Defence Council (PNDC) under Rawlings, which implemented an IMF structural adjustment programme in 1983 (Hutchful 2002).

The conditions of the IMF loan stipulated agricultural sector reforms, including the removal of subsidies and the privatisation of state agricultural corporations. It also promoted export-oriented agriculture and the opening up of the domestic market to food imports, which coincided with US interests and the importation of US rice into Ghana.⁵ This resulted in a decline in research in the food sector as government and donor resources focused on export crops. During the mid 1980s over 45 percent of research funding was allocated to cocoa, which only produced 17 percent of the agricultural gross domestic product (Hutchful 2002). During the 1990s and early 2000s there was also a promising development of horticultural crops for export, of which pineapple was the most significant. However, by the 2010s pineapple exports to the US declined as Ghanaian exporters found it difficult to compete with large transnational corporations based in Costa Rica. Smallholders were also forced out of export pineapple production as they could ill afford to compete with the new international standards imposed on producers, such as GLOBALG.A.P., or to afford the costs of new varieties and technologies (Ouma 2015).

There was no systematic programme for food production following structural adjustment until the 1990s when the Medium Term Agricultural Development programme was launched. The divestiture of agricultural

services did not result in successful privatisation, as few investors were willing to invest in public service sectors with unproven profitability. Many of the public sector agencies were developing nascent technology bases at the time of adjustment. For instance, public seed breeding in the cereal and legume sectors began to release its first certified seeds during the period of adjustment (Amanor 2010). Attempts to reconfigure public seed breeding as a commercial private company were not successful, as there was little private sector interest in rehabilitating the company. As a consequence plant breeding stagnated as it became underfunded. State seed breeders were transformed into a network of private breeders with little commercial acumen (Amanor 2010). Thus, the potentials of technology development that had begun to manifest themselves within the 1990s were halted and the potential of 'Africa's green revolution was stillborn' (Havnevik et al. 2007: 12). Use of inputs and certified seeds declined among farmers as their prices increased and were not reflected in the prices for crops on the market. Many farmers turned to experimenting with alternatives to use of inputs. The decline in input use and modern technology did not necessarily correlate with declining yields; through the 1980s and 1990s food production expanded (Gibbon et al. 1993).

With low demand among farmers for seeds and inputs, NGO programmes took up the task of distributing subsidised agricultural technologies to smallholder farmers. The Sasakawa Global 2000 programme, designed by the architects of the Green Revolution, Norman Borlaug and M.S. Swaminathan, became the main avenue for distributing fertilisers and certified maize seeds to farmers, and for maintaining the legitimacy of national and international agricultural research. However, as Global 2000 attempted to move to a more commercial model of cost recovery in the early 2000s, many farmers defaulted on their loans (Amanor 2013a; Puplampu 2003; Dawson 2002). The state also continued to implement variants on its smallholder contract farming scheme, this time engaging private sector food traders in purchasing and financing loans for farmers to cultivate crops according to specific recommendations. These arrangements sometimes involved the Agricultural Development Bank (ADB) providing credits to farmers for improved crop cultivation, which were guaranteed by commercial food traders. As with Global 2000, these schemes often suffered from problems of cost recovery. By the early 2000s these elements began to be constituted into an operational framework based on food value chain analysis and complex networks through which NGOs and government agencies work with the private sector to establish forms of food governance in which farmers are provided with inputs and instructions to cultivate particular standards of crops for which they are guaranteed markets and higher prices. This approach is built upon an alliance of input distributors, who are guaranteed markets for their produce, and food processors, who gain access to supplies of crops produced to their particular requirements (Ouma 2015; Ouma et al. 2012; Amanor 2010).

By the mid 2000s seed companies and input suppliers began to focus on expanding their presence within African markets. International agricultural policy frameworks now focused on facilitating the use of inputs and improved seeds by smallholder farmers through market incentives to promote increased uptake of new technologies by smallholders. A second major focus was on developing rural infrastructures to promote private sector investment within African agriculture (World Bank 2008). International agencies also framed food security as a matter of providing subsidised inputs to farmers within the context of market-based solutions (Sachs 2005; Sanchez et al. 2005), a task taken up by the World Hunger Programme and later by AGRA. This in effect resulted in the expansion of the technologies of multinational agribusiness corporations into African markets. The world food crisis of 2007 and the increasing cost of synthetic fertilisers during this period as a result of escalating oil prices gave further credence to this approach.

By facilitating the expansion of 'pro-poor markets', African national agricultural research services could gain a new life and a new legitimacy in the extension of modern technologies to smallholder farmers. In Ghana, MOFA began to work within a framework of linking food security and social protection with extension of new technologies, and integration of farmers into value chains and markets. The ministry introduced four new programmes: a programme to facilitate the uptake of mechanisation through the creation of privatised mechanisation centres making tractor ploughing and other services available to smallholder farmers; the facilitation of uptake of fertilisers through 'smart' subsidies paid to agrodealers; the stabilisation of domestic food prices through state procurement of food through a National Food Buffer Stock Company; and the creation of block farming programmes, which organised farmers on contiguous plots of land into an organisation which could receive a package of improved seeds and inputs, in return for marketing their crops through state channels (Benin et al. 2013). Meanwhile, AGRA has supported the expansion of agrodealers into rural areas; the development of private seed companies; and reforms to intellectual property rights in Ghana. This has resulted in the increasing movement of seeds produced by multinational companies into the Ghanaian market, threatening to displace nationally produced certified seeds, and the enactments of new laws to facilitate market penetration and research by transnational agribusiness. A Biosafety Protection Law was enacted in 2010, facilitating the movement of genetically modified organisms (GMOs) and related research into Ghana. However, recent attempts to pass a Plant Breeders Bill in parliament have floundered as a result of popular opposition (Amanor 2013c).

The largest input distributor in Ghana, Wienco, is involved in building farmer organisations to facilitate the uptake of inputs. These programmes have been given a boost by major donor and UN initiatives that support food security by promoting uptake of hybrid

varieties by farmers, and various forms of 'smart subsidies' to promote 'pro-poor market development'. New hybrid crops produced by transnational seed companies are now beginning to be distributed, threatening the production of nationally adapted varieties produced by public research institutions. Wienco is now introducing Pioneer seeds into Ghana, and has also entered into a partnership with RMG Concept Ltd, which holds exclusive rights to distribute the full range of Syngenta products in Ghana (AFIG Funds 2011).

This expansion of agricultural input markets has resulted in increasing interest in commercial food production and the framing of increased food production as a food security issue. Rice production has been central in this policy transformation in Ghana, since about US\$600,000 is spent annually on imports. Rice imports have increased dramatically, from around 30,000t per year during the late 1970s and 1980s to between 500,000t and 650,000t each year since 2010.⁶ A major focus of agricultural policy is now to develop domestic commercial production to compete against imported rice, building up alliances between input distributors, large commercial concerns, contract smallholders and food traders (BMGF 2012).

Between 70 and 80 percent of the rice consumed in Ghana is currently imported, with the major sources being Thailand and Vietnam. A local market preference for high quality perfumed rice from Thailand and Vietnam has displaced US rice, which was originally the main imported rice. Premium quality (less than 5 percent broken) rice currently accounts for about 48 percent of imported rice, of which over 30 percent consists of perfumed rice. Between 2006 and 2011 the premium rice component of consumed rice rose by 40 percent, while consumption of the inferior grades declined. The price of imported rice on Ghanaian markets is high compared with international prices, since it attracts a 20 percent import tariff and 17.5 percent costs in port handling fees (Ibid).

Although imported rice has displaced local production, there are a few environments in which local production is still able to compete favourably with imported rice (Ibid). This usually occurs among smallholder producers on irrigation projects. In these areas farmers have successfully taken up the cultivation of perfumed varieties of rice, which are often passed off as imported Thai varieties by traders on the Kumasi markets. However, most irrigation projects in Ghana are badly in need of rehabilitation or have collapsed due to the high cost of electricity and inability of farmers to pay for costs of irrigation. Those that have tended to survive are the irrigation schemes that were designed by Chinese experts using gravitation. Thus, the development of modern rice production in Ghana is intricately linked with historical Chinese initiatives in irrigated rice cultivation for smallholder farmers. The next section examines this history and its subsequent impact on the development of modern commercial rice production.

Chinese development cooperation in irrigated rice production

Economic cooperation between Ghana and China originated in the context of the Cold War. In its policy of containing communism the US sought to isolate China in the 1950s. China responded by building alliances with former colonies and national liberation movements based on principles of mutual co-existence, non-alignment with superpowers and self-reliant development (Chau 2014; Ogunsanwo 1974). A major objective of Chinese policy in Africa was to gain support for the One China Policy, that is, the recognition of the People's Republic of China as the legitimate Chinese state within the United Nations (UN), in contrast to the US policy of recognising Taiwan (the Republic of China). From the early 1960s China began to extend development assistance to radical states in Africa that opposed imperialism. This included Ghana under the leadership of Kwame Nkrumah and the pro-socialist Convention People's Party (CPP). In 1960 Ghana established diplomatic relations with China and President Nkrumah visited Beijing, during which an economic and technical cooperation agreement was signed. China provided Ghana with an interest free loan equivalent to £7m over five years (Chau 2014; Ogunsanwo 1974). As part of the loan China was to set up a textile factory in Juapong and a pencil factory in Kumasi (Djansi 2015). The agricultural sector did not feature in this agreement on technical cooperation. In October 1962 China and Ghana signed a Sino-Ghanaian protocol which included development of paddy rice cultivation (Peking Review 1962). During his visit to Ghana in 1964, Zhou Enlai commented on the low level of investment in agriculture and advised the Ghanaian State to promote the development of rice cultivation.⁷ Following Zhou Enlai's visit 50 Chinese experts in textiles and agriculture were sent to Ghana (Djansi 2015).

The attempts of the People's Republic of China to gain influence within Africa were countered by Taiwan with US support. Taiwan's relations with Africa date back to 1959 when the Kuomintang sent a mission to Cameroon, Togo, Nigeria, Gabon, Guinea, Ivory Coast, Mali, Tunisia, Somalia and Ethiopia as part of a bid to counter China's growing support in Africa. In 1961 Taiwan launched Operation Vanguard with support from the US Agency for International Development (USAID) (Bräutigam 2009; Tseng 2008; Baker 1985). Operation Vanguard sought to promote technical cooperation between Africa and Taiwan by inviting African technicians to training workshops in Taiwan, providing scholarships for African students and sending Taiwanese experts to African countries to render technical assistance. A major focus of Operation Vanguard was on promoting Chinese cultivation techniques in irrigated rice and vegetable cultivation, which combined indigenous Chinese methods with modern agriculture. In November 1961 the first Taiwanese agricultural mission was established in Liberia with a staff of 11 Taiwanese experts (Tseng 2008). China counteracted by establishing its own agricultural projects from 1961, in Guinea (Ogunsanwo 1974).

In Ghana the US became increasingly concerned with the support the Nkrumah government gave to national liberation anti-imperialist movements and its increasing alignment with China and the Soviet Union. It worked to undermine the CPP government and foment a coup d'état, which finally took place in February 1966 in a period of increasing economic decline.⁸ The new military government demanded the withdrawal of more than 430 Chinese technical experts. China was forced to shut down its embassy in October 1966 while Ghana established relations with Taiwan and supported Taiwan within the United Nations.

Relations with Taiwan further improved with the establishment of economic cooperation. Irrigated rice cultivation was one of the major areas of Taiwanese economic cooperation in Ghana, frequently on land that had been part of the irrigated state farms being developed by the Soviet Union. These projects started around 1970 at sites such as Dawhenya and Ashiaman. Taiwanese technicians were involved in constructing irrigation infrastructure and instructing farmers in rice and vegetable cultivation. However, the Taiwanese projects were short-lived in Ghana. Although electoral democracy had been reinstated, the Progress Party under Busia had failed to solve the economic malaise. This resulted in growing popular discontent and led to another coup d'état, which brought the National Redemption Council to power in 1972. This occurred soon after China gained admission to the UN Security Council as a permanent member, with strong African backing. Following the coup diplomatic relations were reinstated with China and rescinded with Taiwan. As was the case in many other African countries, China took over the running of Taiwanese agricultural projects. Between 1972 and 1976 China managed and constructed irrigation projects at Dawhenya, Ashiaman and Afife.

This change of management did not lead to any radical transformation of the projects, but a continuity. According to P.K. Anamang, who was working as a member of the Ghanaian project staff on the Ashiaman Irrigation Project during the 1970s, when the Chinese team first came to Ghana they held close consultations with the Ghanaian project staff, questioning them in detail about what the Taiwanese were doing on the project. They continued with the same technologies and management style.⁹ Similarly, at Dawhenya Valentine Okumah, who was then employed by the irrigation project, stated that the Chinese came in two batches, from Taiwan and the People's Republic of China. The farmers on the project were not clear on the difference between the two, because their management techniques were similar. Essentially, there was a continuity of the project.¹⁰

Kathleen Baker (1985) makes the same point in her study of Taiwanese and Chinese agricultural programmes in Senegal. As in Ghana, with the establishment of diplomatic relations with China, Taiwanese agricultural projects were taken over by China in 1973:

Despite their differing ideologies the teaching methods used by Taiwanese and the Chinese differed very little, both having been derived from long-established methods used in pre-revolutionary China, but also featuring many modern developments. (Baker 1985: 405)

These similarities also extended to use of inputs and seeds:

The cultivators are not aware that there were any differences in the types or the quality of the seed they obtained from either the Taiwanese or the Chinese, but they maintain that the quality was always high. This is not surprising, because Taiwanese and Chinese seed varieties and cropping patterns are the product of centuries experiment, and research and development in this area has continued along similar lines in both Taiwan and the People's Republic. (Baker 1985: 407)

Anamang recollected that the Ashiaman Irrigation Project was originally constructed by Soviet and Ghanaian technicians in 1965. Before the 1966 coup the dam had been completed, but not the irrigation fields and ditches. The Taiwanese came to construct the irrigation canals and fields. They brought power tillers and tractors, but much of the work was carried out manually with the use of hoes and pick axes. The Taiwanese resided at the project site and worked alongside the Ghanaian staff in the fields, carrying out instruction by practical example. The irrigation system used a gravitational system from the dam to the fields rather than pumps. The Taiwanese brought machinery and seeds with them from Taiwan. The Taiwanese established a demonstration farm growing rice and vegetables. When the technicians from China came they also brought their own machinery and seeds. However, during the Chinese project plots of land were given to farmers to cultivate, and the Chinese technicians instructed the individual farmers on cultivation techniques.¹¹

Similarly, the Afife/Weta Irrigation Project started as a Russian State Farm, which was constructed in 1962 for production of rice and sugar cane. This was taken over by Taiwanese technicians before becoming a Chinese project. According to Simon Gbododzor, an elderly farmer at Afife, who used to be employed on the project, the Chinese established a demonstration farm around 1971:

Those of us who worked on the Chinese farm in those days were not many. The Chinese showed us many things about rice cultivation. They trained us so well that after they finished their contract and left we were able to teach the other farmers. When they first came they lodged at Have in the Dekpur area. They developed their farm at Have. There is a small dam there, which they used to irrigate their farms. Eventually they expanded their farms. We

were the ones who really transferred the knowledge they brought.¹²

At Dawhenya, Valentine Okumah recollected that the irrigation project was originally a state farm that had been constructed by Russians. The Russians constructed the dam but not the irrigation canals. The state farm was used for pig rearing and the dam was still under construction when the 1966 coup occurred. The Russians left and their role was taken over by the Taiwanese, who began constructing the irrigation canals and fields and established a demonstration farm of two acres. Following the 1972 coup, when the Chinese took over the project it was further expanded and plots of three acres were allocated to farmers, of which two acres had to be cultivated with rice and one acre with vegetables, including onions, cabbage, cauliflower, cucumber, cantaloupe and watermelon. In both the Taiwanese and Chinese projects there were five Chinese/Taiwanese technicians living on the project site. There were a total of 52 Ghanaians employed by the project.

According to Valentine Okumah, the main rice varieties introduced by the Chinese were called Thailand, CG40, IR442, IR40 and C20. Anamang also remembers the Thailand variety, but names others as DS3, DS 2, DS 1 and IR8. These were probably a combination of Chinese and International Rice Research Institute (IRRI) varieties, with the IR prefix denoting IRRI varieties. These varieties were multiplied at Dahwenya and sent from there to Ashiaman. Both Okumah and Valentine recollect that the varieties were high yielding, comparable to or better than current varieties. However, both farmers also attribute the high yields to land management and preparation techniques and the uses of mulches alongside fertilisers. They were both impressed by the Chinese practice of ploughing the rice stubble into the soil as mulch. The Chinese introduced special tractors that were able to work the stubble into the soil when the fields were wet and muddy. Since they left this practice has discontinued, since tractors owners are unwilling to undertake the work for fear that their tractors will get stuck in the mud. As a result farmers now allow their rice stubble to dry and then burn it.¹³ At Afife, the farmer Boyvi commented:

I started farming around 1971. When I came the Chinese were already here. They were teaching the farmers how to cultivate rice. They prepared the land with power tillers. Then they prepared nursery beds. Fifteen to sixteen days later they transplanted them. We learnt how to cultivate rice in a nursery and transplant it to the fields. However, since the Chinese left the culture of broadcasting or direct planting came back in, until GADCO [Global Agri-Development Company] has recently come in and brought back nursery preparation.¹⁴

This was corroborated by Mark Afeforgbor at Afife:

When the Chinese came they introduced nursery beds to us. They taught us how to transplant rice on to the fields. We got a lot of yield from this. They showed us how to apply fertilisers on the fields. But when they left we went back to the broadcasting methods because they are easier and do not use so much labour. Labour in this area is very expensive.¹⁵

Chinese rice projects in Africa grew in the context of the Cold War and rivalry between Taiwan and the People's Republic of China for recognition by African states and within the UN. The rationale for these projects was rooted in diplomacy and geopolitics rather than capitalist accumulation, and political competition led to generosity within these projects, which was reflected in support for smallholder farmers. China's involvement in these projects also grew out of a feeling of obligation to take over Taiwanese development interventions in Africa when African governments broke off diplomatic relations in support of China. With entry into the UN and rapprochement with the US, the rationale for Chinese-Taiwanese rivalry through agricultural technical demonstration projects declined (Bräutigam 2009; Tseng 2008).

Although rice was a high priority crop during the 1970s in Ghana, the objectives of the Chinese programmes did not fit with government objectives, which in the early 1970s were largely concerned with promoting large capitalist farmers. Although the government turned to a smallholder approach in the mid 1970s, this was also at variance with the Chinese approach, since this was concerned with building national research capacities and tying farmers into the use of inputs controlled by the state in contract farming schemes that also gave government agencies control over the produce of farmers. This contract farmer model (actively promoted by the World Bank in the 1970s) resulted in the government extending its control over irrigated smallholder schemes in the mid 1970s. The largesse of freely provided inputs and technical advice and autonomy of smallholder marketing within these Chinese initiatives was at odds with the emerging agribusiness agenda of the Ghanaian state. As Ghanaian crop services began to create certified rice varieties, agricultural extension services sought to gain control over and influence the process of seed adoption by farmers. Since the Chinese agricultural projects had been largely construed as demonstration centres of the applicability of Chinese technology and management skills to African environments, there was little attempt to institutionalise them within state agricultural structures. Thus, when they were transferred back to the Ministry of Agriculture the links to seeds, spare parts for agricultural technology, inputs and services provided freely to farmers ceased to continue to exist, and farmers could no longer continue to perform the techniques that had been inculcated by the Chinese. This was further compounded by the declining economic conditions of the late 1970s, which

hindered the ability of the state to provide effective support to agricultural sector development.

Chinese commitments to these agricultural technical demonstration projects in Africa wavered during the late 1970s and 1980s, as China began to reorganise its internal agricultural sector and its aid to Africa. During the 1980s Chinese technical and economic cooperation shifted from concerns with building Third World solidarity and self-reliance from imperial domination to developing forms of economic accumulation based on 'mutual benefit' and 'co-operative projects and joint ventures' (Yu 1988: 857). Within China, agriculture was transformed away from communes and cooperatives towards individual household farming. Public research increasingly organised on commercial lines and opened up to develop markets in hybrid seeds and inputs. Agricultural markets were opened up to foreign investment and competition. The main element that has survived from the early interventions in agricultural development has been the arranged visits of agricultural technical officers to workshops and training courses in China to familiarise themselves with the latest developments in Chinese agricultural technology. These now serve as potential conduits through which China can build interest in its agricultural industries, and facilitate research within Ghana to adapt them to African conditions. A second important link with the early period lies in the periodic rehabilitation of irrigation works that Chinese construction companies have carried out on the old Chinese irrigation schemes. These are significant because these are the main irrigation projects that continue to function in Ghana, while most irrigation projects are seriously dilapidated and in serious decline. The third important link is in the memories of Ghanaian farmers of the Chinese projects, which tend to be informed by favourable impressions of the dedication of Chinese technicians and the viability of the technology they introduced. These serve to create important avenues through which Chinese interests can re-establish a position in the irrigated rice sector. Nevertheless, the present emphasis of Chinese agricultural policy on the commercialisation of research and technology and the increasing use of hybrid seeds and high inputs are distant from the agricultural technology demonstration projects of the 1970s.

Irrigation and structural adjustment

As China retreated from rice development projects in Ghana, agrarian policy became defined by structural adjustment, which created pressures for the irrigation sector to be more cost-effective. The main donors moving into irrigated rice during the 1980s and 1990s were Japan and the EU. However, this was generally a period of retreat for irrigated rice. Many irrigation projects collapsed as project management were forced to recover user fees from farmers to pay for the costs of pumping water. Japan took over the rehabilitation of Ashiaman irrigation project, and added training facilities and a Rice Research

Institute. The EU attempted to rehabilitate the Dawhenya irrigation project during the 1990s. They introduced Integrated Pest Management, Farmer Field Schools and community management of the project. They offered new techniques of cultivation based on perfumed varieties. These required higher applications of fertilisers, which farmers could ill afford in the days of removal of subsidies. The project also introduced higher user fees. This resulted in much higher costs of production than farmers were accustomed to. The management of the project was devolved from the state to community management. However, the project collapsed under community management since farmers were unable to pay the user fees and the management was unable to pay its electricity bills. Consequently the Electricity Corporation of Ghana cut off power supplies to the project, which collapsed. The few farmers who continued to work on their irrigated plots did so with their own private generators, which were used to pump water (Kranjac-Berisavljevic et al. 2003).

The main irrigation projects that continued to operate during the 1990s were those that used gravitational water flow. Chinese technicians invariably constructed these. The most significant smallholder irrigation project was situated at Afife. Although originally constructed by Russians, the Afife project was rehabilitated during the 1980s by Chinese construction companies. They also extended the irrigation perimeter to over 800ha. However, the management of the facility remained under MOFA and the Ghana Irrigation Development Authority (GIDA).

Throughout the 1990s and early 2000s GIDA sought to maintain control over smallholder farmers' rice production and cultivation practices by tying farmers into loans and contractual arrangements. Farmers were instructed in standardised cultivation techniques, and provided with loans for the purchase of seeds and inputs provided they followed these practices. The loans were repayable after harvest in equivalent values of rice. Contractual arrangements were also worked out with food traders and processors through which loans were given on conditions of supplying an equivalent quantity of rice after harvest. However, most of these schemes failed, as a result of high rates of default among farmers.

Since the mid 1990s farmers at Afife were organised into five co-operatives with the assistance of the Department of Co-operatives. The co-operatives facilitated linkages between farmers and markets. Inputs were purchased in bulk from Wienco with assistance from ADB, which provided credits for farmers to use inputs. In 2001 GIDA entered into a relationship with House of Remma, a rice processing and marketing company, to purchase farmers' produce. Farmers participating in the scheme were provided with loans from ADB on the condition that they delivered a specific portion of rice to offset the loan to House of Remma. The operations of House of Remma were also financed by ADB (Dansson et al. 2004). However, this programme collapsed as a result of high default on payments by farmers. Farmers

at Afife complained that they were not given sufficient time in which to repay the loan. Loans had to be repaid immediately after harvest while rice was at its cheapest on the market and farmers had many expenses to defray. Other problems were related to delays in inputs being distributed, poor quality seeds, inappropriate fertilisers (such as fertilisers meant for pineapples) and problems with water control including flooding and insufficient water. Attempts by GIDA to create a cadre of contract farmers have failed. Most of the farmers continue to farm autonomously, multiplying their own seed and engaging in farmer-to-farmer seed exchange. The dominant rice variety planted at Afife is Togo Marshal, a variety brought from Togo by a farmer, which farmers argue grows better under their conditions than Jasmine 85, the main variety promoted by MOFA. However, many of these farmers have financial problems and are forced to seek loans from market traders from Kumasi, who buy crops in advance against loans given to farmers, but charge high interest rates of 50 percent on these loans. Many farmers at Afife complain about declining profit margins in rice cultivation and escalating costs of purchasing inputs and hiring labour.

The structural adjustment era created many pressures for irrigated farmers, which resulted in higher costs of production that were not reflected in returns to farming. The government strategies of attempting to control farmers within the structures of market liberation by entering into contractual relations with private trading corporation and banks and imposing cultural controls on farmers were not successful. The failure of this strategy resulted in farmers maintaining their autonomy, but often at the cost of increasing immiseration or a decline and collapse of irrigated farming. During the 2000s the main initiatives in irrigated rice farming shifted away from an alliance between MOFA and private traders to private initiatives to establish privately owned irrigated estates and contractual relations between privately owned companies and farmers, as MOFA lost confidence in its ability to raise and control smallholder production.

Private foreign sector investment and rice irrigation in the 2000s

With limited success in organising contractual relations with smallholders, limited funds for irrigation development, declining irrigation infrastructures and donors unwilling to fund state-owned irrigation development, the state began to look towards other arrangements in the 2000s to finance agricultural development. Despite all the problems within the rice sector there were three promising signs of its potential. Firstly, although the perfumed rice market was dominated by imports, smallholder rice producers were still able to capture about 20 percent of this market and compete favourably against the price of imported rice. Secondly, locally produced perfumed rice was received favourably on the local market and was able to compete with imported rice, to the extent that some traders in Kumasi were known to pass off local rice as Thai rice. Thirdly, a

growing percentage of the domestic market became willing to pay higher prices for high quality perfumed rice, which captured over 45 percent of the urban market (Angelucci et al. 2013; BMGF 2012). Thus, with improved production, processing and packaging, locally cultivated rice had the potential to compete against high quality imported rice within Ghana and also within the West African sub-region.

The first scheme which was drawn up with international investors in production occurred in 1996 when the government of Ghana signed a contract with Juliet Cotton of the US-based Quality Grains Company to develop rice production on a 4,300ha plot of land at Aveyime. The land had originally been acquired by the state in the 1970s for cotton production, but had never been developed. The Government of Ghana provided Juliet Cotton with US\$20m to develop the project. Although machinery was acquired for the project, much of the funds were squandered, as a result of which Mrs Cotton was imprisoned in Atlanta for 20 years while the former Minister of Finance, Kwame Peprah, the Minister of Food and Agriculture, Ibrahim Adams, and the Director of the Legal Sector of the Ministry of Finance, George Yankey, were given sentences in Ghana of two to four years for causing financial loss to the Ghanaian State (Sakyi-Addo 2002).

Subsequently, a new agreement was negotiated by the Government of Ghana with Prairie Volta from Texas to develop the rice farm at Aveyime. Prairie Volta held a 40 percent share, the Ghanaian government a 30 percent share and Ghana Commercial Bank a 30 percent share in the venture. The venture utilised the machinery acquired by Quality Grains and looked to acquire finances for the project in Ghana. This proved to be a challenge. The project was delayed for eight years as the surrounding communities challenged Prairie Volta's rights to develop the land, and banks refused to release funds to the company until the land matter was resolved. The project only began to operate in 2009. Prairie Volta has gained clearance to bring in Jasmine 85 seed from the US. By 2011, the company had 750ha under rice production. However, difficulties in gaining financial support are delaying the expansion of rice cultivation (Anderson 2011).

A second private sector investment in rice was undertaken by Brazil Agro Business Group in the Volta Region at Kpenu. This is a Brazilian company that has been operating since 2008. It acquired a lease for 5,000ha at Kpenu, of which 500ha has been developed with irrigation facilities to grow rice. The water is drawn from the Volta River. The company has developed an effective system of irrigation based on creating canals with simple equipment and manpower that utilise contour gravitation with minimum pumping of water.

Brazil Agro Business Group has one shareholder from Brazil and no other source of finances. It is not supported by any bank or fund from Brazil. The company originally intended to invest in livestock in Ghana, but switched

to rice, which it came to regard as a potentially more promising investment. The company sought technical advisers from southern Brazil where rice is grown and brought rice technicians to Ghana. However, the seeds planted were acquired from Prairie Volta and multiplied on the farm at Kpenu. The major innovation that the project claims to have introduced is a system of germinating rice within sacks that are soaked in water before they are transplanted. This enables rice to be harvested in 110 days or three times a year in Ghana. The company also uses cheaply constructed but effective roughly hewn irrigation ditches. The company claims to gain a yield of about 5t/ha per annum. It has large outlays in machinery and has acquired a rice mill. It employs 160 workers.¹⁶

Brazil Agro Business Group has become embroiled in disputes with neighbouring communities over land. The company originally leased 5,000ha which it acquired from Biofuel Africa, a Norwegian company involved in *Jatropha* cultivation in Ghana. The land at Kpenu was unsuitable for *Jatropha*, so Biofuels Africa sold the land to Brazil Agro Business. This was arranged with the knowledge of the landowners within the communities, who were involved in the transaction. In addition Brazil Agro Business pays the chiefs of the communities a monthly land rental of US\$10 per acre (LandJustice4wa 2015). However, rival factions in different settlements dispute the ownership of land, and other groups have made claims to it. About 600 farmers lost their land to make way for the rice farm. As a result of disputes over the land, Brazil Agro Business have only been able to develop about 500ha of land and the case is now in court. Many of the youth in the neighbouring settlements are disgruntled and claim that they have lost their land and chances of an independent livelihood because of the company. While they are forced to seek employment with the company now, as a result of a lack of viable alternatives, they claim that the working conditions and pay at the company are unsatisfactory.

Other problems faced by Brazil Agro Business include difficulties in getting access to machinery and spare parts, and the high costs of inputs within Ghana when compared to Brazil. Despite all these problems the Managing Director, Lidiane Jaconi, is optimistic about the future of rice cultivation in Ghana and its profitability.¹⁷

A third important investor in rice is Global Agri-Development Company (GADCO), which has an irrigated farm at Fievia, near Adidome in the Volta Region, drawing its irrigation source from the Volta River. GADCO is a multinational group registered in Amsterdam with strong European, African and Indian connections. The Chairperson of its Boards of Directors is Lord Malloch-Brown, formerly Minister of State in the Foreign Office under the British Labour Party Administration of Gordon Brown, and a former Chief of Staff in the UN. GADCO has managed to attract several investors including Summit Capital, Acumen Fund and the German development bank KfW's African Agriculture and Trade Investment Fund.

Unlike Brazil Agro Business, GADCO has not acquired large tracts of land but works with the community. It has entered into an arrangement with the communities to lease 1,000ha of land for a 2.5 percent share of the profits and the grant of 48ha of developed irrigated plots back to the community. At present, as with Brazil Agro Business, it multiplies seeds in its nurseries originating from Prairie Volta.

GADCO has drawn upon the technical expertise of Brazil Agro Business. Before acquiring its own rice mill GADCO was using the other company's facilities. GADCO has drawn upon the technical expertise of Brazil Agro Business, including the system of contour gravitation irrigation and cultivation techniques based on southern Brazilian knowledge. GADCO entered into a management alliance with a Brazilian Group, Agropecuária Foletto, which was responsible for providing management and technical skills and access to Brazilian technology. However, this relationship has faded. Although GADCO are reticent to discuss this relationship, this is probably a result of the failure of Agropecuária Foletto to be able to establish ready access to Brazilian technology.

GADCO is exploring other avenues of gaining access to seeds produced by transnational seed companies and from Ghanaian seed research institutes, although there are problems with the quality of certified seeds produced in Ghana and difficulties in getting regulatory clearance from imported seeds. For the present, it has entered into an alliance with Wienco, which has contractual rights to distribute Syngenta seeds in Ghana. Beyond its irrigated plots at Fievia, GADCO has also established relations with around 500 outgrowers at Afife/Weta and Asutware irrigation projects in conjunction with Wienco. They provide farmers with interest free credit, technical advice, seeds and inputs and purchase their seeds for milling. The milled rice is sold to Finatrade, the largest rice marketer in Ghana. GADCO has plans to move into rice marketing in Ghana and launch its own Copa Connect rice brand. The GADCO approach depends upon building linkages with other organisations to build expertise and control over the rice chain, and gain influence within the marketing and input supply chain.¹⁸

A fourth potentially significant investor in rice production is China Geo, one of the two biggest Chinese construction companies in Ghana. In 2013 China Geo with Ningxia Province Administration in China expressed interest in developing a programme with the Afife/Weta Irrigation Project to expand and develop rice irrigation within the project site. Feasibility studies were conducted alongside PPP consultations with the community. However, in the process of carrying out these consultations several sections within the community expressed dissatisfaction, which developed into threats against the Chinese technical evaluation team, as a consequence of which the feasibility study was abandoned. These tensions reflected fractures within the communities between factions of chiefs and between different strata of farmers. This includes a dispute between the chiefs of Weta and Afife on the ownership of the land. Recent legal

recognition of the rights of the Weta chiefs to the land has resulted in a change of name of the project from Afife to Weta Irrigation Project, although many of the people farming there are from Afife. Thus, consultations held between the Chinese technical team and the Weta chiefs, which were organised by the management of the irrigation project, alienated the Afife chiefs, who mobilised sections of the community against the project.¹⁹ The project was also opposed by sugarcane farmers working in the lowland areas in which the project was to be extended, who argued that the creation of irrigation facilities would lead to a redistribution of land within the community, which would result in a loss of land for them. Chinese interests in the project were also probably undermined by the expansion of GADCO/Wienco outgrower schemes into the irrigation project, locking farmers into existing commercial production schemes.²⁰

Although China Geo's commercial operations in Ghana are currently largely confined to construction, it has developed a small vegetable farm at Aveyime on land of under 50ha with a staff of nine people. However, it has interests in moving into irrigated rice and tomato farming, producing for the domestic market rather than exporting back to China. Presently, it is attempting to secure a 36,000ha plot at Prang near Sunayani, in the Brong Ahafo Region, and is also negotiating with chiefs at Akumadan to rehabilitate and extend a dilapidated irrigation project. It is attempting to enter directly into negotiation with chiefs for land rather than tender for government land, such as at Afife or on the Accra Plains irrigation project, to avoid the cumbersome processes of public-private partnership (PPP) negotiations. China Geo is also involved in a long-term project that will build a Chinese Rice Research Institute at the Ashiaman irrigation project site. This will create conditions under which Chinese hybrid rice can begin to be produced and adapted to Ghanaian conditions and meet regulatory conditions to be sold within Ghana. A climate of support for Chinese hybrid varieties is also being built by organising training visits for staff on key irrigation projects to visit rice breeding research facilities in China, in which staff are presented with hybrid seeds to experiment with on their return to Ghana (Tugendhat 2015). For instance, Samuel Tettey, a Technical Officer at Ashiaman irrigation project, went on a training visit in 2013 to LongPing High-Tech Institute in Hunan Province, which produces the hybrid variety NP833. He was presented with a sample of seed of this early maturing high-yielding dwarf variety to experiment with on his return to Ghana.²¹ Building these research linkages is likely to constitute a long term objective of China Geo, which can be seen as a frontier company and coordinator of infrastructure and institutional development to facilitate a long term investment of Chinese agribusiness in Ghana. However, the immediate concerns of China Geo are in negotiating the conundrums of land tenure and community politics to facilitate entry into agricultural production.

Conclusion

A long-term historical study of the political economy of rice development projects and the role of China in these developments enables a more nuanced framework of development initiatives in Ghana that does not assume that development is associated with US modernisation paradigms. This also enables the changing framework of Chinese interventions in development cooperation to be discerned, and current trends and patterns in global accumulation in agriculture and agribusiness to be analysed. The major transformations have been through development as bilateral aid carried out through projects, to development as a system of accumulation in which institutional linkages and social networks are central.

In the case of the rice sector in Ghana, Chinese projects in the 1970s developed as a symbol of Cold War rivalry between the China and Taiwan to win diplomatic influence in Africa. Although these projects were significant in introducing smallholder farmers to irrigated rice cultivation and building small-scale modern rice infrastructures, they were insignificant in the processes of domestic capital accumulation in agriculture. During the 1970s rice was an important sector of investment for the government of Ghana. However, the major focus was on building a sector of large estate capitalist farmers cultivating valley-bottom lands, since the development of irrigation facilities were constrained and occupied an insignificant proportion of land. The large estates failed, and since considerable capital had been invested in supporting them by state banks, this contributed significantly to the economic collapse of Ghana and its adoption of structural adjustment. This resulted in the opening of domestic food markets to imports, and the import of large amounts of perfumed rice, which became a dominant staple in urban markets. The willingness of Ghanaian consumers to pay high prices for rice and large potential profits resulted in a resurgence of interest in irrigated rice production, during a period in which China had withdrawn from smallholder rice production in Ghana.

During the 1980s and 1990s China began to remodel its technical cooperation on the basis of 'mutual benefit' and capital accumulation rather than on Third World solidarity and self-reliance from superpower influences. The major economic sectors of interest in Ghana were the construction sectors, natural resources and minerals. During the 1990s the irrigated rice sector in Ghana became subject to restructuring and divestment, which resulted in community management and contractual linkages with input suppliers and food marketers within Ghana, none of which were successful. Given the large market for rice and its profitability, during the late 1990s and early 2000s the Ghanaian government sought to promote commercial production of rice, and turned to US companies for technical and managerial innovations in this sector. These initiatives stagnated, owing to poor

regulatory frameworks, land disputes with farming communities and the difficulties of realising financial support. However, new private sector investors moved in, attracted by perceptions of the relatively low cost of land, including the Brazilian Agro Business Group, which was able to introduce new innovations and draw on technical expertise from southern Brazil. Beyond bringing Brazilian technical experts to work in Ghana, this did not create any lasting technical linkages between Brazilian research services and input suppliers. The Brazilian Agro Business Group was dependent upon getting seeds and inputs from existing suppliers within Ghana. Although the Brazilian Agro Business Group has influenced GADCO, and resulted in linkages between GADCO and Brazilian technicians, the lack of institutional linkages between these Brazilians and Ghanaian input markets eventually resulted in GADCO looking to other input suppliers with strong connections within Ghanaian markets. The marketing strategies of GADCO are also more finally attuned to the Ghanaian institutional environment, aligning themselves with the contract farmer models linked into input supplies and processing marketing models advocated by MOFA since the early 1980s.

Although Embrapa has experience with implementing rice technologies in Senegal, there are no working relations with Brazil Agro Business, since there is no technical cooperation arrangement between Ghana and Brazil for rice production. As a corporate organisation Brazil Agro Business is too small to be able to influence Embrapa. Large Brazilian agribusiness companies have not shown much interest in investing in Ghana, when there are many other potential places to invest with less constraining infrastructures, and also more potential to expand operations through takeovers and mergers. Thus, while Brazil Agro-Business networks with other international rice companies operating in Ghana and with informal technical networks extending back to Brazil, it does not have the power to transform the environment in which it operates. It has to adapt to the institutional and market constraints existing in Ghana. In spite of the rhetoric of the relevance of Brazilian agricultural technology to African conditions, Brazilian private sector investments are hesitant and cautious, given insecurities in acquisition of land and constraints on input and machinery markets. Without private sector investments, investments by the Brazilian government also tend to be hesitant. Thus, the main government interventions at present occur in facilitating markets for agricultural machinery through the More Food International programme, and cautiously building research linkages through Embrapa. Beyond that, the Brazilian state sector promotes Brazilian agricultural capabilities to provide the services of Brazilian technicians to third party investors in trilateral programmes, building its acumen through networking with other developing programmes and investors, and involving other actors in its own programmes, such as in the Africa-Brazil Agricultural Innovation Marketplace. Noticeably absent in these development initiatives are collaborative ventures with China or India, in spite of all declaring

commitments to South-South Cooperation. Given constraints in acquiring land, and availability of inputs and machinery, the main avenues for agricultural development are most likely to occur in seed development, input supplies, machinery, processing and marketing, rather than in large-scale investments in estate agriculture.

In contrast with Brazil, China has a long history of involvement in rice production in Ghana reflected in both the rice projects of the 1970s and the rehabilitation of irrigation facilities from the 1980s. Although there are no discernible Chinese companies operating in rice production at the moment, this is not from lack of interest. The new evolving framework for rice production involves complex relations between advanced production and processing units; provision of infrastructure; electrification; community participation in contract farmer schemes; seed and input supplies; and financial investment. Chinese companies are beginning to formulate interventions within this framework, linking up both large production sites involving contract farming schemes with the construction of infrastructure, and the building of research facilities in hybrid seed technology within MOFA facilities and among MOFA staff. Construction companies such as China Geo function as the links in this process, building on their long experience in Ghana and strengthening networks back to agricultural research establishments in China. They address access to land, machinery and inputs simultaneously, gradually building crosscutting ties to facilitate the emergence of a viable rice production sector supported by Chinese technicians and capital. China is also not averse to building linkages with other global players to facilitate these developments and to extend demand for its research products. China is working in other African countries with FAO and national research agencies and through its agricultural demonstration centres to adapt its research products to African conditions (El-Namaky et al. 2013) and also with the Gates Foundation (Gates 2013). This is not a radically different approach from mainstream agribusiness, and the main concerns here are around integrating smallholders into markets in which Chinese agricultural technology is prominent, including hybrid seed development and input supplies and irrigation development. The policy framework for these developments have been set by the Government of Ghana from the 1970s onward, in its attempt to mediate developments in international agribusiness and integrate smallholder farmers into commercial production. It is within this framework that the various actors in rice production manoeuvre to accumulate capital, including the rising powers.

End Notes

- 1 However, this is not without problems related to imagined identities, false consciousness and the contradictions between class interests and nationalism (Szporluk 1988; Anderson 1983).

- 2 In 2013, over 5,000 small-scale Chinese miners were deported from Ghana for not having registered or acquired immigration clearance.
- 3 Interview with Eric Schaitza, Coordinator, Embrapa Africa, Ghana, 22 January 2015.
- 4 Interview with Eric Schaitza, Coordinator, Embrapa Africa, Ghana, 22 January 2015. This deal was inaccurately reported in Amanor (2013b).
- 5 Bello (2009: 76) records that at the Uruguay Round negotiations in 1987 the US agricultural secretary John Block stated, '[The] idea that developing countries should feed themselves is an anachronism from a bygone era. They could better ensure their food security by relying on US agricultural products, which are available, in most cases at much lower cost.'
- 6 Index Mundi: Ghana Milled Rice Imports by Year / indexmundi.com/agriculture/?country=gh&commodity=milled-rice&graph=imports [accessed 15 March 2015]
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- 9 Interview with P.K. Anamang, Ashiaman Irrigation Project, 10 July 2014.
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- 12 Interview with Simon Gbodzor, Afife, 2 December 2013.
- 13 Interview with Valentine Okumah, Dawhenya Irrigation Project, 2 September 2014.
- 14 Interview with Boyvi, Afife, 29 November 2013.
- 15 Interview with Mark Afeforgbor, Afife, 26 November 2013.
- 16 Interview with Lidiane Jaconi, Managing Director, Brazil Agro Business Group, Kpenu, 8 July 2014.
- 17 Interview with Lidiane Jaconi, Managing Director, Brazil Agro Business Group, Kpenu, 8 July 2014.
- 18 Interview with S.K. Singh and Dzibordi Agbevade, GADCO, Sogakope, 4 September 2014.
- 19 Interview with Afare Akoto Mintah, Irrigation Engineer, Irrigation Development Authority, Accra, 7 July 2014.
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- 21 Interview with Samuel Tettey, Ashiaman Irrigation Project, 10 July 2014.

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