

# Working 12 Paper 12

**Emerging Trends in Global Commodities Markets: The Role of Brazil and China in Contemporary Agrarian Transformations** 

Carolina Milhorance de Castro

May 2015



# Emerging Trends in Global Commodities Markets: The Role of Brazil and China in Contemporary Agrarian Transformations

by Carolina Milhorance de Castro

Published by: BRICS Initiative for Critical Agrarian Studies (BICAS) in collaboration with:

Universidade de Brasilia Campus Universitário Darcy Ribeiro Brasília – DF 70910-900 Brazil *Tel: +55 61 3107-3300 E-mail: sauer@unb.br Website: http://www.unb.br/* 

Universidade Federal do Rio Grande do Sul Av. Paulo Gama, 110 - Bairro Farroupilha Porto Alegre, Rio Grande do Sul Brazil *Tel: +55 51 3308-3281 E-mail: schneide@ufrgs.br Website: www.ufrgs.br/* 

Institute for Poverty, Land and Agrarian Studies (PLAAS) University of the Western Cape, Private Bag X17 Bellville 7535, Cape Town South Africa Tel: +27 21 959 3733 Fax: +27 21 959 3732 E-mail: info@plaas.org.za Website: www.plaas.org.za

College of Humanities and Development Studies China Agricultural University No. 2 West Yuanmingyuan Road, Haidian District Beijing 100193 PR China *Tel: +86 10 62731605 Fax: +86 10 62737725 E-mail: yejz@cau.edu.cn Website: http://cohd.cau.edu.cn/*  Universidade Estadual Paulista (UNESP) Rua Quirino de Andrade, 215 São Paulo - SP 01049010 Brazil *Tel: +55-11-5627-0233 E-mail: bernardo@ippri.unesp.br Website: www.unesp.br* 

Transnational Institute PO Box 14656 1001 LD Amsterdam The Netherlands *Tel: +31 20 662 66 08 Fax: +31 20 675 71 76 E-mail: tni@tni.org Website: www.tni.org* 

International Institute of Social Studies P.O. Box 29776 2502 LT The Hague The Netherlands *Tel: +31 70 426 0460* Fax: +31 70 426 079 *E-mail: information@iss.nl Website: www.iss.nl* 

Future Agricultures Consortium Institute of Development Studies University of Sussex Brighton BN1 9RE England Tel: +44 (0)1273 915670 E-mail: info@future-agricultures.org Website: http://www.future-agricultures.org/

#### ©May 2015

Editorial committee: Jun Borras, Ben Cousins, Juan Liu & Ben McKay

Published with support from Ford Foundation and the National Research Foundation of South Africa.

# Table of contents

1 Introduction	1
2 The Making of a South-South Commodity Complex	1
2.1 China's Agricultural Strategy in the Context of the Global Food Crisis	.1
2.2 Trade Exchanges and the "China Effect"	•3
3 Stepping Stones towards a New Commodity Market	5
3.1 Persistent Interests and Rising Obstacles to Ethanol Expansion	•5
3.2 Expertise Sharing and Political Dialogue with Emerging Economies	•7
4 Current Patterns of Agribusiness Internationalisation	8
4.1 Pioneer Investments in Farmland and Commodity Chains	8
4.2 Development Co-operation as Means of Increasing Investments	10
5 Challenging Dynamics from the Field1	2
5.1 Potential of Projects' Materialisation	12
5.2 Agrarian Concerns of Investments and Trade Shifts1	14
6 Conclusion1	.6
References1	.7

### Abstract

Drawing on the wider political economy of global commodities markets, this paper analyses the dynamics of agrarian change related to the rise of emerging economies. Departing from an overview of China's trade relations with Brazil, it discusses the consequences of these asymmetric relations for the countries' international strategies and their broad impacts in developing countries. To do so, the paper is structured according to two objectives. The first focuses on the political economic trends of the emerging countries' role in the agricultural sector, particularly through the shift in soy trade flows towards Brazil and China and their engagement in building a global biofuel market. The second objective connects the shifts in patterns of trade to an increasing wave of investments in southern Africa's farmland and it analyses the barriers and the effects of this movement in Mozambique.

Keywords: Brazil; China; soy market; trade patterns; biofuels; Mozambique

# **1** Introduction

The current rise of emerging countries has produced major changes in the international economy, with implications for global agrarian transformations. China's rapid growth and outward expansion of international trade fostered the valorisation of energy and natural resources. The country's increasing imports of raw material from developing countries show a cushioning effect of the world economic crisis, particularly in a number of Latin American countries. Economic relations between China and Brazil have increased significantly in the past decade on several trade and investment agreements. However, the consequence of Brazil's current tendency to specialise trade on primary goods has strengthened agribusiness' already significant political influence in the country. There have been efforts to internationalise the sector with the growing integration of national production in the commercial and productive international circuits of commodities. The shift in the roles of emerging countries in agri-food trade and capital accumulation is giving place to new forms of contestation and international social coalitions.

Drawing on the wider political economy of global commodities markets, this paper analyses the dynamics of agrarian change related to the rise of emerging economies. Departing from an overview of China's trade relations with Brazil, it discusses the consequences of these asymmetric relations for the countries' international strategy. Furthermore, focusing on the case of Mozambique, we analyse on-the-ground challenges to the materialisation of Brazil's agricultural interest and their broad consequences. To do so, the paper is structured according to two objectives. The first focuses on the political economic trends of the emerging countries' role in the agricultural sector, particularly through the shift in soy trade flows towards the engagement of Brazil, China and the emerging economies in building an international biofuels market. The second objective looks to increasing investments in southern Africa's farmland connected to this commodities shift as well as the barriers and the effects of this movement in Mozambique.

# 2 The Making of a South-South Commodity Complex

This section aims to discuss the shift away from the traditional production and consumption centres of agricultural commodities, particularly soybeans, from the US and EU complex towards new South-South trade flows. The emergence of the relationships between Brazil and China is examined as a lens of restructuring trends of the global agro-food commodities markets. It illustrates the context of new political economic relationships by transnational agribusiness in the context of increasing demand on the global food supply and increasing variability and severity of inflation in global food prices (Peine 2013; OECD & FAO 2013). These trends have impacts on Brazil's domestic economy, altering the country's trade structure, and contributing to a more assertive international effort by the Chinese government and companies to invest in the global agricultural sector.

### 2.1 China's Agricultural Strategy in the Context of the Global Food Crisis

The food crisis renewed the attention on global food security and the agricultural sector, reshaping the concept of food security to a more production-centred approach. In the current international political economy, China's performance in feeding its population and its grain self-sufficiency are paramount to the country's policy (Alden 2013; Zha & Zhang 2013). China GDP growth is expected to gradually slow the next ten years, but it remains resilient, stimulating food demand. Cereals are still at the core of the population's diet, but growing incomes, urbanisation and changes in eating habits contribute to a transition toward diets that are higher in protein, fats and sugar. According to the OECD's and the FAO's projections, in the next decade, livestock and biofuel production are expected to grow at higher rates than crop production (OECD & FAO 2013). Rural development policies in China broadly aim to sustain and strengthen a very large and

Page/2

heterogeneous agricultural sector.

China's national policies are fundamentally addressed to enhance food security through raising agricultural production and productivity (OECD & FAO 2013). These policies have partly succeeded in enabling high levels of self-sufficiency through government support for the domestic processing of staple food crops, namely corn, rice, and wheat. Such sensitivity towards grain self-sufficiency is rooted in China's domestic structures: hunger and famine are deeply ingrained in its cultural mind-set and history; food self-sufficiency matters to the political legitimacy of the Communist Party; and policies are driven by the desire to protect Chinese farmers, a sector that employs more than one third of the country's labour force (Zha & Zhang 2013). The country is alarmed by the unreliability of the international grain market, particularly after the US' economic sanctions towards China during the Cold War.



Figure 1: Self-sufficiency for major crops/products in China: net exports/consumption

<sup>-0.7</sup> 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 0 indicates full self-sufficiency; -1 indicates net imports fill all domestic consumption Source: OECD-FAO Agricultural Outlook 2013

However, it is becoming increasingly difficult for the country to maintain its high degree of selfsufficiency in grains due to the decline in arable land and water resources as well as shrinkage in the rural labour force. Urbanisation has long been restricted by the use of land and household internal migration, but it has taken off since the 1990s, as the restrictions started to be gradually softened. This process has come a long way over the past two decades and over half of the Chinese population is now officially classified as urban. Between the 1980s and 2011, the urban population grew by a factor of four, when prior to that it was growing by less than 5 million people per year. By 2010, it was expanding by 20 million per year (Koen et al. 2013). Complementarily, dietary patterns have changed, increasing the demand for meat and fish (OECD & FAO 2013; Zha & Zhang 2013). So constraints of land, water and farm labour appear to limit further supply growth.

	1990	1995	2000	2005	2011
Rural	(kg per y	(kg per year/person)			
Grains (unprocessed)	262,1	256,1	250,2	208,8	170,7
Meat and poultry	12,6	13,1	17,2	20,8	20,9
Dairy products	1,1	0,6	1,1	2,9	5,2
Fish	2,1	3,4	3,9	4,9	5,4
Vegetable oils	3,5	4,3	5,5	4,9	6,6
Vegetables	134	104,6	106,7	102,3	89,4
Urban					
Grains (unprocessed)	158,4	117,6	99,8	93,3	97,8

Page/3

Meat and poultry	25,2	23,7	25,5	32,8	35,2				
Fresh milk	4,6	4,6	9,9	17,9	13,7				
Fish	7,7	9,2	11,7	12,6	14,6				
Vegetable oils	6,4	7,1	8,2	9,3	9,3				
Vegetables	138,7	116,5	114,7	118,6	114,6				

Source: OECD-FAO Agricultural Outlook 2013

In this context, the Chinese government cannot exclude a certain amount of dependence on the international markets to ensure agricultural supply. The openness of the Chinese agricultural sector to global markets has increased since 2001, when the country joined the WTO. While the country remains self-sufficient in specific food commodities, it has exponentially increased trade of certain commodities such as oilseeds, dairy products, maize and sugar. From 2001 to 2012, the total value of Chinese agricultural imports and exports increased from USD 27.9 billion to USD 155.7 billion, with an average annual growth rate of 17% (OECD & FAO 2013). Other macroeconomic changes may further limit supply responses, such as the appreciation of the exchange rate through the reduction of the Yuan price, which makes the country less competitive against international markets. Furthermore, labour wage rates have inflated both in urban and rural contexts, creating higher costs of production (OECD & FAO 2013). Therefore, the Chinese macroeconomic policy of boosting exports impacts the government's plans of increasing food security through national production and finishes by privileging agricultural imports.

#### 2.2 Trade Exchanges and the "China Effect"

Emerging countries such as China and Brazil constituted a major force in the world economy over the past decade, underpinned by a rising middle class. The economies of these countries are being gradually connected to global value chains<sup>1</sup> in terms of international trade, capital flows, and market interdependence (Delaney 2013; Chen & De Lombaerde 2014). There has been much controversy about the impact of China's growth on the rest of the world, based for instance on concerns that imports from China have adverse effects on other countries' economic growth and employment (Rangasamy & Swanepoel 2011). Indeed, the question of whether a country benefits from trading with China is a context-specific issue. This section focuses on the features and impacts of this relationship with Brazil.

The growing trade and investment linkages between China and Brazil have assumed greater importance since the late-1990s (Vadell 2013). China became Brazil's main trading partner in 2009, supplanting the US, and these relations have become the object of overt activism by the Chinese government. Peine has illustrated the integration of the Chinese pork sector and the Brazilian soy sector in a highly interdependent commodity complex (Peine 2013). China is currently the major world consumer of swine meat: figures are superior to 50 tons/year, more than twice that of the European Union (2nd major consumer) (USDA 2014). The country has displaced the European Union as the main destination of Brazilian soybean exports, with market shares rising from 15% in 2000 to 53% in 2009. For China, soybeans imported from Brazil are much cheaper than those grown domestically.

However, the Chinese Government intends to encourage domestic processing and promote the importation of whole beans rather than processed or milled products. The soybean-crushing sector continues to expand in China. Despite a crush capacity of 140 million tons per year (in 2013) and plants' low utilization rate, both new construction and expanded renovations raise their crush capacity to 40,000 tons per day. Besides, 78% of crush plants are located along the coastal region in order to facilitate the receipt of imported soy (USDA-FAS 2014). For this reason, Brazilian soy exported to China is barely processed. The outcome of these

<sup>&</sup>lt;sup>1</sup> The global supply chain is used in this article with a focus on cross-border production linkages

increasing relations has been an ongoing trade specialisation of Brazilian exports structure in natural resources and commodities (

Figure 3) (Rosales & Kuwayama 2012).

Seeds and oleaginous fruits are the most highly valued Brazilian exports to China (37%), followed by iron (35%) and crude petroleum (9%), while imports include telecommunication equipment (10%), processing machines (8%) and several other diversified products. Such specialisation has a negative effect on the Brazilian manufacturing sector – already lacking in investments. This scenario of foreign competition favoured by overvalued exchange rates and domestic factors has imposed additional costs on the domestic oriented industrial sectors (Vadell 2013) and may be characterised as the "China Effect".

Figure 2: Brazil's exports of soybeans, 2000-2013 (US\$ Billion)



Source: Comtrade HS 4-digit



Figure 3: Brazil's Imports and Exports to China per category, 2014 (US\$ Million)

It would appear that China has managed to diversify its supply sources of agricultural commodities (mainly from Brazil, Argentina and the US), while Brazil has not succeeded in building a strong bargaining

Source: Comtrade BEC

position regarding these products (Rosales & Kuwayama 2012). Although China ranks amongst the top trade partners for a number of Latin American countries (Argentina, Brazil, Chile, Peru, etc.), the relationship is marked by an outstanding "asymmetric interdependence". Accounting for 2.8% of total imports, Brazil ranks 10<sup>th</sup> amongst China's suppliers (in 2013). Therefore, both international and domestic factors have contributed to establish an agricultural commodity complex, which has become essential to Brazil's trade balance and to China's increasing demand for agricultural products. However, Chinese efforts to diversify its commodities suppliers have not been accompanied by the Brazilian capacity to increase commodities and goods exports to other major partners. On the contrary, the country's macroeconomic stability has become largely dependent on Asian imports and it has been deepened by the low costs of Chinese industrial products – the 'China Effect' – and by the lack of adequate policies to foster domestic industry<sup>2</sup>.

In this context, Brazil's agribusiness sector, responsible for assuring a positive trade balance during the international crisis, has been promoted as a "national champion" and has strengthened its already significant political influence. Soy leads both the grains and the agribusiness sector's export agenda in Brazil (Wilkinson et al. 2012). The Brazilian Agricultural Confederation (CNA), the main private association in the agribusiness sector has formed unprecedented close alliances with the Federal Government under the Rousseff administration, despite traditional conflictual relations between CNA and the Workers' Party (PT). Many of the agribusiness claims have been answered, including an increase of public funding for production and commercialisation, flexibility in environmental norms, regulation of international ports, and important infrastructural investments. Additionally, the Senator Katia Abreu, former president of CNA, became Minister of Agriculture in 2015. This process has contributed to agribusiness internationalisation efforts beyond Latin America, as will be discussed later in this paper.

# 3 Stepping Stones towards a New Commodity Market

Contemporary agrarian transformations have been shaped by a dynamic mix of concerns around food security, energy, climate change mitigation, and rising demand for commodities (Borras et al. 2014). In addition to soy, the involvement of emerging countries in the shift and creation of commodities complexes include recent political economy around biofuels. Despite the significant slowdown of the "biofuel revolution", initiatives to develop a global biofuel complex continue. The interest of Brazil's public and private actors in transforming ethanol into a global commodity and promoting its commercialisation is the background to increasing exchanges with other emerging economies. Admitting difficulties in the ethanol sector domestically and in its foreign direct investments, the country is currently engaging in political dialogues aiming to promote international technical standards and to provide expertise in legal and institutional frameworks to other nations willing to develop the sector.

### 3.1 Persistent Interests and Rising Obstacles to Ethanol Expansion

The use of agricultural feedstock in biofuels production remains an important component of long term demand for agricultural products (OECD & FAO 2013). Brazil is the world's second leading producer of ethanol, behind the USA. A favourable conjuncture enabled the expansion of sugarcane in Brazil, but it was the launch of flex-fuel cars in 2003 that stabilised the domestic market. Government strategies include

<sup>&</sup>lt;sup>2</sup> Some argue that this growing economic integration emerges as a new commercial and financial option for Brazil (and Latin America), in contrast to the hard constraints of the Washington Consensus. New trading opportunities, investments in energy and natural resources, infrastructure and financial aid and benefits to specific sectors such as aeronautics are important for these economies to recover from the 2008 financial crisis (Rosales & Kuwayama 2012; Vadell 2013).

BRICS Initiatives in Critical Agrarian Studies (BICAS)

determination of oil prices assuring feasibility of ethanol production; ethanol blending up to 27% in fuel; infrastructure building; and establishment of credit lines, making the sector one of the largest borrowers from the Brazilian Development Bank (BNDES). Free marketing choice between ethanol and sugar production, in order to better exploit price spikes or to better withstand price shocks, contribute to the sector's current levels of stability, but these "flex crops" may affect price volatility in world markets (Borras et al. 2014). While technological research has also contributed to overcoming market fluctuations, first generation biofuels are still dominant.

Brazilian ethanol companies envisage creating a global market and accessing the main markets in the US and Europe. A concerted effort between the Ministry of International Affairs (MRE), the Ministry of International Trade (MDIC), the Ministry of Agriculture (MAPA) and the Brazilian Association of the Sugarcane Industry (UNICA)<sup>3</sup> now has the potential to create results. The so-called "Ethanol Diplomacy" path driven by former President Lula has been very effective in promoting awareness on ethanol production internationally. Brazil has promoted the adoption of ethanol in Latin America and Africa by providing expertise in building legal and institutional frameworks, technology transfer and capital through the BNDES<sup>4</sup>. The bank has contributed to expanding biofuel production in Brazil and assuring competitiveness, by establishing a hub office in South Africa and has funded feasibility biofuel studies in other African countries<sup>5</sup>. It also signed a MoU with the African Development Bank (AfDB) and with the New Partnership for Africa's Development (NEPAD) to explore collaboration in bioenergy. Senegal, Zambia and Mozambique have been identified as the most promising countries for developing biofuel sectors.

In Mozambique, the feasibility study was initially conducted under the Brazil-European Union joint initiative in renewable energy, but was later funded by Vale S.A. (2011). The World Bank conducted a previous study in 2008, and in 2009 the country approved a national biofuel plan, subsequently starting experimental projects. The Brazil-Mozambique Action Plan (2007) created a bilateral working group for biofuel production and marketing. In 2012, the consulting company FGV Projetos signed an agreement with the investment bank BTG Pactual for the creation of a USD 1 billion fund for biofuel production. In Malawi, Zimbabwe and South Africa, the Brazilian private sector has provided expertise for the construction of ethanol processing plants and the governments of these countries are keen to attract Brazilian companies. Furthermore, the Latin America, Caribbean & Africa Sustainable Bioenergy program (LACAf/GSB) is currently promoting research and technical exchange to evaluate prospects for biofuel production in Mozambique and in South Africa.

However, agroecological zoning developed by the feasibility studies did not guide the projects, which are mainly situated around areas with existing infrastructure and services. Petromoc, the Mozambican oil company, signed an agreement with the Brazilian sugar company Guarani and Petrobrás Biocombustível with the intention of producing biofuel, but the initiative has faced major economic and institutional challenges. Other investors such as Sekab (Sweden), Principal Energy (United Kingdom), Aviam (Italy) faced similar problems. Lack of capital, policies, infrastructure, technology and skilled labour constitute significant barriers. Ethanol diplomacy was left in the hands of ministry-level bureaucrats during Rousseff's

<sup>&</sup>lt;sup>3</sup> UNICA currently has permanent offices in Brussels and Washington, and intends to open an office in Asia. The association has been present in all the climate conferences (COP) of the UN since 2007.

<sup>&</sup>lt;sup>4</sup> Brazilian companies in the private sector, and even UNICA, have been visited and consulted several times for expertise-sharing and information gathering. Government officials from the Ministry of Energy have also participated in several missions to Brazil in order to learn about the country's experience. In addition, a newly created South African-Brazilian joint-venture, SilvaPen, benefits from Brazil's expertise and equipment, and has been consulted by the South African government during the formulation and implementation of the country's biofuel strategy, even though the company depends on public funding.

<sup>&</sup>lt;sup>5</sup> BNDES hired the US consulting firm Bain & Company to conduct feasibility studies in UEMOA nations (Benin, Burkina Faso, Côte d'Ivoire, Niger, Senegal, Togo, Guinea-Bissau and Mali) using a different methodology than FGV's and recommended investment in the production of sugar, followed by that of electricity and ethanol.

BRICS Initiatives in Critical Agrarian Studies (BICAS)

administration and perspectives for the development of an international biofuels market lost some traction as the EU moved toward a lower blending mandate (USDA-FAS 2013)<sup>6</sup>.

Strong criticism from civil society organisations (CSOs) and international communities' (particularly Europe) denunciation of the ethanol industry's social, environmental and food security impacts led to the adoption of a series of measures to ensure the commodity's acceptability: i) elimination of burning and adoption of harvest mechanisation; ii) training programmes to absorb a portion of the labour force unemployed by mechanisation; iii) zoning that excludes investments in the Amazon, the Pantanal and in areas of original forest cover; and iv) conditioning the access to credit on "good" behaviour. Yet, investments have not accompanied the growth in the Brazil's domestic market, and the country has been forced to import<sup>7</sup>. Despite the slowdown, a set of initiatives from private and public sectors have been established, as will be discussed hereunder.

#### 3.2 Expertise Sharing and Political Dialogue with Emerging Economies

Despite several arguments regarding an unlikely second edition of Brazil's biofuel diplomacy (Wilkinson 2014), several prospects show that the country's ambitions are not even close to disappearing. First, China has shown increased interest in renewables but has yet to become a significant ethanol importer. Since 2001, the Chinese government has promoted E10 blending and in 2011 it established an objective of consumption of 5 million tons of ethanol in 5 years. It represents a major importer of Brazilian sugar and ethanol imports are expected to increase, particularly in a context of increasing pollution levels and the expansion of its flex motor vehicles fleet. The Chinese government is under pressure to reduce coal use, improving fuel quality and reducing industrial related pollution. In this context, the biofuel industry is advocating for the use of ethanol. However, ethanol production is lagging behind the government's 12<sup>th</sup> plan due to shortages of non-grain feedstocks and policies that tightly control the production, marketing and distribution of grain-based ethanol.

Most ethanol in China is produced from grains (corn and wheat), but since 2008 government policy has dictated research in alternative crops, such as sweet sorghum and cassava, which can grow on marginal land. These crops are unable to support large-scale industrial ethanol production at this time. Furthermore, the country has engaged in innovative efforts in the sector and in promoting the production of advanced biofuels from sustainable feedstocks, announcing investments for the construction of the world's biggest cellulosic ethanol plant in July 2014 (in the city of Fuyang). Of 100 projects focusing on advanced biofuels worldwide, 18 are located in China (IRENA 2014). Some state-owned companies and coastal provinces have begun discussions with the central government for importing fuel ethanol as a trial to study economics and trading channels (UNCTAD 2014), and importation taxes have been consistently reduced (from 30% in 2009 to 5% in 2014). The mandatory blend rate remains unchanged at 10% in designated markets (FAS/USDA 2014).

The Brazilian Sugarcane Industry welcomed China's initiatives in establishing a biofuels policy and believes that in the long run, Brazilian ethanol can meet the country's rising demand. Brazil has still the lower cost of large-scale ethanol production according to UNCTAD<sup>8</sup>. Therefore, while engagement with African countries through direct investment may not have lived up to expectations, recent years have seen

<sup>&</sup>lt;sup>6</sup> Other countries have also revised their targets as food security concerns undermine the legitimacy of first generation food crops as feedstock.

<sup>&</sup>lt;sup>7</sup> After a disinvestment period during the 2008-09 financial crisis, with a significant number of projects being suspended or cancelled, a clear return was noticed in 2010. However, this time more priority has been given to acquisitions rather than to greenfield-type investments, given that about 70% of agricultural production is undertaken directly by industries (Wilkinson et al. 2012).

<sup>&</sup>lt;sup>8</sup> Estimated production costs range between USD 0.20 and USD 1.38 per litre in OECD developed countries, while it is about USD 0.12 per litre in Brazil and between USD 0.28 and USD 0.46 per litre in China (UNCTAD 2014).

some renewed efforts in stimulating the promotion of a biofuels market. A second strategy includes expertise sharing and political coordination in international fora. The main aspects of exchange between these are: i) harmonisation of technical specifications and standards, considered essential to the "commoditisation" of biofuels (SERE/MRE, Internal Official Letter, 2011); ii) experience sharing in the policy and institutional framework to foster the sector's development in third countries; iii) and the political coordination of emerging economies in international fora (such as the Global Bioenergy Partnership and the Biofuel International Forum) regarding, for instance, their vision on biofuel and international norms so that "consensus of these discussions incorporate the perspective of developing countries" (SERE/MRE 2013).

In this context, subjects such as the automobile industry, bioelectricity cogeneration, integrated distilleries-plantation plants, and the Brazilian public bidding system for biodiesel, including the "social label", have been discussed in several meetings in Brazil, India, China and South Africa (IBSA and BRICS technical groups). For instance, technical exchange has also been taking place at the IBSA Energy Working Group, in which Brazilian experts have often participated. A MoU has been signed in 2008 to establish an IBSA task force to encourage technology transfer, common legal frameworks, technical co-operation, trade and innovation in the biofuels sector. Many workshops have been organised by Brazilian counterparts on issues related to the sector (Brazilian Embassy in Pretoria/MRE 2010). Furthermore, Brazil is planning to rely on Global Bioenergy Partnership (GBEP) as a partner for promoting bioenergy capacity building and training in Latin America, Africa and Asia through short courses and meetings such as the Bioenergy Week (2013 in Brazil, 2014 in Mozambique and 2015 in Indonesia).

Since 2008, a GBEP Task Force has developed a set of 24 voluntary sustainability indicators for bioenergy (GBEP & FAO 2011). The initiative has sought to build consensus among a broad range of national governments and international institutions which include elements to address the conflict "food x fuel". Finally, despite the difficulties faced by Brazilian actors to expand its biofuel industry and to carve out a leading role worldwide, their interests in promoting the ethanol market have not been abandoned. Political dialogue with China has been improved in order to increase trade relations. Meanwhile, technical meetings and political cooperation with other emerging countries have increased with the aim of defining international technical standards, sharing experiences regarding regulatory setups for biofuels (including blending, sustainability norms, research and deployment strategies), and coalitions with emerging countries in multilateral meetings, in order to overcome the debate around the food security concerns of ethanol production.

### 4 Current Patterns of Agribusiness Internationalisation

The previous sections have focused on the increasing South-South linkages through the growing flows of capital and goods and the displacement of the global soy complex, as well as the political dialogue to gradually build a biofuel complex. This section sheds light on China and Brazil's efforts to internationalise their agribusiness sectors beyond their immediate regional surroundings, particularly in southern Africa. With a special focus on direct investments in farmland and on agricultural value chains, this section illustrates their strategy and intergovernmental schemes. Brazil's interest in establishing and producing commodities in African countries is closely connected to the increasing Chinese demand for commodities. The barriers to the materialisation of these investments and the dynamics of the field will be discussed in the last section.

#### 4.1 Pioneer Investments in Farmland and Commodity Chains

Sub-Saharan African and a portion of South-East Asia are the most affected zones by global land investments, drawing particularly on mechanisms of lease and long-term concessions allocated by governments of host BRICS Initiatives in Critical Agrarian Studies (BICAS)

countries (Boche & Pouch 2014). A great diversity of actors and investment models are involved in these projects. National companies, sovereign funds, financial actors, multinationals and private companies not originally related to the farming business are finding places in different organisational forms. These farmland investments are often marked by strong regionalism. China's major agricultural investments are in Asia and Brazil's presence is forcibly stronger in Latin America, particularly in Bolivia (Land Matrix, 2015), but the increasing integration between these two countries through commodities complexes, and the outstanding governmental support to agribusiness, have the potential to contribute to its internationalisation towards other regions such as Africa.

Regarding China, the overwhelming reliance on imports for one of the most significant food value chains in the country restrains political emphasis on food self-sufficiency. The Chinese National Development and Reform Commission (NDRC) revised the Catalogue for the Guidance of Foreign Investment, including a special section advocating investment in the foreign soybean supply chain and encouraging domestic firms to "go out" and develop international resources. In this context, since 2008 the NDRC directives have mandated Chinese agribusiness to buy farmland and directly invest in Brazilian soybean production. China's agricultural "going out" strategy is not a new phenomenon, its roots date back to the 1960s. However, the country's recent presence in sub-Saharan Africa's agricultural sector has been surrounded by pre-conceptions: high amounts of aid, massive land grabs to feed China, an inert co-operation model, and centralised orchestration by the government (Gabas & Tang 2014).

Contrary to claims in major media, evidence suggests that – as yet – there is no large-scale Chinese "land grabbing" in the continent (Alden 2013; Gabas & Tang 2014). According to the Land Matrix database (2013), which records large-scale land acquisitions, China's public and private acquisitions represent 290,000 ha – 15 times less than the US' acquisition, almost 10 times less than the United Arab Emirates' acquisition, and more than 6 times less than the UK's acquisition (Gabas & Tang 2014). Such a strategy is apparently not only driven by the desire to produce grains for the country's domestic consumption; rather, it is part of a complex process involving a wide range of players and driven by multiple objectives including agricultural exports, direct investment in agriculture overseas, foreign cooperation to modernise its agriculture and diplomatic goals of external assistance (Zha & Zhang 2013). This pattern suggests that China has a diversified approach, ranging from technical co-operation to commercially motivated projects and market-based trading arrangements.

In Brazil, the government has prohibited foreign ownership of farmland, as it believes that this process may push Brazilian competitors away from business and allow territorial occupation. Even "pro-market" actors such as those from agribusiness sectors have voiced alarm over trends of the "foreignization" of land. In spite of a certain consensus on the required caution with investments, there is no agreement on concrete measures to be adopted (Sauer & Pereira Leite 2012). However, in Brazil, instead of direct land acquisition, China tends to invest in new transportation systems for Brazilian soy. This was a major point of the talks during the presidential visit of Xi Jinping to Brazil in July 2014. The joint-venture between China Railway Construction Corporation (CRCC) and Brazil's Camargo Corrêa to build several railway lines in the Cerrado soy production region is an example of this objective (Aiko Otta 2014).

Therefore, the Brazilian-Chinese commodity complex goes beyond soybean market integration, but includes direct investments in the supply chain in Brazil. The lack of appropriate transportation corridors from the production region in the Centre West region to the shipping ports is considered one of the main barriers to reducing exportation costs of soy. In Brazil, road transportation is responsible for 60% of all the country's cargo and it is the preferred means for the transport of most produced soy to the main exporting ports. The transport cost of soybeans can represent up to 20% of the final cost (da Silva & de Almeida D'Agosto 2013). Hence, the twofold emerging strategy of increasing trade and investments on the value chain contributes to the integration of the commodity complex presented above.

With respect to Brazilian investments, the country's agribusiness internationalisation is already in full

swing, recognised for instance in the global consolidation of the meatpacking corporation JBS Friboi as the world leader in its sector. International investments by leading Brazilian corporations in other agro-industrial chains have normally been restricted to the industrial stage of the chains. However, more direct investments in farming can now be identified, including forms of contracting with the ranching and livestock sectors or direct investment on sugarcane/ethanol sectors (Wilkinson et al. 2012). Brazil's direct investments in farmland in Africa have faced major challenges, including lack of funding and of knowledge about markets and institutional/legal frameworks. Only a few pioneer investors managed to settle in the continent such as the Pinesso Agroindustrial Company on the cotton, maize, sorghum, beans and sunflower cultures in Sudan and on the soy culture in Mozambique. As a consequence, emerging economies have begun deploying diplomacy as an additional mechanism to succeed in agro-food international investments, as will be discussed below.

#### 4.2 Development Co-operation as Means of Increasing Investments

Recent research about agricultural co-operation with Africa highlights the commercial drivers of Chinese engagements. The Agricultural Demonstration Centres (ADC) constitute an important piece in China's cooperation agenda, which puts high emphasis on financial sustainability and on the promotion of Chinese companies. The Wanbao Farm in Gaza Province is intended to grow rice in a region previously used by a former colonial authority to a large irrigation scheme (a planned farming area of 20,000 ha). The centre is managed almost exclusively by Chinese workers, seeds were brought from China and plantation methods were not adapted to Mozambican context. Language barriers also caused miscommunication with local farmers, but Mozambican authorities are very supportive of the project. Chinese companies are attracted by the potential high market margin and invest along extended value chains in the agricultural sector<sup>9</sup> (Tang 2014).

Other authors highlight the increasingly "invisible nature" of land acquisitions, through the role played by Chinese FDI in controlling production value-chains<sup>10</sup> or through the establishment of these ADCs, allowing them to control land and natural resource-related activities without owning the land. Taken as an example, the China-South Africa Agricultural Demonstration Centre established in the Free State<sup>11</sup>. Fraser and Anseeuw show how an increasing number of Chinese-backed agricultural investments in South Africa occur despite the country's framework for securing land rights. The authors also suggest that land acquisitions are increasingly occurring toward more secure investments sites in developed and emerging economies, and in order to gain access to other natural resources, rather than purely the land itself (Fraser & Anseeuw Forthcoming).

The Centre intends to promote both training provision and freshwater fish production, but effective results have been scarce to date. Prospects about production and commercial impacts remain unclear and socio-economic benefits have been low. The equipment was imported from China and a Chinese contractor was responsible for the construction of the facility and for the operational phase. Land is definitely not the major objective of the project – comprising only 47 hectares – but the access to freshwater appears to be key. Therefore, the current land acquisition trend is argued to be broader resource seeking, as opposed to sole

<sup>&</sup>lt;sup>9</sup> Wanbao aims to establish a complete machinery system, charging for the services.

<sup>&</sup>lt;sup>10</sup> Control over the value-chain is orchestrated through investments in equity in production entities, as well as strengthened vertical integration. The integration entails control over upstream, financing; downstream, processing and distribution, as well as production activities (Fraser & Anseeuw Forthcoming).

<sup>&</sup>lt;sup>11</sup> The China-South Africa Agricultural Demonstration Centre intended to conduct research on freshwater aquaculture breeding and technology and select seeds for local conditions; to demonstrate and promote freshwater aquaculture technology and management practice; to develop technology extension and train farmers from South Africa and neighbouring countries; and to promote freshwater fish consumption in South Africa.

market and land control. A note of caution is necessary since the centre is not fully operational yet, but it contributes to the argument that land deals are broadening with regard to the control over natural resources related to the agro-food-energy nexus (Fraser & Anseeuw Forthcoming).

Likewise, ProSAVANA is the biggest cooperation programme in the Brazilian Cooperation Agency's (ABC) entire portfolio. It is aimed at developing agricultural research capacity and the economic development of the northern region of Mozambique, the Nacala Corridor. It was initially inspired by PRODECER, a Japan-supported program of agricultural development, which was oriented towards commodity exports, implemented in the 1970s in the Cerrado region of Brazil (CCIJB 2011; Nishimori e o ProSavana 2012; Schlesinger 2013; Funada Classen 2013; Canal Terraviva entrevista Cleber Guarany 2013; FGV Projetos 2014). Diplomatic actions are combined with public financial support for the establishment of the private sector. The agribusiness internationalisation effort beyond Latin America is largely connected to the ProSAVANA initiative and the growing Chinese commodities market, bringing supply geographically closer to its demand sites. Efforts have been consolidated in order to attract Brazilian investments to the Nacala Corridor, including business missions, public-private seminars, technical reports and strategic meetings (SERE/MRE 2011b; Brazilian Embassy in Maputo 2011a; Brazilian Embassy in Maputo 2011b)<sup>12</sup>.

The key lines considered in the ProSAVANA are the increase of productivity and the establishment of agricultural value chains (ProSavana 2013). It intends to include smallholder farmers in support of initiatives through contract farming and cluster-based agricultural growth (GRAIN & Justiça Ambiental 2013; ProSavana 2013). The connection between bilateral cooperation and the "potential to leverage business opportunities for Brazilian companies in the sector of agribusiness" has been identified as an important component since the programme's early stages (Brazilian Embassy in Maputo 2003b, 1, free translation). Other letters showed Mozambican interest in Brazilian expertise for soy production through technology transfer and joint ventures, given the crop's priority status to the African country (Brazilian Embassy in Maputo 2003b). Brazilian interests also include exports of agricultural machines (SERE/MRE 2012), which could be boosted with the More Food Programme. This provides credits to certain African countries willing to buy Brazilian agricultural machines adapted to family farming.

ProSAVANA is coupled with an entire scheme to attract investments to Mozambique: infrastructure development, research for adaptation of agricultural varieties, and legal and institutional security. Together, these incentives were expected to overcome unfamiliarity and high costs handled by Brazilian investors on the African continent. In addition, Mozambique's proximity to the Asian markets represents major encouragement for the internationalisation of Brazil's productive component to southern Africa, as previously stated (Interview, 04/07/2013). So far, these investments have faced challenges in materialising despite Mozambican high-level support to the initiative<sup>13</sup>. Brazil's institutional environment is still considered favourable for agricultural investments and land prices remain competitive. Moreover, in the past two years, ProSAVANA has been subject to strong criticism by local and international CSOs, as will be discussed in the last section.

Emerging and middle-income countries are the main players of foreign investments in farmland.

<sup>&</sup>lt;sup>12</sup> In November 2010 a business mission organized by CNA with ABC's support brought Brazilian agribusiness investors to Mozambique in coordination with the ProSavana team. Leading the mission Senator Katia Abreu, president of CNA, invited the Mozambican Ministry of Agriculture to visit Brazil and proposed that the CNA's technical branch, SENAR, be directly involved in ProSavana (SERE/MRE 2011b). As a result of this visit, the Seminar "Agribusiness in Mozambique: Brazil-Japan International Cooperation and Investments Opportunities" was held in São Paulo in April 2011 with the aim of publicising potential for investments in Nacala Corridor for Brazil's private sector (SERE/MRE 2011b).

<sup>&</sup>lt;sup>13</sup> Discussions pointing to this integrated perspective have been identified since the Programme's formulation in 2003 when Mozambican Government officials expressed to the Brazilian Ambassador their country's interest in benefiting from Vale's investments in transport infrastructure for other sectors, particularly agribusiness (Brazilian Embassy in Maputo 2003c).

However, this trend is marked by a strong regionalism, hence South Africans tend to play a more significant role in Southern Africa (Hall 2011) than Chinese or Brazilian investors, despite overall concerns. The recent movement of investments in farmland and in value chains in southern Africa illustrates the South-South character of the current phenomenon and is closely connected to the commodities complex integrating China and Brazil. This is also based on emerging countries' ambitions of playing a stronger political role in the international system through development cooperation initiatives. This movement has face significant constraints, however it did not prevent the production of local and national effects, as will be discussed in the section below.

# 5 Challenging Dynamics from the Field

The emerging countries' efforts in internationalising their agribusiness sector beyond their immediate zones of influence face several challenges. This section discusses some of the results of these projects when they reach the field. According to Borras and Franco, many of the reported land transactions are real and successfully being implemented; others remain only on paper, while still others are more speculative in nature (S.J. Borras & Franco 2010). Brazil and China's projects have followed the same trend and faced increasing tests regarding local politics and civil society struggles. This section evaluates the potential of materialisation of these two countries' agricultural projects in Mozambique and discusses some of the broad consequences of such recent strategy.

#### 5.1 Potential of Projects' Materialisation

A great deal of agricultural foreign investments approved worldwide fail to be implemented (Deininger & Byerlee 2011; Anseeuw et al. 2012). This is due to factors such as: i) the underestimation of the technical difficulties and management; ii) the lack of the necessary attributes and high transaction costs; and iii) the speculative position of some investors to ensure the property (Anseeuw et al. 2012). In addition, biofuel international promotion lost some of the track when faced with declining oil prices, reduction of the objectives of European policy, and the failure of a number of projects. Besides, high institutional risks and contestation movements contribute to delay projects such as ProSAVANA. This may constitute a particular challenge to projects led by emerging countries due to their weak policy concerning civil society participation.

In Mozambique, failure rates are very high both in negotiation and implementation processes. Land surface actually occupied in the country represents only 8% of the total announced. Many projects are not economically viable considering prices system, cost of capital, settlement and transaction costs, and technical and managerial difficulties<sup>14</sup> (Boche 2015). This is especially true for the biofuel projects, which require high technical management and a strong institutional framework including organized industry and a policy of prices. In this context, many South African commercial farmers became service providers for other foreign investors willing to settle in Mozambique<sup>15</sup>. Brazilian investors have also reported their interest in establishing joint ventures with South African companies to benefit from their expertise in Mozambique and other countries in the region.

<sup>&</sup>lt;sup>14</sup> Transaction costs include diverse analysis regarding agricultural conditions (soil, climate and land use) and national institutional frameworks.

<sup>&</sup>lt;sup>15</sup> Anseeuw et al. (Forthcoming) illustrate the example of the company Agri-SA, which has been invited, either as farmers or as managers, to more than 42 countries in Africa. South African agribusiness companies specialised in farm inputs (Pannar, Omnia), processing (Illovo and Tongaat-Hulet), packaging (Westfalia) and integrated service providers (Unitrans), as well as some of the recently privatised cooperatives, in particular AFGRI, have developed activities throughout southern Africa and beyond, proposing financial and technical services.

BRICS Initiatives in Critical Agrarian Studies (BICAS)

Furthermore, both Brazilian and Chinese projects have faced severe criticism from CSO. A national campaign has emerged against ProSAVANA, supported by international and Brazilian NGOs. This transnational coalition stems from political statements presenting the triangular initiative as inspired by the Cerrado development model. Alarmist articles produced by national and international media intended to draw the public's attention to the risk of "land grabbing" (GRAIN et al. 2012). For instance, representatives of the Mozambican Peasant's Union (UNAC) and other local Mozambican organisations of the Nampula Province Civil Society Platform (PPOSC-N) have participated in technical visits to Brazil in 2012, with the technical support of organisations historically engaged in activism against the "Cerrado model", such as FASE.

The Brazilian Peasants' Movement (MPA), the National Confederation of Rural Workers (CONTAG), the Movement of Peasant Women (MMC), and other CSOs have strongly adhered to the campaign and claimed the creation of a space of dialogue with the Brazilian government about the modalities of its Development Co-operation. Japanese civil society has also been called upon to mobilise and integrate into the contentious network under the frameworks of Via Campesina, the international alter-globalisation movement ATTAC, Africa Japan Forum (AJF)<sup>16</sup>. Shared values and a common discourse towards agriculture modernisation and large-scale investments bound them together and continued financial support from NGOs, such as Oxfam and ActionAid, ensured the increasing exchange of information, international meetings<sup>17</sup> and open letters to national leaders<sup>18</sup>.

This joint effort opposing the project has contributed to a prolonged debate on its vision and activities. The impact of international criticism has also alarmed potential investors that recognised costs related to the increased opposition. Integrated strategies combining infrastructure development, agricultural research and funding may not be sufficient for attracting significant amounts of investments with no "social licence to operate". The Nacala Fund, originally conceptualized as a private equity fund based in Luxembourg has been reformulated due to fundraising failure, lack of strategic alignment among partner countries, inefficient institutional communication and civil society pressure (FASE 2014). The current plan proposes a private company based in Mozambique with no participation of Brazilian or Japanese governments and no mandate to support social initiatives.

On-the-ground surveys showed that for the moment there are no land grabbing initiatives related to ProSAVANA<sup>19</sup>. This does not mean that ProSAVANA is paralysed or that private investors abandoned the idea of settling in Mozambique. Larger-scale investments have recently been directed to Niassa province, which is less populated. Only a few Brazilian investors have been identified in Niassa and Zambezia, but private interests seem now to increasingly focus on the Pemba-Lichinga Corridor (north of Nacala Corridor) where agricultural conditions, weaker civil society articulation and prospects for investments in infrastructure<sup>20</sup> are positive. Furthermore, the Quick Impact Projects are ongoing and aiming to establish preparatory activities for the agribusiness clusters. The ProSAVANA Development Initiative Fund (PDIF)<sup>21</sup> selected five companies to receive loans for the establishment of contract farming, marketing and equipment acquisition (interest 5-10%). Operational difficulties have been reported in 2014 regarding some of the projects (Oruwera, Ikuru and Matharia), as well as farmers' complaints about the establishment of individual

<sup>&</sup>lt;sup>16</sup>Japanese civil society statement on ProSAVANA: Call for an Immediate Suspension and Fundamental Review, September 30, 2013. 17 T

Triangular Conference of the Peoples Against the ProSavana, Maputo, August 7-8 2013

<sup>&</sup>lt;sup>18</sup> "Open Letter from Mozambican civil society organisations and movements to the presidents of Mozambique and Brazil and the Prime Minister of Japan", Maputo, May 28, 2013.

<sup>&</sup>lt;sup>19</sup> Other authors and stakeholders have come to the same conclusion (Ekman & Macamo 2014).

<sup>&</sup>lt;sup>20</sup> The Project for the Nacala Corridor Economic Development Strategies (PEDEC) funded by JICA is promoting private investments in agricultural, infrastructure and the energy sector in Nampula, Niassa, Cabo Delgado, Tete and Zambézia.

<sup>&</sup>lt;sup>21</sup> With an initial investment of USD 750,000 and support by the investment company GAPI.

contracts with larger farmers (and not by means of producer organisations).

Chinese projects have faced similar challenges. The Wanbao project in Xai-Xai suffered from extreme flooding events and other initiatives such as cotton development projects were affected by the civil armed conflict in Sofala in 2014. Chinese investors in Mozambique's agricultural sector have not yet recovered initial investments. This did not prevent companies from investing in the country, which are increasingly focusing on extended value chains (Tang 2014). The Chinese ADC has also served as a base for Chinese investors to better understand Mozambique's market context. Land concession in the Gaza province also received criticism from CSOs, particularly FONGA.

The project has been accused of contributing to neo-patrimonial dynamics of accumulation and benefiting FRELIMO members, the ruling-party. The farmers' association ARPONE created to work alongside the Chinese company were mostly FRELIMO members. Similarly, some high-up employee of the public company in charge of the irrigation scheme joined ARPONE to produce rice (Chichava 2015). Therefore, governance issues, land tenure insecurities, market weakness, social struggles and lack of infrastructure act as barriers towards investments despite emerging countries' discourse of familiarity and similar challenges with developing economies.

#### 5.2 Agrarian Concerns of Investments and Trade Shifts

Despite major barriers to materialise investments and emerging countries' agricultural projects in Mozambique, several effects may be identified. Some of them include: i) land concentration and value chain reconfigurations; ii) policy mainstreaming and consolidation of a specific development model; and iii) consolidation of selective contention movements. First, project failure and abandonment of land by investors maintain many of these areas without revocation of land rights until a new wave of investments, which may increase land concentration in Mozambique. This scenario is doubly negative because local people are not benefitting from employment opportunities and cannot access the unoccupied portions of land. It may prevent the development of family farms and let national governments reaffirm its political authority over land concession (Smart & Hanlon 2014; Boche 2015). Moreover, Boche identified an incremental process of value chain reconfiguration taking place. Control of knowledge and capital are two important elements for project success, hence some investors establish a diversification strategy based on vertical integration of value chains controlled upstream (Boche 2015). This is the case of the poultry-soy complex in Zambézia and Chinese investments in Gaza.

A second general consequence is the mainstreaming of a development model that may influence public policies formulation. The features of this model include consolidation of the role of state as the "facilitator" of private investments; development of smallholder agriculture through contract-farming schemes; and promotion of technical assistance based on a technological packages. This process is aligned with narratives developed by international institutions such as the World Bank, however in the case of emerging countries' projects the strategy is also based on the idea of experience sharing. South-South Cooperation has mainly relied on the narrative that developing and emerging partners may share development solutions in a more effective way. Both Brazil and China stress how their own local experience may contribute to African agriculture.

ProSAVANA promotes a vision of the private sector as the "driving force of development" and of the public sector as "facilitator and supervisor of public policies" (ProSAVANA-PD 2014, 7), which is closely aligned with national plans for agriculture. ProSAVANA has been often presented as the executing arm of the Mozambican Strategic Plan for Agricultural Development (PEDSA). Likewise, Chinese programmes often put high emphasis on financial sustainability (Tang 2014). Furthermore, agricultural investments are often promoted as means to accessing new technologies (Liu 2013) and ProSAVANA is based on the idea that low productivity is the main determinant of poverty reduction and that smallholders' access to inputs depends on BRICS Initiatives in Critical Agrarian Studies (BICAS)

out-grower schemes. ProSAVANA's ongoing technical assistance component relies on five models aiming at the integration of peasants farmers into agricultural value chains, with no place for alternative techniques or conservation agriculture. The focus on productivity is also highlighted in the Chinese demonstration centre which is expected to expand from 1-1.5t/ha to 9-10t/ha for some crops (Chichava & Fingermann 2015).

Finally, contract farming has been promoted as an alternative to land acquisition and consolidated as the only solution for reducing rural poverty. The transition from subsistence to market-oriented farming has been presented as the major premise for the increase of agricultural productivity (ProSAVANA-PD 2014, 11), without taking into account the asymmetric access of smallholders to markets. The same aspect is promoted by the company Wanbao Africa Agriculture Development Limited, which received a concession of 6,000 ha to produce rice, from which 4,000 ha should be used by local farmers through a contract-farming model. The project also suggests that investments may be regulated by voluntary guidelines such as the Principles for Responsible Agricultural Investments (FAO/IFAD/UNCTAD/World Bank), but without a clear strategy for enforcement or for implementation of inclusive arrangements and local mechanisms of conflict management.

Both projects thus contribute to a mainstream development model sustained by the leading role of the private sector. According to Borras and Franco, this is purportedly justified by the 'imperatives' of capital accumulation that partly require 'neoliberal enclosures' and the expansion of market relations and commodification (S. Borras & Franco 2010). This is not exclusive of emerging countries initiatives but they contribute to its consolidation, underpinned by the experience sharing and South-South partnership narrative. Finally, a third effect is related to local political dynamics facing foreign investments. The emergence of a "selective contention movement" has not been effective in preventing risks of other foreign investments. For instance, the criticism towards ProSAVANA – and to a lesser degree to Chinese projects<sup>22</sup> – has not been accompanied by an integrated denunciation of other donors promoting investments in export crops in Nacala Corridor.

The international coalition against ProSAVANA has become a major political phenomenon in Mozambique, having attained some of its objectives. However, the territorial reality reveals complex political and economic dynamics: on the one hand some local peasants' organisations and NGOs show increasing interest in directly participating in the project, on the other hand, national-level peasants' movements and NGOs contribute to blocking its implementation. Despite strong criticism against land deals, other foreign investors from the US, Portugal, Zimbabwe, Norway and South Africa faced no resistance. Soy production has received development co-operation support for more than ten years in the Nacala Corridor. There have been differences of opinion on the launch of the "No ProSavana Campaign" and among urban/rural movements, but also among the many provinces of the Corridor. CSOs in the Nampula province are often more critical of the ProSAVANA while those in Niassa do not automatically reject it<sup>23</sup>. ProSAVANA was also blamed by existing conflicts in the Nacala Corridor for which it was not responsible. Meanwhile, commercial and land conflicts have been identified in many regions of the Nacala Corridor, such as Rapale, Malema, Ribaue, Chimbunila e N'gauma, which are related to other countries' companies<sup>24</sup>.

In the district of Gúrùe, a soya boom has been fostered by donor agencies and NGOs, such as Clusa, TechnoServe, Gates Foundation, Norway, Switzerland, the US and the International Institute of Tropical

<sup>&</sup>lt;sup>22</sup> The levels of criticism towards the Chinese project reached violent demonstrations and a FONGA 'open letter' to Armando Guebuza. Actions counted on the support of other CSOs like Justiça Ambiental (JA) and UNAC and claims are also receiving international coverage (Chichava 2015).

<sup>&</sup>lt;sup>23</sup> The Nampula province is the most populous and has historically benefited from foreign support to civil society organisations. However the Niassa province is more isolated in terms of transport infrastructure and attraction of private investments. Access of smallholders to local and regional markets is constrained by logistic deficits. This is also a less populated province and civil society organisations are much less articulated. All these factors contribute to the opinion that ProSavana will find easier conditions to establish itself in this area.

<sup>&</sup>lt;sup>24</sup> With companies such as Lurio GreenResources, Matanuska and Chikweti.

Agriculture (IITA)<sup>25</sup>, based on a support package from the Norwegian-funded business programme (Hanlon & Smart 2012). Several of these organisations are major funders of CSOs, which could be preventing open criticism. A set of other donor-driven initiatives such as the G8 Alliance for a Green Revolution in Africa (AGRA), the Rural Markets Promotion Programme (PROMER), the USAID Mozambique Competitiveness and Agribusiness Program (AgriFUTURO) and the JICA Project for the Nacala Corridor Economic Development Strategies (PEDEC) are all concretely promoting agribusiness, market-oriented agriculture and cash crops, particularly soy, in the North of Mozambique. However most of them have not received much public attention in comparison with ProSAVANA.

This fragmented approach may be the result of local civil society dynamics (including strong activism from Brazilian CSOs), the lack of transparency and of support to civil society, which is typical of emerging countries intergovernmental international engagement. Nevertheless, such a restrictive tactic constrains a broad and integrated strategy concerning recent trends in commodities markets and agrarian change.

### 6 Conclusion

This paper has shown different shifts in patterns of investment and trade in the context of the increasing role of emerging countries in international political economy. The Chinese influence in relocating global commodity chains to a South-South axis has important impacts in the domestic contexts of emerging partners such as Brazil. The ongoing specialisation of the country's export structure of primary goods, particularly soybeans, has strengthened the bargaining power of domestic agribusiness' elite vis-à-vis the federal government. The result is a renewed influence on domestic legal frameworks, increased financial subsidies and the support to their internationalisation beyond regionalists' patterns. Such commodity integration is however not stable as Chinese imports rely on diversified partners and Brazil's leadership and significance could be easily replaced by the US, Argentina or another Latin American country. Such asymmetric interdependence is also deepening specialisation on low value-added products as China increases focus on the import of whole beans to develop its crushing industry.

A second shift in commodities economy discussed here included emerging countries' efforts to establish a biofuel complex. Their interest in transforming ethanol into a global commodity and consolidating an international market has faced obstacles regarding the domestic and international environment. After a first wave of diplomatic and financial strategies to promote ethanol production internationally, a set of constraints in terms of international blending mandates, low oil prices, lack of structured policies in third countries willing to develop the sector, and a slowdown in Brazil's domestic ethanol sector contributed to a declining trend. This has not prevented a recent engagement in political dialogues aiming to promote international technical standards and to provide expertise in legal and institutional frameworks to other nations. Moreover, Brazil has sought to coordinate emerging countries in international fora discussing biofuel agendas in order to incorporate these countries' perspective, which could contribute to gradually building up a biofuel complex.

In both the soy and ethanol cases, investments in farmland and agricultural value chains have been promoted. Meanwhile, concerning Chinese direct investments in Brazil's farmland and the aim to deepen this bilateral integration, Brazilian authorities have provided the means to increase investments in logistics for commodities complexes and their transportation to China for lower costs. A similar approach has been identified in South Africa through the role played by FDI in controlling production value chains or through

<sup>&</sup>lt;sup>25</sup> Major investors in the region are Portugal, South Africa, Zimbabwe and the US. A new entrant announced in 2012 is Agromoz, owned by groups Américo Amorin of Portugual, Pinesso and Intelec Holdings (a Mozambican company part owned by President Armando Guebuza). Pinesso is a major soy producer in Brazil and a pioneer investor in the African continent, with investments in cotton in countries such as Sudan. However, this company has already faced criticism and has been accused of disseminating pesticides with adverse effects on the local population's health.

BRICS Initiatives in Critical Agrarian Studies (BICAS)

the establishment of agricultural demonstration centres, which control land-related activities without owning the land. Complementarily, an incipient agribusiness internationalisation effort beyond Latin America is conceivable due to such increasing integration with Asian markets. This relied on significant government support, including diplomatic and technical co-operation strategies.

However, the analysis of macro tendencies regarding agrarian transformations in Brazil and China remain incomplete without understanding the role of national and local dynamics in altering the direction, the path, and the depth of these emerging changes. The analysis of such dynamics are context-specific, but some commonalities stem from our case studies: i) the high proportion of emerging land deals that fail or are never implemented; ii) the increasing influence of transnational coalitions of civil society activists in the rural sector; and iii) the importance of civil, economic and political elites and of domestic institutional frameworks in determining the effects of related transformations. Despite major challenges to the effective materialisation of emerging countries' investments in Mozambique, several results have been identified. Besides direct effects of land concentration and reconfiguration of agricultural walue chains to deal with the risky environment, these initiatives have contributed to consolidating an agricultural model centred on the role of the private sector and to reinforce selective contestation movements. Therefore, agrarian restructuring trends connected to the rise of emerging economies are still evolving but some of their shapes and potential effects in domestic economies and in capital accumulation centres may already be acknowledged.

#### References

Aiko Otta L. 2014. Chineses vão entrar em leilão de ferrovias [Internet]. [cited 2014 Nov 4]. Available from: http://si.knowtec.com/scripts-

si/MostraNoticia?&idnoticia=71809&&idcontato=8916091&origem=fiqueatento&nomeCliente=CNA &data=2014-07-17

- Alden C. 2013. China and the long march into African agriculture. Cah Agric. 22:16–21.
- Anseeuw W, Boche M, Breu T, Markus G, Lay J, Messerli P, Nolte K. 2012. Transnational land deals for agriculture in Global South: analytical report based on the Land Matrix Database [Internet]. Bern/Montpellier/Hamburg: CDE/CIRAD/GIGA; [cited 2014 Feb 14]. Available from: http://www.oxfam.de/sites/www.oxfam.de/files/20120427 report land matrix.pdf
- Boche M. 2015. Contrôle du foncier, agricultures d'entreprise et restructurations agraires: une perspective critique des investissements fonciers à grande échelle: Le cas de la partie centrale du Mozambique [Doctorat]. Paris: Université Paris XI Sud.
- Boche M, Pouch T. 2014. L'usage conflictuel des terres agricoles : nouvel enjeu géoéconomique de la mondialisation. Cah Déméter.
- Borras S, Franco J. 2010. Contemporary Discourses and Contestations around Pro-Poor Land Policies and Land Governance. J Agrar Change. 10:1–32.
- Borras SJ, Franco J. 2010. From Threat to Opportunity-Problems with the Idea of a Code of Conduct for Land-Grabbing. Yale Hum Rts Dev LJ. 13:507.
- Borras SM, Franco JC, Isakson R, Levidow L, Vervest P. 2014. Towards Understanding the Politics of Flex Crops and Commodities: Implications for Research and Policy Advocacy [Internet]. [cited 2014 Sep 28]. Available from: http://oro.open.ac.uk/40501/
- Brazilian Embassy in Maputo. 2003a. CTPD. Brasil-Moçambique. EMBRAPA-MADER. Projeto na área de Agricultura. Assinatura de Memorando de Entendimento.
- Brazilian Embassy in Maputo. 2003b. Brasil-Moçambique.Agricultura. Assinatura do Protocolo de Entendimento entre o Instituto de Desenvolvimento Industrial de Minas Gerais e o MADER.
- Brazilian Embassy in Maputo. 2003c. Brasil-Moçambique. Projetos de desenvolvimento. Visita da CVRD. Embrapa.
- Brazilian Embassy in Maputo. 2011a. Promoção comercial. Brasil-Moçambique. Delegação da Companhia Siderúrgica Nacional e FIESP.

- Brazilian Embassy in Maputo. 2011b. Moçambique. Promoção comercial. PEPCOM 2011. Realização de estudos. Orçamento.
- Brazilian Embassy in Pretoria/MRE. 2010. Energia. IBAS. África do Sul. Workshop sobre Padrões e Especificações Técnicas para Biocombustíveis. Relato.
- Canal Terraviva entrevista Cleber Guarany. 2013. São Paulo: Grupo Bandeirantes; [cited 2014 Oct 22]. Available from: http://fgvprojetos.fgv.br/noticias/canal-terraviva-entrevista-cleber-guarany
- CCIJB. 2011. Seminário internacional debateu sobre investimentos no agronegócio em Moçambique. Câmara Comércio E Indústria Jpn Bras [Internet]. [cited 2014 Jan 28]. Available from: http://pt.camaradojapao.org.br/camara/noticias-da-camara/?materia=13884
- Chen L, De Lombaerde P. 2014. Testing the relationships between globalization, regionalization and the regional hubness of the BRICs. J Policy Model. 36:S111–S131.
- Chichava S. 2015. Mozambican elite in a Chinese rice "friendship": an ethnographic study of the Xai-Xai irrigation scheme [Internet]. [cited 2015 Apr 8]. Available from: http://www.cmi.no/file/3007-.pdf
- Chichava S, Fingermann N. 2015. Chinese and Brazilian agricultural models in Mozambique: the case of the Chinese Agricultural Technology Demonstration Centre and of the Brazilian ProALIMENTOS programme. Sussex: Future Agricultures Consortium/ Institute for Poverty, Land and Agrarian Studies.
- Deininger KW, Byerlee D. 2011. Rising global interest in farmland: can it yield sustainable and equitable benefits? [Internet]. [place unknown]: World Bank Publications; [cited 2015 Feb 25]. Available from: http://books.google.com/books?hl=en&lr=&id=pyeNA0iNg\_4C&oi=fnd&pg=PR5&dq=%222+3+4+13 +13+12%22+%22the+legal+status+of+any+territory+or+the+endorsement+or+acceptance%22+%22W orld+Bank+does+not+guarantee+the+accuracy+of+the+data+included+in%22+&ots=gdXcpMVSst&si g=QtxIu-AuvdvxkTh1Vexrh2S5Hpc
- Delaney LJ. 2013. New Frontiers in Emerging Markets. In: Exporting [Internet]. [place unknown]: Springer; [cited 2014 Oct 2]; p. 467–482. Available from: http://link.springer.com/chapter/10.1007/978-1-4302-5792-9 28
- Ekman S-MS, Macamo C. 2014. Brazilian Development Cooperation in Agriculture [Internet]. Bogor, Indonesia: Center for International Forestry Research; [cited 2014 Oct 22]. Available from: http://www.cifor.org/publications/pdf\_files/WPapers/WP138Ekman.pdf
- FASE. 2014. Fundo Nacala: estrutura original e desdobramentos. Rio de Janeiro: FASE Solidariedade e Educação.
- FAS/USDA. 2014. China's 2014 fuel ethanol production is forecasto to increase six percent Biofuel Annual [Internet]. Washington, D.C.: USDA Foreign Agricultural Service; [cited 2015 Apr 6]. Available from: http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Biofuels%20Annual\_Beijing\_China%20-%20Peoples%20Republic%20of\_11-4-2014.pdf
- FGV Projetos. 2014. Nacala Corridor Fund [Internet]. São Paulo: FGV Projetos; [cited 2014 Jan 16]. Available from: http://www.oecd.org/forum/issues/NACALA%20CORRIDOR%20FUND-FGV%20Projetos.pdf
- Fraser A, Anseeuw W. Forthcoming. New Facets of Land Acquisition: The Case of the Chinese Investments in South Africa. Dev South Afr.
- Funada Classen S. 2013. Analysis of the Discourse and Background of the ProSAVANA Programme in Mozambique – focusing on Japan's role [Internet]. Tokyo: Tokyo University; [cited 2014 Oct 21]. Available http://www.open.ac.uk/technology/mozambique/sites/www.open.ac.uk/technology/mozambique/files/fil

http://www.open.ac.uk/technology/mozambique/sites/www.open.ac.uk.technology.mozambique/files/files/files/ProSavana%20Analysis%20based%20on%20Japanese%20source%20(FUNADA2013).pdf

- Gabas J-J, Tang X. 2014. Chinese agricultural cooperation in Sub-Saharan Africa: challenging preconceptions. Paris: CIRAD.
- GBEP, FAO. 2011. The global bioenergy partnership sustainability indicators for bioenergy [Internet]. Rome, Italy: FAO, Climate, Energy and Tenure Division; [cited 2015 Apr 7]. Available from: http://www.globalbioenergy.org/fileadmin/user%5Fupload/gbep/docs/Indicators/The%5FGBEP%5FSus tainability%5FIndicators%5Ffor%5FBioenergy%5FFINAL.pdf
- GRAIN, Justiça Ambiental. 2013. Leaked ProSAVANA Master Plan confirms worst fears. GRAIN [Internet]. [cited 2014 Feb 14]. Available from: http://www.grain.org/fr/article/entries/4703-leaked-prosavanamaster-plan-confirms-worst-fears

GRAIN, UNAC, Via Campesina Africa. 2012. Brazilian megaproject in Mozambique set to displace millions BRICS Initiatives in Critical Agrarian Studies (BICAS)

of peasants. GRAIN [Internet]. [cited 2014 May 6]. Available from: http://www.grain.org/article/entries/4626-brazilian-megaproject-in-mozambique-set-to-displace-millions-of-peasants

- Hall R. 2011. Land grabbing in Southern Africa: the many faces of the investor rush. Rev Afr Polit Econ. 38:193–214.
- Hanlon J, Smart T. 2012. Soya boom in Gúruè has produced few bigger farmers so far [Internet]. Maputo, Moçambique: The Open University; [cited 2014 Oct 23]. Available from: http://www.open.ac.uk/technology/mozambique/sites/www.open.ac.uk.technology.mozambique/files/pi cs/d136343.pdf
- IRENA. 2014. Renewable Energy Prospects: China, REmap 2030 analysis [Internet]. Abu Dhabi: International Renewable Energy Agency (IRENA); [cited 2015 Apr 6]. Available from: http://www.irena.org/remap/IRENA REmap China report 2014.pdf
- Koen V, Herd R, Wang X, Chalaux T. 2013. Policies for inclusive urbanisation in China [Internet]. [cited 2015 Mar 30]. Available from: http://www.oecd-ilibrary.org/economics/policies-for-inclusive-urbanisation-in-china\_5k3xz6hc2z0x-en
- Liu P, editor. 2013. Trends and impact of foreign investment in developing country agriculture: evidence from case studies. Rome: Food and Agriculture Organization of the United Nations.
- Nishimori e o ProSavana. 2012. Brasília: Palavra Aberta; [cited 2014 Oct 22]. Available from: http://www2.camara.leg.br/camaranoticias/tv/materias/PALAVRA-ABERTA/422013-DEP.-LUIZ-NISHIMORI-(PSDB-PR)---RELACOES-EXTERIORES.html
- OECD, FAO. 2013. OECD-FAO Agricultural Outlook 2013 [Internet]. [place unknown]: OECD Publishing; [cited 2014 Oct 2]. Available from: http://www.oecd-ilibrary.org/agriculture-and-food/oecd-faoagricultural-outlook-2013 agr outlook-2013-en
- Peine E. 2013. Trading on Pork and Beans: Agribusiness and the Construction of the Brazil-China-Soy-Pork Commodity Complex. In: James, HS, editor. Ethics Econ Agrifood Compet [Internet]. Vol. 20. Dordrecht: Springer Netherlands; [cited 2014 Oct 2]. Available from: http://link.springer.com/10.1007/978-94-007-6274-9
- ProSavana. 2013. Elaboração do Plano Director do Desenvolvimento Agrícola no Corredor de Nacala: Nota Conceitual [Internet]. [place unknown]; [cited 2014 Jan 14]. Available from: https://www.prosavana.gov.mz/pdf/note\_pt.pdf
- ProSAVANA-PD. 2014. Formulação do Plano Director de Desenvolvimento Agrícola no Corredor de Nacala - Versão Preliminar. Maputo: ProSAVANA.
- Rangasamy L, Swanepoel JA. 2011. China's impact on South African trade and inflation. Dev South Afr. 28:141–156.
- Rosales O, Kuwayama M. 2012. China and Latin America and the Caribbean: building a strategic economic and trade relationship. United Nations, Economic Commission for Latin America and the Caribbean, editors. Santiago: Economic Commission for Latin America and the Caribbean (ECLAC).
- Sauer S, Pereira Leite S. 2012. Agrarian structure, foreign investment in land, and land prices in Brazil. J Peasant Stud. 39:873–898.
- Schlesinger S. 2013. Cooperação e investimentos do Brasil na África: o caso do ProSavana [Internet]. 1a ed. Maputo: FASE; [cited 2014 Jan 23]. Available from: http://www.biodiversidadla.org/content/download/102476/768871/version/1/file/Coopera%C3%A7%C 3%A30+e+Investimentos+do+Brasil+na+%C3%A1frica+%E2%80%93+O+caso+do+ProSavana+em+ Mo%C3%A7ambique.pdf
- SERE/MRE. 2011a. IBAS. Energia. VII Reunião do GT de Energia (Pretória, 12/10/11). Relato.
- SERE/MRE. 2011b. Brasil Moçambique. Missão empresarial da Confederação Nacional de Agricultura. Seguimento de atividades.
- SERE/MRE. 2012. Relações federativas. Rio Grande do Sul. Missão público-privada à África do Sul, Angola e Moçambique. Apoio.
- SERE/MRE. 2013. IBAS. VI Cúpula. GT Energia. Instruções.
- Da Silva MAV, de Almeida D'Agosto M. 2013. A model to estimate the origin-destination matrix for soybean exportation in Brazil. J Transp Geogr. 26:97–107.
- Smart T, Hanlon J. 2014. Chickens and beer: A recipe for agricultural growth in Mozambique. [place unknown]: Bicycles+Development Lrd.

Tang X. 2014. Scoping Study of Chinese Agricultural Engagements in Mozambique. [place unknown]: AFD.

- UNCTAD. 2014. The state of the biofuel market: regulatory, trade and development perspectives [Internet]. New York: United Nations Conference on Trade and Development (UNCTAD); [cited 2015 Apr 7]. Available from: http://www.researchgate.net/profile/Alessandro\_Sanches-Pereira/publication/266368893\_The\_State\_of\_the\_Biofuels\_Market\_regulatory\_trade\_and\_developmen t\_perspectives/links/542d61400cf29bbc126d2b9d.pdf
- USDA. 2014. Livestock and poultry: world markets and trade [Internet]. Washington, D.C.: United States Department of Agriculture/ Foreign Agricultural Service; [cited 2014 Nov 6]. Available from: http://apps.fas.usda.gov/psdonline/circulars/livestock poultry.pdf
- USDA-FAS. 2013. Brazil: Biofuel Annual: Annual Report 2013 [Internet]. Washington, D.C.: Global Agricultural Information Network/U.S. Departement of Agriculture; [cited 2014 Nov 26]. Available from:

http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Biofuels%20Annual\_Sao%20Paulo%20AT O\_Brazil\_9-12-2013.pdf

- USDA-FAS. 2014. Oilseeds and Products Annual: Peoples Republic of China [Internet]. Washington: United States Department of Agriculture/ Foreign Agricultural Service; [cited 2014 Nov 9]. Available from: http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Oilseeds%20and%20Products%20Annual\_ Beijing\_China%20-%20Peoples%20Republic%20of\_2-28-2014.pdf
- Vadell JA. 2013. The North of the South: The Geopolitical Implications of "Pacific Consensus" in South America and the Brazilian Dilemma. Lat Am Policy. 4:36–56.

Wilkinson J. 2014. Brazilian biodiplomacy in Africa: the case of biofuels. Rio de Janeiro: Actionaid.

Wilkinson J, Reydon B, Di Sabbato A. 2012. Concentration and foreign ownership of land in Brazil in the context of global land grabbing. Can J Dev Stud Can Détudes Dév. 33:417–438.

Zha D, Zhang H. 2013. Food in China's international relations. Pac Rev. 26:455–479



# Working Paper Series

**BICAS** is a collective of largely BRICS-based or connected academic and policy-oriented researchers concerned with understanding the BRICS countries and some powerful middle income countries (MICs) and their implications for global agrarian transformations. Critical theoretical and empirical questions about the origins, character and significance of complex changes underway need to be investigated more systematically. BICAS is an 'engaged research' initiative founded on a commitment to generating solid evidence and detailed, field-based research that can deepen analysis and inform policy and practice – with the aim of ultimately influencing international and national policies in favour of rural poor peoples. In BICAS we will aim to connect disciplines across political economy, political ecology and political sociology in a multi-layered analytical framework, to explore agrarian transformations unfolding at national, regional and global levels and the relationships between these levels. BICAS is founded on a vision for broader, more inclusive and critical knowledge production and knowledge exchange. We are building a joint research agenda based principally on our capacities and expertise in our respective countries and regions, and informed by the needs of our graduate students and faculty, but aiming to scale up in partnership and in dialogue with others, especially social movement activists. BICAS Working Paper Series is one key venue where we hope to generate critical and relevant knowledge in collaborative manner. Our initial focus will be on Brazil, China and South Africa, the immediate regions where these countries are embedded, and the MICs in these regions. While we will build on a core coordinating network to facilitate exchange we aim to provide an inclusive and dynamic space, a platform, a community, hence we invite participation.

www.plaas.org.za/bicas; www.iss.nl/bicas; Email: bricsagrarianstudies@gmail.com

#### About the author

**Carolina Milhorance de Castro** is a PhD Candidate at the University of Brasília (UnB) and the French Center for Agronomical Research and Development (CIRAD). She holds a Master's degree in International Affairs (Sustainable Development) from Sciences Po Paris, having completed a Bachelor's degree in International Relations at PUC-Rio and a second one in Biology/Ecology at the Federal University of Rio de Janeiro (UFRJ). Her professional experience includes work for the Organisation for Economic Co-operation and Development (OECD), Institute for Sustainable Development and International Relations (IDDRI), Oswaldo Cruz Foundation (FIOCRUZ), and Brazilian Biodiversity Fund (FUNBIO).

