

Chinese and Brazilian agricultural models in Mozambique.

The case of the Chinese Agricultural Technology Demonstration Centre and of the Brazilian ProALIMENTOS programme

Sérgio Chichava and Natalia N. Fingeremann

February 2015

Introduction

China and Brazil have called increasing attention from the international community, especially in the field of development cooperation (Cabral and Shankland 2013; Chichava et al. 2013; Cabral and Weinstock 2010; Brautigam 2009; Alden 2007). In Africa, for instance, both countries have expanded their development activities and defined agriculture as one of the main sectors to boost mutual cooperation (Cabral and Shankland 2013; Chichava et al. 2013). Recognising that agriculture played a key role in both China's and Brazil's economic development, these countries, usually called 'emerging donors' or 'new donors', state that unlike 'traditional donors' they will be able to bring their respective agriculture-based developmental experiences to African countries. According to Li et al. (2012), as cited by Buckley (2013), the Chinese government affirms that the development models proposed for African agriculture 'reflect similar assistance mechanisms and embody the valuable experience of China's agricultural development at different stages'. A comparable statement is made by Brazilian leaders, as they believe that what is good for Brazil is also good for Africa. The former Brazilian president Lula da Silva said, 'I am convinced that the public policies implemented in Brazil can be exported to Africa. There will need to be some adjustments of course, but these policies can work in Africa' (Instituto Lula 2013)¹.

Although both countries stress how their own local experience may inspire African agriculture, it is important to highlight that the modalities and models of technology transfer might differ from one country to another. In the case of China, the engagement in African agriculture is generally through the establishment of Agricultural Technology Demonstration Centres (ATDCs) which seek to implement successful practices from Chinese agricultural development in African nations. As of 2013, the Chinese had built 14 ATDCs from a list of 20 that they promised to build on the continent since 2006. Liberia, for example, was the first African country to obtain an ATDC, which was completed in July 2010 (Chichava et al. 2013). Meanwhile the engagement of Brazil tends to be through specific bilateral or trilateral projects, mostly run by Embrapa, the most important Brazilian agricultural research centre specialised in tropical seeds.

In order to understand how Chinese and Brazilian models and modalities play out in the African context, this study has examined and compared the activities of a Chinese and a Brazilian project carried out in the district of Boane in Mozambique. The Chinese project is an ATDC, locally known as *Centro de Investigação e Transferencia de Tecnologia Agrárias do Umbelúzi* (CITTAU). The Brazilian programme is a trilateral agreement, involving Embrapa, called *ProAlimentos*, also known as *Projeto de Apoio Técnico aos Programas de Nutrição e Segurança Alimentar de Moçambique* (Mozambique Food and Nutrition Security Programme, or PSAL). This paper is organised in two parts. The first explains the process of CITTAU and *ProAlimentos* implementation in Mozambique as well as their organisation and operation, while the second

looks at the differences and similarities between both development programmes. Finally, the paper concludes that due to cultural and communication issues, as well as managerial practices, the Chinese agricultural model is facing more difficulties in Mozambique than the Brazilian one, although the Chinese have more financial capacity to implement their agriculture-based experience.

The birth of the *ProAlimentos* programme

Conceptualised in 2010 and put in place in 2011, *ProAlimentos* originated from a trilateral cooperation agreement between Mozambique through the Ministry of Agriculture (MINAG), Brazil through the Brazilian Cooperation Agency (ABC) and the USA through the United States Agency for International Development (USAID). The project is executed by the Brazilian Agricultural Research Corporation (Embrapa) on behalf of ABC; the Universities of Florida (UF) and Michigan State (MSU) on behalf of USAID; and the Institute of Agrarian Research of Mozambique (IIAM) on behalf of MINAG. As in other Brazilian trilateral cooperation agreements, the financial resources of *ProAlimentos*, valued at US\$2.4m, are shared between partners, but in such a way that USAID is primarily responsible for purchase of machinery and equipment while ABC is responsible for the payment of trips and costs related of Embrapa staff. Embrapa and IIAM cover the salaries of their researchers and experts (Fingermann 2015).

The project is located at the Agrarian Institute of Umbelúzi, at Boane district, in the South of the country². According to Embrapa, Umbelúzi was chosen because of two practical reasons: (i) it is close to Maputo, the capital of Mozambique; and (ii) there is a former cassava processing plant which could be used to establish the centre of vegetable training and a processing factory, as well as other existing buildings and facilities at the Institute.

In line with MINAG's agriculture strategy, called *Plano Estratégico para o Desenvolvimento do Sector Agrícola* (PEDSA); with the Strategy for Rural Development (EDR); and with the demands of IIAM researchers (Fingermann 2015), *ProAlimentos* aims to improve local horticulture production and distribution through three integrated components: (i) socio-economic surveying of local producers; (ii) strengthening of production activities; and (iii) training in post-harvest and agro-processing (Fingermann 2015). The first component intends 'to know the specifics of the production and consumption of vegetables in Mozambique and evaluate supply chains and competitiveness' in order to properly implement the second component, which aims to 'strengthen integrated models of agricultural production, post-harvest and processing of strategic products, and improve packaging systems, storage and processing of vegetables' (Interview with Embrapa former coordinator, 2012). The third component includes training of Mozambican researchers in Brazil and the United States, as well as the establishment of an agro-processing plant at the Agrarian Research Institute of Umbelúzi, known as *Unidade Colectiva de*

Coletiva de Processamento Agroalimentar (Collective Unit of Food Agro-processing) once it became clear that the current facilities are completely damaged and could not be used by the *ProAlimentos* team as was initially expected (Interview with Embrapa team, March 2013). However the construction of this facility, which had been announced in 2011 by USAID, has slowed down because of hesitations over its location and political discussions within IIAM (Fidry 2014).

The main goal of *ProAlimentos* is to contribute to Mozambican food security, as Embrapa might introduce modern irrigation systems like sprinklers, micro-sprinklers, drip and drilled holes which can replace the current Mozambican irrigation system of flood and furrow irrigation. This fact is also mentioned by the Mozambican team leader, who recognises the importance of it to Maputo province (Namaacha, Moamba, Boane, Matola) and the 'green zones' on the outskirts of Maputo city. For the IIAM team, the project may create jobs, raise the income of local farmers and probably reduce the country's dependence on South African vegetables (Zacarias 2014).

As of the end of 2013, *ProAlimentos* had tested almost 50 varieties of different kind of vegetables from Brazil, the United States and Mozambique. First the project has tested 'different tomato varieties out of which ten were from Brazil and four local'; then it has tried other vegetables from the three countries, like lettuce, cabbage, pepper, carrot and melons. Furthermore, IIAM researchers affirm that besides the intensive training provided by Embrapa, UF and MSU in every mission, the project officially organised a short-term course on soil management to rural extensionists in 2012. This was thanks to an informal agreement with the local Chinese researchers who allowed the *ProAlimentos* team to use CITTAU facilities, because it was impossible to run the course at the Agrarian Institute of Umbelúzi (Interview with IIAM researchers, April 2 and 3, 2013).

The birth of CITTAU

Announced in 2007 at the time of former Chinese president Hu Jintao's visit to Mozambique, the construction of CITTAU started in 2009 and terminated with its official hand-over to the former Minister of Science and Technology (MCT), Venâncio Massingue, and the Vice-Minister of Agriculture, António Limbau, by the Chinese Ambassador in Mozambique in July 2011 (MCT 2011). With an estimated cost of approximately US\$6m, it was agreed that during the first three years the management of the centre would be conducted by the Chinese enterprise Hubei Lianfeng Agricultural Development Corporation, supported by Chinese grants estimated to be of 5m Yuan per year (China Daily 2014; Chichava et al. 2013). Similarly to the Brazilian project, the Chinese centre is also located in Boane district, and occupies an area of 52ha conceded by the Agrarian Research Institute of Umbelúzi. The reasons for the establishment of CITTAU in Boane are the same as the reasons for the establishment of *ProAlimentos*: the previous existence of an agricultural research centre and

some infrastructural facilities. However, unlike the old, damaged and opened facilities used by *ProAlimentos*, the Chinese built up a brand-new facility which is separated from the Agrarian Research Institute of Umbelúzi by an entrance gate and a massive wall.

The first training course on Chinese agricultural technology organised by CITTAU took place in June 2012 and aimed to educate local producers on vegetable production, agricultural machinery operation, animal nutrition, rice and maize production, processing and management. Chinese and Mozambican experts conducted the course, involving 34 local producers from the South of the country. Chinese and Mozambican agricultural experts expected to run more courses during the same month involving 60 producers from the Centre and North of the country (MCT 2012a; 2012b). The courses were also directed to agricultural experts. Apart from agricultural activities, CITTAU has increased local populations' production rates of biogas production using organic and animal wastes. The first course was organised in March 2014 and reunited 46 women from Maputo (MCT 2014).

In consonance with PEDSA and the EDR objectives, CITTAU is an institution for research, technological development, technology transfer, innovation, human capital formation and agricultural and livestock production. According to Mozambican authorities such as current president Armando Guebuza, the organisation is an important instrument in the struggle against poverty and food insecurity. Mozambican authorities also consider CITTAU to be a concrete symbol of China's pledge to develop Mozambique. Moreover, thanks to Chinese technology, Mozambicans will learn how to increase their productivity without needing to use large land concessions (AIM 2011). According to one of the former MCT ministers, Chinese technology is expected to expand productivity from 1-1.5t/ha to 9-10t/ha in some crops (AIM 2012).

In 2012, tests of the adaptability to the local agro-climatic conditions of Chinese seed varieties of pepper, cabbage, eggplant, cauliflower, sweet corn, turnip and cabbage, and tests comparing their productivity income with Mozambican seed varieties, were ongoing. There were also comparative tests of Chinese and Mozambican tomatoes, lettuce and maize (Governo de Moçambique 2012). The Chinese director of CITTAU considers Mozambican soil to be very rich, meaning it does not need any pesticides or many cultivation techniques to obtain good harvests, and reported in 2014 that local farmers' rice production had risen from 100kg per acre to 150kg per acre thanks to Chinese technology (China Daily 2014). Also, as previously mentioned, CITTAU seeks to improve livestock productivity and has been testing the adaptability of some animal species like pigs to the local environment. Finally, it is important to point out that CITTAU provides a platform for Chinese companies to enter the agriculture industry in Mozambique: 'These companies use the center's seeds, techniques and technology, which are based on our research in Mozambique' (China Daily 2014).

Differences between the two models of agricultural technology transfer

In order to understand commonalities and differences between the two programmes, this paper now investigates the institutional relationship of CITTAU and *ProAlimentos* with Mozambican partners as well as their communication and sustainability issues.

Objectives and characteristics of each programme

The *ProAlimentos* project is only focused on vegetable technology transfer with a specific emphasis on tomatoes, lettuce, garlic, onions, Peruvian carrots, carrots, peppers and cabbage. CITTAU's emphasis, on the other hand, includes other crops such as rice and maize. The *ProAlimentos* seed varieties being tested at Umbeluzi agrarian station are mainly from Brazil, with a small portion of Mozambican and American crops. *ProAlimentos* tests more Brazilian crops because they believe Brazilian varieties can do better in Mozambique, coming from a country with similar agro-climatic characteristics, in contrast with vegetable varieties from Europe, which have been deemed less suitable and less productive in Mozambique (Embrapa 2013).

In contrast with *ProAlimentos*, the Chinese centre has been asked to test more local varieties. However as of 2013, most of the seed and animal varieties tested at CITTAU were Chinese, leading the Mozambican Agricultural Minister to express his frustration in a public newspaper: 'I am not happy with the production. When I visited [the center] for the first time in 2012, we recommended that the centers bid on more local varieties of vegetables, but I can see that this objective has not been followed [by the Chinese CITTAU staff]' (Jornal Domingo 2013). According to him, 'It is much easier and cheaper for the population to deal with national products. I am not saying that I am against Chinese varieties because they are Chinese, I just want to say we would like to see more Mozambican varieties' (Ibid).

The Minister also said that among the 18 Mozambican seed varieties selected, only one, 'Limpopo', was tested by CITTAU. Equally, CITTAU tested only one Mozambican maize seed variety, 'Changalane' (Trape 2013). In the Mozambican authorities' perspective Brazilian agricultural varieties are more adaptive to Mozambican local conditions than Chinese agricultural varieties because of agro-ecological affinities.

Another difference between the two projects originates from the type of partnership. While *ProAlimentos* derives from a trilateral cooperation between Mozambique, Brazil and the USA, in which the role of Brazilian institutions is narrowed to technical cooperation and the financial aspects are mostly carried out by USAID, CITTAU is a result of bilateral cooperation that is entirely funded by the Chinese government.

It is important to point out that trilateral cooperation is one of the main features of Brazilian technical cooperation with its partners in the South. For ABC, trilateral cooperation is a strategic tool that strengthens the South-South narrative, once 'traditional donors' are obliged to adopt Brazilians' guiding principles, which 'represent a progress in relation to the traditional North-South cooperation, as they promote a horizontal perspective instead of a patronising attitude'³ (Abreu 2013). Thus, as of September 2013, ABC has registered 37 ongoing trilateral agreements, which corresponded to over US\$54m, out of which 45 percent (US\$24.3m) was financed by Brazilian institutions (Ibid).

Despite the positive perception around Brazilian policymakers on trilateral cooperation, one might note that this type of engagement has affected the way Mozambican bureaucrats and agriculture experts perceive Brazilian development cooperation as having less money than either the Chinese or the other 'traditional donors' participating in the programmes (Chichava et al. 2013). For them, Brazilian development cooperation has advantages over the Chinese, as both countries, Brazil and Mozambique, share a common language and historical background and have similar weather conditions, but trilateral agreements have shown several institutional weaknesses of Brazil's international development cooperation, which still lacks a proper legal framework to provide financial aid (Cabral and Weinstock 2010; Interview with IIAM researchers, April 2 and 3, 2013).

Institutional relationship and work environment

The main Mozambican partner of the *ProAlimentos* is IIAM, while for CITTAU the main partner is the Minister of Science and Technology, even though the Memorandum of Understanding (MoU) between Mozambique's and China's governments states that IIAM will be the local institution responsible for the implementation and execution of the project (MCT 2007). One of the possible explanations for this lies to the fact that the MoU was signed by MCT in representation of the Mozambican government.

This aspect is important because the partnership of CITTAU affects its day-to-day activities, once the main task of MCT is not related to agricultural research. In addition, in order to solve the issues related to CITTAU, the MCT often must first contact MINAG. For example, in response to the unhappiness of the Minister of Agriculture regarding the neglect of bidding on Mozambican varieties of vegetables when he visited the CITTAU, one of the Chinese managers said that the reason behind this is that they do not have a direct relationship with IIAM: first they have to ask MCT. Then MCT contacts MINAG, which slows the process. Apart from this institutional problem, the expensiveness and the lack of Mozambican seeds in the local market remains a source of conflict between CITTAU, MCT and MINAG.

But it seems that the main problem has been the lack of commitment of the Mozambican staff at CITTAU, which according to the Minister have not been doing their jobs properly. Instead, the Mozambican staff have left all of the work to the Chinese side: 'It is a problem of planning and self-esteem. When we give people to the Chinese technical programme, they will do the job that they are used to, because they like to work' (Trape 2013).

Secondly, because the agreement regarding CITTAU's strategic implementation says that the Ministry of Agriculture, in particular, IIAM will be the main Chinese partner for the Mozambican side, which actually is not the case. Indeed, neither IIAM nor other departments of the Ministry of Agriculture are involved in any aspect related to CITTAU's management; instead, they are officially reduced to mere 'spectators'. According to IIAM researchers at the Agrarian Research Institute of Umbéluzi, CITTAU leaders should be working side by side with IIAM researchers, despite the institutional ambiguity (Interview with IIAM researcher, April 2, 2013).

It is also worth noting that MCT staff at CITTAU have not been working with agriculture or technology transfer. In fact, MCT staff have worked in bureaucratic tasks like facilitating visas and working permits for Chinese experts, assisting Chinese imports of equipment and seeds among other material used at CITTAU, and coordinating some events like the opening and graduation ceremonies of the training courses (interview with MCT official, Maputo, November 2013).

Moreover, the Chinese CITTAU staff accuses MCT staff of not going to work with them, even if they have offices there. They also accuse MCT of not doing enough to improve their work conditions, since until the time of this study there were no internet connections at CITTAU offices. The only Mozambicans who work closely and daily with the Chinese agricultural experts are the seasonal workers, who lack agricultural techno-scientific expertise. This also leads the Chinese agricultural experts to think that the Mozambican officials are not recognising the importance of agriculture in the struggle against poverty (Interview with one of the Chinese CITTAU managers, Boane, October 18, 2013).

Differently to CITTAU, interaction between Mozambican, Brazilian and North American partners at *ProAlimentos* has been much more consistent. Mozambican agricultural experts from IIAM have been receiving training courses in vegetables technology transfer from Brazilian experts. The main examples of this interaction are the training courses provided to Mozambican experts in both countries as well as the organisation of workshops to discuss the work of the programme (Embrapa 2014). Equally, interaction with local farmers is relatively more intense within *ProAlimentos* than in the Chinese case. The main work of CITTAU until now is completing tests of seed varieties' adaptability to the local Mozambican conditions, work done entirely by the Chinese staff. In contrast, IIAM staff linked to *ProAlimentos* feel a lack of support from MINAG, as MINAG does not provide financial resources to properly support agricultural research, even if it claims that research is the

backbone for agricultural development in Mozambique. If *ProAlimentos* currently works it is because the project has the financial support of North Americans and Brazilians (Fingermann 2015).

Communication and management issues

The language barrier also hurts institutional relationships between the Mozambicans and Chinese agricultural experts at CITTAU. It is also the main handicap in the relation with local farmers. While this aspect is not specific to the Chinese case—because not all international cooperation or economic agents in Mozambique speak Portuguese—in the Chinese case this problem is most severe because not one Mozambican working with them can speak Chinese and no Chinese can speak Portuguese or understandable English. The Chinese centre seems also to be inaccessible to Mozambicans, since every sign inside the centre has been written in English and Chinese. The language barrier not only affects the institutional relations at CITTAU and other Chinese cooperation activities; it also makes technical cooperation and information exchange even more difficult.

Despite there being language and culture barriers, IIAM researchers at Umbeluzi said that there is an informal relationship with the Chinese researchers working at the facility and they have lent equipment, like tractors, to the IIAM team when it was required (Interview with IIAM team, April 2, 2013).

In contrast to the CITTAU case, the relationship at *ProAlimentos* is facilitated by the fact that all partners can communicate either in Portuguese or English. The relationship is also eased by the fact that the majority of researchers involved have worked together on previous projects, particularly in projects at Embrapa. Fingermann (2015), for instance, points out that the previous professional network and a deep understanding of Embrapa corporate culture might have positively impacted on the implementation process. A previous study, Chichava et al. (2013), has also shown that as a Portuguese-speaking country, Brazilian cooperation practices were perceived to be better suited to Mozambican realities than the Chinese ones, which may have to deal with the language barrier.

Nonetheless, the Brazilian organisations have attracted some criticisms from their American partners for what is described as 'heavy and slow bureaucratic processes,' and so UF and MSU have had to slow down the implementation process to work alongside the Embrapa team. As put by an MSU interviewee, 'we were frustrated because if I needed to go to Mozambique, I could go to Mozambique ... we had the money, but the Brazilians were still waiting to get their part approved' (Interview with MSU researcher, March 10, 2013). It's important to stress that Mozambican agricultural experts and bureaucrats working alongside different partners in trilateral programmes with the involvement of Brazil have also pointed out this aspect, but in the case of this specific project IIAM researchers have not considered it a barrier to the implementation of the project (Interview with IIAM

researcher, April 3, 2013). However, the perception of China among Mozambican bureaucrats and politicians is much more positive in this aspect, because they see the Chinese as very flexible, acting quickly without being hampered by bureaucratic procedures (Chichava et al. 2013), although IIAM technicians perceive that the Chinese do not make a lot of effort to transfer technology to Mozambicans.

The sustainability of CITTAU and ProAlimentos

Finally, there is the problem of sustainability of both projects, which has not yet been solved. Perhaps this will be one of their biggest challenges for agricultural development in Africa, since the majority of African states have limited material or financial capital to deal with issues of sustainability. If the *ProAlimentos* programme has been mainly supported by USAID and is registering some success among the trained farmers, it is reported that their lack of credit and lack of access to markets as well as the inexistence of agro-processing factories remain the main challenges of the local farmers. Equally, low salaries paid to the Mozambican staff of IAAM working on *ProAlimentos* can cause the most qualified IIAM staff to quit the project in search of better paid jobs, which endangers the future of the project (Fingermann 2015). The other discouraging factor for the Mozambican staff is the fact that they see their Brazilian and American partners receiving huge salaries.

Regarding CITTAU, the whole project is supposed to last for 10 years. After the first three years, the Mozambican staff will replace the Chinese employees. However, the Mozambican government, due to its material and financial difficulties, claims that they need more financial help from China. According to the Chinese manager, 'from then [after April 2014, end of the first three years], a seven-year commercial partnership will start. The centre will become self-sustaining because the Chinese government may stop its financial support' (China Daily 2014).

Actually, the Chinese managers are envisaging three options to guarantee the future sustainability of the centre after the three years of Chinese government support, some of which are already under implementation, namely:

- i) Introduce paid training courses for Mozambican farmers or others interested. This system has already been implemented in China where local farmers have to pay to get agricultural technological training. However, this option seems doomed to fail right from the start since many Mozambican farmers have limited resources.
- ii) Develop agro-industry which includes growing and processing crops like rice and maize, which are very popular on the local market due to the low prices and the different varieties provided by the Chinese. Alternatively the centre could produce cotton-seeds – one of the advantages of Hubei agriculture

– which might be sold in the market; and/or develop a pig farm at CITTAU. This latter project idea is already under experimental implementation.

At the moment of our study there were about 600 pigs in the centre aimed at introducing the business CADC model – that is, to operate the centre by a Chinese company and do it in a business model, nonetheless maintaining some degree of social welfare instead of becoming a pure commercial organisation.

Conclusion

This paper compared Brazilian and Chinese agricultural models of technology transfer. If both programmes of agricultural technology transfer are based on their respective successful experiences, a comparison of the two modalities of agricultural technology transfer reveals how local context and cultural and linguistic differences matters for their success. In the case of CITTAU this is much more evident than in the case of the *ProAlimentos*. However, it appears that the fact that Brazil relies more for its engagement on trilateral cooperation, where it only provides technical assistance, makes the locals think that the Latin American country is not as big a player as the 'traditional donors' like the United States and China, who are the one who provide money and other main facilities in these programmes alongside.

The future is much more uncertain for CITTAU than for *ProAlimentos*. For example, it is difficult to see how the locals will replicate the Chinese agricultural model since they are not involved in day-to-day management of the Centre. Regarding *ProAlimentos*, if the technological knowledge has been transferred to the local agricultural experts, bureaucrats and local farmers, difficulties in credit and markets will continue to be a problem for the latter, since they don't have money to replicate the experience acquired in results. Last but not least, the continuity of research on vegetables production can be compromised after the end of the *ProAlimentos* project if MINAG is still not supporting IIAM staff involved in the project.

End Notes

- ¹ Translation of the following sentence: *Eu tenho a convicção de que as políticas públicas que fizemos no Brasil têm a cara da África. Tem que ser adaptado em relação a cada realidade e cultura, mas podem ser implantadas*
- ² Created in 1909 under Portuguese colonial rule the Umbeluzi Agricultural Station occupies an estimated 700 hectares. For more details see Boletim do IIAM (2009).
- ³ Translation of the following sentence: *'a cooperação trilateral representa um avanço em relação à tradicional cooperação Norte-Sul, ao favorecer a adoção de abordagem horizontal e menos paternalista'* (Abreu 2013: 13).

References

- Abreu, F. (2013) 'A evolução da Cooperação Técnica Internacional no Brasil', *Mural Internacional*, 4(2), Jul-Dec
- AIM (2012) 'China apoia transferência tecnológica', *Portal do Governo de Moçambique*, 1 April / www.portaldogoverno.gov.mz/noticias/agricultura/abril-2012/china-apoia-transferencia-tecnologica (accessed 17 September 2014)
- AIM (2011) 'Centro de Investigação Agrária vai garantir auto-suficiência alimentar', *SAPO Notícias*, 4 August / noticias.sapo.mz/aim/artigo/190104082011151138.html (accessed 17 September 2014)
- Alden, C. (2007) *China in Africa*, London, UK: Zed Books Ltd; Cape Town, South Africa: David Philip
- Boletim do IIAM (2009) *EAU.100 anos na Vanguarda da Pesquisa Agrária em Moçambique*, Maputo, Mozambique: Ministry of Agriculture
- Brautigam, D. (2009) *The Dragon's Gift: The Real Story of China in Africa*, New York, NY: Oxford University Press
- Buckley, L. (2013) *Narratives of China-Africa Cooperation for Agricultural Development: New Paradigms?* FAC Working Paper 53, Brighton, UK: Future Agricultures Consortium
- Cabral, L. and Weinstock, J. (2010) *Brazilian Technical Cooperation for Development: Drivers, Mechanics and Future Prospects*. Report for ABC and DFID, London, UK: Overseas Development Institute
- Cabral, L.; Shankland, A. (2013) *Narratives of Brazil-Africa Cooperation for Agricultural Development: New Paradigms?* FAC Working Paper, 51, Brighton, UK: Future Agricultures Consortium
- Chichava, S. Jimena D., Cabral, L., Shankland, A., Buckley, L., Tang, L., Zhang and Y. (2013) 'Brazil and China in Mozambican Agriculture: Emerging Insights from the Field', *IDS Bulletin*, 44.4
- China Daily (2014). Center's challenge of going it alone, http://africa.chinadaily.com.cn/weekly/2014-02/14/content_17282692.htm (accessed 13 January 2015).
- Domingo (2013) 'Ministro insatisfeito com desempenho do Centro de Umbeluzi', *Jornal Domingo*, 21 April, Maputo, Mozambique / www.jornaldomingo.co.mz/index.php/economia/1036-ministro-insatisfeito-com-desempenho-do-centro-de-umbeluzi (accessed 17 September 2014)
- Embrapa (2013) *Experimentos apontam melhores cultivares de hortaliças para Moçambique*, Brasília, Brazil: Empresa Brasileira de Pesquisa Agropecuária / www.embrapa.br/busca-de-noticias/-/noticia/1498434/experimentos-apontam-melhores-cultivares-de-hortalicas-para-mocambique (accessed 19 September 2014)
- Embrapa (2014) *Missão em Moçambique capacita técnicos e extensionistas do IIAM*, Brasília, Brazil: Empresa Brasileira de Pesquisa Agropecuária / www.embrapa.br/hortalicas/busca-de-noticias/-/noticia/1759361/missao-em-mocambique-capacita-tecnicos-e-extensionistas-do-iiam (accessed 18 September 2014)
- Fingermann N (2015) *A study of Brazilian Trilateral Development Cooperation in Mozambique: The case of ProSAVANA and ProALIMENTOS*. FAC Working Paper 113, Brighton, UK: Future Agricultures Consortium
- Fidry, C. (2014) *Missão define local para unidade de processamento agro-alimentar em Moçambique. Unidade será um centro de treinamento para processamento de produtos vegetais*, Portal Dia de Campo <http://www.diadecampo.com.br/zpublisher/materias/Materia.asp?id=23971&secao=Not%EDcias> (accessed 13 January 2015)
- Governo de Moçambique (2012) *Balanço do Plano Económico e Social 2012 (1º semestre)*, Maputo, Mozambique: Government of Mozambique
- Instituto Lula (2013) *Lula na África: 'É importante o Brasil estar junto da África neste processo de crescimento'*, São Paulo, Brazil: Instituto Lula / www.institutolula.org/lula-na-afrika-o-brasil-precisa-estar-junto-da-afrika-neste-processo-de-crescimento (accessed 19 September 2014)
- Li, X.; Qi, G.; Tang, L.; Zhao, L.; Jin, L.; Guo, Z. and Wu, J. (2012) *Agricultural Development in China and Africa: A Comparative Analysis*, London: Routledge
- MCT (2007) *Memorandum de Entendimento sobre a visita de um missão Chinesa para o Estudo de viabilidade do Centro de Demonstrações de Tecnologias Agrícolas Chinesas em Moçambique*, Maputo, Mozambique: Ministério de Ciência e Tecnologia
- MCT (2012a) *MCT realiza curso de capacitação*, Maputo, Mozambique: Ministério de Ciência e Tecnologia
- MCT (2012b) *Cursos de capacitação técnica em tecnologias agrárias chinesas*, Maputo, Mozambique: Ministério de Ciência e Tecnologia
- MCT (2011) *Comunicado de Imprensa. Assunto: Tem lugar a cerimónia de entrega do projecto de construção*, Maputo, Mozambique: Ministério de Ciência e Tecnologia
- MCT (2014) *Curso de Capacitação sobre Demonstração da Produção de gás doméstico através do uso do biodigestor*, Maputo, Mozambique: Ministério de Ciência e Tecnologia / www.mct.gov.mz/portal/page?_pageid=617,6170344&_dad=portal&_schema=PORTAL (accessed 17 September 2014)

Trape, D. (2013) 'Ministro', *SAPO Notícias*, 5 April / <http://noticias.sapo.mz/aim/artigo/739205042013185434.html> (accessed 19 September 2014)

Zacarias, A. (2014) 'Moçambique: Inovação brasileira para um agro sem financiamento', *Terramérica*, 10 March / envolverde.com.br/ambiente/terramerica-mocambique-inovacao-brasileira-para-um-agro-sem-financiamento (accessed 18 September 2014)

This **Working Paper** was written by **Sérgio Chichava** and **Natalia N. Fingermann** for the **Future Agricultures Consortium**. The FAC Working Paper series publishes work in progress by FAC members. All papers are technical research papers which have been peer reviewed, and are available in open access format. The series editor is **Paul Cox**. Further information about this series of Working Papers at: www.future-agricultures.org

The Future Agricultures Consortium aims to encourage critical debate and policy dialogue on the future of agriculture in Africa. The Consortium is a partnership between research-based organisations across Africa and in the UK. Future Agricultures Consortium Secretariat at the University of Sussex, Brighton BN1 9RE UK T +44 (0) 1273 915670 E info@future-agricultures.org

Readers are encouraged to quote or reproduce material from Future Agricultures Briefings in their own publications. In return, the Future Agricultures Consortium requests due acknowledgement and a copy of the publication.