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Of zinc roofs and mango trees: tractors, the state and agrarian dualism in Mozambique

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ABSTRACT

This paper reviews the latest mechanisation programme by the Mozambican government, asking how it is politically driven and how it shapes and is shaped by agrarian structures. Old ideas about agrarian dualism are reproduced today, albeit with a new language of public-private partnerships that are seen as potentially driving the modernisation of the peasantry. State-sponsored and privately-run service centres, featuring zinc roofed warehouses, are the government's preferred route to modernisation, yet failing to reach the average farmer and understanding the motives and predicaments of private managers. Emerging small to medium farmers, who keep tractors under shady mango trees in their backyards, are also offering mechanisation services to their peers, which are instrumental to stepping up their production and commercial activities. The state's push for mechanisation feeds uneven patterns of accumulation and social differentiation.

KEYWORDS

Tractors; Mozambique; agrarian dualism; public-private partnerships; accumulation

Introduction

In 2015, the government of Mozambique (GoM) launched the National Agriculture Mechanisation Programme, which, in line with its agricultural development strategy (*Plano Estratégico de Desenvolvimento do Sector Agrário*, know as PEDSA), aimed to increase agricultural production and productivity (MINAG 2011). By 2018, the programme had established 96 Agrarian Service Centres (*Centros de Serviços Agrários*, CSAs) across the country for the provision of mechanisation services to farmers. Of this total, 27 CSAs were managed by government agencies and 69 by private operators, selected to enter public-private partnerships (PPP). The CSAs were equipped with machinery imported from Brazil, mainly tractors and implements for ploughing, bought with a concessional loan provided by the Brazilian government (Cabral et al. 2016). The loan was part of a South-South cooperation programme between Brazil and five African countries (Mozambique, Ghana, Kenya, Senegal and

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Zimbabwe), with a stated aim of improving food security through small-scale farm mechanisation.¹

The renewed interest in agricultural mechanisation, noticeable not only in Mozambique but also across sub-Saharan Africa (SSA), prompted academic and policy discussions about what would be suitable types and sources of technology and about effective channels for supply of machinery and mechanisation services. Were economic and structural conditions (such as relative factor prices and farm sizes) now suitable for mechanisation (Diao et al. 2014), contrary to previously found for the SSA region (Binswanger and Pingali 1988)? Were technology and know-how originating from other Southern countries more adequate to the needs of African agriculture (Cabral 2016; Agyei-Holmes 2014)? What roles for the state and for the private sector in supplying machinery and delivering mechanisation services (Daum and Birner 2017)? And how important was it to consider the scale of technology if state policy was to benefit primarily the majority of the (smallholder) farming population – should small engines rather than tractors be prioritised (Biggs and Justice 2015)?

These questions revived old disputes on the case for mechanisation in SSA, which had both ideological and technocratic contours (cf. overview paper in this special forum). In Mozambique, they recalled passionate debates held immediately after Independence in the 1970s on whether farm mechanisation would assist or hinder the socialist revolution of the countryside. Back then, the links between farm mechanisation, agrarian structures and class relations had been emphasised (O’Laughlin 1996; Wuyts 1981) to suggest that government options for mechanisation were not simply a technocratic matter. These options were instead fundamentally political. The politics of mechanisation concerned both deliberations on the agrarian structures to privilege (the peasantry, state farms or the enterprise sector) as well as the international partners to favour as technology providers (China, Soviet Union or Western countries).

The politics of mechanisation today have much in common with the dynamics of the past, as I will illustrate in this paper. Focusing on the recent mechanisation programme that emerged out of Brazilian South-South cooperation, I describe the approach followed by the GoM and analyse similarities and differences relative to that previous experience. I discuss the role played by mechanisation in the interplay between state, business and other actors, in relation to processes of agrarian change and accumulation (Borras 2009).

The role of the state in driving agricultural mechanisation and influencing agrarian change and accumulation is a central aspect of my analysis. While state power and mediation may be needed to resolve the agrarian question (Byres 2009), the co-optation of state institutions by narrow (agrarian) class interests may subvert such objectives (Hall 2011), as likely the case in Mozambique today where the ruling elite controls access to resources and economic benefits to achieve narrow and short-term gains rather than inclusive and longer-term goals (Macuane, Buur, and Monjane 2018). Furthermore, the state’s tendency to simplify complex reality to render it legible (Scott 1998) undermines its ability to put forward appropriate support programmes. And yet, the extent to which top-down state interventions can have a meaningful impact on the ground has been questioned by Berry’s (1993) work on the social dynamics of agrarian change in SSA. She argues that agrarian change is an ongoing process and hegemonic impositions from above are resisted and adapted by the people.

¹Cabral et al. (2016) discuss the motivations of Brazilian government and private sectors for supporting this programme and competing understandings of the programme’s purpose on the Brazilian side.

So, while seeking to understand the state's drive and motivations, I also interrogate the extent to which policy interventions such as the mechanisation programme have the intended impact or whether unforeseen changes occur. Within this broad interest on state and agrarian change in processes of mechanisation, four questions guide my analysis. What motivations and visions of agricultural development drive the present mechanisation programme of the GoM? How do these differ from past mechanisation strategies? Who wins and who loses from the current strategy? How is mechanisation shaping and being shaped by agrarian structures and accumulation in the Mozambican countryside?

Three main findings emerge from my analysis. One is that the mechanisation programme exposes the GoM's dualistic understanding of the agricultural economy and agrarian structures, which separates the peasantry from the enterprise private sector, and persists since the period after Independence (O'Laughlin 1996). This dualistic framing drives the GoM's strategy of mobilising presumably efficient and financially sustainable private operators to offer mechanisation services to the peasantry and assist their modernisation.

The other key finding relates to Berry's (1993) thesis specifically. Two concurrent channels of service provision are discernible in connection to the GoM's programme. One, which I playfully call the 'zinc roof' channel, is the result of the government's deliberate choice of the entrepreneurial sector as the preferred route for mechanisation service delivery; it reflects an updated version of dualism that sees the state as a partner of the entrepreneurial private sector. The other channel, which I refer to as the 'mango tree' channel, results from the ongoing agrarian dynamics, specifically the emergence of capitalised small- to medium-scale farmers from within the peasantry with capacity to take on mechanisation service provision in their own hands. Yet, in line with Berry's analysis, the zinc-roof channel is not working as the GoM intended and the unforeseen mango tree channel is not the making of GoM and appears to be better geared to reach out to the peasantry, while contributing to their differentiation.

The third finding is that these two channels represent parallel paths of accumulation which the GoM's subsidised tractors help to feed. Borrowing from Mamdani's (1987) analysis of social differentiation in agrarian societies, two paths are discernible – the zinc roof channel represents 'accumulation from above', resulting from the GoM's favouring of the entrepreneurial sector, comprising large farms and established businesses, some of them with direct links to the state as well as international capital; the mango tree channel embodies 'accumulation from below', in that increasing capitalised small-to-medium scale farmers draw on subsidised tractors and their social networks to step up their agricultural production and commercial activities.

My analysis draws on secondary literature on mechanisation history, a review of government policy documents and recent studies on mechanisation (e.g. Dada, Nova, and Carlos 2017), and fieldwork conducted between March 2017 and July 2018 in Mozambique. I selected two farming regions with established CSAs as fieldwork case studies. One of the study's sites, the district of Chókwè, was selected for being a priority area of the mechanisation programme and therefore having a particularly dense geographical concentration of newly established CSAs (MASA 2017),² which maximised opportunities for

²Seven new CSAs were established in Chókwè, whereas for other districts the number varies between one and three new centres (MASA 2017).

data collection. The district is situated in the Southern province of Gaza and is well known for its irrigation infrastructure dating back to the colonial period, which covers an area of 30,000 hectares and irrigates rice and horticulture fields. The relatively high concentration of CSAs in Chókwè reflects the fact that this is an established farming region with a long history of aid-supported state investments. The other study site was the Nacala corridor, an area spanning five provinces and several districts in the North of Mozambique (MASA 2015). The Nacala corridor was chosen for being the locus of land based conflicts and an area of potential expansion of large-scale and export-oriented agriculture (UNAC and GRAIN 2015; Shankland and Gonçalves 2016; Monjane and Bruna 2020). This provided an interesting backdrop to analyse the motivations of government as well as private partners in relation to a programme advertised as geared towards small-scale farmers while prioritising high potential farming areas. In the Nacala corridor, I conducted fieldwork in four districts within the province of Nampula: Malema, Meconta, Monapo and Ribáuè.

Qualitative data was collected through semi-structured interviews with key informants, including CSA managers, private sector operators involved in mechanisation services (including SOTEMA, the company responsible for distributing and servicing the machinery under the mechanisation programme), government officials at national and district levels, former civil servants involved in past mechanisation programmes, medium and small-scale peasant farmers, farmer associations and their members. Although my sampling strategy was guided by the location of CSAs, I looked at the wider network of tractor procurement and use, which allowed me to identify the protagonists of the 'mango tree' model and their peer-to-peer rental arrangements. Fieldwork also included field observation, comprising visits to CSA infrastructures (comprising 8 private and 2 public CSAs) and to farming areas while mechanising services were ongoing. Data generated included details on CSA infrastructures and machinery, transcripts from recorded interviews, interview notes from non-recorded interviews and notes from field observation. Content analysis was used to identify emerging themes, including: CSA manager profiles and their connections to other activities (farming or otherwise), understandings of the PPP and of CSA roles by GoM and by CSA private managers, service delivery experiences and challenges, access to services by peasant farmers, and peer-to-peer arrangement.

After this introduction, I briefly review the history of mechanisation in Mozambique, focusing on the period immediately after Independence and the current mechanisation programme. I then look at this programme in detail, discussing the state-business interaction in PPPs, access to the programme by the average farmer, and patterns of accumulation nurtured by state-driven mechanisation.

Agricultural mechanisation in Mozambique: past and present

Low levels of mechanisation

The short-handled hoe (*enxada de cabo curto*, in Portuguese) remains the main tool used by Mozambique's predominantly small-scale subsistence farmers. About 97% of production comes from rain-fed agriculture practised in plots with an average size of 1.2 hectares, with minimum input use and virtually no mechanisation (CGAP 2016; MASA 2016). According to the 2009–10 agricultural census, only 1.6% of farmers use tractors, 0.3% use trailers and 0.2% use motorised water pumps (MASA 2011). Animal traction is also

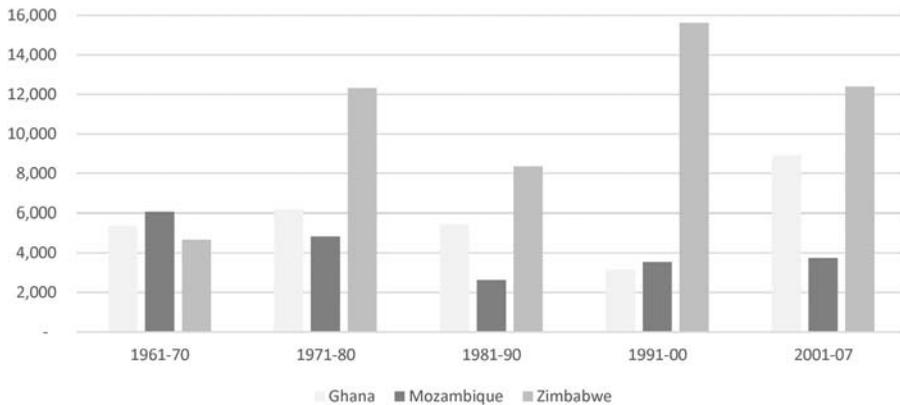


Figure 1. Tractor imports in Ghana, Mozambique and Zimbabwe, 1961–2007 (Y = units). Source: Compiled by the author with data from FAOSTAT.

generally low in the country (under 10%), except in areas not affected by animal sleeping sickness (MASA 2016).

Although official data on machinery stocks or tractors in use are not readily available, one estimate puts the current stock of tractors (of under 100 horsepower, or hp) at 1500–2000. These are used not only in agriculture but also in road maintenance and rubbish collection.³ Historical records for tractor imports give an indication of Mozambique's low levels of mechanisation in relation to other African countries in the post-colonial period (Figure 1).

Mechanisation after independence: tractors and a dualistic policy framework

At Independence, in 1975, Mozambique's agrarian structures included three farm types: large plantation farms (particularly for sugar, copra, tea and sisal) owned by foreign capital; medium-scale colonist farms owned by Portuguese farmers; and small-scale peasant family-based units, who produced most of the country's cashew (an export crop) and maize, as well as other staple food crops (Hanlon 1978; Wardman 1985). Mechanisation was a feature of most plantation farms and some colonist farms. According to one estimate, there were 4500 tractors and a few dozen combine harvesters across the country before Independence (Hanlon 1978). At Independence, Portuguese farmers, who produced much of the food for urban consumption, fled the country and many destroyed farm infrastructures and machinery as they left.

As the Frelimo-led socialist government took office, most land that had been under colonist farms gave way to state farms. These were regarded as the quickest way of addressing food shortages, besides providing the basis for developing a working class, which the country lacked and was at the core of the Marxism-Leninism the government had embraced. State farms inherited colonial machinery stocks and although new machinery imports declined sharply in those early years, they gradually picked up in the late 1970s, though never near pre-Independence levels (Figure 2).

³Interview with leading Mozambican agriculture machinery trader and former government official working on state-run mechanisation programme (Maputo, March 2017).

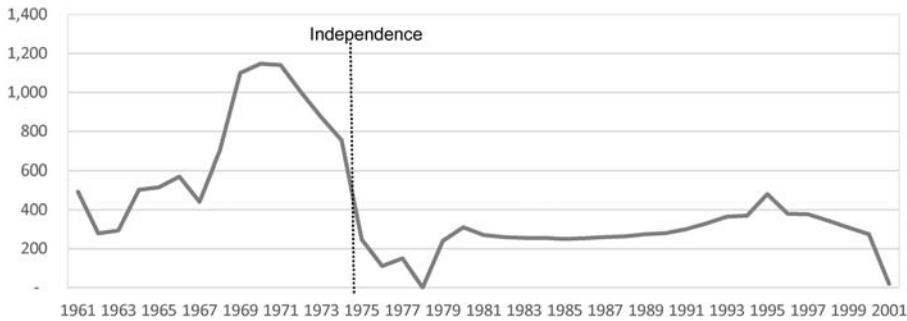


Figure 2. Tractor imports in Mozambique, 1961–2001 (Y = units). Source: Produced by the author with data from FAOSTAT.

Notes: The series stops in 2001 for Mozambique, and the FAO series for mechanisation stopped being compiled altogether in 2008, reflecting, as remarked by Biggs and Justice (2015), reduced interest in the topic since the mid-1990s. The apparent downward trend since 2016 may reflect the country's severe debt crisis the country has been facing and the consequent slowdown in foreign direct investment and trade.

In 1977, the first public tender for mechanisation of independent Mozambique was launched with support from Italy, Sweden and other countries. Procured machinery originated from Western partners and included brands such as Massey Ferguson (Hanlon 1978). More machinery arrived in the early 1980s, this time funded by Eastern partners, such as the Soviet Union, Bulgaria and East Germany, which provided their own brands.⁴

The newly constituted state farms were their main destination. Some machinery was distributed to machinery stations, which the Portuguese had set up during the colonial period and were now managed by the state.⁵ A state company, MECANAGRO E.E., was created to support mechanisation, including importing new machinery, managing stocks and providing services to farmers (Mosca 2011). It operated machinery stations and sold services to state companies, emerging co-operatives and some large farms that remained under private management after Independence, particularly in the sugar sector. Chókwè became the country's most mechanised district and the place where the largest tractors could be found (some as big as 300 HP). By 1982, there were reportedly 5000 tractors in the country, though far below the estimate of 40,000 tractors thought to be needed at the time (Hanlon 1978).

The option for mechanisation was contested and exposed fractures within the government's socialist strategy for agriculture. In 1977, at the Third Congress of the Frelimo party,⁶ the government announced its agricultural policy and put the emphasis on state farms, while diminishing the importance of communal land and co-operatives that had been at the core Frelimo's initial revolutionary vision (Wuyts 1981). This had centred on the creation of communal villages, of the type pursued in neighbouring Tanzania by President Julius Nyerere (1968), and where production was to be organised around agricultural co-operatives. Harris (1980) describes the process leading to that earlier recognition of communal farming at the core of the Frelimo socialist revolution,

⁴Interviews with two informants who were closely involved in mechanisation policy during the first decade of the post-Independence period (Maputo, March 2018).

⁵Interviews with two informants who were closely involved in mechanisation policy during the first decade of the post-Independence period (Maputo, March 2018).

⁶This was the first held after Independence and hence a milestone in setting the tone and direction of the new regime.

formalised in a Resolution approved at the 8th Session of the Central Committee of Frelimo in 1976:

The Resolution set out the guidelines for the development of the economic and social structure of communal villages. At the economic level the Resolution stated that the material base will be a co-operative or state farm, but emphasised only the former and in defining it linked its economic aspects within the 'political, social and cultural aspects' of village development. It also indicated that the co-operative's and communal village's production techniques should be labour-intensive and that within the aim of 'self-reliance' production should be oriented towards direct consumption as well as marketable surpluses. (339)

Yet, by the time of the 1977 Congress, the turn towards state companies and machines (rather than labour) was obvious:

The state-owned enterprises are the quickest means of responding to the country's food requirements because of the size of the areas they cover, their rational organization of human and material resources, and the immediate availability of machinery. They will form centres for research and development of agrarian techniques and science. (Central Committee Report to the Third Congress of FRELIMO, cited by Harris [1980, 340])

A news piece published by *The Washington Post* in 1978 describes cleavages inside government and the Frelimo party regarding technology choices (Ottaway 1978). The dispute was reportedly between Soviet-leaning party members, favouring mechanisation for large-scale state farms, and China-influenced members, preferring labour-intensive technologies centred on 'people's power'. There were concerns that tractors were not suitable for small farms and calls for more appropriate technology, such as animal traction, adequate ploughs and storage facilities (Hanlon 1978).

The dispute eventually led to the sacking of the Minister of Agriculture, presumably because of his failure to support communal villages. And yet, support to state farms and tractorisation continued (O'Laughlin 1996), while communal villages and intermediate technologies failed to emerge as an alternative to Soviet-style development, which would soon reveal its own shortcomings.

A few years later, Wuyts (1981) criticised the option for tractors as driven by political considerations that overlooked Mozambique's material conditions, where rural labour was abundant and labour-intensive farming was the most suitable option until industrialisation started absorbing it and raising rural wages.

The concrete conditions of the present phase, however, are not constituted by the necessity to release labour from agriculture so as to enable industrialization, but rather to cope with a severe crisis of the colonial economic structures (...). The question today is not to 'release' labour but to 'absorb' it within agriculture so as to prevent the deepening of the crisis of the peasantry. (14)

But, as Berry (1993) would later argue, technological choices in agriculture cannot be reduced to production factor proportions alone, but 'must be understood in relation to changes in the organization of agricultural production and specific regional configurations of economic, political, and social change' (183). In Mozambique, the way in which mechanisation was framed in dualistic terms, or in relation to labour abundance, simplified the reality on the ground and overlooked the ways in which machinery was used and appropriated locally.

Analysing experiences with farmers' co-operatives in Mozambique, Harris (1980) illustrates how the social structures idealised by the co-operative model (where co-operative members were expected to emerge from a group of poor landless and exploited peasants within the village) contrasted with reality where social differentiation was shaped by class stratification and livelihood diversification strategies. Often, active co-operative members were rich peasant farmers within the village who had accumulated wealth during the colonial period and retained individual family plots on the side of communal land. They exploited labour and reinvested accumulated income in means of production, including tractors, which only a few accessed. Some co-operatives emerged hence as capitalistic enterprises dominated by a small group of farmers and were not the village-wide mechanism of cooperation between poor peasants and exploited labour that Frelimo had idealised. This ideal was part of a distorted dualistic perspective on agrarian class structures that regarded the peasantry as a homogeneous sector of society and opposed to an enterprise sector, which was now in the hands of the state (O'Laughlin 1996).

Likewise, the reality of state farms did not conform with Frelimo's ideal type of agro-industrial complexes absorbing a large reserve of waged labour and addressing the country's food needs. Instead, state farms struggled to hire labour (competing with peasant farms) and managed inputs efficiently, failing to meet their production targets or the broader proletarianisation mission. Yet, they played a role in local capital accumulation to the extent that their managers and most skilled workers 'used their connections to buy or acquire inputs through the state farm for use on their own farms or for resale' (O'Laughlin 1996, 23). Production targets were kept artificially high by managers as these were linked to supplies of means of production (including tractors) and fuel they could draw on. State farms became hence a 'nucleus of private accumulation of capital, either as commercial producers or in speculative trade' (23)

The ways in which co-operatives and state farms failed to conform with the idealised dualistic framework of the Frelimo government illustrate Berry's argument that state interference in the countryside is never hegemonic or truly transformative. Capitalist patterns of accumulation, with their roots in the colonial period (through consolidation of class strata and labour relations), may have been slightly disrupted by socialism but got quickly reconfigured in the ways co-operative members and state farm managers appropriated resources and available technology for private gain.

Meanwhile, the circumstances of Mozambique's state-run agricultural sector and its mechanisation strategy deteriorated significantly throughout the 1980s not only by failings of the model but also because of civil war. Poor management of MECANAGRO and the widespread collapse of state companies at a time of conflict⁷ led to the end of the mechanisation company and the abandonment of the mechanisation strategy, alongside the extensive withdrawal of the state from agriculture, much as it happened throughout Africa. This process was accelerated by the Structural Adjustment Programme, overseen by the Bretton Woods institutions, which regarded the state as inefficient and sought to dismantle it and make way for a private sector-led transformation (Harrison 1994).

⁷Interview with Joseph Hanlon (Maputo, March 2018). Hanlon highlighted the devastating impact of the war on the Mozambican countryside during the 1980s, where state farms and farm machinery were frequent targets of attacks by opposition Renamo forces.

Yet, shortages of capital meant that there was no substantive private sector to take the state's place in Mozambique. The consequence was a vacuum in the countryside where farmers were left without mechanisation services or indeed other services or organised markets for their produce. The international aid sector eventually filled some of gaps, particularly with extension, input supply and market support initiatives operationalised by non-governmental organisations, but mechanisation remained off the radar for many years.⁸

The recent revival of mechanisation

Mechanisation re-emerged as a salient topic in recent years, reigniting debates about development pathways and agrarian change, in Mozambique as well as in other SSA countries. Organisations such as the African Union (AU), the African Development Bank (ADB), the United Nations Economic Commission for Africa (UNECA) and the Food and Agriculture Organisation (FAO) have explicitly renewed their commitment towards mechanisation as part of their support to Africa's agricultural transformation (African Development Bank 2016; Ahmed 2015). It has been noted that 'the dream to have a hunger-free Africa by 2025 would remain a mirage without mechanization' (FAO Regional Office for Africa 2016, para. 6).

In Mozambique, the rise in machinery imports has been noticeable in recent years (Figure 3). Countries like South Africa, China, the United Kingdom, the United States, Japan, and Brazil are amongst the sources of imports.⁹ Turkey, India and South Korea have also reportedly approached the GoM for mechanisation-focused aid and trade.¹⁰

The rise in imports is aligned with GoM's emphasis on agricultural modernisation. Following the endorsement of the Comprehensive Africa Agriculture Development Programme in 2003, the government pledged to increase spending in agriculture and help raise production and productivity. Mechanisation is part of a strategy to modernise and transform the peasantry (MINAG 2011). The National Policy for Agricultural Mechanisation, launched in 2015, is one component of such strategy (MASA 2017). Other components include investment in storage and input supply facilities in high potential farming areas, and partnerships with the private sector for the management of these government-sponsored infrastructures and services.

The government's assumption is that, in contrast with the past, when state-run services failed to become financially sustainable, the private sector can make mechanisation work and thereby assist the modernisation of the sector, transform the peasantry, and increase food production and the productivity and market competitiveness of Mozambican agricultural commodities. Despite the ideological differences between the Frelimo-led government of now and then, a similar dualistic vision of agriculture is reproduced by the current logic – the modern entrepreneurial sector, though still guided by the state (who sponsored the zinc-roofed service centres), takes the lead in service provision (much like state farms previously had) so that the peasantry can catch up.

⁸Interview with former civil servant and currently business entrepreneur in the field of mechanisation services (Maputo, March 2018)

⁹Based on data from the Mozambican Institute of National Statistics, INE.

¹⁰Interview with FDA (Maputo, March 2018).

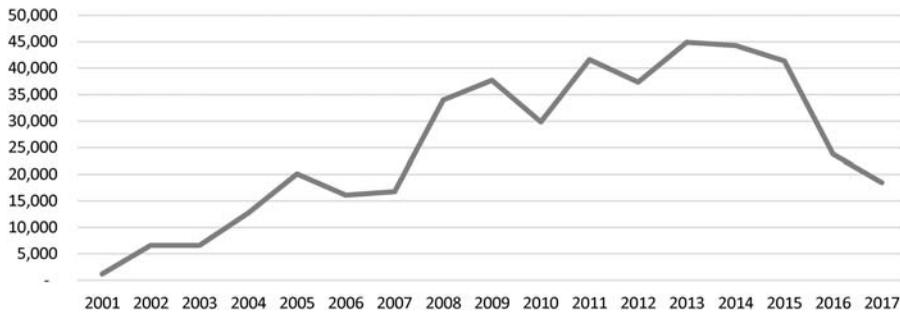


Figure 3. Imports of tractors and other farming machinery and equipment, 2001–17 (Y=1000 US\$). Source: Produced by the author with data from Mozambican National Statistics Institute.

Notes: Data for 2017 is preliminary. Other machinery and equipment include ploughs, seeders, fertiliser distributors, combine harvesters and threshers.

The next section reviews the GoM's mechanisation strategy in detail. The conditions under which dualism are reproduced come to light in subsequent sections. Berry's argument about the limits of the state's hegemony is revealed by the ways in which the government's mechanisation programme is appropriated by agribusinesses and farmers alike.

Agrarian service centres: visions and model

Brazilian machinery: for family farmers?

The launch of the mechanisation programme by GoM in 2015 was prompted by the arrival of farming machinery from Brazil, funded by the South-South cooperation programme known as More Food International. This was one of the largest agriculture mechanisation initiatives in Mozambique in recent years, amounting to a concessional loan of US\$98 million for machinery procurement plus in-kind technical cooperation.¹¹

The Brazilian government led by President Lula da Silva and the Workers' Party had, over the period 2003–10, significantly increased support to the family farming sector in Brazil and put forward several policies targeting this sector. These included credit provision to assist the mechanisation of family farms, which was part of a domestic initiative called More Food programme (Patriota and Pierri 2013). The Brazilian Ministry of Agrarian Development (MDA), which had overseen these policies in Brazil, eventually became involved in international cooperation and incorporated its domestic experiences in Brazil's cooperation portfolio, seeking to project its political agenda abroad, both as part of a South-South solidarity and to strengthen the family farming agenda domestically vis-à-vis the dominant large-scale agribusiness (Cabral et al. 2016). Yet, More Food International mobilised a broader set of interests beyond MDA, including the Brazilian industry, seeking to promote machinery sales in Africa.

Political changes in Brazil led to the dismantling of MDA and the gradual withdrawal of programmes directed to family farmers, domestically and abroad. MFI ended up solely centred on machinery sales, and the connection with the political dimension of the

¹¹See Cabral et al. (2016) for further details on this programme and a discourse-politics analysis of its genesis and early years, as the programme travelled from Brazil to Africa.

family farming agenda that had initially driven the programme was eventually lost. Besides Brazil's domestic politics, a major factor contributing to the erosion of the family farming agenda in MFI was lack of interest by the GoM. Rather than the social and political reproduction of the family sector advocated by the Brazilian MDA, GoM envisaged the transformation of the peasantry into competitive commercial farmers, through mechanisation and access to modern inputs and other services.

By early 2015 the first (and at the time of fieldwork still only) consignment of machinery arrived in Mozambique (MDA 2015). The package was supplied by three machinery companies in Brazil: LS Mtron (a South Korean brand with a factory in Brazil) supplied 513 tractors model LS Plus 80, and Tatu Marchesan and Triton supplied a range of tractor implements and other equipment (2623 items in total). These brands were new to Mozambique and hence there were no local brand representations. Incidentally, this would prove to be a challenge for timely and affordable access to spare parts and technical assistance.

Despite the initial drive by the Brazilian government and business actors (Cabral et al. 2016), this paper places the emphasis on the agency of the GoM in the mechanisation programme, especially as Brazilian players gradually retreated from implementation and GoM took the lead in setting up CSAs, allocating machinery and producing guidance on service delivery (Cabral 2019).

The entrepreneurial CSA model – new ‘wine’ ...

The CSA model was devised by the *Fundo de Desenvolvimento Agrário* (FDA), the government's implementing agency for the programme. Its core idea involved establishing agricultural service centres that would provide services to farmers for a fee. Two types of service provision channels were envisaged: public CSAs, managed by governmental entities, including state-owned enterprises, agronomic research stations and penitentiaries; and private CSAs to be managed by private agribusinesses and associations and to provide services to local farmers on a fee-for-service basis.

The advertised novelty of the programme concerned the privately managed centres and the provision of a range of services, which besides mechanised farming operations would eventually include selling of agricultural inputs, storage and agro-processing facilities, extension services and market information for farmers. Once fully developed, the centres would cover a range of agricultural inputs and services required for farming, post-harvest storage, processing and commercialisation, as state farms once had. Mozambique's high potential farming areas were selected as main destinations for the new machinery. Within these, the centres were expected to provide mechanisation services to farmers without their own machinery but with the financial capacity to pay the fees for services.

The programme aimed to assist the transformation of peasant agriculture while increasing food production. When launched in 2014, the president of FDA announced it would help the small-scale, peasant or family sector drop rudimentary farming practices and equip it with modern means to reduce drudgery and time spent on land preparation, assisting the transformation of subsistence peasants into commercial farmers, while meeting national food production targets (FDA 2014).



Figure 4. Zinc-roofed warehouse at a private CSA, Malema district. Source: Photo taken by the author, Malema, July 2018.

GoM issued competitive bids for private CSAs in 2015–16, calling for young entrepreneurs with agricultural training, business entrepreneurs, private societies, farmer associations and private service providers, with preference to those already established in the districts where the centres would be located (FDA 2015). They would set up business units to manage the machinery, which would eventually expand to offer the full range of agribusiness services. Successful applicants would have the financial capacity to pay upfront 5% of the price of the machinery and would then enter a leasing contract with the government for 10 years and pay annual interest of 10%. By 2018, 69 privately managed CSAs were set up across the country. These typically featured zinc-roofed warehouses to lodge the tractors (Figure 4).

... in old 'bottles' – bureaucratic control and its limits

Despite the emphasis on the entrepreneurial (privately managed) CSAs, this mechanisation programme was largely a state endeavour, with a distinctive bureaucratic logic (as discussed further ahead in relation to how the PPP was seen by the state). Indeed, the selection of machinery preceded the identification of service providers, let alone their needs. The machinery package allocated to CSAs was uniform across the country. Tractors, ploughs, harrows and other equipment had the same characteristics in terms of dimension, power or capacity, and had been centrally selected and then allocated by FDA. Whereas farmer associations with limited financial capital typically bought only tractors, disc ploughs and heavy disc harrows (often one of each item), private CSA managers were compelled to acquire the full set of tractors and implements,¹² even if they did not need all items.¹³ Private CSAs were in effect treated as state-like enterprises, managed as businesses but steered and controlled by government. Whilst promoting a model of

¹²Which included chisel ploughs, lime and fertilizer spreaders, weeders, trailers, trailed boom sprayers and trailed seed planters.

¹³While doing fieldwork, I observed situations where items bought under the programme remained wrapped and untouched in their boxes, one year on from their arrival.

privately managed services, the government intended to keep a hand on decisions such as defining machinery allocations and setting the terms of service provision, including fees to be charged and population to service.

Furthermore, the distribution of machinery and training of tractor drivers was carried out by SOTEMA, a Maputo-based service company specialising in farming machinery and contracted by FDA to assist the overall programme from its headquarters in the Mozambican capital. Whereas MECANAGRO had during the earlier socialist period managed the tractor fleet, this was now in the hands of a private company, though this was subcontracted by the GoM to provide services during the machinery's one-year guarantee.

And yet, the GoM's control over the programme had its limits. For example, despite the initial intention to establish CSAs of medium and large size (of 30 and more tractors), none of the CSAs bought more than eight tractors. Not enough Mozambican entrepreneurs had responded to the call and there had been difficulties in distributing the machinery across all districts, as the GoM had initially envisaged. Part of the machinery ended up thus being sold to individual farmers, who would themselves unexpectedly emerge as service providers, as I discuss later in the paper.

Also, despite the government's attempt to keep service provision under scrutiny, this proved challenging. As explained by some of my GoM respondents,¹⁴ CSAs were expected to provide services to the peasantry and contribute to food production alone. In practice, however, the capacity to verify whether these aims were being achieved was limited – as observed during fieldwork in Chókwè and in Nacala, monitoring officers from agricultural district departments lacked the means to visit CSAs and perform their duties. The similarities with unsuccessful attempts to control state farms back in the old days were striking.

The following sections document the experiences of CSA managers, other service providers and farmers in search of services. Although the analysis does not claim to be representative of the entire country, the evidence presented illustrates how realities on the ground contrast with the idealised model and intents of the GoM. It also indicates how the government's mechanisation programme is appropriated by business entrepreneurs and farmers alike and feeds distinct but concurrent processes of accumulation and differentiation.

PPPs for mechanisation services and accumulation from above

PPPs were the GoM's novel proposition for agricultural mechanisation, which aimed to transform and modernise peasant farming (through seemingly paternalistic provision of services and definition of food production targets) while nurturing a new class of agricultural entrepreneurs. Yet, such aims were in tension with one another. I discuss this by analysing the profile of CSA managers, their motivations and understandings of the partnership (*vis-à-vis* the GoM's expectations). I also illustrate how the mechanisation programme assists accumulation from above.

Private CSA managers, their drivers and ambitions

Managers in the eight private CSAs visited included one farmers' union, medium to large-scale farmers and private companies operating in agricultural production, processing and

¹⁴Interview with FDA (Maputo, March 2018) and with district government official (Ribáuè, July 2018)

Table 1. Private CSAs covered by the study and their characteristics.

CSA-private #	Location	Tractors bought under the programme	Core business	Farming area	Main crops
#1	Meconta, Nampula	8	Mechanisation services	Own: 200 ha	Horticultures
#2	Monapo, Nampula	5	Machinery rental (farming and other)	Own: 220 ha	Maize, beans, horticultures and banana
#3	Ribáué, Nampula	8	Farming and services	Own: 1000 ha	Maize and soybean
#4	Malema, Nampula	8	Tobacco processing	Contract farming: 15,000 producers over 4000 ha	Tobacco
#5	Chókwè, Gaza	8	Agribusiness services	Own: 12 ha; Service provision planned for 3000–4000 ha (but target never achieved)	Rice and other cereals
#6	Chókwè, Gaza	3	Farmers' cooperative	Own: 100 ha	Rice and horticultures
#7	Chókwè, Gaza	6	Farming	Own: 50 ha	Rice
#8	Chókwè, Gaza	5	Farming	Own: 40 ha	Rice

Source: Author's own table.

agribusiness services (Table 1). It is worth describing in some detail who these managers are in order to appreciate their motivations in relation to the mechanisation programme.

One key aspect to consider is the managers' class position. Except for the farmers' union, all other private managers were selected based on their financial capacity to repay the loan and availability of infrastructures to lodge the machinery. These characteristic and, for those with direct farming activity, the reported size of their land (cf. Table 1) indicate that these managers come from affluent strata in the district. Their reported connections with local and central government and aid-funded projects confirm their relatively privileged status.

Of all eight CSAs visited, the farmers' union was the only case where a zinc roof warehouse for storing the machinery was not available. Access to existing physical infrastructures gives an illustration of enduring connections with the state and insertion in the networks of public funding and aid projects. For example, the manager of the centre in Namialo had worked as civil servant in the Ministry of Agriculture and as manager in aid-funded projects; he used the facilities of the National Forum of Cotton Producers (previously built with aid funds), over which he presided, as the location for the CSA centre. Most, if not all, private managers in Chókwè had a history of connections to government and aid projects, which is unsurprising in a district that has over the years been an important target for public funding and investments in agriculture.

Besides these locally established managers, there were also newcomers in this sample of eight centres. These included a Maputo-based service company, which set up a CSA in Chókwè using the new premises of the state company *Complexo Agroindustrial do Chókwè* (CAIC).¹⁵ Also, the CSA in Ribáué was purposely erected and managed by a Brazilian entrepreneur new to farming; this was one of the largest CSAs in terms of newly erected

¹⁵This complex, funded with a Chinese loan, had been inaugurated in 2015 and featured modern storage and agro-processing facilities.

physical infrastructure.¹⁶ The international tobacco processing company SONIL was already operating in Malema district (with contract-farming arrangements with local small-scale tobacco producers and its own tractor fleet to service them), but the CSA constituted a new, if secondary, activity.

So, what were these CSA managers' drivers and ambition? When GoM launched the call for private CSAs, it expected prospective managers to be driven by the prospect of running a profitable business. The subsidised cost of the machinery and attractive leasing conditions, coupled with the need for machinery for their own farming and businesses, made this a relatively low-risk investment for many.

But ambitions varied somewhat among CSA managers interviewed. For the manager of the CSA in Monapo, participation in the programme meant an extension of the already established machinery rental business. For two private managers in Chókwè, the machinery was essential for their own farming development plans and their agribusiness advisory services to other medium-scale farmers in the area. The farmers union entered the programme to provide services mainly to its members.

The manager in Ribáuè had ambitious plans, which suggest how mechanisation gets entangled with land politics, business speculation and international capital. Having obtained a number of land concessions adding to a total of 1000 hectares, this manager was in the process of securing tenure rights¹⁷ for an additional 10,000 hectares for maize and soybean production, which is significant for a part of the country (the Nacala corridor) with noteworthy land disputes (UNAC and GRAIN 2015). The centre was indeed a parallel initiative to his core business, which would eventually be focused on large-scale soybean and maize production for export markets, with the South African company Pannar Seed Ltd. (now part of one of the largest seed multinationals DuPont Pioneer) as one named partner. For his own farmland, he had bought 2 bulldozers to prepare the terrain and start production in 600 ha of the overall area in the 2017/18 season. As for the CSA, it would ensure stable access to inputs at competitive prices, as the centre would stock from Pannar Seed Ltd. and other companies for the whole district.

In one case, original plans had already failed. The centre managed by Agri-arena had been established to service an area of 4000 hectares inside the Chókwè irrigated zone. Envisaged clients were small farmers in contract farming arrangements with CAIC, expected to be a stable clientele. Yet, CAIC went bust less than a year after its inauguration. Agri-arena's initial plans failed, and the company just about managed to keep its machinery busy, ploughing 500 hectares in the 2016/17 season.

The motivations of SONIL in relation to the programme were intriguing, as the machinery procured under the FDA programme could not be used to service its network of tobacco outgrower farmers. For the duration of the lease, the machinery was authorised by the GoM to operate in food crops alone. This may partly explain failure to reach annual targets for serviced areas for the newly acquired machinery: 480 of 700 hectares in 2016/17 and 272 of 1200 hectares in 2017/18. SONIL expected GoM would eventually wave the

¹⁶In addition to newly built warehouses, plans for future developments included two silos, training and accommodation facilities and a shop for agricultural inputs and advisory services.

¹⁷Land in Mozambique is owned by the state. Local communities have automatic rights to use the land and, according to the Mozambican law, no formal title is required to secure their customary rights. Outside investors can apply for land concessions provided local communities have been consulted and agreed to the concession, in which case a land use title is granted by the relevant authorities to the investor.

rule that tractors could only plough for food crops. This would allow the company to use the newly procured fleet to service the 4000 hectares of its 15,000 outgrowers.¹⁸ Perhaps this expectation was what had driven the company to enter the lease contract and take on the CSA business in the first place. Until then, the company did not regard tractor service provision as business per se but rather as corporate social responsibility which ensured a smooth relationship with government.

Given the diversity of actors and interest mobilised by the GoM's mechanisation programme, looking at CSAs simply as service provision centres (not exactly successful, as the remainder of the paper will further illustrate) would be to overlook the multiple dynamics at play, which concern also land access, connections with international agribusinesses, capture of state resources, and the management of relations with local government and communities, as will become clearer by considering interpretations of what the PPP entailed.

How the PPP is interpreted by government and its private partners

The formal terms of the PPP were stipulated in the contractual terms of the partnership. The GoM supplied the machinery (at subsidised prices) under a leasing contract and provided training on machinery handling and maintenance for drivers and operators as well as one year of technical assistance. In turn, CSA managers run mechanisation services as a private business and repay their lease to the state. They would eventually take ownership of the equipment once they had fully repaid the lease. In practice, however, the partnership involved additional unwritten expectations and transactions.

Whereas private CSAs were assumed to run independently as profit-oriented businesses, there was an expectation by the GoM that CSAs would contribute to the government's policy objectives, including serving the small-scale sector and contributing to national food production targets. Government officials in district offices of agriculture were responsible for monitoring whether the centres were servicing the population and hence contributing to the overall aims of the policy.

The tension between the objective of servicing many small farmers and ensuring CSAs remained profitable and financially sustainable was felt by the CSA managers. They complained that the average small farmer cultivated land that was not suitable for tractor ploughing, and that, because they were geographically disperse and located in hard to access areas, fuel costs made service provision overly expensive.

Besides these tensions, there were also ambiguous interpretations of the partnership on either side. The GoM acknowledged that CSAs were privately managed and that it was up to their managers to ensure their machinery renting business was profitable. And yet managers were often reminded of their obligations towards the peasant population and vis-à-vis national food production goals. This passage from an interview with a district official is illustrative.

The government cannot interfere in the business plan of the centre. (...) But there are contractual directives that require managers to provide services to peasant farmers. Regardless of how much the CSA manager increases its own production area, it has to have at least 1 or 2

¹⁸Interview with SONIL manager, Malema (July 2018).

tractors available for the population. (government official, Maputo, July 2018, author's translation)

Although the leasing contract does not include any specifications about obligations towards a particular target group, government officials interpreted the partnership in this manner and their role as one of steering and controlling business.

Some CSA managers' interpretation of the partnership also extended beyond the written leasing contract. For example, securing access to land for expanding production depended on maintaining a good relationship with local communities and authorities. The performance of a public service type of function towards the community served such a goal. For established companies, corporate social responsibility towards the community was, it seems, a temporary commitment, performed half-heartedly. Once the lease was paid, they would be free to use the machinery where they wanted and would no longer be pressured to service food growing small-scale farmers.

Overall, the zinc roof model envisioned by the GoM turned out to be inadequate to meet the mechanisation programme's stated objectives of servicing and transforming the average small-scale farmer. Instead, it served to manage relations with local government and local communities (particularly for international companies and investors) and it offered further opportunities for accumulation (of land, infrastructures and capital) for the relatively affluent farmers and business entrepreneurs.

Service access challenges and accumulation from below

From the point of view of the intended target group (the small-scale, peasant or family sector), private CSAs were regarded as an extension of the state and therefore expected to perform the same provision function the government was understood to have vis-à-vis the population. After all, government officials had toured the country announcing the new mechanisation policy for food production. People had been asked at public rallies to contribute to government-defined food production goals as a national cause and, therefore, presumed they would get help from government in return for supporting the cause. They therefore expected tractors and equipment to become accessible to them. The small farmers interviewed did not seem to view CSAs as private businesses since the programme had been introduced to them as a state-led initiative directed to the peasant population. And yet they had little hope that the programme would benefit them.

The remainder of this section considers the challenges faced by the average Mozambican farmer in accessing mechanisation while highlighting an additional channel for service provision not envisaged in the government's strategy. The latter illustrates a parallel process of accumulation prompted by the state-led mechanisation programme.

The challenges of small-scale tractorisation

The typical farmer in the family sector cultivates marginal land with an area often under 1 ha. Equipped mostly with a hoe, land preparation is a major constraint. Yet, because small farmers' land is often uneven and dotted with stones, roots, stumps and anthills, tractor ploughing is challenging and there is a high risk of damaging the equipment. This is particularly problematic under this programme as spare parts and repair services are

centralised by SOTEMA in Maputo. One of the CSA managers explained that he used to send someone ahead to check the plot and if the land was not sufficiently cleaned, he would ask the farmer to remove stones and stumps before doing the job. He also conceded that he prioritised clients he knew had clear and ready to plough land that was easy to access – this would normally be farmers cultivating lands which had been previously cleared, such as former colonial plantations turned into state farms during the socialist period and now mainly in the hands of the affluent few.

Besides the challenging topography, another commonly reported challenge concerned the dispersion of plots. The maximum distance of travel reported by managers was 15–20 km. One manager noted, however, he had refused to move his machinery 15 km to plough one hectare, as the service would have been too small to cover for transport costs, paying the tractor driver and making a profit. Another manager explained how he had encouraged farmers to mobilise neighbours needing of service to make the dislocation worthwhile. In such cases, larger distances of 30–40 km would be travelled to service a group of farmers.

Service costs typically comprise fuel, the salary of the tractor driver/operator, spare parts and maintenance. CSA managers complained that rises in fuel prices had squeezed profit margins, discouraging service to small and distant plots. SONIL had already adjusted to this situation by excluding fuel from the service fee and asking clients to supply fuel themselves. This procedure also aimed to address the problem of clients misreporting distances to their farm and size of their plots at the time of service request.

As for peasant farmers, the inability to pay for services was a problem. This is unsurprising given the low income of the average Mozambican family in the countryside (Smart and Hanlon 2014). Some farmers were only able to pay for service fees after harvest and, in the first year of the programme, some CSA managers agreed to this. Yet, payment defaults in the first year led some to abandon this practice. Hence, for the average peasant farmer access to mechanisation is challenged not only by the characteristics of their land and their dispersed location, but also by the difficulty of paying for services upfront. One interviewed farmer noted that peasants are always named as the target group in government policy discourse, and yet they remain ‘barefoot’ and excluded from the modernisation process, as policies are in practice not suited to their needs.¹⁹

In response to some of these challenges, local government officials in the Nacala corridor encouraged farmers to move out from their original areas of cultivation and set up block farms,²⁰ as farmers had in the past been directed to move into communal villages and join collective farms. Yet, CSA managers in the corridor expected that larger farmers would eventually arrive in the area and guarantee the right clientele to make mechanisation services a profitable business. In the meantime, service provision to medium-sized farmers with more than 10 hectares and locally established agricultural companies was taking place. In one instance a CSA manager hired out the entire fleet of tractors to OLAM, an international company that managed a large cotton outgrower scheme in Nampula, during the peak moment of the land preparation activities. Meanwhile small farmers complained they were serviced late or not at all.²¹

¹⁹Interview with farmer (Malema, July 2018).

²⁰Interview with district government official (Ribáuè, July 2018).

²¹Interviews with farmers (Chókwè, March 2018 and Ribáuè and Malema, July 2018).

Yet, some peer-to-peer mechanisation services were being provided by individual farmers who had been brought into the programme, as the following section describes.

Under the mango tree: unintended mechanisation channel and accumulation from below

Due to the shortage of bidders for private CSAs, the GoM ended up extending the programme's credit facility to individual farmers across the country and 53 such farmers bought tractors and implements for their own farms (typically one tractor and plough each).²² For them, the leasing conditions comprised an upfront payment of 50% of the value and repayment over a five-year period at the rate of 10%. These were small- to medium-scale farmers with 5-to-60 hectares of land, growing maize, beans and horticulture, as well as rice in Chókwè.²³ They already owned some machinery. As they had no physical infrastructure to keep the machinery, they typically parked tractors and equipment under the shade of a large mango tree, a feature of Mozambican homegardens (Figure 5). As these farmers also started to provide mechanisation services to monetise surplus capacity of their newly acquired machinery, I call theirs the 'mango tree' channel as opposed to the 'zinc roof' channel of private CSAs.

I interviewed three of these tractor-owning farmers who explained that, when they finished work on their own plots, they serviced other farmers to generate income to help with repayment. They reported travelling a maximum distance of 15–20 km to service individual farmers (as private CSAs did) or longer distances when servicing clusters of farmers. Yet, because each of these individual tractor-owning farmers were spread around in the district (and not concentrated in one centre), they were in principle able to reach out to the scattered farms.

While private CSA managers mentioned not knowing their clients well,²⁴ these tractor-owning farmers used their kinship and social networks to mobilise clients. These clients were, by nature of these networks, of relatively small size. Reported service fees charged were equivalent to those practiced by CSAs. Yet, because of their social networks, these farmers were willing to offer flexible conditions – including in-kind payments – and be more accommodating with regards to payment delays. One of these tractor-owning farmers noted that the previous year's harvest had been bad and many of his clients had failed to pay for services delivered. Yet, because he knew them well, he was confident that they would soon be able to pay their debts.

Although this study did not look extensively at the experiences of individual tractor owners across the country, the evidence collected suggests that, compared to private CSAs, they may be better placed to reach the average farmer (Table 2). And yet, recalling the analysis by Harris (1980), these emerging farmers are not to be idealised as the bottom-up, peasant-based alternative for mechanisation. They are themselves enmeshed in the complex class stratification and social differentiation.

²²Interview with FDA (Maputo, March 2018).

²³Interview with FDA (Maputo, March 2018).

²⁴One of the companies explained it interviewed clients (farmers demanding services) in order to find out about location, size and characteristics of their farm sites.



Figure 5. Tractor under the mango tree, Chókwe district. Source: Photo taken by the author, Chókwe, March 2018.

Indeed, these unintended service providers have, through almost accidental access to the GoM's mechanisation programme, accumulated wealth and are gradually differentiating from the average peasant. By comparison with the relatively affluent and capitalised CSA managers, the medium-scale farmer interviewed in Ribáuè epitomises a parallel process of 'accumulation from below' which the GoM's mechanisation programme has equally assisted. Besides the two tractors, which this farmer used in his farm and for

Table 2. 'Zinc roof' and 'mango tree' service provision channels compared.

Dimension of comparison	Zinc roof	Mango tree
Typical clients	Prioritisation of farmers with large and cleared farming plots, located in accessible areas; cases reported of renting machinery to large companies located in the district.	Family members, neighbours and friends, largely small-scale farmers with capacity to pay for service (after harvest).
Client identification and selection	Social and business networks (other medium to large-scale farmers and companies); small farmers interviewed for assessment of plot conditions.	Kinship and social networks.
Nature of service delivery to small farmers	Service delivery to small farmers often not regarded as business but as corporate social responsibility, done to maintain good relations with local government officials.	Service delivery to small farmers regarded as means to generate income to help repaying lease, as well as peer-to-peer solidarity, particularly in relation to payment conditions.
Payment conditions	Farmers complain conditions are prohibitive – initial practice of payment after harvest abandoned by CSAs after experiencing delays in payment.	Payments in kind practiced and kinship and social networks working as insurance of payment mechanism.
Accumulation pattern	From above – tractors offer accumulation opportunities (including land access) for affluent medium and large-scale farmers, agribusinesses and large agricultural (national and international) companies.	From below – tractors offer accumulation opportunities for small to medium local farmers embedded in local networks.

Source: Author's own table.

servicing his peers, he owned a small mill and shop for agricultural inputs in the village. Tractor services were a means to obtain relatively inexpensive grain for the mill and therefore in-kind payments at harvest may have been a kinship-grounded concession but were also a convenient form of payment.

Conclusion

The mechanisation strategy recently pursued by the GoM illustrates historical contingency concerning agricultural policy and agrarian change in Mozambique. It also illustrates how the push for mechanisation is fundamentally political in that it embodies a particular understanding of agricultural development (centred on a linear pathway towards modernisation) and nurtures uneven patterns of accumulation and social differentiation, with winners and losers.

The current mechanisation wave has commonalities with the experience of the early years of the socialist regime, immediately after Independence. Although this latest wave is set in a different political and economic context (and a new language of PPP and fees for service), the same dualistic understanding of agrarian structures and paternalistic attitude towards the farmers are discernible. The socialist government viewed agriculture as a dual system made of state farms and the peasant sector, and the former as the production base for the latter's development, operating in a co-operative fashion. The current vision sees private agribusinesses as the motor of development, although government guidance is needed to oversee the transformation and modernisation of the peasantry.

The current mechanisation programme also echoes the past inability (or lack of desire) by the state to discern the complex reality of social relations and differentiation within the peasantry, and of patterns of resource capture and private accumulation within state farms. The PPP embodied by the zinc-roofed CSAs assumed managers were focused on the mechanisation business alone, overlooking ulterior motives for taking on CSA management and buying the programme's machinery, even when they do not need it. And, yet, the GoM urged managers to operate in ways that undermine the financial viability of their businesses. This was because the nature of these centres and the machinery that equipped them were not suited to the conditions facing the average farmer, the presumed target of the programme.

Yet, the programme generated, unintentionally perhaps, another route for service provision that seems relatively more attuned to the reality of Mozambican agriculture, the mango tree channel. Emerging small-to-medium individual farmers who bought tractors and ploughing equipment not distributed to CSAs are themselves taking on the role CSAs were expected to perform, reaching out to the small, rugged and dispersed farmland of the average farmer. And they too are able to appropriate resources in a parallel process of accumulation.

Both the zinc roof and the mango tree channels are the product of historical contingency and the expression of social differentiation. Zinc-roofed CSAs mingle old-style state dirigisme with the new language of business and PPPs. Mango tree farmers epitomise the emergence of capitalised small- to medium-scale farmers with capacity to offer mechanisation services to their peers and thereby expand their agricultural production and commercial activities.

The complexity of the agricultural politics and agrarian dynamics depicted here highlights the shortcomings of studies and debates on mechanisation that are exclusively

centred on the achievements and failings of individual interventions, or on the type of technology or model of service provision that is, *ceteris paribus*, economically rational. As Berry noted, technological choices are embedded in specific local configurations of economic, political, and social change, which make interventions subject to modification and unexpected effects.

Not all themes identified by this study were developed in this paper. One such theme concerns the stakes of large agribusiness companies directly or indirectly involved in the mechanisation programme (such as Pannar Seed and OLAM), and their connections with the state more broadly. The extent to which the CSAs, sponsored by public and aid resources, are creating the infrastructure and technological networks that will ease the penetration of international agribusiness across the Mozambican territory, as well as technological grabbing, is an issue that deserves further investigation. Another issue that deserves attention concerns the role of farmer unions and cooperatives in mediating small farmers access to mechanisation. Finally, there is scope for interrogating the global push for mechanisation and its connection with new politics of development cooperation (Scoones et al. 2016). The fixation with tractors and tillage that pervades state and aid bureaucracies overshadows discussions of alternative technological pathways that consider the needs of different social groups, the nature of labour relations, as well as the ecological implications of deep soil tractor ploughing.

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