

*Full Length Research Paper*

# The changing agricultural landscape in developing sub-Saharan countries: Is there a transformation or a crisis? Evidence built from Mozambique

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Agriculture has historically been the most important sector of Mozambique's economy, providing the primary source of income for nearly 69% of the active labor force. However, nearly five decades after independence, agriculture remains dominated by subsistence-oriented smallholder farmers (SHFs). Over the years, the sector has undergone various government agendas focused on reducing poverty through enhanced agriculture productivity, a strategy considered relevant for achieving sustainable development in similar economies. This context is shared by many developing countries in the Sub-Saharan region. This research analyzes signals from agriculture and labor participation in Mozambique's agricultural landscape. Understanding these signals is crucial for evaluating and realigning policy interventions to accelerate agricultural transformation in Mozambique and similar economies. The study employs an explanatory trend analysis, examining subsistence-oriented crops, traditional cash crops, and emerging cash crops segments. The study analysis covers annual data from national agricultural surveys from 2002 to 2020. The findings suggest that the overall agriculture sector is experiencing a decline, with the exception of emerging cash crops. However, the percentage of SHFs engaged in this segment remains low. This study advocates for rethinking public support to agriculture, focusing on capitalizing on emerging trends while consolidating and addressing the free-rider problem in traditional cropping segments.

**Key words:** Agriculture landscape, trends, Mozambique, policy.

## INTRODUCTION

Mozambique's population is approximately 31 million, with 67% living in rural areas (INE, 2022a; INE, 2022b). The majority of the population is young, with a median age of about 16.6 years, and the population density is around 33.5 inhabitants per square kilometer (INE, 2019; INE, 2022a). The population growth rate in 2014 was estimated at 2.8% with a life expectancy of 53.5 years (INE, 2014). Based on the most recent population census of 2017, the

updated population growth rate is about 2.6% and the life expectancy has been adjusted to 53.7 years (INE, 2022a). Nevertheless, infant mortality reported for 2020 (57 per 1,000 births) is still amongst the highest in the globe and nearly twice the world's (30 per 1,000 births) average (World Bank, 2022). In addition, the country also struggles with a high prevalence of HIV/AIDS. The most recent statistics indicate Mozambique as the second country in

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the globe with the highest number of people (2.2 million) infected by HIV, just behind South Africa (Index Mundi, 2020).

Rural migration seems also to be a concern in Mozambique. Between 2007 and 2017, the fraction of the population living in rural areas declined by about 3 percentage points. Currently, about 33% of the population lives in urban areas (INE, 2019). Combining this with the declining rates in the primary (mainly agriculture) sector's employment – 76% in 2007 and about 66.9% in 2017 (INE, 2019) – indicates that work in agriculture is becoming less attractive. Nevertheless, the agriculture sector in Mozambique is and will continue to be critical to its economic growth and development due to the country's potential for this activity as well as the remaining high fraction of the population reliant on the sector. This is unsurprising given that this sector alone contributes directly to about one-quarter of GDP (World Bank, 2024).

In Mozambique, nearly 99% of farmers are smallholder farmers, cultivating an average of 1.4 ha per holding, and accounting for over 90% of the total agricultural production (MADER, 2021). Despite the passage of time, the profile of smallholder farmers (SHFs) in the country remains largely unchanged. Currently, “farmers face *hurdles such as low productivity and limited competitiveness, inadequate access to advanced technologies, inadequate rural infrastructure, low value added, and market uncertainties*” (World Bank, 2024: 4).

This study investigates the extent to which trends in the agriculture sector and labor participation in agricultural activities signal a transformation or a crisis of Mozambique's agricultural landscape. By answering this question, the goal is to contribute with information that can influence a paradigm shift in the form at which agriculture support has been ordinarily provided, in order to align it with development goals.

This article comprises six major headings. Following the introduction, the next heading describes the major structural interventions in the agriculture sector since the country's independence from the colonial regime, as well as highlighting the main agricultural policies and strategies that have been implemented. The next heading highlights the methodological approach followed in this study, whilst the next two sections revolve around the results and policy implications, respectively. The last heading is for the concluding remarks.

## **OVERVIEW OF THE MAIN AGRICULTURE POLICIES IN MOZAMBIQUE**

Since Mozambique gained independence from the Portuguese colonial regime in 1975, agriculture has been defined in the Republic's Constitution as the primary and most important development sector for the country. To date, the agriculture sector has undergone several

structural and governmental changes. One of the most significant changes in the agricultural sector during the immediate post-independence period was the definition of land as government property, accompanied by the emergence of state-owned agrarian enterprises and cooperatives, which replaced previously foreign-managed businesses.

Early outcomes from this regime showed a 17.2% increase in agricultural production between 1975 and 1977 (Mosca, 1996). However, the country's economic situation was described as being in crisis, characterized by high inflation rates and over 70% of businesses unable to operate independently. In 1983, new reforms and adjustment programs were initiated, including the reallocation of land use rights to private agribusiness enterprises, market liberalization for several crops previously controlled by state firms, and the restructuring of state-owned agrarian firms. By 1986, these reforms had yielded significant results, including increased agricultural supply and exports, a strengthened private sector, and weaker state firms (Mosca, 1996).

In 1987, Mozambique launched the Economic Reform Program (PRE), characterized by further privatization of state enterprises, export incentives, and import controls aimed at promoting economic growth through a conducive business environment for savings and investments. However, due to the ongoing civil war and high inflation, agricultural activity declined, particularly among (SHFs), and demand for domestic agricultural products decreased in favor of cheaper imports (Mosca, 1996).

The approval of the Agrarian Policy and Implementation Strategy (PAEI) in 1995 led to the emergence of new agrarian development programs. One such program, ProAgri, was implemented in two phases (Nuvunga, 2006). ProAgri I (1999-2004) focused on increasing agricultural production while strengthening the regulatory framework for agricultural inputs production and marketing (Mutondo et al., 2011). ProAgri II (2005-2009) shifted focus towards improved food security, nutrition, and poverty reduction by engaging smallholder farmers, the private sector, and development partners.

ProAgri II aimed to address existing gaps in access to financing, technologies, marketing infrastructure, business environment, and natural resources management (Nuvunga, 2006; Mutondo et al., 2011). Despite these efforts, the agrarian sector in Mozambique still faces significantly most of the longstanding challenges. Criticisms of ProAgri I and II include an overemphasis on institutional capacity building at the expense of the productive sector, delayed program implementation, and budgetary deficiencies resulting from policy restructuring under the new government (CDD, 2020).

Mozambique's modern era of agrarian sector planning instruments is marked by the Strategic Plan for Agrarian Sector Development (PEDSA). The first PEDSA, designed for 2010-2019, aimed to achieve longstanding sector

goals, including increasing agricultural production, productivity, and competitiveness, improving marketing infrastructures and services, ensuring sustainable management of natural resources, establishing adequate legal and policy frameworks to promote agrarian investments, and strengthening agricultural institutions (MINAG, 2010).

However, PEDSA's success was hindered by a lack of capital. An assessment of the five-year agrarian sector investment plan (PNISA 2013-2017) revealed an 85% financing gap for PEDSA's implementation due to underfinancing from both the public sector and development partners, as well as PEDSA's limited scope to mobilize funds and engage with the private sector (MASA, 2017). Recently, in 2022, Mozambique approved its new PEDSA (PEDSA II or PEDSA 2030), whose major objectives mirror those of the previous PEDSA.

## METHODOLOGICAL APPROACH

This article focuses mainly on understanding the trends in the agriculture sector over time. Data from the national agricultural surveys available for the years of 2002, 2003, 2005-2008, 2012, 2014, 2015, 2017 and 2020 were used. Due to limited number of observations, both descriptive statistics and linear regression model<sup>1</sup> techniques are used to assess trends over time. The structural form of the estimated linear regression model is illustrated below. This model is defined to capture any structural changes that might have occurred in recent periods, associated with the first PEDSA and its investment plan implementation. Ordinary least squares with robust standard errors are applied to estimate the parameters of Equation 1:

$$y_t = \beta_0 + \beta_1 d(t) + \beta_2 t + \varepsilon_t \quad (1)$$

where  $y_t$  is dependent variable (number of farm units, production area, production volume and yield) in log-terms;  $x_t$  is structural time change dummy regressor.  $x_t = 0$  for years until 2012, and  $x_t = 1$  otherwise;  $t$  is Time trend;  $\beta_j$  is Parameters to be estimated ( $j = 0, 1, 2$ ); and  $\varepsilon_t$  is Error term. This analysis examines national trends in Mozambique's overall farm sector, with a focus on key value chains. Specifically, the study investigates maize, cotton, and soybean, representing staple and cash crops. These crops were selected due to their significance in Mozambique's agricultural landscape. Maize, the most grown and consumed cereal, is analyzed as a staple crop, while cotton, historically the primary cash crop produced by (SHFs), provides insight into the cash crop segment. Soybean, a recently emerging cash crop among SHFs, is also examined. The analysis assesses current trends in number of farm units, production area, production volume, and yields. Descriptive statistics for these variables are presented in Table 1.

## RESULTS

### Trends in rural migration and employment by sector

Mozambique's population was estimated at approximately 28 million in 2017, with 52% of the population aged 15 or older, considered the potentially active labor force (INE, 2022a). The majority, nearly 67% of the total population, resides in rural areas. Rural migration has been a growing concern over the years. Immediately following independence, between 1980 and 1989, the rural population migration rate peaked at 1.4% per year. However, this rate significantly decreased to 0.32% per year between 2000 and 2009. Recently, rural migration has reemerged as a pressing issue. Between 2010 and 2021, the rate more than doubled to approximately 0.81% per year (Figure 1). Concurrently, Mozambique's unemployment rate remained persistently high, at around 43%<sup>2</sup> (INE, 2022a).

Within Mozambique's active labor force, the agriculture sector employs the majority (68.7%) (INE, 2022a). However, recent decades have witnessed a labor shift from agriculture to construction, trade, and services. A study by Fox, Bardasi, and Van den Broeck (2005) reveals that between 1996 and 2002, agricultural employment decreased from 82 to 75%, while other sectors experienced growth: construction (1 to 3%), trade (4 to 8%), and services (3 to 6%) (Figure 2). Recent trends indicate a rising unemployment rate in Mozambique, despite the agriculture sector's consistent contribution to GDP (around 25%) over the past 20 years (World Bank, 2023). This suggests stagnation in agricultural development, largely due to inadequate incentives. This stagnation is unsurprising, given that approximately 99% of farmers are classified as SHFs.

### General trends in Mozambique's agriculture

Despite rural and labor migration, the total number of smallholder farmers (SHFs) has continued to increase over time. Between 2002 and 2020, the number of SHFs grew at an annual rate of 1.5%, mirroring the 1.4% annual growth in cultivated land. Figure 4 illustrates the changes in SHFs and cultivated land over two distinct periods: before and after 2013, coinciding with investments in modern agrarian sector planning instruments (PEDSA). Prior to 2013, cultivated land grew at 1.76% annually, while the number of SHFs increased by 1.92% per year. This period corresponds to the implementation of ProAgri I and

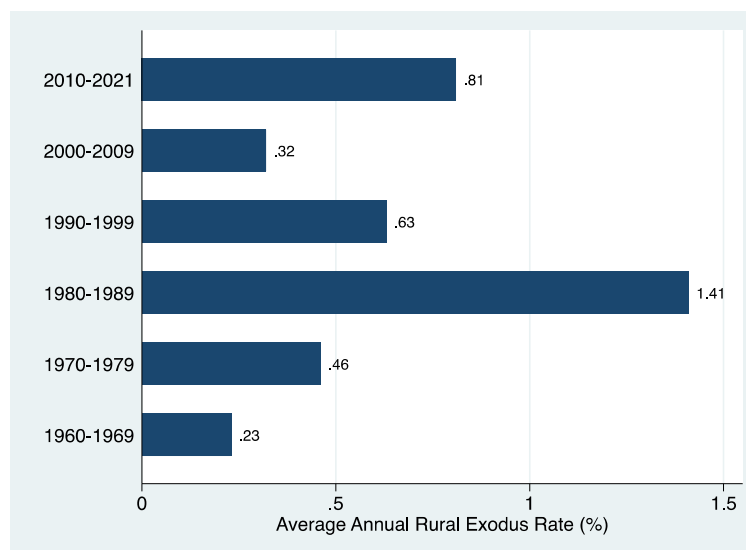
<sup>1</sup>Meanwhile, this research should be regarded as qualitative rather than quantitative analysis. The number of observations is very limited to ensure a very strong causality-effect.

<sup>2</sup> This information is higher than the unemployment rate reported by the World Bank (2023), which is estimated at 3.5% for the same period. Such

differences might be explained by several factors, including the classification of potentially active labour force based on national and international standards, the inclusion/exclusion of informal labour in employment statistics, amongst others. Though, interpreting these differences is beyond the scope of this work.

**Table 1.** Descriptive statistics on key variables used for the trend analysis.

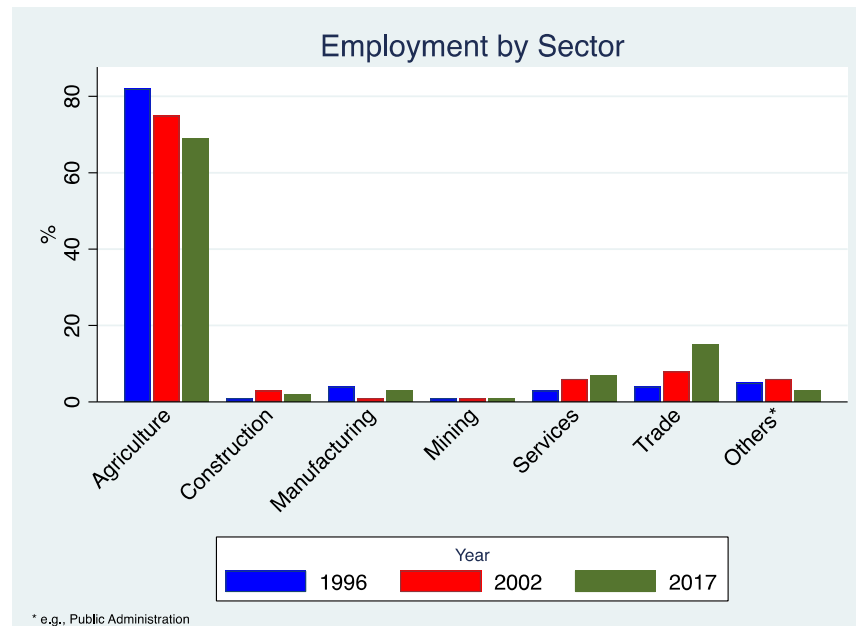
Variable	N	Mean	Std. Dev.	Min	Max
<b>Number of farmers (million people)</b>					
Total	11	3.55	0.45	3.09	4.51
Maize	11	2.85	0.34	2.52	3.66
Cotton	11	0.15	0.084	0.0025	0.25
Soy	11	0.038	0.028	-	0.084
<b>Production area (million ha)</b>					
Total	11	5.22	0.70	4.19	6.45
Maize	11	1.75	0.30	1.37	2.29
Cotton	11	0.12	0.061	0.040	0.22
Soy	11	0.021	0.022	0.00092	0.066
<b>Production volume (million tons)</b>					
Maize	11	1.26	0.26	0.93	1.79
Cotton	11	0.083	0.044	0.0010	0.16
Soy	11	0.020	0.038	-	0.13

**Figure 1.** Average annual rural migration rate per decade<sup>3</sup>.  
Source: Data from World Bank (2023).

II, which focused on boosting agricultural production and productivity to reduce poverty. However, poverty reduction progress was limited. Nationally, poverty rates decreased marginally from 52.8 to 51.7% between 2002 and 2008, with similar poverty rates in urban and rural areas (Santos and Salvucci, 2016).

The second period, starting at the reference line shown in Figure 3 and 4, exhibits declining trends in the number of (SHFs) and total cultivated land. This decline is supported by the negative coefficient (-0.025) of the dummy regressor in Table 2. Although the coefficients in Table 2 do not capture the decline in cultivated land efficiently, Figure 4 reveals a similar downward trend.

<sup>3</sup> Adjusted to compound annual growth rate per decade, based on the data from the indicated source about the annual ratio of rural households over the total population in Mozambique.



**Figure 2.** Employment by sector in Mozambique (1996, 2002 and 2017).  
Source: Data from Fox, Bardasi and Van den Broeck (2005) and INE (2022a).

Notably, the second period shows a significant short-term increase in both SHF numbers and cultivated land, suggesting positive impacts of PEDSA and PNISA (2013-2017) initiatives aimed at boosting agricultural sector performance. However, as shown in Table 2, these impacts are not substantially distinct from past agricultural sector planning eras, as indicated by the statistical (in)significance of the dummy and time-trend regressors.

It is essential to acknowledge significant economic shocks impacting Mozambique (and globally) between the two periods (before and after PEDSA): (i) The 2007-2009 Global Financial Crisis, leading to rapid food and oil price increases until mid-2008; (ii) recurrent events of droughts, floods and cyclones, (iii) political conflicts and terrorist attacks in the central and northern regions of the country, (iv) the “hidden debts” case discovery and (v) the covid-19 pandemic, to highlight a few (Gueorguieva, et al., 2010; SSN, 2022; Popat et al., 2018).

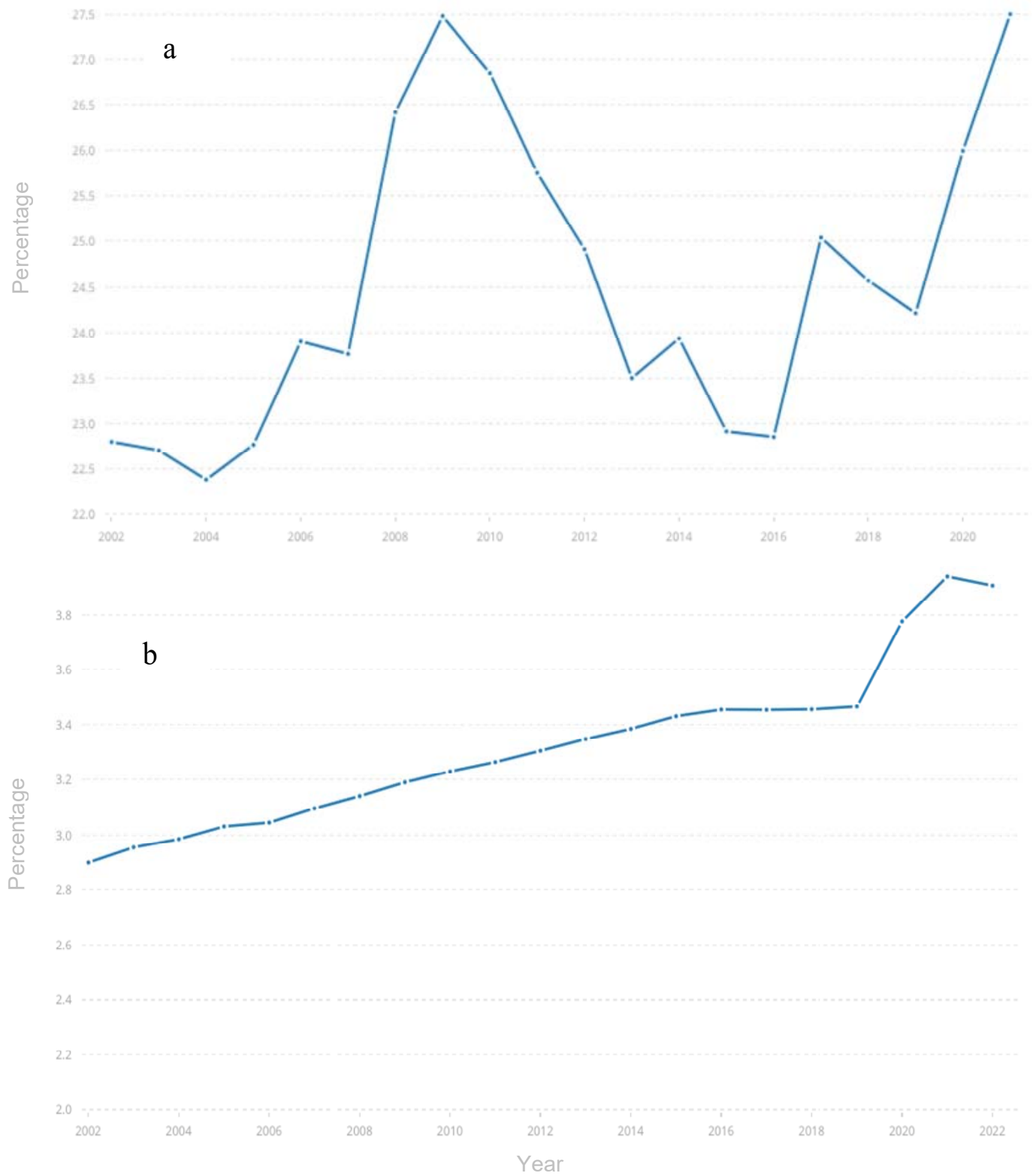
These shocks likely hindered agricultural sector progress due to Mozambique’s high dependence on imported productive inputs, processed products, and capital.

Notably, PNISA’s budget shortfalls exacerbated these challenges. Between 2013 and 2016, the production and productivity component faced a 92% budget shortfall, while market access and expansion component faced a 79% shortfall (Anson et al., 2017). The slow pace of (SHFs) agricultural transformation reflects the lack of sustained investments in production and productivity. Analyzed data show that farmers cultivating small plot

sizes (<5ha) have increased at a faster rate than those farming larger areas. However, the number of SHFs per land holding size has remained relatively stable (Table 2). Notably, recent trends (around 2015) indicate a sharp increase in SHFs cultivating plots larger than 5 ha (Figure 5). This coincides with the actual government’s initial year in office, suggesting potential correlations with new agricultural sector investments.

A notable example of recent investments in Mozambique’s agriculture sector is the SUSTENTA project. Launched in 2017 as a pilot program in 10 districts of Zambezia and Nampula, it expanded nationally in 2020. The project integrates smallholder farmers (SHFs) into commercial farming by establishing linkages with emerging commercial farmers and agribusiness firms, including input suppliers. Beneficiaries receive subsidized production kits, technology transfers, and financing (MADER, 2020a).

Similar findings regarding the stagnation of the agriculture sector’s development are reported by van Seventer and Tarp (2023). The authors highlight a lack of structural transformation and dynamic changes, resulting in minimal progress in agricultural value-added growth. Despite the apparent stagnation over time, an important question now is to what extent some of these investments have succeeded in promoting structural changes within specific value chain segments. Given that agricultural planning has traditionally focused on increasing production and productivity, it seems logical to examine whether any structural changes have occurred, particularly in key



**Figure 3.** Agriculture share of GDP and unemployment rate in Mozambique. (a) "Agriculture, forestry and fishing, value added (% of GDP)". (b) "Unemployment [rate], total (% of total labor force)".  
Source: World Bank (2023).

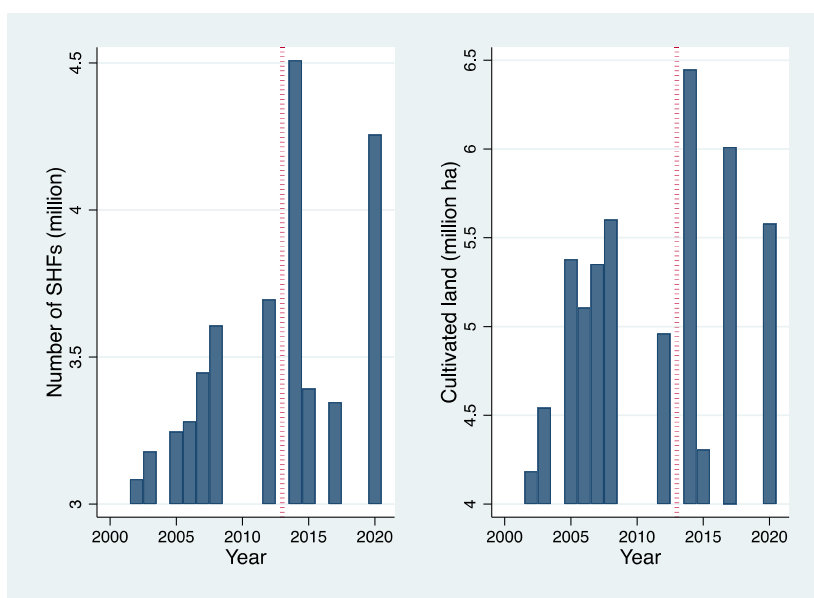


Figure 4. Number of SHFs and total cultivated land (2002-2020)<sup>4</sup>.

Table 2. General trends in the number of SHFs and total cultivated land.

Outcome variable	Time trend regressor			Dummy regressor		
	Coeff.	Robust S.E.	p-val.	Coeff.	Robust S.E.	p-val.
Total number of SHFs	0.015*	0.0075	0.075	-0.025	0.14	0.87
Less 1 ha	0.024	0.018	0.21	0.10	0.27	0.74
1 – 2 ha	0.0084	0.012	0.50	-0.095	0.22	0.68
2 – 5 ha	0.0031	0.015	0.83	-0.20	0.19	0.34
More 5 ha	0.035	0.070	0.64	-0.009	0.79	0.99
Total cultivated land	0.014	0.013	0.31	0.045	0.20	0.83

\*\*\*, \*\*, and \* significant at 1, 5, and 10% respectively.

cropping segments such as staple and cash crops.

### Trends in cropping segments: staple and cash crops

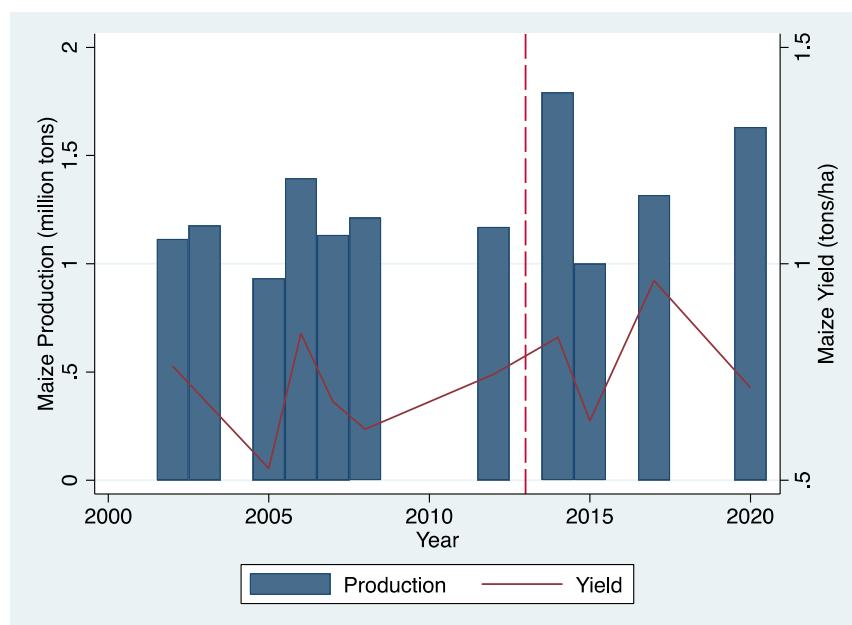
Regarding staple crops, specifically maize, results mirror the overall agriculture sector trends. Table 3 shows minimal changes in the total number of smallholder farmers (SHFs), total cultivated land, and production volumes, with all three variables exhibiting a proportional annual growth rate of approximately 1%. This indicates a lack of significant technological advancements during the analysis period. Furthermore, yield trends (Figure 6) reveal

no substantial and consistent improvements, and actually suggest a slight decline in maize yields of 0.3% per year during the PEDSA era, although not statistically significant. This is unsurprising, given staple crops dominate Mozambique's agriculture sector. Maize is the most grown and consumed crop, cultivated by approximately 80% of SHFs, accounting for one-third of total cultivated land, 80% of total cereals production, and 18.9% of households' food expenditures (maize meal) (Popat et al., 2020; INE, 2021). Recently, increased demand for maize has emerged from expanding breweries, millers, and feed millers. However, production has not significantly increased to meet this demand.

<sup>4</sup>The rapid decline in the number of SHFs and/or total cultivated land observed from 2014 to 2015 and/or 2017 needs some attention on its interpretation. Although the information derives from official sources, such a rapid decline is very unlikely unless any shock has occurred that we could not capture during this study. Otherwise, it might represent a limitation from the data collection or processing at the original sources.



**Figure 5.** Trends in the number of SHFs per land holding size.



**Figure 6.** Maize production and yield.

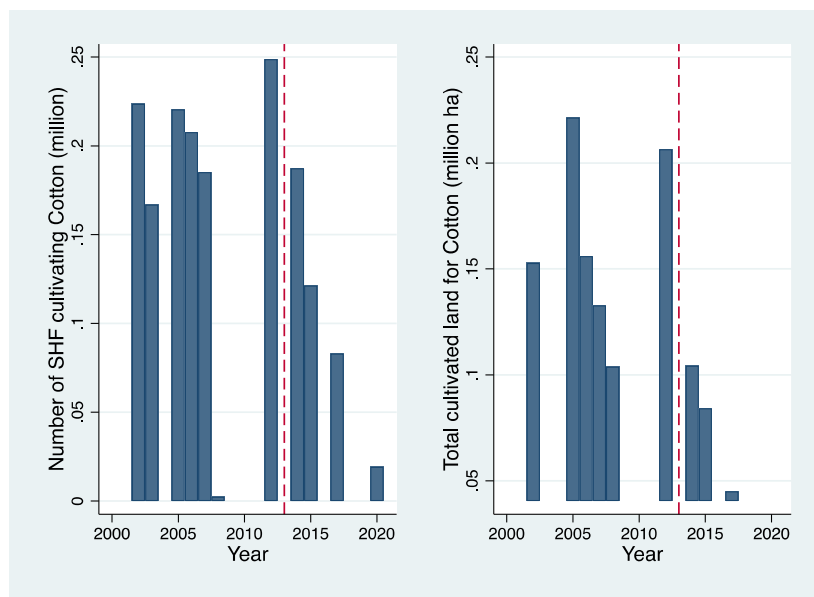
Similar trends, albeit with varying magnitudes, are observed in traditional cash crops, exemplified by cotton. Notably, the number of smallholder farmers (SHFs) exhibits a more pronounced downward trend compared to total cultivated land (Table 3 and Figure 7). This has two interpretations. The traditional cash crops segment has

deteriorated during the new era of agricultural planning, as evidenced by declining SHF numbers and cultivated land. However, labor's marginal productivity has increased, particularly since 2015, when cotton production and productivity began to show a consistent positive trend (Figure 8). Despite this improvement, overall production



**Table 3.** Trends in different cropping segments.

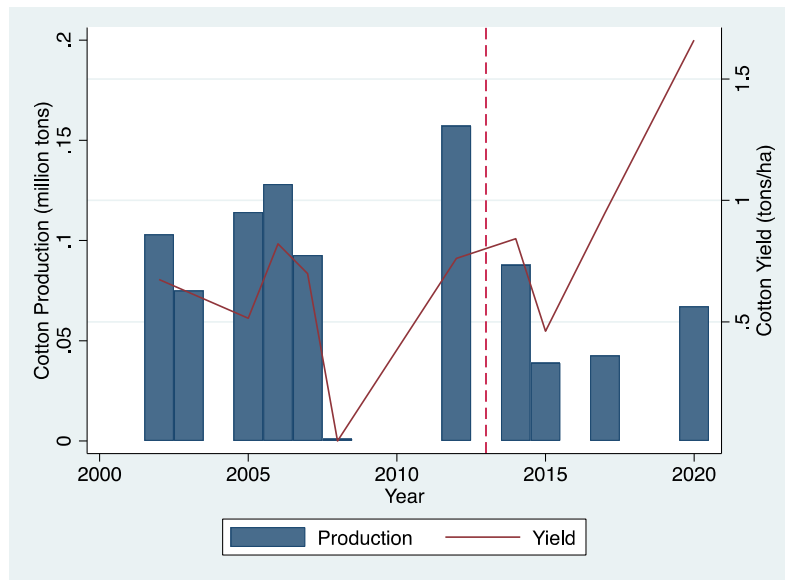
Outcome	Time trend regressor			Dummy regressor		
	Coeff.	Robust S.E.	p-val.	Coeff.	Robust S.E.	p-val.
<b>Maize</b>						
Number of SHF	0.010	0.0070	0.19	0.045	0.13	0.74
Cultivated land	0.012	0.019	0.56	-0.038	0.23	0.87
Production volume	0.010	0.013	0.49	0.092	0.24	0.72
Yield	0.00052	0.015	0.97	0.12	0.17	0.51
<b>Cotton</b>						
Number of SHF	-0.17	0.17	0.36	1.38	2.33	0.57
Cultivated land	-0.039	0.050	0.46	-0.52	0.62	0.42
Production volume	-0.061	0.15	0.69	0.63	2.17	0.78
Yield	-0.017	0.12	0.89	1.12	1.77	0.55
<b>Soybean</b>						
Number of SHF	0.091*	0.044	0.078	0.21	0.36	0.58
Cultivated land	0.19*	0.10	0.085	-0.06	1.01	0.95
Production volume	0.26***	0.089	0.022	-0.27	1.17	0.83
Yield	0.071	0.066	0.33	-0.39	0.68	0.59

**Figure 7.** Total number of cotton farmers and cultivated land.

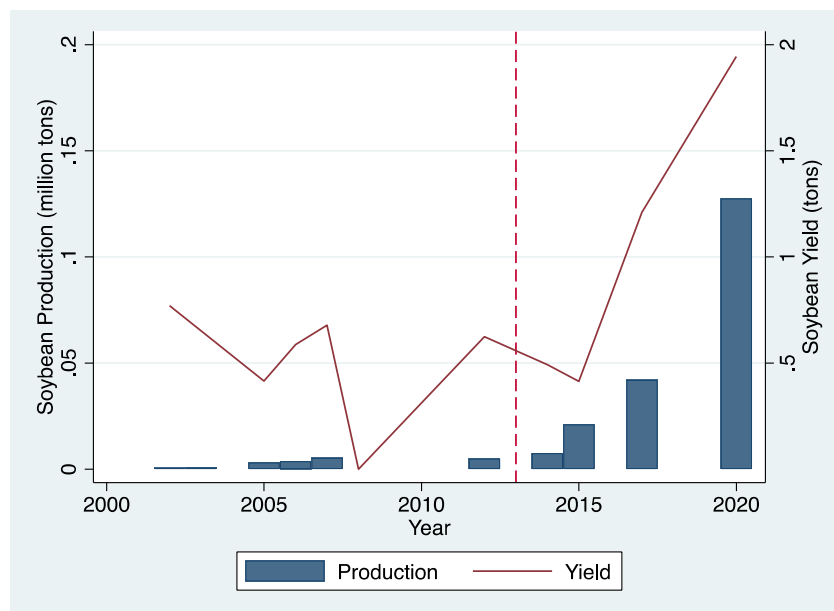
and productivity remain low, threatening sector sustainability. This is exacerbated by domestic processing firms' lack of economies of scale. Traditional cash crops like cotton and tobacco operate under concession regimes, where firms hold monopsony power in government-designated areas. Under this system, firms

provide SHFs with input kits (on loan) and technical advice in exchange for exclusive purchasing rights and the government sets minimum prices (OzMozi Lda, 2020; Cabo and Nunes, 2020).

However, evidence from the cotton sector reveals that firms' processing units operate at over 50% excess



**Figure 8.** Cotton production and yield.



**Figure 9.** Soybean production and yield.

capacity due to limited supply (OzMozis Lda, 2020). In contrast to traditional cash crops, emerging cash crops like soybean have exhibited positive trends over time, unrelated to changes in agricultural planning periods (pre- and post-PEDSA). Figures 9 and 10 illustrate accelerated growth in four key outcome variables (excluding SHF numbers) in recent periods. Notably, the emerging cash crops segment remains largely unstructured and has

received limited government attention. Instead, private sector involvement (including informal agents) has likely driven the observed trends. This is understandable, given the competitive pricing for crops in this segment (Table 4). The data suggests that market forces, rather than government intervention, have fuelled growth in emerging cash crops.

This finding raises interesting questions about the

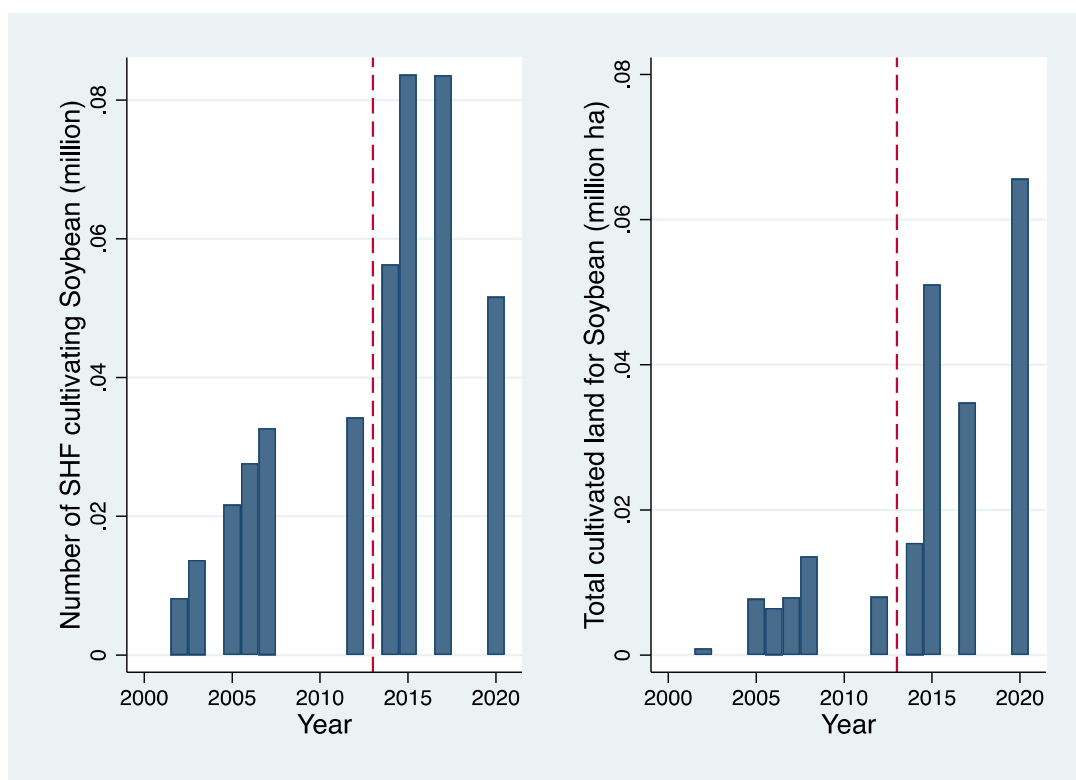


Figure 10. Total number of soybean farmers and cultivated land.

Table 4. Descriptive statistics for national retail prices (2019-2022).

Commodity	N	Min	Max	Avg.	St. dev.
Maize	60.00	10.88	29.91	19.87	4.46
Rice	60.00	48.72	63.65	53.16	2.79
Cotton*	4.00	22.36	31.50	25.40	4.13
Soybean	34.00	18.00	100.00	46.24	26.61
Sesame	45.00	42.50	242.12	111.78	58.92
Pigeon Pea	49.00	11.20	89.00	39.03	15.94

Source: MADER (2020b) and FONPA (2023).

effectiveness of private sector-led initiatives versus government-driven programs in promoting agricultural sector growth. Between 2018 and 2022, the average retail price<sup>i</sup> for pigeon pea was around 39.03 MZN/kg and for sesame 111.78 MZN/kg (Table 4). The attractiveness of emerging cash crops to smallholder farmers (SHFs) is further reinforced by their agronomic specifications and on-farm demands. Compared to traditional subsistence crops (e.g., maize, cassava) and cash crops (e.g., cotton, tobacco), these value chains are relatively less distorted by government intervention.

For instance, cotton farmers face lower net prices due to

high production costs. Input loans can account for 30-45% of total revenue per hectare (Chemane, 2008).

Emerging cash crops share a common feature: private sector-driven demand and complementarity in domestic and international markets. Soybean production, reintroduced in 2003/2004, has grown primarily to meet domestic poultry industry demand (Janeque et al., 2020). Other emerging cash crops, such as sesame and pigeon peas, are mostly export-oriented due to limited domestic value addition facilities (World Bank, 2012). In 2016, Mozambique's pigeon pea exports accounted for 85% of total production, primarily sold to India (Oppewal and Cruz,

2017).

## POLICY IMPLICATIONS

Despite years of efforts, these results indicate that progress in promoting structural change, transformation, and development in Mozambique's agriculture sector has been slow. This study finding contradicts the economic development theory proposed by Lewis. According to Lewis's neoclassical theory, structural transformation occurs when subsistence farmers migrate to modern, industrialized agriculture without reducing total output. This migration, led by market incentives, results in increased labor productivity (Todaro and Smith, 2012). While Lewis's key assumption holds for Mozambique (rural labor surplus with near-zero marginal productivity), labor has not migrated to the modern sector. The lack of evidence of structural change in agricultural growth and development in Mozambique call for reevaluation of agriculture-related public policies. The Food and Agriculture Organization (FAO) emphasizes (2023):

1. Agricultural public investments, although increased between 2009 and 2014, primarily focused on subsidizing inputs, credit, and technology adoption for producers.
2. Policy and market dynamics inadvertently disadvantage producers of essential food staples.
3. Commodity-specific interventions are lacking, even for stagnating productivity areas.
4. Key export-oriented commodities identified by PEDSA and PNISA as priorities for Mozambique's agricultural export potential receive insufficient or ineffective public support.

The findings of this study align with the FAO's concerns, particularly regarding the lack of commodity-specific interventions and insufficient support for key export-oriented commodities. To address these issues, public policy should focus on facilitating private sector development through a liberalized market approach. Modern economic development theories, such as the Big Push theory, emphasize the importance of coordinated public policies across sectors and actors to achieve sustained economic growth. Therefore, policies should adopt a microlocal context-based approach, targeting specific development corridors, such as Maputo, Limpopo, Beira, Zambezi Valley, Nacala, and Pemba-Lichinga, to exploit existing potential and eliminate barriers restricting private sector establishment. Improving the business environment and taxation regime is also crucial. Mozambique's ranking of 138 out of 190 countries in the 2020 Doing Business Index highlights significant room for improvement, particularly in areas like getting credit, protecting minority investors, enforcing contracts, and resolving insolvency, all of which scored below 50 out of

100 (World Bank, 2020). Addressing these challenges will foster a more conducive business environment.

By promoting policies aimed at fostering the sustainable establishment of the private sector, it not only realigns economic incentives to promote efficiency and large-scale operations in the agricultural primary sector through increased demand, but also touches on other dimensions contributing to more accelerated development. This includes resulting in more on- and off-farm job creations in rural areas, mainly, which, apart from preventing rural migration, would also represent income opportunities for the most marginalized groups (youth and women). Such policies could also emphasize promoting value-added activities, such as aggregation, grading, milling, amongst others, at both small- (startup businesses) and large-scale levels.

Furthermore, it's essential to learn from experience regarding in-kind assistance and policy interventions in the agricultural primary production sector, which can result in what can be regarded, by analogy, as the free-rider problem. In economics, a free rider is defined "as a person who receives the benefit of a good but avoids paying for it" (Gans et al., 2012). Consequently, this individual lacks incentive to make rational or profitable use of provided resources.

Accordingly, input subsidies to (SHFs) are unlikely to produce fruitful results in the future, just as they have not in the past, for several reasons. One reason is likely the risk appetite profile of most SHFs, which prevents them from taking risks when subsidies are removed. This experience should equally inform policy interventions in higher segments of value chains. Nevertheless, subsidies for research and development of non-public goods, such as risk mitigation alternatives, are encouraged to eliminate the unsustainable free-rider problem.

## Conclusions

This research aimed to provide insights into Mozambique's agriculture sector over the past 20 years. The primary objective was to assess whether trends in agricultural labor participation indicate a transformation or crisis in the country's agricultural landscape. These results confirm that labor participation in agriculture is declining, but this decline does not align with the neoclassical theory of economic development. Additionally, the empirical findings support the view that current public policies are insufficient to drive agricultural sector development in Mozambique. Therefore, a shift in public policy approach may be beneficial, focusing on liberalizing agricultural markets while providing incentives for private sector coordination, complementarities, and growth. This would enable small- and large-scale operators to maximize their potential beyond primary production, eliminating existing gaps and barriers to economic development, including the

unsustainable free-rider problem.

## CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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<sup>1</sup>This information is generated from available price data collected from the agriculture market information system (SIMA) of MADER.