





Mozambique: Background Study

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Acronyms and Abbreviations

ATE	Agriculture Training and Education
CEPARGRI	Center for the Promotion of Agriculture
DNEA	National Department of Agricultural Extension
innovATE	Innovation for Agriculture Training and Education
IFPRI	International Food Policy Research Institute
IMF	International Monetary Fund
IIAM	Mozambique Institute of Agricultural Research
IWMI	International Water Management Institute
FAO	Food and Agriculture Organization
FRELIMO	Frente de Libertação de Moçambique
нн	Household
MDG	Millennium Development Goal
MEC	Ministry of Education
MINAG	Ministry of Agriculture
MMAS	Ministry of Women and Social Welfare
RENAMO	Resistência Nacional Moçambicana
UNICEF	United Nations International Children's Emergency Fund
UNDP	United Nations Development Program
USAID	United States Agency for International Development
WFP	World Food Programme

Introduction

Innovation for Agricultural Training and Education (InnovATE) is a USAID-funded project supporting the capacity development of agricultural training and education systems from primary school through secondary institutions as well as vocational and technical schools and universities. The InnovATE program, implemented by a consortium of US universities led by Virginia Polytechnic and State University and including Pennsylvania State University, Tuskegee University, and the University of Florida, aims to strengthen the range of institutions that train and educate agricultural professionals (InnovATE, 2013).

The InnovATE program takes a "learn, design, train" approach to capacity development. The "learn" component of the program aims to "provide educators and practitioners with good practices and tools that promote agricultural training and education systems development" (InnovATE, 2013). Coupled with this are case studies, needs analyses, action-oriented research, and analytical work necessary to support and foster capacity development in agricultural education. The "design" component of the program "undertakes country scoping assessments that lead to program design recommendations to improve the effectiveness of agricultural training and education" (InnovATE, 2013). The "train" component "will develop materials for training programs that promote new strategies and approaches to agricultural education and training" (InnovATE, 2013).

In support of the "learn" component of the InnovATE program, a series of country desk studies will be commissioned to provide relevant background information to inform a basis for identifying gaps in Agricultural Training and Education (ATE) programs and institutions in target InnovATE countries.

This paper is the 8th in this series. It explores agricultural education in **Mozambique** to better understand the overall educational structure, participation and performance in the educational system, the availability of agricultural education in Mozambique, and gaps in and barriers to agricultural education. The first section of the paper will describe the overall structure of the Mozambican education system from pre-primary through tertiary and vocational education. The second section will provide background information on participation and performance in the educational system. The third section will provide information on the availability of formal agricultural education. The fourth section will discuss gaps in and barriers to agricultural education. The final section will discuss the possible next

steps for policy makers, donors and private and civil society partners to take to address these challenges.

Country Background

Mozambique is located in South-East Africa and has a legacy of five centuries of colonial rule and trade relationships with Portugal. Mozambique gained independence from Portugal in 1975 (CIA, 2014). According to the 2007 census, Portuguese is spoken by over 50% of the population, primarily as a lingua franca, but only 12.78% speak it as a first language. The most commonly spoken local languages are Emakhuwa (26.1%) and Xichangana (11.3%) (INE, 2007). Mozambique has a population of 25.8 million, the majority of which are extremely young, with 45.4% of the population between 0-14 years of age, 51.4% between 15-64 years of age and only 3.3% over the age of 65. The country remains one of the least densely populated on the continent with only 32 people per km², although this is changing due to a high fertility rate of 5.3 births per woman, and an annual population growth rate of 2.5% (World Bank, 2014). The population is predominantly rural with only 32% of Mozambicans residing in urban areas (FAOSTAT, 2014). Poverty is also rural, affecting an estimated 80% of rural Mozambicans (WFP, 2012). The vast majority of the workforce is employed in subsistence agriculture.

Mozambique has experienced a decade of impressive economic performance, led by transportation and communications, financial services and extractive industries. The economy grew 6-8% from 2003-2013, a period of low inflation (World Bank, 2014). However, economic growth has not been accompanied by the creation of jobs and reduction of poverty. Poverty continues to be prevalent in Mozambique by any measure, with 60% of the population living on less than \$1.25 a day, and the poverty gap remaining at 21% from 2003 to 2009. The World Bank estimates that 80% of households are multidimensionally poor (2014).¹ On a national level, Mozambique ranked 185 out of 186 countries in the 2012 Human

¹ The Multidimensional Poverty Index (MPI) complements income-based measures of poverty by considering other, overlapping deprivations such as poor health, lack of education and inadequate living standard (World Bank, 2014).

Development Index, with an index rating of 0.327² (UNDP 2012). High inequality is reflected in an inequality-adjusted Human Development Index of 0.220³ and a GINI index of 45.7⁴ (World Bank, 2014).

Economy

When Mozambique finally gained independence in 1975 following a decade of armed struggle, it emerged as one of the poorest countries in the world. The economy was further weakened by the flight of Portuguese settlers, failed socialist policies and a protracted civil war. In 1987, the government undertook a series of macroeconomic reforms in an effort to stabilize the crumbling economy. These reforms combined with renewed donor assistance and the political stability that was achieved through the 1994 multi-party elections ushered in a period of robust economic growth. Further fiscal reforms such as the introduction of a value-added tax and reform of the customs service have improved the government's ability to raise revenue – although Mozambique remains dependent upon foreign assistance for up to half of its annual budget. At the same time, a substantial trade imbalance persists as imports and exports still reflect colonial terms of trade (CIA, 2014).

The recent discovery of large coal and natural gas deposits has increased foreign direct investment (FDI), and improved prospects for mitigating trade imbalances and reducing the government's reliance on foreign assistance. Mozambique's once substantial foreign debt has been reduced to manageable levels via debt forgiveness and rescheduling under the International Monetary Fund (IMF). Mozambique has been one of Africa's strongest economic performers over the last decade. The primary industries are aluminum, hydroelectric power, petroleum products, fertilizer, textiles, cement, glass, tobacco and food and beverages. In 2013, the economy grew by 7%, as large investments in natural resources continue to fuel growth. The U.S. Central Intelligence Agency predicts that the revenues from the country's vast natural resources, including natural gas, coal, titanium and hydroelectric capacity, are expected to overtake donor assistance within five years (Ibid.). Today, Mozambique is primarily an agricultural

² The Human Development Index (HDI) is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and have a decent standard of living. Achievement in these dimensions is used to compare and rank the development performance of countries (UNDP, 2012). ³ The Inequality-adjusted Human Development Index (IHDI) takes into account the distribution of health, education and income achievements across a country's population. The difference between the IHDI and HDI is considered

the loss to human development due to inequality in a country (ibid.).

⁴ The Gini index measures the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution. An index of 0 represents perfect inequality, while an index of 100 implies perfect inequality (World Bank, 2014).

economy with strong state-sponsored services. These services currently account for 47% of annual GDP, followed by agriculture at 30% and industry at 23% (World Bank, 2014).

Tables 1 and 2 detail the top products exported and imported by Mozambique and its top trade partners (source: OEC, 2014).

Product	Share of Total Value of Exports
Raw aluminum	30.0%
Aluminum bars	25.1%
Refined petroleum	10.0%
Raw tobacco	4.6%
Petroleum gas	4.4%

Table 1. Export products by share of total value of exports

Top five import origins: South Africa (27%), Netherlands (9.1%), China (7.3%), United Arab Emirates (5.2%), and India (4.9%)

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Product	Share of Total Value of Exports
Refined petroleum	16.0%
Construction machinery and vehicles*	8.8%
Raw aluminum	8.0%
Wheat	2.3%
Rice	1.9%

* Combines the categories of "large construction vehicles" and "excavation machinery."

Top five export destinations: Netherlands (26%), South Africa (17%), Belgium-Luxembourg (11%), Italy (8.6%), and Spain (5.9%)

Agriculture

Overview of Agricultural Sector

Of the nearly 800,000 km² that comprises Mozambique, 6.6% of land is arable, 39% of which is under permanent cultivation. According to the Food and Agriculture Organization (FAO), Mozambique is the third most vulnerable in Africa to weather-related hazards, including drought, cyclones and flooding. An estimated 118,000 hectares are equipped for irrigation, representing only 3% of the total irrigation capacity in the country (FAO, 2007). Increasing the amount of farmland under irrigation could increase agricultural production by mitigating the impact of drought. FAO estimates that over 99% of farms are operated by small or medium sized land holders (FAOSTAT, 2014). Since land is relatively abundant, agriculture is generally characterized by extensive rather than intensive production. Agriculture is also primarily subsistence and not commercially-oriented (FAO, 2007). Mozambique is endowed with 10 agro-ecological regions that support the cultivation of diverse annual and perennial crops. The country's land and coastline also hold promise for producing livestock, forestry, fishing and aquaculture products (Gêmo, 2009).

According to the Ministry of Agriculture (MINAG), the long term goals of the agricultural sector in Mozambique are "to improve food security and reduce poverty by supporting the efforts of smallholders, the private sector and governmental and nongovernmental agencies to increase agricultural productivity, agro-processing and marketing, while keeping a sustainable path for the exploitation of natural resources" (MINAG, 2005: p. iv). The Ministry oversees "the implementation of policies on land, agriculture, livestock, forestry, wildlife and aquaculture" in Mozambique (MINAG, 2014). The Ministry is responsible for managing resources "essential to agriculture!" promoting agricultural production; marketing inputs and products; and carrying out agricultural research, extension and technical assistance (Ibid.). These responsibilities are assigned across the central administration, seven directorates (agrarian services (DNSA), veterinary services (DNSV), lands and forests (DNTF), agricultural extension (DNEA), economics (DINE), human resources (DINRH) and administration and finance (DINAF)), two research institutes (agrarian research (IIAM) and agricultural promotion (CEPAGRI)) and a training institute (CFA) (Ibid.).

More than 80% of the labor force is engaged in agriculture. Of that amount, women comprise 65% of the agricultural workforce. This dependence on agriculture for employment, shows few signs of changing, remaining constant since the country's GDP composition was first measured, in 1998

(FAOSTAT, 2014). Agriculture is the primary livelihood for rural and to some extent peri-urban populations, and therefore crucial in boosting food security and contributing to improved welfare of particularly poor people. With such a large section of the Mozambican population dependent on agriculture, it is imperative that strategies for economic growth and poverty reduction focus on this sector. Gross national income (GNI) per capita has nearly doubled in the last ten years, but is still relatively low at \$416. This is reflected in the low agricultural value added per worker of \$301, which is more than 50% lower than the regional average of \$766 (World Bank, 2014). Average crop yields are also lower than regional standard estimates, although there have been notable increases in cereal production in recent years (WFP, 2011).

Despite the importance and potential of agriculture, the Food and Agriculture Organization still classifies Mozambique as a low-income, food deficit country by (FAO, 2009). Mozambique ranks 64 out of 78 countries in the 2013 Global Hunger Index (WFP, 2010). Chronic food insecurity is widespread, affecting nearly one in three Mozambicans. At the same time malnutrition rates among children under five remain at a staggering rate of 43% (USAID, 2011). The 2010 WFP Comprehensive Food Security Analysis attributes the prevalence of food insecurity in Mozambique to low agricultural productivity, the rising relative cost of food (38-46% of income expenditures), poor access to services, inappropriate feeding practices, and the risk of climate-induced crop failure (WFP, 2010). Health and productivity are further threatened by a high HIV/AIDS prevalence of 11.1% (UNICEF, 2014). These factors contribute to the dismally low life expectancy of 49.9 years and an under-five mortality rate of almost 90/1000 births (World Bank, 2014).

Agricultural Shortages and Gaps

By many accounts, Mozambique has not lived up to its agricultural potential (WFP, 2011, FAO, 2009, Gêmo, Stevens and Chilonda, 2013). The poor performance of agriculture can be attributed to a number of broader factors including climate shocks, deteriorating terms of trade, poor infrastructure, limited inputs, and weak institutional and human resource capacity (WFP, 2010). These broader factors encompass several key supply side and demand side issues:

 The production and marketing of agricultural inputs has failed to achieve broad coverage: less than 15% of producers used improved seeds in the last five years (Gêmo, 2009); and in 2010, farmers used only 8.9 kilograms of fertilizer per hectare of arable land (World Bank 2014), with the majority of fertilizer used on large-scale commercial farms (FAO, 2014).

- Participation in farmers' organizations is low: only 6.5% of farmers are members of associations and cooperatives (Gêmo, 2009). With the limited coverage of formal extension (between 8.3% and 14.3% nationwide), these organizations serve a valuable role as informal extension networks (Gêmo, Stevens and Chilonda, 2013).
- In areas prone to drought, access to insurance could alleviate the catastrophic damage of crop failure, yet smallholders have been slow to enroll in insurance schemes (Gêmo, 2009). This is also a supply side issue of insurance premiums being prohibitively expensive for most farmers.
- While the private sector has improved overall access to credit for commodity producers, most subsistence farmers still do not meet the criteria to qualify for loans. At the same time, microfinance initiatives have failed to penetrate rural areas and attract smallholder clients. Access to capital has been identified as a key determinant of adoption of new agricultural practices and technology (Cunguara and Moder, 2011). As with insurance, this is both a supply and demand side issue.
- Poor access to credit has also limited investment in agricultural infrastructure: less than 10% of farmers have access to irrigation; while mechanized agriculture is found almost exclusively on medium and large farms (Gêmo, 2009).
- Likewise, investments in commercial livestock production have been limited to large farms.
 Smallholders raise livestock primarily for home consumption. Less than 6% of the population owns cattle, the majority of which are inherited and not purchased. Only 3% of farmers vaccinated their chickens. Moreover livestock inventories showed a decline between 2002 and 2005 (Cunguara and Moder, 2011).

Agriculture in Mozambique is characterized by extensive rather than intensive production (FAO, 2007). The use of improved seed, inputs and infrastructure are all low, and expected to remain low unless appropriate technologies are introduced. Resource-poor technologies such as smaller packages of improved seeds and chemical fertilizers hold promise for farmers engaged in smaller, subsistence-commercial production. Since many farmers cannot afford the capital up front of investing in new technology, inputs could be provided on a shared-risk basis, under which they are given credit and money is deducted from sales at the end of the season, so that it does not need to be repaid if the crop fails (Cunguara and Moder, 2011).

Agricultural R&D has an important role to play in developing technology packages that are adapted to the different agro-ecological regions in the country. Since rain-fed agriculture is predominant, improved seeds should be selected for drought tolerance, especially in the more arid zones such as the southern provinces. Agricultural education and training (AET) complements this research by generating demand for new technologies and the capacity to implement them. Compared with agricultural infrastructure development or input distribution, AET stands out as an affordable opportunity to improve agricultural production and incomes. Indeed, the government and other stakeholders have identified AET as instrumental to sustained economic growth and poverty reduction (Gêmo, Stevens and Chilonda, 2013).

The Supply Side of Agricultural Education and Training

Education Overview

Following independence in 1975, the *Frente de Libertação de Moçambique* (FRELIMO) government embarked on an ambitious basic education and primary health care program. Within a year however, the country was plunged back into violence, as the *Resistência Nacional de Moçambique* (RENAMO) guerillas tried to destabilize Mozambique, with external military and monetary support. RENAMO forces waged a "scorched earth" campaign that systematically targeted education and health infrastructure and state employees (Finnegan, 1993). When Mozambique finally emerged from civil war in 1992, it faced an enormous education deficit. Primary School gross enrollment plummeted to 32% during the conflict (UNICEF, 2014). The infrastructure that survived was poorly maintained, while inputs such as teachers, books and supplies were inadequate. Teachers that were qualified to teach were concentrated in provincial capitals (Fox, et al., 2012).

Since the end of the civil war, the Government of Mozambique has pursued the objective of universal primary education by expanding the infrastructure network and using existing resources more efficiently (Ibid.). Sustained investment and the introduction of key reforms in education have improved access to and quality of education. Since 2000, the Government has allocated an average of 20% of the budget, about 5% of GDP, to the education sector (World Bank, 2005). This investment has produced an average of 3,500 new teachers every year and tripled the number of primary and secondary schools (MEC, 2010). The increase in supply has been matched by rising demand for education. Gross enrollment at the primary level increased from 67% in 1997 to 111% today, as many children past primary school age

enroll for the first time. The elimination of primary school fees in 2004 has further driven demand for education (Fox et al., 2012).

Despite these gains, education still lags behind in several key areas. Gross school enrollment tapers off at the secondary and tertiary levels, with 26% enrolled in secondary school and 5% at the tertiary level. This is reflected in low retention and completion rate of students. Nearly half of students do not complete primary school, while only 48% of those that do finish continue on to secondary school (World Bank, 2014). The average adult has completed only five years of education (USAID, 2011). Moreover, the national curriculum at the primary level is focused on preparing students for secondary level education, and not for employment. The quality of education is still inadequate in many schools and contributes to poor academic performance and learning. Although teacher training has expanded in recent years, the pupil-teacher ratio remains high (Fox et al., 2012). Consequently, only 51% of the adult population is literate and of those, 71% are males (World Bank, 2014). As it stands today, the Mozambican education system does not prepare its workforce to capitalize on the country's newfound stability and abundant natural resources.

Education Administration and Structure

The Ministry for Education and Culture (MEC) oversees education in Mozambique with support from the Ministries of Planning and Development (MPD), Agriculture (MINAG), Science and Technology (MCT) and Women and Social Welfare (MMAS) (MEC, 2014). The Government of Mozambique has demonstrated a strong commitment to education by allocating an average of 20% of the budget to the sector since 2000 – making education the most privileged of the "priority sectors." External donors have matched this investment by contributing approximately half of the education budget. The largest donors are the World Bank, European Union, United States of America and the United Kingdom (UNICEF, 2012).

According to the Ministry of Education's website, the Government of Mozambique views education as a "fundamental right of every citizen, an instrument for the assertion and integration of the individual in social, economic and political life, a prerequisite for the continuation of the construction of society and to combating poverty" (MEC, 2014). The government has worked to fulfill this fundamental right by making education compulsory and free through lower and upper primary school. Students are still responsible for covering matriculation and book fees, although families that meet certain criteria are exempted from paying fees. Although primary education is considered compulsory, limited resources exist to enforce the law and demand outpaces enrollment capacity in most regions (Fox et al., 2012).

Many schools operate in two shifts – morning and afternoon – to provide primary through secondary education using the same classrooms. Where electricity is available, night shifts are also provided for older students (MEC, 2014). In this way, the government has attempted to maximize the utilization of existing infrastructure – and frequently, of human resources, as many teachers are expected to teach double or triple shifts (UNICEF, 2014).

Formal education and training is most broadly comprised of general education, technical and vocational education, tertiary education and extension. Mozambique's basic education cycle consists of two primary levels: lower and upper primary. Students who complete upper primary can go on to secondary school. Students sit for national entrance exams at the end of grades 5, 7, and 10. Students are required to pass exams to advance to the next level. There are various technical and vocational education and training opportunities for graduates of lower and upper primary, or lower secondary. Higher education, or tertiary level, is open only to graduates of secondary schools (Fox et al., 2012). Figure 1 outlines the structure of the Mozambican education system.

Figure 1. Advancement in the Mozambican Education System



Pre-school education: Kindergarten and pre-school instruction is provided outside of state channels by non-governmental organizations, community associations and the private sector. The Ministry of Women and Social Action (MMAS) is responsible for overseeing these institutions. Pre-school education falls into two categories: the level of child care, which covers children from 0 to 2 years, and the level of school preparation that serves children between 2 and 5 years (MEC, 2014). Pre-school is optional, but has been encouraged by a number of externally-financed school feeding programs (UNICEF, 2012). Pre-school enrollment rates are estimated to be between 35-52%, with higher enrollment in urban areas (UNICEF, 2012, World Bank, 2014).

Primary Education: Primary education is divided into lower and upper cycles that cover the first seven years of education. The official age of entry into 1st grade is six years. Students are expected to complete primary school by the age of 12 (MEC, 2014):

- EP1 (Ensino Primário do 1º Grau) grades 1–5, ages 6–10
- EP2 (Ensino Primário do 2º Grau): grades 6–7, ages 11–12

Primary school gross enrollment ratios have risen to over 100% in recent years – which includes students that start and/or finish school late. This progress has put Mozambique on track to meet the second Millennium Development Goal (MDG) of providing universal primary education by 2015 (Government of Mozambique, 2008). However, enrollment ratios are based on the number of students formally registered in primary school and therefore do not necessarily reflect actual school attendance. Attendance rates are lower in rural areas where students take time from school to assist their families with seasonal agricultural work. Primary education is almost exclusively provided by the state. Less than 2% of primary school students attend private or community schools. This reflects the challenge of competing with free education provided at public schools (Fox et al., 2012).

General secondary education: Secondary education is divided into two cycles (MEC, 2014):

- ES1 (Ensino Secundário do 1º Ciclo): grades 8–10, ages 13–15
- ES2 (Ensino Secundário do 2º Ciclo): grades 11−12, ages 16−17

Admission to secondary school is based on a student's grades and age, rather than national examination scores – as long as a passing score is received on exams. Among students with the same grades, those who are younger, and therefore completed primary school on time, are given priority (Handa, Simler, and Harrower, 2004).

The government's investment in primary education has carried over to higher rates of secondary school enrollment. Rural areas in particular have seen impressive growth in gross enrollment – increasing from 3% in 1997 to 21% in 2010 (Ibid.). The overall gross enrollment in secondary education rose to 26% in 2012, pointing to both progress and room for improvement in coverage. Since students are required to pay tuition after the 7th grade, many private secondary schools have emerged to meet the demand for placement and quality. In 2011, 10% of secondary school students attended these private schools (Ibid.).

Vocational and technical education: As an alternative to general education, vocational and technical schools offer vocation-specific instruction that combines theory and practice. The National Directorate for Professional Technical Education (DINET) is the section of the MEC responsible for professional and technical education in Mozambique. Certification programs cover major sectors such as agriculture, fisheries, ecotourism, civil construction, mining and entrepreneurship. Typical programs are two to three years and have the following admission requirements (UNESCO, 2014):

- Elementary: grade 5 required, 2–3-year programs
- Basic: grade 7 required, 3-year program, equivalent to grade 10 upon completion
- Advanced: grade 10 required, 2-year program, equivalent to grade 12 upon completion

During the 2011 academic year, there were a total of 37,325 students enrolled at 83 technical and vocational schools. Of these schools, 36 offer elementary level instruction (5,810 students), 28 basic level instruction (23,667 students) and 19 advanced level instruction (7,848 trainees). The students enrolled in technical and vocational education represent less than 1% of total school enrollment, but 5.8% of secondary school enrollment. Greater gender disparities exist in vocational education than in general education, with girls comprising only 34.1% students (ibid.).

Higher education: Tertiary level education is available in two-year technical colleges and in four-year university level bachelors programs. Three public institutions offer Masters level degrees. There are no institutions which grant PhDs in Mozambique. Many students pursue higher education in neighboring countries, particularly South Africa (Davis et. al, 2007).

The higher education system in Mozambique is comprised of total of 26 higher education institutions: 13 private institutions and 13 public institutions. Most of these institutions are located in the capital city, Maputo. Eduardo Mondlane University is the oldest and largest university. There has been rapid growth in the number of options since the government in first permitted private institutions in 1993. However higher education in Mozambique is still largely provided by public universities, accounting for 73% of all students in 2011. Eduardo Mondlane University and the Universidade Pedagogica account for an estimated one-third of all higher education enrollment. According to the Ministry of Education's most recent count, there were 113,464 students enrolled in higher education in 2011. The majority of students are enrolled in education programs (13.4%), followed by business administration (9.3%), engineering and architecture (5.4%). Agricultural programs only account for 2.7% of students enrolled. The gender disparity in education is widest at the tertiary level, where women make up only 38.6% of students (MEC, 2011).

Education Coverage, Participation and Performance

The Government of Mozambique has promoted education as a centerpiece in its poverty reduction strategy. The government sees investing in human resources as the means of making growth more

equitable and sustainable. The MEC has sought to increase access to education and training by "expanding enrollment and establishing new institutes in the provinces and rural areas (outside the historically overrepresented Southern Province), by changing the entry and exit points so that students can cycle through the system at new and different education levels, and by changing the duration of programs to cycle students through the system faster" (Davis et. al, 2007: p. 29). Unfortunately, these initiatives have not always been matched by improvements in either the quality or quantity of staffing or infrastructure. While coverage has improved dramatically in the last decade, educational disparities still exist across gender and regional lines (Ibid.).

These disparities threaten to exacerbate existing power imbalances and leave behind the most vulnerable members of the population, specifically women and children in rural areas. Women are underrepresented at every level of education and training, being less likely to enroll, more likely to drop out and less likely to hold a teaching or extension position (World Bank, 2014, AEASW, 2012). Educational spending has a strong urban bias and tends to be concentrated in the southern provinces closer to the capital of Maputo. The schools that do exist in rural areas are frequently a long distance from homes. Rural students have to commute an average 4.5km to school (UNICEF, 2014). Education is also prohibitively expensive for some of the poorest families. At the primary level, families bear the cost of matriculation and book fees, while at the secondary level they are also required to pay tuition fees. Families also bear the opportunity costs of sending children to school instead of having them assist in household and agricultural labor. According to the World Bank however, regional inequalities in education access are more pronounced than inequalities by income level (World Bank, 2003).

The Government of Mozambique has made progress to address these inequalities. Between 2004 and 2011, enrollments doubled at both the primary and secondary levels with increasing gender parity. The gender parity index among students has steadily improved and stands at 0.92 as of 2011. Progressive public and non-profit scholarship programs have helped disadvantaged groups close the gap in primary and secondary education (Fox et al., 2012). The decrease in pupil-teacher ratios has seen the inclusion of more female teachers, although women are still outnumbered 4 to 1 in teaching faculties (World Bank, 2014). Recently, the MEC introduced a program of distance learning order to help overcome poor access to secondary education in rural areas. Coverage of the program is limited, but growing. Vocational and technical institutions provide boarding facilities that also allow rural students to attend school (Gêmo, 2006).

While gender parity has improved, significant gender disparities still exist in the students that elect to study agricultural sciences. In the 10th grade, students choose between a study track of social sciences or hard sciences. Girls are underrepresented in the hard sciences track. Following focus group interviews with students and faculty, researcher Van Houweling concluded that this decision "seems to be the major bottleneck for girls when they are all steered away from the subjects that set up the possibility of entering university agricultural programs" (2014: p. 3). Van Houweling observed that there is "a general perception that all agriculture work occurs in "the bush." Girls may avoid the work because it is seen as dirty, rural, and physical" (ibid.: p. 3). Furthermore, there appears to be little institutional support for gender equity and mainstreaming: There are no quotas for girls at schools or specific gender policies at higher education institutions. No programs/policies exist to support families, such as child care programs, except for the standard two-month maternity leave for faculty. Within agricultural programs there are no specific courses on gender, although the community development and extension classes incorporate gender considerations into strategies for working with rural communities (ibid).

The Mozambican education system has seen improvement in learning outcomes as result of the construction of new facilities, training of teachers and smaller class sizes. The number of primary school teachers rose from 59,000 in 2005 to 98,000 in 2012. During this period, the primary to lower secondary school transition rate increased from 54% to 71%. At the same time, the youth literacy rate increased from 65% to 72% (Fox et al., 2012).

Agricultural Research and Development

The Ministry of Science and Technology (MCT) oversees all research activities in Mozambique. In 2006, the government released the Mozambique Science, Technology, and Innovation Strategy (MOSTIS) to serve as a 10-year framework guiding all science, technology, and innovation efforts at research institutes and universities. Agriculture is the main focus of the MOSTIS framework. The Mozambique Institute of Agricultural Research (IIAM) serves as the principal public institution for agricultural research and development (R&D). IIAM was established in 2005 following the consolidation of separate institutes for crop, livestock, and forestry research. Fisheries research remains independent from IIAM under the

mandate of the Fisheries Research Institute (IIP) (Flaherty, Mazuze and Mahanzule, 2010). IIAM, IIP and higher education institutions accounted for 68.2%, 12.7% and 19.1% of the agricultural R&D spending in 2011 respectively. The operating budget for R&D in Mozambique is highly dependent on donor funding, and subject to fluctuations from year to year. Non-profit and for-profit private companies have had minimal involvement in agricultural R&D (Flaherty and Nhamusso, 2014).

While there has been an increase in staff in agricultural R&D positions, overall spending essentially stagnated between 2004 and 2011, rising slightly from US \$17.7 to US \$20.6 at 2005 PPP. Consequently, there has been a tradeoff in quantity and quality of staff (ibid.). As a group, researchers in Mozambique are younger and less qualified than their counterparts in many other African countries. As of 2011, less than half of researchers possessed an Msc or higher degree. During this period the research intensity ratio⁵ in Mozambique also declined: In 2008, for every \$100 of agricultural output, \$0.41 was invested in agricultural R&D. By comparison, the 2004 ratio was \$0.55 for every \$100, meaning that agricultural R&D expenditure levels did not keep pace with rising agricultural GDP.

This represents a missed opportunity to develop new agricultural practices and inputs. Currently, agriculture extension relies heavily on imported technology packages, which are frequently inappropriate for local conditions (Flaherty, Mazuze and Mahanzule, 2010) .The disconnect between research and extension in Mozambique also stems from the many changes within the research system and the relative newness of the extension system (Gêmo, 2006). According to Davis, Ekboir and Spielman, the weak linkages between these sectors are a related to "structural/organizational problems (lack of technical people), motivation/incentive problems (professional merit focusing on publications rather than technology transfer), lack of resources (time constraints), and communication problems (lack of equipment)" (2007: p. 46).

Agricultural Extension

For those out of school, there exist a number of agricultural training opportunities. The National Agricultural Extension System (SISNE) in Mozambique was established in 1987 as one of the four national directorates of the MINAG. Agricultural extension services encompass crop production, livestock and natural resource management. While initially carried out entirely by the public sector,

⁵ The research intensity ratio represents total spending on agricultural R&D as a percentage of agricultural output, or agricultural GDP. This ratio is commonly used to compare investment in R&D across countries.

extension is now implemented by a network of public, private and non-profit providers. In 1999, the MINAG developed the first National Extension Master Plan to coordinate the emerging pluralistic extension system. The National Directorate for Agricultural Extension (DNEA) and Provincial Agricultural Extension Services (SPER) were established to execute the master plan. The SISNE approach is premised on a Farmer Field School (FFS) model which aims to disseminate agrarian technologies, support and build the capacity of farmers' organizations, provide technical assistance and training to farmers and deliver "timely and relevant" information through various communication channels, such as farm visits, workshops, radio, leaflets, and manuals (Gêmo, Stevens and Chilonda, 2013: p. 65).

In theory, the SISNE has achieved complete geographic coverage in Mozambique: the public extension network now covers 127 of the 128 rural districts, NGOs are present in 91 rural districts, 50 districts have private extension services, while *all* 128 rural districts are covered by one provider or another (Gêmo, Stevens and Chilonda, 2013). Despite having operations in all rural districts, the actual coverage of agricultural extension has been limited. According to data collected by Gêmo, Stevens and Chilonda from 2002-2008 (2013) in Table 3, only a fraction of farms are actually reached by services – even with the support of private and non-profit sectors.

Table 3. Percentage of total farms with access to extension services (public, private and NGOs) from2002-2008. Source: Gêmo, Stevens and Chilonda, 2013

Provinces/Years	2002	2003	2005	2006	2007	2008
Niassa	10.6	9.2	13.7	23.1	12.1	8.9
Cabo-Delgado	18.7	14.2	15.8	11.4	5.8	6.8
Nampula	16.1	16.5	18.7	9.8	8.5	10.9
Zambezia	9.5	8.6	10.3	9.7	11.6	6.6
Tete	19.9	16.3	16.0	13.4	13.5	12.8
Manica	14.9	8.9	11.6	14.9	10.9	7.5
Sofala	19.8	24.0	21.1	16.9	14.4	10.2

Inhambane	4.6	9.9	7.8	6.6	7.4	4.6
Gaza	10.4	18.4	22.2	15.3	7.7	4.6
Maputo	11.0	14.5	11.0	9.8	19.9	6.8
National Average	13.5	13.3	14.8	12.0	10.1	8.3

According to the IWMI researchers, access to extension services refers to "physical interaction between farmers and extension workers or trained local people that support extension activities" (Gêmo, Stevens and Chilonda 2013: p. 61). Table 3 illustrates that the maximum coverage attained was 14.8% in 2005 and after which coverage has been in consistent decline. More recent data on coverage is not available (Ibid.), however available data suggests that the greatest area for improvement is in the public sector, which accounts for less than 25% of extension services. According to Gêmo, private firms and NGOs provide the remaining 75% of services (2006).

This division of coverage is partly by design. The MINAG's new extension strategy calls to "outsource" certain activities to the public and non-profit sectors. The Ministry has contracted local NGOs (frequently through donor-allocated funds) and pursued public-private partnerships in order to provide services outside the scope of its own extension system. Beyond these arrangements, each sector has fulfilled different roles in extension. While these roles are not always well defined, they provide some clarity to how the pluralistic extension system operates:

- International NGOs have largely focused on specialized advocacy, such as market related issues, HIV/AIDS and women's empowerment, rather than more general extension support. Donor support has generally taken the form of financial support for DNEA activities and training of human resources (Ibid.).
- Private extension firms have promoted the production of commercial crops through for-profit partnerships with producers. Firms have provided farmers with access to inputs credit and processing and marketing services. This "commodity-oriented extension" has focused primarily on cotton, tobacco and cashews, and increasingly on emerging crops such as sesame and soybean (Cunguara and Moder, 2011: p. 575).

A nationally representative survey of extension recipients conducted by Cunguara and Moder revealed that in addition to the limited coverage of extension, there exist significant disparities in *who* receives extension visits (2011). The study results suggest that public and NGO extension services target households with more education, larger cropped areas, higher farm incomes and those that are

members of farmers' organizations – in short, wealthier farmers. The authors reason that extension services target wealthier farmers due to "their ability to adopt extension advices, and thus extension workers might want to use them as model or demonstration farmers" (Ibid: p. 579). Targeting wealthier farmers, however, may also increase income inequality since increase in farm incomes will be concentrated among the top income groups. Several studies have demonstrated the effectiveness of extension visits in increasing the use of improved inputs, adoption of new technologies, agricultural productivity and farm incomes (Cunguara and Moder, 2011). These potential benefits underscore the importance of expanding coverage to poorer farmers.

Formal extension is not the only communication channel through which farmers access agricultural information and technology. Smallholder farmers have come together to organize associations and cooperatives that provide many of the same extension services in addition to other benefits. Many of these organizations are supported by NGOs or donors who provide financial and/or technical support. Some organizations are part of regional or crop-specific cooperative networks. Although participation rates vary across districts, Gêmo and Rivera estimated that only 6.5% of farmers belong to farmer organizations (2001).

Informal extension and other services exist through farmers' cooperatives and associations. These organizations assist smallholders to reduce transaction costs, secure higher prices for products and access training and other services. There appears to be a synergy between these informal and formal systems, as farmers that are members of such organizations are also more capable of taking advantage of extension recommendations (Ibid.). Unfortunately, membership in such organizations is low. The extension system would benefit from collaborating with farmers' organizations to improve membership as well as their capacity to support the adoption of new technologies (Gemo, 2009).

Relevance and Quality of AET

The primary school curriculum is currently oriented to teaching basic skills and preparing students for secondary school. However, due to the high cost of education at this level and limited spaces available, most Mozambican children cannot continue into secondary school. For many of students, primary education will be the extent of their formal education – this is borne out in the education level of the workforce in Figure 2. Yet, these students graduate from upper primary unprepared to pursue employment (Ibid: p. 68). Indeed, many students are unaware of what opportunities exist and how to

take advantage of them. The experience from other countries suggests that post-school training is expensive, unlikely to reach less-educated members of the population and yields poor payoffs (Mourshed, M., Farrell, D. and Barton, D., 2013). This evidence demonstrates a need to make primary school as valuable and productive for children as possible. One way this can be done is by supplementing the basic skills curriculum with financial literacy and other practical, competency-based subjects that can serve youth in the workplace.

The International Food Policy Research Institute (IFPRI) conducted a review of AET in Mozambique (Davis et. al, 2007). The review found that current postsecondary instruction has a "deep emphasis on theoretical and conceptual (rather than practical) competency" (Davis et. al, 2007: p. 34-35). This emphasis is underpinned by a culture of elitism that has characterized higher education in Mozambique, whereby office positions are more highly valued than practical employment, particularly in the agricultural sector. As a result, the report concludes: "Formal AET in Mozambique is focused on getting a degree, with little reference to the development of practical skills in areas such as problem solving, decision making, integrating knowledge, hands-on technical work, or management. Curricula and learning philosophies remain grounded in traditional lecture-style approaches. The result: graduates without 'real-world' skills who require extensive reeducation when employed outside public service" (lbid.: p. 34-35). It follows that these graduates are equally unprepared for public service in extension if they adopt the same lecture-driven approach to instruction in their training and visits. Gêmo cautions that the same education that is intended to prepare graduates for extension can also alienate them from the farmers they intend to assist (Gêmo, 2009).

Figure 2. Observed and Projected Distribution of Labor Force by Education Level, 2008 and 2013



Source: Fox, L., Santibañez, L. Nguyen, V. and André, P. World Bank, 2012: Figure 6.1

These findings were echoed in a recent study of higher education conducted by Van Houweling as part of a baseline study for the innovATE program (2014). A series of focus groups and interviews identified these parallel challenges in higher education instruction:

- Lack of practical courses/experiences. Students feel unprepared to enter the workforce. The lack of practical courses is principally related to a lack of resources (equipment, materials, lab space, research centers, nearby fields, and funding for research). Students also have few opportunities to do practical internships or research.
- Students enter programs with very low level writing, science, and technology skills and do not graduate with the skills needed to be entrepreneurs or work in agribusiness.
- Professors often graduate from their bachelors (or masters) and go directly into teaching without any career or teaching experience.

The study did find considerable optimism among students and educators, pointing to a high demand for agricultural graduates in extension services, new employment opportunities with private companies and NGOs and the relevance of curriculum to "real development issues in Mozambique" (Van Houweling 2014: p. 4). The study also highlights the development of new research sites and expansion of the UniZambeze and University of Eduardo Mondlane (UEM) agriculture facilities (Ibid.).

Another challenge for the education system is the country's linguistic isolation. Portuguese competency is an admissions requirement for universities and other AET institutions, but many students from the rural areas are unprepared for higher education instruction in the language. The linguistic isolation of students is often compounded by a similar isolation of faculty, who rely on relative scarce Portuguese-language educational materials, teaching aids, and information sources. Few faculty or students have the capacity to work with the more extensive English-language materials available in the agricultural sciences and related fields. Lusophone instruction also isolates faculty and students from counterparts they might collaborate with in the neighboring English-speaking countries. While English instruction commences in the 8th grade, it is rarely sufficient to achieve fluency during secondary education (Davis et. al, 2007).

Reforms in AET

Starting in 2005, the MEC began to devolve control over national curriculum to the local level as part of an overall decentralization strategy. The Ministry has tasked local regions and communities with identifying topics of local importance and incorporating these into the school plan. More localized curriculum has also allowed regional schools to provide early primary instruction in the native dialect of students (MEC, 2005). This process of decentralization should make classroom instruction more relevant to students, and hopefully, more relevant to the labor market.

Curriculum reform has proceeded at the national level based partly on analysis of market demands and trends. These reforms have introduced several new educational approaches and learning philosophies. The revised curriculum includes "new subjects that provide more general education skills; overview courses that cover multiple subjects for incoming students; shorter courses in single specialized subjects; optional courses that allow students to explore their interests more generally; and non-science courses that include management, project cycles, commercialization and marketing, economics of production, rural extension, and computer skills" (Davis et. al, 2007:36).

Technical and vocational education is also under review. In 2006, Mozambique launched the Integrated Program for Professional Educational Reform (REP), a 15-year program which aims to improve the responsiveness of technical and vocational education to labor market. The REP program works in partnership with industry representatives to develop relevant, national curriculum and connect students with employment opportunities (MEC, 2012). This provider-employer partnership is important to ensuring the successful transition from education to employment for students (Mourshed, M., Farrell, D. and Barton, D., 2013). Private institutions have also taken the initiative to reform the approach to higher learning. The two agricultural polytechnic universities have introduced competence-oriented curricula geared towards producing graduates who are endowed with practical skills and ready for employment in agribusiness. While still relatively new, these programs have the potential to serve as models for other institutions to follow (Davis et. al, 2007:35).

In recent years, the public extension service has undergone reform. The National Agricultural Extension System has increased the size and quality of its human resources. There are currently 1,342 staff members employed by the DNEA, including 748 extension agents (although, only 11% of which are female). Under a new human resource training and recruitment program, 93.3% of extension agents have at least Basic certification and 4% have a BSc degree or higher. This represents a significant improvement in qualifications from previous years, but reveals the need for further training and education (AEASW, 2012, Gêmo, 2006).

Demand Side of Agricultural Education and Training

Labor Market Structure

In the 2014 USAID study, *Mozambican Labor Markets in the Face of a Natural Boom*, authors Salinger and Ennis characterize the Mozambican labor market as a "highly segmented market: a small portion of the workforce is educated, skilled, and either formally, informally, or self-employed, while the vast majority of Mozambicans is locked into lower productivity, informal or self- employment, on and off farm, often under employed, and struggling to patch together enough different livelihoods to make ends meet for their families" (p. 28). They draw on previous studies of the labor market to summarize the defining features of the labor market through a series of "stylized facts" (ibid.):

- 1. Mozambique's population is young, rural and growing rapidly.
- 2. Rates of labor force participation are high, unemployment is low and principally confined to

urban youths.

- 3. <u>Under</u> employment is rife.
- 4. The informal sector is large and is the principal locus of new job creation.
- 5. Levels of education (skills) remain low throughout the economy.
- 6. Structural change in the labor market has been limited
- 7. There are large spatial differences in the distribution of Mozambican labor.
- 8. Productivity gaps between sectors are large and widening, largely due to slow productivity growth in agriculture.
- 9. Household income sources have diversified over time.
- 10. Social discontent appears to be rising, particularly among the urban youth.

The Government of Mozambique has promoted primary education as the centerpiece of its workforce development and poverty reduction strategy. The United Nations Educational, Scientific and Cultural Organization (UNESCO) estimates that 56.2% of the education budget in Mozambique is allocated to primary education, 28.5% to secondary education and 14.3% to tertiary education (UNESCO, 2012). The World Bank defends this prioritization of funding in its 2003 report on *Cost and Financing of Education* in Mozambique, arguing "primary education is an all-purpose investment whose results (basic reading and writing, basic arithmetic and problem solving, basic life skills) contribute to improved productivity in the traditional sector. Moreover, the economies in a number of developing countries have difficulty absorbing the graduates from secondary or even higher education, making unemployment of graduates wide-spread in many African countries. Under these circumstances, overinvesting in higher levels of education is more a burden, rather than an engine for, economic growth" (World Bank, 2003: p. 5).

The World Bank's 2012 report on *Education Reform in Mozambique* substantiates this claim: "Analysis of employment and livelihood opportunities indicates that the transition out of subsistence agriculture requires primary education. This means that to achieve inclusive growth, the key strategic objective of the education system must be to ensure that as many children as possible start and finish primary school with competency in basic subjects and the skills that will help them find productive economic activities that will provide a better income" (Fox et al., 2012: p. 46). In 2009, 88% of primary employment was found in household-based activities. The majority of those employed in the household sector reported that their primary activity was agriculture. Only 7.8% of the labor force reported that their primary employment was in the private sector, non-agricultural, wage and salary employment –

see the evolution of the structure of employment in Mozambique in Table 4. In 2009, only 12% of the workforce was employed in the formal wage sector. About 80% of the total formal sector employment was made up of trade and services (including public administration, education, health and social services) (ibid.). The expansion of secondary education has temporarily reduced the growth of the labor force, which is currently growing at approximately 0.4% per year (Salinger and Ennis, 2014: p. 32).

The authors of the 2012 World Bank report conclude that the structure of employment is unlikely to change soon: "Thus, for the foreseeable future, Mozambique will be a country of household farms and firms" (Ibid: p. 47). Therefore education must prepare students for current opportunities in agriculture and the informal sector as the country gradually transitions to higher productivity sectors. Part of that transition will be to diversify rural livelihoods and develop non-farm household enterprises to supplement farm incomes. Household enterprises have expanded dramatically in urban areas, accounting for 23.2% of primary employment, but have stagnated in rural areas, where they account for only 2.8% of primary employment (Fox, et. al, 2012: p. 46). The presence of a household enterprise is seen as contributing to food security, health outcomes and educational attainment (Salinger and Ennis, 2014: p. 27). Fostering a business environment for household enterprises should be considered alongside education as part of the government's poverty reduction strategy.

Type of Employment	National		Urban			Rural			
	1997	2003	2009	1997	2003	2009	1997	2003	2009
Household Agriculture	86.8	80.1	79.6	66.7	46.7	44.7	94.0	92.3	93.2
Household enterprise	4.4	8.3	8.4	10.1	19.0	22.7	2.3	3.8	2.8
Wage employment	8.9	11.7	12.0	23.2	34.3	32.7	3.7	3.9	3.9
Private sector	3.0	7.2	7.8	7.6	21.9	22.5	1.3	2.2	2.1
Public sector	5.9	4.5	4.2	15.6	12.5	10.2	2.4	1.7	1.8
Total	100	100	100	66.7	46.7	44.7	94.0	92.3	93.2

Table 4. Structure of Employment, Household vs. Wage, 1997-2009

Source: Fox, L., Santibañez, L. Nguyen, V. and André, P. World Bank, 2012: Table 5.1

Skills Shortages and Gaps

Enrollment and completion rates in primary and secondary education are much lower in Mozambique than other Sub Saharan African Countries (World Bank, 2014). For those who do graduate, they frequently enter the workforce with low level writing, science and technology skills. According to the African Development Bank, the low skill level of the labor force remains a significant barrier for employers who are unable to engage qualified laborers as well as a barrier for cultivating a culture of entrepreneurship. A 2014 study carried out by the Ministry of Planning on employers across different sectors concluded, "The general perception [of employers] is that the Mozambican youth workforce has immense limitations in terms of quality. Those with secondary schooling do not have skills that are directly applicable to industry. And those with technical or university training have received theoretical information, rather than the practical skills needed to respond to the demands of firms. Due to this, companies are obliged to offer additional training programs or recruit foreign workers" (Salinger and Ennis, 2014: p. 37).

The Ministry of Planning study reveals that the skills gap is felt at all levels of the labor market, although most acutely at the top and middle tier positions. Managerial and skilled professional positions are "almost impossible" to fill in the local market, particularly for positions requiring both academic qualifications and years of experience (which frequently must be acquired abroad) (ibid.: p. 38). Most relevant to agriculture is the finding that employers feel the skills gap is almost as acute for skilled technical positions, such as field technicians, machine operators, mechanics, farm managers etc. Employers observe that many members of the workforce are unable to perform at the standard expected by companies, despite possessing a relevant diploma or certificate. At a minimum, employers require workers to be able to read, do math and reliably perform a technical skill. According to the study, the most lacking skills in the workforce fall into two categories: "technical/vocational and general work culture." The authors describe "work culture" as "a culture of working shifts, punctuality, reliability in turning up for work every day" (ibid.: p. 38). They also note that rural workers engaged in their own, household agriculture are frequently absent from formal wage labor during harvest times. These perceived differences in work culture and gaps in technical/vocational skills contribute to the recruitment of foreign workers to fill jobs.

The trend of recruiting foreign workers has led the Ministry of Labor to impose a foreign worker quota system in order to give priority for employment to Mozambican nationals (ibid.).⁶ The supply constraints of the workforce exist alongside a vast potential supply of unskilled or low-skilled labor and widespread

⁶ Depending on the size of the firm, a company can employ between 1% and 5% of its total workforce from foreign workers. A company can request authorization to employ additional foreign nationals, if it can prove that no Mozambican can be found to fill the job. However, in practice this route is "extremely bureaucratic" and employers complain that the decisions can be arbitrary (Salinger and Ennis, 2014: p. 34).

under employment, particularly in rural areas. Given the lack of skills at every level, labor mobility between sectors, and into formal employment, in Mozambique is severely constrained. There are significant skills barriers in Mozambique that prevent the "flow" of labor from low-paid, low-productivity activities into higher paid, higher productivity activities – despite a clear demand from these sectors (ibid.).

The other side of the demand picture is the demand for AET programs of study. Currently, agricultural programs only account for 2.7% of students enrolled in tertiary education. In their review of AET, Davis, Ekboir and Spielman explain that the incentives to study AET in Mozambique are limited: "graduates are typically consigned to relatively low-paying positions in public extension services, research organizations, or teaching organizations, often in remote areas disconnected from urban centers" (2008: p. 45). The average monthly salary for employees with a B.A. in agricultural sciences is US\$60 in public service and as much as US\$1,400 in the employment of NGOs. There are signs that incentive structures are changing, specifically through efforts to upgrade AET instructors' qualifications, introduce more practical education through curricula reform, invest more in AET infrastructure and equipment, and reach out to stakeholders in industry and the NGO sector (Davis, Ekboir and Spielman, 2008).

There appears to be growing demand for AET graduates and professionals. The GoM is currently the main employer of AET graduates, "hiring to fill the ranks of extension agents in the provinces, teachers at the agrarian institutes and polytechnics, technicians in research stations, civil-service positions in MINAG, and, occasionally, posts in other government agencies outside the agricultural sector" (ibid.: p. 26). Although NGOs are largely based in the capital, many operate in rural areas and hire AET professionals and graduates with skills in the agricultural sciences, community mobilization, and rural extension. The private sector is emerging as a new employer for AET professionals with the entry of large, foreign agro-processing companies that operate in traditional cash-crop sectors such as cashew, cotton, tobacco, and fisheries. The authors conclude in their assessment, "Higher-paying job opportunities and short-term consultancies in both the private and NGO sectors will motivate a new generation of AET graduates to excel not only as technical experts, but as independent entrepreneurs and innovators as well" (Ibid.: p. 45). Establishing career counseling centers at institutions could assist in informing students of these employment opportunities as well options for continuing their education (Van Houweling, 2014).

Agricultural Industry

Commercial agriculture also factors to be a major employer for low-skilled labor with the recent increase in foreign direct investment in the sector. As part of their strategy to increase agricultural production, the government has granted massive land concessions to firms to establish export-oriented commercial farms. These farms range from medium sized farms of 25 hectares to industrial operations up to 10,000 hectares. Since 2004 more than six million acres have been leased to both foreign and domestic investors for foresty products, biofuel and agriculture, accounting for some 7% of the country's arable land—one of the highest rates in Africa. These land concessions have a history of displacing farmers, but they also have the potential to create wage labor, contribute to infrastructure development and provide social services not supplied by the state to residents (Bourne, 2014: p. 34).

Minimum wage rates vary widely by sector and employment type in Mozambique. While agricultural wages have long lagged behind other sectors, the increased demand for farm laborers from commercial agriculture is contributing to more competitive wages. In 2014, the minimum wage rate for the agricultural sector saw the single largest raise among sectors: increasing by over 20% to 3,010 metecais per month (US \$98.36). With the agricultural sector subject to some of the strictest foreign worker quota restrictions, the majority of these jobs – from field labor to skilled technicians and managers – are expected to go to Mozambicans (Salinger and Ennis, 2014). Commercial farms can also serve as a partner in the AET system by providing employees with hands-on training and experience that is absent in many academic programs.

Conclusion

Mozambique stands out as a success story in Sub-Saharan Africa after its steady recovery from nearly 30 years of armed conflict. The peace dividends from the end of hostilities coupled with relative political stability and robust donor support have created an enabling environment for economic growth; and to some extent, development has followed suit. However, development has not reached the poorest sections of the population who remain mired in multidimensional poverty. Agriculture's predominance amongst the rural poor singles out the sector as a promising avenue for more equitable growth and poverty reduction. The poor performance of agriculture suggests that there are "low hanging fruit" to be gained in improving agricultural productivity and incomes. One opportunity within reach is to improve agricultural training and education, as highlighted in this research.

The Government of Mozambique has pursued education as a centerpiece in its poverty reduction strategy. The government's commitment to universal primary education has expanded access to formal education for millions of Mozambicans, including members of the "lost generation" that grew up during the civil war. While this investment has achieved gross enrollment rates of over 100% at the primary level, enrollment tapers off dramatically at higher levels of education. Disparities in enrollment among women and rural areas are also more pronounced at the secondary and tertiary levels. As a result, nearly half of students do not complete primary school, while only 48% of those that finish primary continue on to secondary school (World Bank, 2014). Moreover, the national curriculum at the primary level is focused on preparing students for secondary level education, and not for employment.

This evidence suggests a need to make primary school as valuable and productive for children as possible. One way this can be done is by supplementing the basic skills curriculum with financial literacy and other practical, competency-based subjects that can serve youth in the workplace. The need to introduce professional training into earlier levels of education is supported by labor market analysis. According to the most recent figures, 88% of primary employment was in household-based activities, with the majority of those employed in the household sector reported that their primary activity was agriculture (Fox et al., 2012). With this composition unlikely to change soon, the education system must therefore prepare students for current opportunities in agriculture and the informal sector as the country gradually transitions to higher productivity sectors. In order to take advantage of these opportunities, students must be prepared in the basic technical/vocational skills and work culture cited by employers in the recent Ministry of Planning labor market survey.

Due to the concentration of higher education institutions in the capital of Maputo, the limited spaces available and the high cost of admission, higher learning has generally been reserved for the country's elite. It follows that instruction has focused on preparing graduates for careers in "office" positions, far from the agricultural fields. Reflecting this prioritization, only 2.7% of university students are enrolled in degrees in agricultural sciences. For students that do enter agricultural programs, curricula and learning philosophies remain highly theoretical and grounded in traditional lecture-style approaches. Graduates are therefore poorly prepared for practical employment in agribusiness, entrepreneurship or extension. The quality and relevance of instruction could be improved by training teachers in more participatory and practical pedagogy, reforming curricula to include more practical courses, providing better learning materials, creating internship opportunities and developing provider-employer partnerships to connect

students with post-graduation employment. At the same time, scholarship programs, distance learning and satellite campuses could expand access to higher education for underrepresented members of the population.

As a result of the quality and quantity of AET opportunities, the supply of qualified professionals in agriculture has not been able to keep pace with demand. According to the results of the labor market survey, skills gaps are present at every level: public school system graduates often lack the financial or actual literacy necessary for low-skilled positions, vocational graduates are unable to reliably perform the skills required for technical positions, and university graduates often lack the practical, communication and business skillsets to succeed in managerial positions. These shortfalls have contributed to the recruitment of foreign workers by employers and subsequent creation of foreign worker quotas by the GoM. Limiting the entry of foreigners does not address the shortcomings in the workforce. In order to attract foreign investment and secure higher quality jobs - in agriculture and other sectors – the government must focus on massively increasing the supply and quality of skilled Mozambican workers. At the same time, the AET system must respond to the evolving needs of the labor market to make the workforce more competitive. Finally, the recent discovery of coal and natural gas reserves underscores the need for pro-active investments in agriculture in order to maintain a diverse economy and support rural development. Without continued support for agriculture, the impact of the extractive sector on poverty reduction and sustainable growth for all Mozambicans will fall short of its promise.

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