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Democratic Republic of the Congo: AET Background Study

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Acknowledgements

This document was written as part of a series of InnovATE background studies. These are studies conducted on the AET system in a particular country, at times with particular attention paid to an AET institution or program. Background studies are based partially on USAID mission interest, partially on the presence of interesting AET activities or problems, and on providing a geographical balance. Most of the initial work on the studies will be done through desktop review of available literature and communication with experts. The remainder of the information is sometimes amassed through data collection visits. Lessons learned in one country can often be applied in other countries.

The InnovATE project was made possible by the United States Agency for International Development and the generous support of the American people through USAID Cooperative Agreement No. AID-OAA-L-12-00002.

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Acronyms and abbreviations

AfDB	African Development Bank
ALEF	Advancing Learning and Employability for a better Future Project
ATE/ATE	Agriculture Training and Education
ASTI	Agricultural Science and Technology Indicators
AU	African Union
BEFS	Bioenergy and Food Security Projects
CIA	Central Intelligence Agency
DRC	Democratic Republic of Congo
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
HDI	Human Development Index
IFPRI	International Food Policy Research Institute
INERA	National Agricultural Study and Research Institute
IRIN	Integrated Regional Information Networks
MINAGRI	Ministry of Agriculture
OECD	Organization for Economic Co-operation and Development
OFDA	Office of U.S. Foreign Disaster Assistance
PIEQ	Package for Improving Education Quality
PRSP	Poverty Reduction Strategy Papers
R&D	Research and development
SADC	Southern African Development Community
SAURA	Southern Africa Regional Universities Association
TVET	Technical and Vocational Education and Training
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
USAID	United States Agency for International Development
VVOB	Flemish Association for Development Cooperation and Technical Assistance
WFP	World Food Program

Executive summary

The Democratic Republic of Congo's (DRC) agriculture sector has enormous potential for fostering economic prosperity as it has been categorized next to the mining. It contributes 44.9% to Gross Domestic Product (GDP) and employs more than 70% of the total labor force. About 40 million people depend on farming for their livelihood. However, the agricultural potential remains largely untapped. As a result, 6.4 million people countrywide are acutely food insecure. The agricultural production has fallen by 40% since 1990, productivity has suffered from the steady shift of labor to the more lucrative mining sector, and rural agricultural labor force has been displaced to the urban areas for off farm work. Starting in the 1960s, agriculture was neglected and at times was allocated as little as 1% of the government's total budgetary spending. Similarly, spending in all research as a share of agricultural GDP is only 0.17%. Participation of women in research is only 9% despite women making up 50.7% of the population.

The infrastructure is dilapidated, the educational tools, equipment, materials, and textbooks in most of the academic institutions seem to be obsolete. In general, DRC has realized a decline in educational enrollment, overall quality, and interest in AET and TVET as economic growth has slowed down and employment opportunities outside of the country appeared more lucrative. Most of the institutions the Congolese State created in the previous years to provide Technical and Vocational Education and Training (TVET) are in a state of severe disorder. The teaching staff lack motivation and are largely underqualified, and therefore, neglect giving practical or experiential training and favor theoretical, rote learning, do not meet the labor market's changing needs, and do not include current technologies. Enterprises, potential employers, and students show a lack of interest in TVET because of this sector's current weak performance nationwide. Besides academic institutions, formal Agriculture Education and Training (AET) and TVET institutions could be key players in the modernization of agriculture in the DRC to increase agricultural production and productivity by empowering the producers and supplying the needed skilled professionals in the agricultural workforce. But the management and coordination of TVET is complex and inefficient, and hence, warrants appropriate attention if the DRC intends to increase the living standards of 80% of Congolese living on less than \$1 per day.

The primary goal of innovATE program is to strengthen training and education systems to improve the performance of the agricultural sector in developing countries around the world. Tuskegee University, as one of the consortium partners on innovATE, has the responsibility to lead innovATE activities in Africa including the DRC, where USAID has invested through "feed the future" initiative.

This report was arranged in preparation for a scoping assessment of the vocational training in the DRC conducted by the innovation for agricultural training and education (innovATE) project team during August 2014. The purpose of the scoping visit was to assess the current state of AET and TVET with the goal of identifying key opportunities for building human and institutional capacity for the agricultural workforce. This report is the first step in the innovATE methodology that will link long-term AET human and institutional capacity development with short-term agricultural value chain economic growth. It is hoped that it and other background reports that we have

compiled will serve as a resource for efforts to improve AET capacity, both in the region and worldwide.

Introduction

The DRC due to its natural resources is considered to be one of the richest countries in the world. However, despite a climate conducive to agriculture and abundant mineral resources present in country, the economy of the DRC has declined drastically since the mid-1980s. Over 85% of the population lives in extreme poverty and 80% of households report an inability to meet basic needs. Close to 75% of the total labor force is undernourished. The agricultural sector offers hope for economic prosperity as it accounts for 44.9% of GDP and employs more than 70% of the total population. However, the country's agricultural potential remains largely untapped; eighty million hectares of arable land is available, but so far, only 10% of it is being used. Agricultural production has fallen by 40% since 1990, and productivity has suffered further from the steady shift of labor to the mining sector.

This study encompasses the current strengths and challenges facing the AET and TVET systems and identify potential ways forward for innovATE to build capacity in AET in the DRC as well as potential next steps for strengthening these systems and ways for leveraging innovATE program involvement. The sections below will discuss the general information on country's background, economy and the agricultural systems, overall structure of the DRC educational system from pre-primary through tertiary and vocational education as supply side, as well as the needs for skilled manpower and gender integration in agriculture and other economic sectors as demand side. The review paper will end with a conclusion vis-à-vis potential and contribution to InnovATE scoping assessment.

Background

History and demographics

The DRC is located in the African Great Lakes region in Central Africa. It is the second largest country in Africa, with a population of over 75 million from 250 ethnic groups. A former Belgian colony, exploited for both manpower and natural resources, the DRC gained independence in 1960, but suffered from political instability and violence. Since independence, the country has experienced political unrest and socioeconomic turmoil. Control over the mineral-rich areas of the country has been the focus of much conflict, which has been fueled by both domestic and international interests. Civil war between ethnic groups between 1998 and 2007 killed an estimated 5.4 million people, most of them were members of displaced populations, who died from malaria, pneumonia, malnutrition and diarrhea, and living in unsanitary and over-crowded conditions. Although the violence has reduced significantly, more than 1.5 million people remain internal refugees among whom many thousands of deaths are recorded each month. There are also more than 150,000 refugees from the conflict in surrounding countries.

In spite of renewed growth since 2002, the DRC remains one of Africa's poorest countries. About 80% of Congolese live on less than \$1 per day. The 2011 Human Development Report of the United Nations Development Program (UNDP) ranks the DRC last out of 187 nations in terms of the Human Development Index (HDI). The poverty rate in the DRC is very high, hovering at 70% in 2006. The DRC lags far behind most of its neighbors in infrastructure, governance and social and economic indicators. In the last decade, the government of DRC has maintained solid macro-economic growth, reduced inflation, and expanded exports of minerals again. However, extensive corruption, weak institutions and human capacity, coupled with severe logistical difficulties has resulted in the pace of development for the average citizen remains slow. Nonetheless, the strong entrepreneurial spirit and optimism of many Congolese people has translated into successful programming in many sectors.

The population of DRC is very young, with 47% of people being age 15 or younger. Youth in general are likely to be involved in armed conflict and often enlisted in armed service during the war time. Integrated Regional Information Networks (IRIN), a humanitarian news network (<http://www.irinnews.org/>), cites the reintegration of these young ex-combatants into civilian life as one of the greatest challenges facing the DRC. This is partially due to a lack of literacy and the perception that obtaining a job is impossible. African Development Bank (AfDB) in 2008 illustrated 28% unemployment among the working population under 24 years of age. Thus, youth unemployment is a major concern. In some provinces, like North Kivu, up to 95% of youth are unemployed. The national unemployment rate is estimated at 8.9% and the underemployment rate at 81.7%. In general, unemployment and underemployment affect men and women in equal numbers regardless of their level of education. The labor market in DRC is also characterized by an employment rate that is relatively low in comparison to the average rate in sub-Saharan Africa: 63.1% (50.8% in urban areas as against 68.1% in rural areas). This situation mainly stems from a relatively late entry into the labor market due to more years of schooling

Economy

The economy of the DRC is slowly beginning to recover after decades of decline. Systemic corruption since independence in 1960 and conflict beginning in the 1990's had reduced national output and government revenue while increasing external debt. After the installation of a transitional government in response to peace accords in 2003, economic conditions began to improve as relations with international institutions and donors began to increase. According to CIA (2014), much economic activity takes place in the informal sector, which is not reflected in GDP data. For the past five years, there has been strong GDP growth (5.8% on average). The country's GDP is much smaller than its top trade partners and neighbors (Table 1). Additionally, a much

smaller percentage of the revenue comes from the service and industry sectors, while a much larger share is attributed to agriculture sector. Industry accounts for 21.8% of GDP, with main industries being mining (copper, cobalt, gold, diamonds, coltan, zinc, tin, and tungsten), mineral processing, consumer products (textiles, plastics, footwear, and cigarettes), metal products, processed foods and beverages, timber, cement and commercial ship repair.

Agriculture, on the other hand, accounts for 44.9% of GDP with main agricultural products being coffee, sugar, palm oil, rubber, tea, cotton, cocoa, quinine, cassava (manioc), bananas, plantains, peanuts, root crops, corn, fruits and wood products.

Table 1: GDP sectors and indicators by country

	DRC	Uganda	South Africa	Zambia	Kenya
Total GDP (US \$ billions)	17.20	20.03	384.31	20.59	40.697
Agriculture (% of GDP)	44.9	25.9	2.6	19.6	29.9
Industry (% of GDP)	21.8	28.6	28.4	38.1	17.4
Services (% of GDP)	33.4	45.5	69.0	42.3	52.7
Exports (% of GDP)	55.5	23.2	28.3	46.4	27.3
Imports (% of GDP)	67.3	38.8	31.3	43.2	44.5
Inflation (annual %)	2.3	24.1	5.5	5.9	10.1
Population (%) at poverty	71	24.5	31.3	60.5	43.4
Population Growth (annual %)	2.7	3.4	1.3	3.2	2.7
Net Migration (number of people)	-75,000	-150,000	-100,000	-40,000	-50,000

Source: CIA (2014).

Exports

Total exports to the countries (Table 2) totaled around \$9.936 billion in 2013. The top exports were diamonds, copper, gold, cobalt, wood products, crude oil and coffee (CIA, 2014). The main destinations for exports of these products were China, Zambia and Belgium.

Table 2: Major export destinations

Rank	Country	Percentage of total exports
1	China	54.3
2	Zambia	22.6
3	Belgium	5.7

Source: CIA (2014).

Imports

Total imports from countries (Table 3) totaled more than \$8.924 billion in 2013 and the top imports were foodstuffs, mining and other machinery, transport equipment, and fuels (CIA, 2014). The main countries from which import products originated were South Africa, China, Belgium, Zambia, Zimbabwe, France and Kenya.

Table 3: Major import destinations

Rank	Country	Percentage of total imports
1	South Africa	22.3
2	China	15.3
3	Belgium	8
4	Zambia	6.9
5	Zimbabwe	5.6

Source: CIA (2014).

Agricultural economic systems

The DRC is primarily a rural country therefore; agriculture remains the largest sector in terms of employment, with more than 70% of the population dependent on farming for their livelihoods. The majority of agriculture is subsistence, with the average land holding being less than one hectare. The main food crops are tubers, plantains, maize, green peas, rice, groundnuts, and black-eyed beans. Staple foods include cassava, banana and maize, with cassava accounting for 80% of food production (African Development Fund, 2005). Starting in the 1960s, agriculture was neglected and at times was allocated as little as 1% of the government's total budgetary spending. The nationalization of small to medium sized foreign-owned agricultural enterprises had a disastrous effect on production, which has not since recovered. Production has grown by around 2% annually. Per capita agricultural production has also fallen far below than the levels achieved

before independence. Agricultural production has fallen by 40% since 1990, productivity further suffered from the steady shift of labor to the more lucrative mining sector. FAO (2012) has elucidated that there are adequate water and arable land available in DRC however; a poor internal transportation system impedes development of an effective food system. Diminished agricultural productivity and poor transportation both contribute heavily to the country's reliance on imports for food consumption.

Roughly only 10% of the arable land is cultivated (Herderschee and et al., 2012). Agricultural production has been declining, with cassava declining 23% between 1990 and 2006, and Katanga experiencing a decline of maize by 12% (WFP, 2008). And while production per worker has increased, less people work in the agricultural sector (D'Haese, Banea-Mayambu, & Winter, 2013). Livestock is mostly in small scale operations, and only 18% of households own livestock (WFP, 2008). Agriculture is primarily rain-fed, with crop rotation and slash-and-burn farming that leaves land fallow up to 5 years and typically a very low output per hectare (World Bank, 2010). Farming is the main source of income for the rural population. Larger scale agribusiness operations mainly produce crops for export, such as coffee, rubber, and cocoa. Due to the on-going conflict in the DRC, most of these operations exist on paper only, or have extremely low production (D'Haese et al., 2013). In the Katanga province, industries are concentrated in the southern districts, while the north primarily produces agriculture and livestock (Lapeyre, Lebailly, M'Bayo, & Kyamakosa, 2011).

Underinvestment in agricultural research and development is serious issue. Spending in research as a share of agricultural GDP is only 0.17%. Participation of women in research is only 9% despite their 50.7% share in the population. Moreover, full time researchers per 100,000 farmers are only 2.94 people, which imply that there is a high demand of trained manpower. There are opportunities to modernize and strengthen the agricultural sector, but these will require overcoming resource constraints, administrative difficulty, poor infrastructure, and institutional and human capacity challenges. Besides academic institutions, formal AET and TVET institutions could be key players in the modernization of agriculture in DRC to increase agricultural production and productivity by supplying the needed skilled professionals in the agricultural workforce.

Intense food insecurity has worsened through decades of conflict, low agricultural productivity, and migration out of rural areas and agricultural profession. The poor performance of agriculture has increased the vulnerability of the population to recent increases in food prices and low incomes exacerbate the issue of food affordability. A 50% increase in food prices is estimated to increase the incidence of poverty at the national level by 5% from already high levels. Much of the impact in Kinshasa arises from a high dependence on imported rice. The food that is available does not always meet nutritional requirements, leaving the majority of the population with nutrient deficiencies, the most common being protein, iron or zinc (MacNeil, 2011).

The Ministry of Labor estimates less than 5% of the labor force is formally employed in the private sector. Employers are discouraged from formally hiring as labor laws are extremely strict. Most employers classify their workers as freelancers, assigning single tasks like picking the crops or cleaning grain, so as to avoid paying minimum wage or providing the health care required by law (USAID, 2012). More than 80% of national production is attributed to family farming, also labeled traditional farming, as subsistence agriculture (D’Haese et al., 2013). The importance of local channels and community cannot be overstated, as 96% of farmers in Katanga access their seed from those circles. Formal agro-dealers and international seed relief have essentially no impact (CIAT, 2012). There is an especially urgent need for microcredit towards agriculture, as only 2% of government grants in 2011 were towards agriculture. In Katanga, only 17% of microenterprises have credit with a bank (Lapeyre et al., 2011). The Katanga province specifically has been identified as a priority area for increasing access to microcredit and strengthening farmers’ production assets (WFP, 2008). One of the major constraints for farmers is lack of access to transport. There is difficulty in getting their crops to the local market, so post-harvest losses are very high (Mbago-Bhunu & Lotombe-Bolema, 2012). Other issues are antiquated methods/technology and difficulty accessing quality inputs, but primarily the processing and storage problems result in food scarcity and price hikes. More extension and research services and organizational support are needed to enhance farming techniques, and therefore smallholder productivity (World Bank, 2010).

Food security and livelihoods

USAID/OFDA (2013) in fact sheet # 2 illustrated that 6.4 million people countrywide are acutely food insecure. Out of the \$138.2 million USAID grants to assist food-insecure and conflict-affected populations in the DRC, 11% was allocated to agriculture and food security. USAID/OFDA grantees provide training on improved agricultural and livestock rearing techniques, establish demonstration gardens to promote nutritional foods, and organize seed and tool fairs to distribute improved tools and high-quality seeds—resulting in an increased and more varied food supply. Complementary livelihoods projects—such as temporary employment programs to build and improve roads, irrigation canals, and other infrastructure—increase agricultural productivity and access to markets.

Agriculture accounts for 44.9% GDP of the DRC’s gross domestic product, employs 62% of its men and 84% of its women, and is the country’s most promising foundation for establishing food security and sustainable, equitable economic development. For the last four years, DRC has been ranked first on the Global Hunger Index, while agricultural production has fallen 40% since 1990. Average daily food consumption is estimated at less than 1,500 kilocalories per person, below the minimum of 1,800 per person required to maintain good health (USAID, 2014). To reduce poverty

and increase agricultural productivity, market access, and environmental sustainability, USAID uses an integrated approach to inform and influence each of its programs. USAID activities support increased agricultural production through development of new varieties, improved growing and harvesting techniques, and increased processing efficiency. To increase investment in agriculture, USAID supports the strategic planning and coordination role in advancing agriculture in DRC along with establishing agriculture targeted loan guarantee programs providing access to credit for the small and medium-sized Congolese agricultural enterprises. In western DRC, USAID is supporting agriculture sector stakeholders along important value chains and building the foundations for sustainable food security in the Kinshasa area, home to over 10 million people. In eastern DRC, USAID supports the transition from conflict and humanitarian relief programming to development assistance and economic growth. These programs advance the fight against poverty, create new and better livelihoods opportunities for Congolese, and support research, innovation, and sound policy development.

Supply side of education

Overview of an educational system

The education system in the DRC is governed by three government ministries: the Ministère de l'Enseignement Primaire, Secondaire et Professionnel (MEPSP), the Ministère de l'Enseignement Supérieur et Universitaire (MESU) and the Ministère des Affaires Sociales (MAS). The educational system in the DRC is similar to that of Belgium in that there are six years of primary followed by 6 years of secondary education. The education system has suffered from decades of conflict although recent years have shown an improvement

The educational system in the DRC has been challenged by economic decline, violence, and political turmoil, yet has continued to expand at all levels (World Bank, 2005). Many Congolese, particularly women, lack basic education. The adult literacy rate was 61.2% in 2012 and the literacy rate for youth aged 15-24 was 65.8% in 2007. Only 53.3% of female youth are literate while the literacy rate for male youth was 78.9% in 2007. While publicly financed institutions enroll 86% of students, only 24% of these are managed directly by the state, and the remainder is managed by religious institutions. Each management type receives the same amount of public funding, which is insufficient for operating costs. Thus, most schools are largely financed by private households.

There is a significant need for improvement in terms of the reach and quality of education. Technical and agricultural education is particularly weak even though technical and agricultural skills are what is most needed to grow the economy (Herderschee et al., 2012). In recent decades, the education system has operated on the dwindling financial resources. The government allocates meager funds to education in general and to TVET (10%) in particular. Education spending as a proportion of the total budget dropped from 30% in 1960 to 2% in 2004. Education relatively has poor coverage at the primary level, sizable inequalities in terms of access and uncontrolled

expansion at the secondary and higher education levels, serious deterioration in the quality of education at all levels, and an extremely low spending in general. The educational infrastructure is dilapidated and the educational tools and materials are obsolete. Most of the institutions the Congolese State created in past years to provide technical and vocational training are in a state of severe disrepair. This situation reflects the government's inadequate investment in school reconstruction and rehabilitation, which has a negative impact on enrolment capacity (enrollment in TVET is only 20%) and the provision of specialized training at secondary schools and institutions of higher learning. Employers and students show a lack of interest in TVET because of its current weak performance nationwide. There is a discrepancy between the supply of qualified labor and the demand for skills on the job market.

The education sector is poorly organized and lacks a strategic vision and consistent structure for implementing programs. Similarly, the quality of curricula is declining because the subjects taught are out of date. Educational tools, equipment and textbooks are obsolete and in poor condition. To meet training needs, some private enterprises provide job training through vocational schools or institutes of higher learning. Future prospects depend on the DRC giving serious consideration to education as a whole and TVET and AET in particular in its growth and development strategy.

School enrollment trend

In respect of overall education, the school enrollment rate is declining. The gross enrollment ratio in primary school has declined sharply, from 92% in 1972 to 64% in 2002. In 2000/01, according to national sources, the rate stood at 33% for primary schools. Only 29% of children finish primary school and 4.7 million young children, including 2.5 million girls, receive no education at all. In secondary schools, it is estimated at 29% in 2001/2002 as compared to 26% in 1977-1978, with an internal efficiency coefficient of 36%. In addition, there has been: (i) deterioration in the school survival rate (25%) while the school completion rate is only 29%; and (ii) a low level of supervision and the existence of inequalities in gross enrollment ratios by gender (72% for boys and 56% for girls) and by place of residence (school admission rate of 71.6% in urban areas and 43.6% in rural areas). Moreover, postponed schooling affects more than 16% of boys as compared to 12% of girls in 2001. Since 2005, teachers have incessantly been demanding the salary increase agreed with the government in February 2004 (Mbudi agreement). This sets the monthly minimum wage at \$208 whereas a teacher now only earns an average of \$ 67.

Structure of education system

Education law amended in September 6, 1990 stipulated the right to education ensuring equal access to education and vocational training. Public education is free and basic education is compulsory. The right to establish private schools is subject to the approval of the State (Ministere de l'enseignement Primaire et Secondaire Charge de l'Alphabetisation, 2002). In order to improve

learning and evidence-based decision making, USAID (2013) has stated to collaborate with the Ministry of Education and national universities to initiate a robust operations research agenda on topics such as: 1) monitoring the relationship between school fees, enrollment, and student learning outcomes; 2) studying the relationships between learning outcomes and repetition and dropout; 3) evaluating inclusive community engagement/oversight on access and learning outcomes; 4) assessing retention and frequency of school departure for boys and girls in high risk areas; and 5) evaluating the impact of primary and secondary education for girls with respect to progress in the health and economic sectors. The school system in DRC consists of the following three levels:

Pre-primary (École Maternelle)

A three-year program for children from three to five-years, which is not compulsory. This level prepares young students for primary education.

Primary (École Primaire)

Primary education is free, compulsory and targeted at students aged 6-12. The six-year program is divided into three levels of two years each, namely, an elementary level for children six to seven years old; a middle level for children eight to nine years old, and a terminal level for children ten to eleven years old. The ages must be respected to pass from one level to another. The ratio of female to male in primary enrollment is 87.6%. A Certificat d'École Primaire is awarded upon completion of the six-year program. This is necessary to proceed on to secondary education. Unfortunately many students especially in rural areas fail to even get this far. In 2012, the primary completion rate was 72.8% (World Bank, 2014). Persistence to final grade of primary school improved dramatically from 2010 to 2012, jumping from 48.5% to 65.8% for females and 59.7% to 74.9% for males. The primary education system is characterized by: (i) rapid population growth; (ii) the large number of children not attending school; (iii) low population density, a large number of residences that are scattered and difficult to access, children living in forest areas, and disadvantaged groups; (iv) under qualified teachers and the shortage of instructional materials; and (v) instruction in a foreign language and the high cost of private education.

Secondary (École Secondaire)

Typical of Francophone educational systems, secondary school consists of two tracks: the long cycle and the short cycle. The long cycle, which is also referred to as formal secondary education, and the short cycle is the vocational education/training.

*The long cycle, or formal secondary education, lasts 6 years, and allows entry into higher education. The vast majority of secondary students are enrolled in the long cycle (Bashir, 2009). The first two years, or *tronc comun*, provide common education before students split into three streams. These streams are of general, teacher education, and technical are meant to last four years (Bashir, 2009;*

World Bank, 2005). There are several options within each stream; the four-year program is divided into literary, scientific, commercial, social, artistic, vocational (for women), agricultural, veterinarian, medical, pedagogical and professional/technical sections (World Bank, 2005). The passing percentage from one class to another is minimum; overall of 50% (including tutorials, quizzes and exams). This cycle ends in a national public examination, the *Examen d'Etat*. The Diplome d'Etat (State Diploma) is awarded upon passing the examen d'Etat with 50% or more. Failing this exam causes many students to repeat years. According to Bashir (2009), only 50% of students graduate without repeating a year, though the number of repetitions in each stage is limited. The completion rate is 59%. Students who do not pass the exam are often treated as though he or she has no secondary education whatsoever, limiting their employment opportunities (Bashir, 2009). Those who complete the long cycle in a technical field and pass the Diplôme d'Etat are eligible for admission to higher education. The quality of education at the secondary level is low. Fifty-one percent of mathematics teachers and 38% of science teachers had only an upper secondary school education (Bashir, 2009). Overall, 60% of secondary school teachers have no more than a secondary school education themselves.

The short cycle, or vocational training, offers courses of varying length. Though most last 2-3 years, others run as short as 6 months. Several different types of vocational training schools exist, each resulting in a different certification for graduates. **Craft schools** prepare students for manual unskilled occupations. Upon completion, students earn a vocational aptitude certificate or the *Brevet* (in area of specialization) after passing the exams in all subjects on the program with 50% or more. Areas of concentration depend on the availability of the subjects after the two-year core program of lower level secondary education sections. The school year is divided into two semesters and each semester (6 months) into two periods of 3 months each. At the end of a period, the students must have sat for as many quizzes as the hours of a course per week. **Schools for skilled occupations** require that students first complete the *tronc comun* of the long cycle. These programs last 2-3 years, translating to 4-5 years total of post-primary education. Graduates receive vocational aptitude diplomas. Primary teacher schools last 4 years. Higher educational vocational schools also exist, and are entered by the best short-cycle students and long-cycle students who failed the exit exam. Graduates of these schools receive a certificate of vocational specialization.

Structure of higher education system

The DRC has a relatively large higher education sector, which closely follows the Belgian system from which it was designed. The medium of instruction is French. The academic year runs from October to June. As a signatory of the Southern African Development Community (SADC) Protocol on Higher Education and Training, the DRC has acknowledged the role of higher education in national and regional development and the importance of a regional higher education system. The

higher education system in the DRC is run by the Ministry of Higher and University Education, known by its French appellation *Ministère de l'Enseignement Supérieur et Universitaire* (MESU). Private higher education in the DRC was first established in the early 1990s, when the government authorized private institutions to operate. The number of private institutions has risen significantly over the years (Appendix Table A).

Enrollment in higher education has increased in recent years, from 4.6% in 2007 to 8.2% in 2012 (World Bank, 2014). Access rates, defined as the proportion of students who passed secondary school exit exams that enroll in an institution of higher education, growing from 50% to 65% during the nineties. There is wide variation among provinces of higher education capacity. Bas-Congo and Bandundu are the best endowed provinces, but the Kinshasa area has the most students. Higher education in the DRC is a mix of public and private provision (refer to Appendix Table A), with primarily private financing. The majority of private institutions are religious, while others are associated with provincial governments or are run by private individuals, trusts, or societies (World Bank, 2005). The category of higher education comprises both university and non-university institutions, which have approximately, equal enrollment rates. Non-university institutions are professional institutions, generally classifying as either an *Institut Supérieur Technique* (IST) or an *Institut Supérieur Pédagogique* (ISP). There are more non-university institutions, though they tend to be smaller than university institutions. These institutions tend to be considered less prestigious than universities. However, the distinction is being blurred. The ISPs have begun adding courses outside the realm of teacher training, including business courses. Many ISPs and ISTs are demanding that their status be raised to that of a full-fledged university (World Bank, 2005). The World Bank further states that these institutions offer two cycles, or degree levels. Completion of the first cycle lasts three years and is the equivalent of an undergraduate degree, is honored with a *diplôme de graduat*. The second cycle, to be completed after the first, lasts two to three years, is honored with a *diplôme de licence*. There are two options for the third cycle: a two-year program that leads to a *diplôme d'études*, or a doctorate program.

University education was originally intended to produce a highly trained intellectual cadre which could undertake fundamental research in various disciplines. Because this does not fit with the modern labor market or current role of the university, there has been a call for reforming the university structure. There are three cycles, or degree levels, at Congolese universities. *The first cycle* lasts three years and is the equivalent of an undergraduate degree. *The second cycle*, to be completed after the first, lasts two to three years. Graduates are *Licensés*. There are two options for the third cycle: a two-year program that leads to a *diplôme d'études* or a doctorate program (World Bank, 2005).

a) Universities

There are many privately and publicly funded polytechnics and specialized colleges in DRC, but only 4 state universities in total (Appendix Table A). These include the Universities of Goma, Kinshasa, Congo, and Lubumbashi. The latter is by far the oldest, having been founded in 1991, after functioning as a branch of the University of Zaire for 26 years. *Enrollment in science, technology, engineering, and agriculture is low.* Data gathered in 2007 from the universities of Kinshasa, Kisangani, Goma, and Lubumbashi show that only 14% of students are enrolled in non-health science, engineering and technology disciplines (SARUA, 2014). This study did not assign a percentage to the students enrolled in agriculture programs. However, estimates of student enrollment in public institutions from 2003 indicate that **only 3% of students are studying rural development, agricultural sciences, or veterinary sciences.** One way that institutions have worked to address these challenges is through partnerships with foreign universities, either as research collaboration or through faculty exchanges (World Bank, 2005). The University of Kinshasa has several such partnerships. Their profile on the Southern African Regional Universities Association (SARUA) describes a few such partnerships with institutions in Canada, China, and India, which focus on agricultural and forestry programs. Besides the research, the SARUA (2014) states that the universities are also involved with outreach into various DRC communities, most specifically in terms of food security and the development of fish farming. The University of Lubumbashi second to the University of Kinshasa in size is the premier higher education in the Katanga province. Due to the emphasis of the mining sector in Katanga, the university has a strong emphasis on geology, mining, and information science. Still, only 14% of students are enrolled in science, engineering and technology disciplines, a lower percentage than all other fields.

Table 4: Number of students enrolled per subject of study at the University of Lubumbashi

Major field of study	Total number of students	Percentage of the total students	Under-graduate degree/ diploma	Post-graduate Degree/ Diploma	Master's Degree	Doctoral Degree
Science, Engineering & Technology	2,972	14%	19,723	0	17	11
Business, Management & Law	5,892	27%	3,892	0	8	9
Humanities and Social Sciences	6,623	30%	2,440	0	30	34
Health Sciences	6,411	29%	5,594	0	49	14
Total	21,898	100%	13,898	0	104	68

Source: SARUA (2007).

b) Technical and vocational education and training (TVET)

Enrollment in vocational schools is very low as described by Bashir (2009) as only 1% can be explained by the irrelevance of the degrees offered by these institutions. Curricula have not been updated, modern materials are not available, and instructors do not receive up-to-date training. Even the technical stream in formal education is hindered by its division into 30 specialties, which raises costs. At the same time, such over-specialization damages the employability of graduates, as the labor market has shifted towards valuing flexible workers with general skills.

The TVET suffers from the weak connection between secondary and technical education (World Bank, 2008). The expense of accessing TVET is a drawback to families: it costs 134% of GDP per capita (on average, for the Sub-Saharan region), while the same expenditure could fund 4 junior secondary or 2 senior secondary students (Verspoor, 2008). This of course prevents many children from continuing their education, and poses difficulties for funding the expansion of technical programs. Those formal training programs that are in place do not have sufficient funding. ***A World Bank assessment (2008) of Sub-Saharan TVET repeatedly stressed the need for hands-on training and upgraded facilities.*** Aside from a lack of materials, the challenge in finding qualified teachers for rural areas has created a severe disparity in the quality of education between rural and urban schools.

Nearly all agricultural sector training is funded or provided by donors—the remainder provided through formal schooling and on-the-job training (USAID, 2010). These donor-based programs mostly focus on the informal sector as a response to current labor market conditions, with the trending expansion of informal jobs (AU, 2007). One successful informal training program is the Netherlands Development Organization (SNV), which offers training through a team of permanent members to local farming cooperatives (Mbago-Bhunu & Lotombe-Bolema, 2012). **Formal TVET programs are criticized for being unresponsive to labor market needs** (Verspoor, 2008). Accordingly, companies typically create their own technical training institutions with customized curriculum, mostly with mining operations, which design their own curriculum and therefore focus on industrial skills (AU, 2007). In 2010, there were more than 1,200 secondary schools focusing on agriculture, although reportedly the number of vocational schools has since been decreasing (USAID, 2010). Approximately 70% of youth in Africa leaving the TVET system in 2007 were trained under the German training module, which is a dual system of training in a vocational institution and in an enterprise (AU, 2007). The German government developed a new curriculum in 2010 for the DRC, offering different concentrations in agricultural education—all of them emphasizing entrepreneurship and starting a business, as opposed to seeking formal employment (USAID, 2010). Similarly, the Belgians developed an agricultural curriculum in 2008, based on a UNESCO course, to combat the disorder and ineffectiveness of the current program (Diallo, Mans, & Ntoya, 2012). It also incorporates an entrepreneurial approach, and 56% of schools have retained the curriculum since formal adoption in 2010. The program requires revision every four years (Diallo et al., 2012). In general, those who graduate from agricultural secondary schools in the DRC largely join the workforce, but a percentage does continue on into higher education (USAID, 2010).

Most of the institutions the Congolese State created in past years to provide technical and vocational training are in a state of severe disrepair. The École nationale de l'administration (ENA: National school of administration) no longer exists, and the institut national de préparation professionnelle (INPP), Vocational training institute and Centreinterdisciplinaire pour le développement del'éducation permanente (CIDEP), interdisciplinary continuing education center, must operate on limited resources to fulfil their missions. Yet in the 1970s and early 1980s, these institutions were able to provide the country with skilled workers for specific occupations. This situation reflects the government's inadequate investment in school reconstruction and rehabilitation, which has a negative impact on enrolment capacity and the provision of specialized training at secondary schools and institutions of higher learning. Teaching quality has seriously eroded, particularly through an increase in the number of pupils. Accordingly, enterprises, other employers, and students show a lack of interest in TVET because of this sector's current weak performance nationwide. There is a discrepancy between the supply of qualified labor and the demand for skills on the job market. The education sector is poorly organized and lacks a strategic vision and consistent structure for implementing programs. TVET is not a priority for the Congolese

government, as it is not addressed in the national education outline law and only receives a brief mention in the PRSP. However, in the reality, more education on agricultural techniques such as crop rotation, fertilization, companion planting, intercropping, and other organic and cost effective methods of managing and maximizing land use would be extremely empowering. For example, not very much exploration seemed to be happening with growing one plant under the cover of another plant (i.e. growing beans under banana trees).

The quality of curricula is declining because the subjects taught are out of date. Educational tools, equipment, and textbooks are obsolete and in poor condition. The growing indifference on the part of employers and students is evidenced by the lack of relations between the various schools and the institutions and enterprises that use them. Employers are increasingly less likely to attend school board meetings. Because the *diplôme d'état* (state diploma) is seen as possessing a legendary value, students scorn technical and vocational training, viewing it as intended for less important staff. To meet training needs, some private enterprises provide job training through vocational schools or institutes of higher learning. Most of these schools teach their students how to practice a trade and earn a living. The value of certificates granted by these vocational schools is a matter of subjective opinion. Future prospects depend on the DRC giving serious consideration to technical and vocational training in its growth and development strategy.

In 2007, TVET shares only accounted for a fraction of total secondary enrolment. Public vocational training centers tend to have a wide geographical coverage and to focus on training in skills required by highly capital-intensive occupations. Both the quantity and quality of public vocational training centers are highly dependent on government budgets. Moreover, since budget allocations to public training providers are usually unrelated to objectives and outcome measures such as success in placing trainees in productive employment. There is little incentive for institutional training providers to align training courses offered with the needs of the labor market. Consequently, most centers have little interaction with the private sector. Most public training centers do not develop training programs focusing on the particular needs of the informal sector nor do they cater well for the special needs of minorities and disadvantaged groups. Available documents reveal that the ministry of education of DRC is committed to improving its system of TVET in general and of agricultural education in particular. The education and training of teachers is high on the policy agenda. The current teaching staff is often the product of mere secondary education and thus they lack some pedagogical and didactic skills. The result is that teachers often rely on theoretical and non-practical methods. These are far removed from the daily lives of students and the demands of the labor market. Research indicates that the number of teachers without pedagogical training peaks up to 60%. In addition, teachers lack technical competences (VVOB, 2014).

Overall situation of higher education

Internal efficiency tends to be low. At the University of Kinshasa, 50% drop out within the first year, with another 35% following suit their second year. Only 18% of students graduate with a *license* without any repetition. Overworked and poorly qualified instructors constitute the primary constraint to educational quality. The average teacher-pupil ratio in the country is 1:20. However, the instructors are frequently poorly qualified. Only 17% of faculty members have a doctorate, enabling them to teach higher levels. Twenty-three percent are *Licensés*, and the remainders are *gradués* (World Bank, 2005). Instruction quality is further degraded by competing claims on teachers' time. Though teaching staff at public institutions are required to put in many instruction hours, these same instructors typically augment their income by teaching at private institutions on the side. The copious amount of time that instructors spend teaching classes severely restricts their ability to conduct research and leads to exhaustion. Challenges related to insufficient instructors, materials, and facilities have been exacerbated by increases in enrollment. The quality of education in the natural sciences and medicine particularly suffers from outdated textbooks and overcrowded labs. Lack of materials limits opportunities for application, leading to primarily theoretical training.

Table 5: Enrollment by subject at four universities (Kinshasa, Kisangani, Goma, and Lubumbashi)

Major field of study	Total number of students (headcount)	Percentage of the total students
Science, Engineering & Technology	6,487	10%
Business, Management & Law	19,841	32%
Humanities and Social Sciences	18,458	29%
Health Sciences	17,013	27%
Other	859	1%
Total	62,658	100%

Source: SARUA (2007).

Research need and challenges in higher education

Although universities employ a much higher (and younger) proportion of PhD-qualified agricultural scientists compared with National Agricultural Study and Research Institute (INERA) and other government agencies, few of them have the time or resources to focus on research. With students of agricultural sciences numbering around 1,000 at each of the country's three largest higher education agencies, it is not surprising that teaching is their dominant activity—often despite universities' research mandates and the desires of individual scientists to integrate research into their academic careers. PhD-qualified scientists in the higher education sector are an untapped

resource whose time could potentially be put to better use if they were provided with the necessary support staff and financial resources to enable them to conduct research. Despite rapid growth in recent years, DRC's agricultural research and development spending remains well below the levels required sustaining its needs; in fact, spending levels as a share of agricultural GDP are among the lowest in Africa. Agricultural researcher numbers also grew rapidly in recent years, particularly at INERA and the Agri-Food Research Centre (CRAA), although most of this growth occurred among researchers trained to the BSc or MSc levels. Accounting for just 9% of total researchers, women are severely underrepresented in agricultural research and development in DRC; especially given that the country's agricultural labor force is predominantly female (ASTI, 2014).

Table 6: Agricultural research and development indicators

Total public agricultural research spending	2009	2011
Congolese francs (million constant 2005 prices)	1,975.5	3,474.8
PPP (Purchasing power parity) dollars (million constant 2005 prices)	9.2	16.2
Overall growth	76%	
Total number of public agricultural researchers		
Full-time equivalents (FTEs)	340.4	423.9
Overall growth	25%	
Agricultural research intensity		
Spending as a share of agricultural GDP	0.10%	0.17%
Full time equivalent researchers per 100,000 farmers	2.44	2.94

Source: ASTI (2014).

Twenty public agencies conduct agricultural R&D in DRC. INERA is by far the largest and employs close to half the country's agricultural researchers (194 full time equivalent researchers in 2011), has a broad mandate covering crop, livestock, forestry, and fisheries research. It operates 12 research centers and stations across the country focusing on locally relevant adaptive research. An increasing number of private universities and nongovernment organizations have also become involved in agricultural R&D in recent years, but their capacity is limited. Some private agro-industrial companies based in DRC are known to conduct research on oil palm, Chinchona (*Cinchona pubescens*), a medicinal plant, coffee, and sugar. Underinvestment in agricultural R&D in DRC is serious. The government funds research staff salaries, but funding for actual research programs and the much-needed rehabilitation of R&D infrastructure is largely dependent on volatile donor support (FAO, 2013).

Table 7: Institutional profile in agricultural R&D

Institution	Share of total country research
National Agricultural Study and Research Institute (INERA)	46%
Higher education	29%
Other government	25%

Source: ASTI (2014).

The research focus for these institutions in 2011 was mainly crops (60%) with the main subjects being Cassava (19%), Bananas and plantains (15%), Maize (10%), Rice (8%), Beans (7%), and Soybeans (5%). Other research areas include fisheries (6%), natural resources (7%), livestock (12%), and forestry (3%). The gender distribution within these agricultural R&D institutions is predominantly male, 91%, with only 9% of the students were female (ASTI, 2014). This brings to light an issue of gender inclusion in both higher education and research institutions.

Gender participation in school and work

Women in the DRC have not attained a position of full equality with men, with their struggle continuing to this day. Although the Mobutu regime did not take seriously the important role of women in society, and although women enjoy some legal rights (e.g., the right to own property and the right to participate in the economic and political sectors), custom and legal constraints still limit their opportunities. Females over 25 years with secondary education were 10.7% in 2010 and women in labor force were 70.2% in 2011. Female participation in the private sector economy is lower than in most African countries (World Bank, 2013). Female inclusion in the private sector in DRC lags behind than in other countries in all measures of participation considered. Similarly, female participation as firms' owners and managers is not only low but it is also lower compared to 2010. In 2013, only 15% of firms in DRC have at least one woman among the owners compared to 39% in 2010 and to an average of 37% for all countries. The same applies for the percentage of **firms run by a female manager which decreased from 14% in 2010 to 11% in 2013, below the global average of 19%**. The percentage of female workers in the workforce was stable at 19% but notably lower than the average of 34%.

In spite of the different national legislative provisions and international conventions which the DRC has adopted, the level of female representation in public decision making positions is put at less than 10% for the country at large and 5% for Kinshasa. Inequalities between boys and girls and men and women can be seen in terms of schooling and access to work. About 7.1 million children do not attend school. Girls, especially in the countryside, are the chief victims of this exclusion (54% of those not attending school). The balance between girls and boys in primary and secondary education recorded a slight improvement between 2010 and 2011. The proportion of women

unable to undertake an economic activity for lack of resources is put at 44% against 22% for men. The distribution of jobs is marked by deep disparities between the sexes. According to AfDB, (2008), women occupy only 2.8% of waged jobs, which are concentrated in farming, the informal sector, and commerce.

Demand side for education

Labor market and employer needs

There is a clear need for a better trained workforce in the DRC, 26.7% of firms identify an inadequately trained workforce as a major constraint to conducting business (World Bank, 2013). The construction and mining sectors in particular are in need of more skilled labor, while the **agricultural sector requires knowledgeable individuals to lead the country towards fulfilling its potential as a net exporter of agricultural goods.** Employment in the DRC is dominated by the informal sector. The formal sector, which accounts employs only 1.2% of the workforce, is comprised of state-run enterprises, small-and medium-sized, and a few large foreign-owned firms, most of which are in the mining or telecommunications sectors. According to World Bank (2006), investment climate survey suggests that 90% of all business activities are in the informal sector. Since 2003, the economy has experienced rapid growth in large companies and agriculture. Small-and medium- size companies have grown only modestly in the same time frame (Herderschee et al., 2012; PACT, 2008).

Total labor force comprises people ages 15 and older who meet the International Labor Organization (ILO) definition of the economically active population; all people who supply labor for the production of goods and services during a specified period. More than 70% of the young have no jobs. Of the 9,000 university graduates from Congolese universities each year, fewer than 100 find work. A poverty reduction strategy paper (PRSP) has been created for 2012- 2016, with the aim of creating 900,000 jobs each year for young people, but this goal appears hard to achieve (KPMG, 2014). With the backing of development partners, a pilot program for young graduates was launched in 2011 with 54 participants.

In rural areas, there is a growing need for trained agricultural professionals and producers' access to production inputs. Importance of agricultural development has placed on the top priority for the well-being of rural people and overall economic development of the country. A time-driven public extension different from traditional extension system seems to be today's need. This need has not been addressed properly by the main higher education institutions, especially in terms of 'extension process' skills, which include community organizing, use of participatory techniques and other community-based assessment and learning approaches. A strong incentive for reform has come from the increasing recognition that higher technical and vocational skills are crucial in enhancing competitiveness and contributing to social inclusion, decent employment, and poverty

reduction. The term technical and vocational skills development (TVSD) refers to the acquisition of knowledge, practical competencies, know-how and attitudes necessary to perform a certain trade or occupation in the labor market. Competencies can be acquired either through structured training in public or private TVET schools and centers, or through practical experience on the job in enterprises (work-place training in the formal sector and informal apprenticeship), or both (dual training, involving a combination of work-place and institution-based training).

The government allocates meager funds to education in general and to technical and vocational training in particular. Education spending as a proportion of the total budget dropped from 30% in 1960 to 2% in 2004, and this figure only represented payroll costs. The country has an insufficient number of technical and vocational schools, which only constitute 10% of the number of general education schools. In recent decades, the Congolese education system has operated on the dwindling financial resources devoted to the sector during a recessionary period. *Enterprises, other employers, and students show a lack of interest in TVET because of this sector's current weak performance nationwide.* The education sector is poorly organized and lacks a strategic vision and consistent structure for implementing programs.

The low budgetary allocation to TVET supports this contention as 90% of TVET costs are funded by families and students compared to 10% by the state. The infrastructure is dilapidated and the educational tools and materials are obsolete. Most of the institutions the Congolese State created in past years to provide technical and vocational training are in a state of severe disrepair. This situation reflects the government's inadequate investment in school reconstruction and rehabilitation, which has a negative impact on enrollment capacity and the provision of specialized training at secondary schools and institutions of higher learning. Teaching staff lack motivation, are largely underqualified and do not meet the labor market's changing needs. Because compulsory retirement no longer exists, old teachers retain their positions and neglect practical training in favor of theoretical, rote learning that ignores technological developments. The quality of curricula is declining because the subjects taught are out of date. Educational tools, equipment and textbooks are obsolete and in poor condition. All these problems mentioned above have mentioned shortage of trained manpower with appropriate agriculture business skills and practical training to address the variety of emerging problems/issues in agricultural value chains.

There is a cyclical connection between the informality of the agriculture sector and low skill levels. As workers are typically unqualified for their positions, they have little leverage in demanding better terms from their employers. There is a serious shortage of occupational skills, particularly with processing and marketing agricultural products. Employers have difficulty finding qualified candidates for higher level positions Congolese literacy and university enrolment rates are incredibly low, but labor laws also heavily restrict foreign labor (USAID, 2012). From the view of those attempting to enter the workforce, there is a perception that education does not make a difference in terms of employability, as opportunities are scarce regardless of a person's education

level (World Bank, 2008). A comprehensive World Bank report from 2010 found that 25% of businesses considered their workers unqualified, and only 24% of businesses offered formal training to their employees. However, 65% of businesses reported that unqualified workers are a concern in their operations (Diallo et al., 2012). An overarching issue within the labor force is the permanent shift of workers from agriculture to the mining sector (Lapeyre et al., 2011). Several barriers exist to women in working in the agriculture sector due to state laws. Land rights in particular are difficult, as married women need signed approval from their husband allowing them to start a business (USAID, 2012). Women are also prohibited from working outside the home between 7pm and 7am.

Gender inclusion in AET

Women farmers in the DRC have even greater challenges than the men due to the severe lack of gender equality. The DRC ranks 79th of 102 countries in OECD's 2009 gender inequality index and 119th of 122 countries in the women's ownership right index. Women also face severe legal and social discrimination in terms of education, access to land, and access to credit. Even with these challenges, women represent 60% of agricultural laborers, 73% of farmers, and produce 80% of food crops for household consumption (Jurewicz, 2013). The causes of gender disparities in education from primary, secondary, and higher education to TVET adversely affect agricultural production and productivity. According to World Bank (2012), from primary through tertiary and vocational education issues of gender-bias in curriculum, teacher gender bias, and institutional gender bias prevail, particularly in subjects and fields that are seen as gendered, such as math, science, and agriculture. Another report by the World Bank (2009) has stated that the roadblocks preventing young women from studying and entering the field of agriculture are creating a growing problem for food security and agricultural production, particularly in low and middle-income countries. Analyses of ATE institutions and their role in development have found that women are underrepresented as students, instructors, extension agents, and researchers, and agricultural innovation processes are hardly ever aimed at women (Bientema, 2006). This is in contrast to evidence that shows that equalizing access to resources could increase agricultural output in developing countries by 2.5-4% - a number that significantly increases when looking at countries Sub Sahara Africa (World Bank, 2012). There is a very urgent need to motivate women to attract them to teaching and training in agriculture (Vandenbosch, 2006). The loss of women in the education roadmap has significant impacts on agriculture where women make up an estimated 43% of the agricultural workforce (World Bank, 2012). Gendered differences in education including access to and quality of education, prevent women from accessing employment opportunities in agriculture, constrains women from accessing markets, and prevents increases in agricultural yield. In cases where agricultural institutions seek to increase female employment, gendered differences in education leads to a lack of qualified women – even when women have been shown to be as capable as men at performing job tasks (World Bank, 2009). Like many other countries in Africa,

DRC also has gender parity index (0.867) indicating severe gender disparities (UNESCO, 2012). Access to TVET centers in sub-Saharan Africa is difficult for poor and rural students as most TVET institutions are centered in capitol and large cities (World Bank, 2008). In secondary vocational and technical education - and within agricultural education in particular - gender is an important issue. In the DR Congo, agriculture is largely carried out by women. Nevertheless, women are hardly found in agricultural training programs that lead to qualifications and thus to a higher status and better pay. **Female enrollment in TVET in DRC as a % of total enrollment in secondary education is 33%** according to UNESCO, 2012b.

Weakness of TVET

Many students do not want to participate in TVET, as students and parents see TVET as a pursuit inferior to service jobs and other higher-education related positions (African Union, 2007). Issues such as lack of relevance of TVET programs in meeting labor market demands, low quality of curriculum and educational outcomes, lack of standards, ineffective skill delivery, and cost of schooling have contributed to under-enrollment in TVET programs (World Bank, 2008). The TVET institutions in [sub-Saharan Africa] continue to fall short in assessments of their relevance to economic and social needs, their effectiveness in delivering skills, and their cost and efficiency” (Johanson, 2004). **Only few TVET institutions are serving the needs of the agricultural sector. In the past ten years enrollment in agricultural TVET programs has been decreasing at all levels.** Many agricultural institutions in sub-Saharan Africa are directed at providing employees for governmental positions which have been decreasing with the decentralization of governments and the hiring of fewer civil service employees. World Bank (2007) highlighted that the funding for agricultural TVET programs has steadily been decreasing in favor of higher education, the curriculum is obsolete and irrelevant in relation to the economy, institutions are lacking appropriate staffing, and interest in agriculture as a career is declining.

Rural producer organizations (RPOs) and AET

If rural producer organizations could provide farmers with the essential services, they need to spur agricultural growth in DRC and other fragile and post-conflict states. The RPO organizations are groups such as farmer-based organizations, women’s organizations, youth organizations, local development groups, village associations, and unions or federations— that facilitate collective action in agricultural production, processing and marketing, and various aspects of rural livelihoods. The researchers found that RPOs are not a silver bullet when it comes to catalyzing development in the agricultural sector. They cannot entirely fill the vacuum of publicly-financed services in fragile states. In fact, the effectiveness of RPOs is limited, they need good governance and proper security to maximize benefits for their members; however they have the most to offer to the communities without these conditions, specifically when strong government institutions are largely absent.

Many studies reported that RPOs are most effective when they link with other potential sources of services, information, technical support, and market outlets; benefit from external support during setup; offer management and organizational training to their key officials; and have committed, active members. In addition, the report mentioned that understanding and addressing the sources and causes of conflict is crucial for developing and implementing successful agricultural and rural development strategies. RPOs can often contribute to the broader agricultural development of fragile and post-conflict states by bridging the gaps in service provision. With a focus on food security, the DRC worked hard to allocate 10% of the national budget to agricultural investments. Agricultural extension experts, who provide the training and support services for farmers to increase agricultural output, have been provided with the opportunity to share their experiences and advice as to where the DRC could make its next moves. Once it was a breadbasket of Africa, these untapped resources have the capacity to transform communities across central Africa according to Romero 2012.

In the DR Congo, VVOB (<http://www.vvob.be/vvob/en/programmes/dr-congo>) focuses on four result areas aiming to enable them to support the management of a number of pilot schools in the realization of female-friendly agricultural schools and a better integration of these schools in the local business sector, focused on the competence development of teachers, entrepreneurship, and internships.

1. The *Service National de Formation*. This is the Training Service of the Inspection Department of the Ministry of Education (*Ministère de l'Enseignement Primaire, Secondaire et Professionnel*). The responsibilities of *Service National de Formation* include the training of the provincial inspectors. These in turn provide training for the teachers in agricultural education. VVOB supports *Service National de Formation* in its capacities to assist the provincial inspection services in the realization of quality training for teachers in agricultural education. A competency-based approach, gender and environment receive special attention.

2. The National Control Service of the Inspection Department in strengthening the provincial inspection in order the latter can adequately evaluate the technical agricultural schools. Again, competency-based approach, gender and environment get special attention.

3. The *Direction des Programmes Scolaires et Matériel Didactique* in its substantive, organisational and logistical capacities to create didactic material that complies with the competency-based approach and include gender and environment, and to distribute it to the agriculture teachers.

4. The provincial inspection services in the education provinces of Bandundu 2, Kin Est and Bas Congo 2.

Frisbie (2014) states that the United Methodist Committee on Relief (UMCOR) is a prominent worldwide emergency relief organization in cooperation with Foods Resource Bank offers committed individuals a year of training in how to grow food. Author further explains that this training enabled many subsistence farmers as it pushes them toward technology and easier agricultural methods that use chemicals have devalued traditional, local knowledge of how to grow

nourishing food while also stewarding land and water resources. In the training organic methods such as composting, creating organic pesticides and seed preservation are emphasized. Thus, the training aims to help farmers by enabling them to ensure that the family has reliable access to food, health care, education and other life necessities that we take for granted.

Skills shortages and gaps

A history of instability has had a devastating impact on agricultural human resources in DRC. It lost a sizable number of skilled individuals, who may have been killed during the violence, left the country out of fear for their physical safety, or have fled in response to poverty and lack of future prospects. The government endeavors to train and enhance the agriculture sector, human resources already in place, but also to motivate, incentivize, and retain the personnel thus trained, including by adjusting wages upward in both the public and private sectors. Such increases in wages could have a beneficial impact by promoting the return of skilled persons who became expatriates for economic reasons. Similarly, the institutional capacities of the various structures need to be strengthened as well. All the institutions involved in the education and education management of the country needs to build their capacities, the planning and management tools, as well as the databases, and educational curriculum. Operating procedures and systems should be improved and adapted to new situations, making use of new information and communications technologies to this end. Gendered roadblocks to education and constraints for women in accessing to agricultural inputs, training, and assets have been identified by many developing countries as major issues affecting food security and development – particularly for women (World Bank, 2009). In some cases, efforts have been made to remove or improve the roadblocks that prevent students from pursuing and participating in agricultural education.

Agricultural education and training (AET)

The abandonment of the coercive food crop production system, poorly maintained transportation facilities, nationalization of commercial farms and inability of the research system to respond to new plant diseases are major factors leading to food shortages and malnutrition by the late 1960s. These conditions in turn led to the need for financial and technical assistance from outside the DRC including from the United States and international agencies. Various technical assistance projects targeted for the improvement of food crop production in the DRC included components for practical and academic training of indigenous agricultural scientists. These projects were responsible for educating the bulk of Congolese scientists receiving M.S. and Ph.D. degrees from universities in the U.S. and other developed countries. Active AET continued until 1991 when the next wave of political disruptions began that included stripping President Mobutu Sese Seko of most of his dictatorial powers in 1992.

This continuing wave of violence is considered the worst in modern history in terms of widespread population displacement and violence against civilians. Severe disruption of food production has caused massive food shortages. Agricultural research and outreach as well as AET have not only stagnated but previous gains continue to be lost as more experienced personnel retired. For example, the 65% of the DRC's ministry of agriculture personnel are past retirement age including scientists receiving academic training prior to initiation of the current violent conflicts (World Bank, 2010). There is no evidence that significant tertiary AET occurred during this era although, various agricultural recovery projects have been initiated and continued to offer tertiary AET for Congolese nationals and some offering secondary school AET as well (VVOB, 2014).

Challenges in AET

In Status Report on the National Education System (RESEN), World Bank (2005), identified four major problems that undermine access to and the quality of education in the DRC, namely:

1. Relatively poor coverage at the primary level, with sizable inequalities in terms of access and uncontrolled expansion at the secondary and higher education levels,
2. Serious deterioration in the quality of education at all levels,
3. A cumbersome and outmoded system of school administration, and
4. An extremely low spending level and an inefficient and inequitable financing system.

The Education Development Center, Inc. (EDC) has launched a package for improving education quality (PIEQ) project to improve French and math learning in the DRC. The PIEQ was supposed to build the capacity of teachers, schools, and communities in three Congolese provinces to improve student learning, teaching and the school environment. The \$40 million program, sponsored by the USAID, would reach 3,600 schools, 21,000 teachers, and 900,000 students. PIEQ would collaborate with DRC's National Ministry of Education to help primary school teachers learn and use effective teaching practices. A carefully designed course of professional development will build teachers' knowledge in their subject area and skills in student-centered teaching. In addition, PIEQ will extend an existing interactive radio instruction series from the current grade 1 and 2 programs through grade 6, ensuring that students receive quality daily lessons based on the Congolese curriculum and that teachers receive support in practicing the interactive techniques they learn in training. PIEQ will expand on the successes of the Pour une Approche Globale de l'Education (PAGE) program, which improved education quality in grades 1 and 2 in three Congolese provinces through community participation training, teacher professional development, interactive radio instruction programming, and education policy support. Among other measures of success, students in PAGE-supported schools were nearly twice as likely to receive a passing grade or better in math as students in non- interactive radio instruction schools, and nearly four times as likely to receive a passing grade or better in French.

TVET in conflict and post-conflict periods

War and conflict situations have destroyed the TVET delivery system in DRC. The TVET system in post-conflict countries is characterized by damaged infrastructure and inadequate human resources due to the death or displacement of instructors and other workers. Also, many households are headed by women. *Vocational training can therefore help reintegrate the victims of war and violence into mainstream society.* Since a good basic education enhances effective vocational training, combining literacy programs with livelihood skills training presents the best approach to skills development in post-conflict areas. Vocational training in these areas should therefore be delivered concurrently with the teaching of basic skills.

Non-formal TVET has the advantage of shorter duration, is occupation-specific, and may or may not follow the standard curriculum prescribed by national educational authorities. The emphasis is on acquisition of practical skills for direct employment. For this reason, skilled craftsmen with some pedagogical training may be engaged as instructors. However, the strategies and structures for formal and non-formal TVET delivery are similar in many respects. In particular, it is important that the two TVET systems are piloted by a single national coordinating body in order to facilitate articulation between the two systems and enhance coherence and better management of the entire TVET system. A number of policy issues are critical to the successful implementation of the TVET strategy. These include:

- the need to conduct an initial assessment of its national TVET system capacity,
- linkage of the TVET strategy with other national policies and strategies,
- linkage with relevant regional and international policies,
- instructor training and professionalization of TVET staff,
- funding and equipping of TVET institutions, and
- female participation in TVET.

Weak research and policy linkages

Reports suggest that the organizations with policy-relevant research are not well connected to the most influential people responsible for agricultural policy. These weak linkages can be seen in nearly all the organizations involved in creating agricultural policy in DRC. The strongest analytical potential in DRC lies with key universities, the Central Bank's Economic Research Department, and the Ministry of Planning. However, policy research and analysis are often not coordinated between these organizations, and research conducted by universities is carried out in isolation, with no bearing on the policymaking needs of the ministry. Within Ministry of Agriculture (MINAGRI), policy advice is provided by minister-appointed policy advisers, who are not connected, formally or informally, to university research. Likewise, the agricultural policy advisors of those with the highest influence have limited interaction with MINAGRI, universities, and other sources of

analytical work. There is very limited interaction between the ministries of budget and finance and MINAGRI and universities and other ministries that play a key role in agricultural strategies (Ministere de l'Agriculture et du Développement Rural, 2013).

Ragasa and et al (2011) emphasizes the lack of interaction between donors and relevant ministries and local universities in the research process. Research work funded by donors is often done by consultants, who report back to the donors but have limited interaction with ministry officials and do not work together with local researchers. Often, the ministry is consulted at the start of the research process but never gets involved in the research process and often does not see the research findings.

Conclusions

The available documents reveal that vocational training in a massive scale has been deemed a need that could reintegrate the victims of war and violence into mainstream society. Since a good basic education enhances effective vocational training, combining literacy programs with livelihood skills training presents the best approach to develop skills in post-conflict areas. Vocational training in these areas should therefore be delivered concurrently with the teaching of basic skills. Correspondingly, educational curricula, operating procedures, and systems should be improved and adapted to new situations, making use of new information and communications technologies to this end.

Given the scale of human resource development needs in the DRC emerging out of war, it will be necessary for governments to foster collaboration and partnerships with private sector training providers, including NGOs and RPOs. An intermediating organization like RPO would help connect the different stakeholder groups regionally and locally, and in sustaining successful TVET systems. The RPOs demonstrate how building the capacity of these organizations strengthens TVET results and helps sustainability because TVET programs require deep linkages among producers, industry, government, and educational institutions. These RPOs would work collaboratively with public and private partners to strengthen the relevance of basic education and vocational training, thereby increasing job opportunities in rural communities.

The focus on TVET provides a strategic framework for the development of national policies to address the challenges of technical and vocational training to support economic development and the creation of national wealth and contribute to poverty eradication. The TVET addresses the crosscutting issues of employability, relevance, collaboration between training institutions and employers, accreditation of training providers (in the formal, non-formal and informal sectors), assessment, certification and *quality assurance of training programs*, and portability of vocational qualifications across national boundaries.

In the last decade of post-conflict era, the DRC has maintained solid macro-economic growth, reduced inflation, and expanded exports of minerals. However, 6.4 million people countrywide are acutely food insecure. Besides academic institutions, formal ATE and TVET institutions could be key players in the process of modernization of agriculture in the DRC to increase agricultural production and productivity by supplying the needed skilled professionals in the agricultural workforce.

The facts and figures show that AET institutions have suffered from neglect as resources have declined and less attention has been paid in general to educational institutions, their functioning, human capital development, and facility management; for example, spending in research as a share of agricultural GDP was as low as 0.17%. Similarly, participation of women in research seemed to be only 9% despite their 50.7% share in the population. Moreover, full time researchers per 100,000 farmers are only 2.94 people, which implies that there is a high demand for trained manpower in the field of agricultural education and training.

Women have been increasingly underrepresented at all levels of AET institutions, from postsecondary to tertiary and higher education. Thus the gendered roadblocks preventing women from accessing education from primary school through secondary and vocational school should be removed if women are interested to participate and excel in agricultural education at vocational and higher education institutions.

Based on the various sources referred, this document acknowledges that the TVET alone does not provide enough jobs, resolve gender disparity or eradicate poverty. Good government policies do both. The strategy therefore should urge governments to create an economic environment that promotes the growth of enterprises and generally stimulates the economy. When businesses develop and expand, additional labor-market demands for technical and vocational training emerge, new job opportunities are created, more people get employed, and the incidence of poverty reduces. For this to happen on a sustainable basis, however, the TVET and ATE systems must be labor-market relevant, equitable, efficient, and of high quality.

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Appendix: Additional tables of reference

According to SAURA (2014), there were 380 institutions working in higher education. Of which, 59.74% are privately funded and only 1.05% publicly funded universities. A big chunk is specialized colleges (38.68%) funded publicly.

Table A: Type and number of higher education institutions in DRC

Type of higher education institutions	No. of institutions	%
Publicly funded universities	4	1.05
Publicly funded Polytechnics or specialized colleges	147	38.68
Privately funded, accredited universities or colleges	227	59.74
Other institutions	2	0.53
Total	380	100

Source: SARUA (2014)

Table B gives a comparison of personnel engaged in research activities in DRC with three other countries in the region. Of the four countries compared, DRC has achieved 25% growth in number of researchers and 13% of the total researchers were PhD degree holders.

Table B: Comparison of DRC research manpower with three countries in the region

Country	Total number of Researchers (2011)*	Growth in number of researchers (2008–2011)	Share of PhD researchers (2011)*
DR Congo	423.9	25%	13%
Rwanda	180.4	44%	12%
Burundi	132.3	32%	18%
Kenya	1,150.9	13%	32%

* Full time equivalent

Source: World Bank (2013).

Table C contains the finding of a survey to combat poverty in the DRC, where agriculture development stands on the top priority.

Table C: Selected areas to reduce poverty and food insecurity

Major areas that would contribute most to reducing poverty in the DRC.	Percentage of respondents (N =330)
Agricultural development	28.5%
Job creation/employment	27.6%
Economic growth	23.9%
Education	7.9%

Source: World Bank (2013).

Table D shows number of female students in comparison to the total students enrolled in agricultural program at various universities in DRC. Of the total students enrolled, 12.47% were female students.

Table D: Student enrollment and academic staffing at agricultural higher institutions in DRC

Institution	Established	Academic Capacity	Academic Staffing	Female Students	Total Current Enrolment
Catholic University of Bukavu	1989		12	55	167
Catholic University of the Graben	1989		35	6	14
Evangelical University in Africa	1991	300	13	43	
IFA - Yangambi	1971		39	204	2600
Kongo University	1990	486	32		10
National Teaching University			32		
Protestant University of Congo	1959				
Teaching institute of higher learning of Mbanza-Ngungu	1972		7		82
University of Goma	1993	500	32	24	215
University of Kinshasa	1954		67	39	286
University of Kisangani	1963		4	2	93
University of Lumbumbashi	1955	460	43	194	1079
University of Uele	1998	23	11		
Total		1769	327	567	4546

Source: SARUA (2014)