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.

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Executive Summary

The primary goal of the 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 Democratic Republic of Congo (DRC), where USAID has invested through Feed the Future initiative.

This report was prepared 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 agricultural education and training (AET) and technical and vocational education and training (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 (HICD) with short-term agricultural value chain economic growth. This report is being released now for comment after internal review and revision. It is hoped that it and other background reports that we have compiled will serve as a resource for efforts to improve AET capacity in the region and worldwide.
Introduction

The Democratic Republic of Congo 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 population 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. 80 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 report encompasses the current strengths and challenges facing the AET and TVET systems in 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 background, economy and the agricultural systems; and then describe the overall structure of the DRC educational system from pre-primary through tertiary and vocational education as supply side, as well as the needs for skills in agriculture and other economic sectors. The paper will end with a conclusion vis-à-vis potential and contribution to InnovATE scoping assessment.

The background information presented in this report suggests that agriculture is the most potential sector next to mining in the DRC. In general, DRC has seen 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. This report provides the first step to assess the critical challenges facing the AET system and identify potential ways forward for InnovATE to build capacity in AET in the DRC. The information analyzed in this study was used in preparation for the InnovATE team’s scoping visit to the DRC in August 2014.
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 percent of Congolese live on less than $1 USD 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 percent in 2006. 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. 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. IRIN 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. With 28 percent unemployment among the working population under 24 years of age, 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 percent and the underemployment rate at 81.7 percent. In general, unemployment and underemployment affect men and women in equal numbers regardless of their level of education. The labor market is also characterized by an employment rate that is relatively low in comparison to the average rate in sub-Saharan Africa: 63.1 percent (50.8 percent in urban areas as against 68.1 percent in rural areas). This situation mainly stems from a relatively late entry into the labor market due to more years of schooling. Women and men are equally involved in the labor market (African Development Bank, 2008).

Geography and Natural Environment
The DRC is rich in natural resources. Untapped deposits of raw minerals are estimated to be worth in excess of US $24 trillion. These include minerals such coltan, cobalt, diamonds, and copper. The DRC also has substantial oil reserves, close to 22 million hectares of natural forests, and a highly developed hydrographic network. The DRC’s geographic location, with a long Atlantic coastline and a deep-water port (Pointe-Noire), is strategic and can serve as a commercial gateway for the entire region. These assets have potential to help develop a strong economy, and raise the standard of living for the DRC’s citizens.

Economy
General
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. The mining sector, a major portion of the economy and the source of most export income, has also experienced corruption and a lack of transparency. However, this sector is experiencing renewed activity and has contributed to GDP growth in recent years. Much economic activity also takes place in the informal sector, which is not reflected in GDP data (CIA, 2014).

For the past five years, there has been strong GDP growth (5.8% on average). This growth comes from the non-oil sector, which has seen an annual average growth of 6.8% despite unstable oil production between 2008 and 2012. The country’s GDP is much smaller than its top trade partners and neighbors. Additionally, a much smaller percentage of the revenue comes from the service and Industry sectors, while a much
larger share is attributed to agriculture. 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 (CIA, 2014).

Table 1: GDP Sectors and Indicators by Country (2012)

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


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.

Exports
Total exports from the country totaled around $9.936 billion (USD) in 2013 and the top exports were diamonds, copper, gold, cobalt, wood products, crude oil and coffee (CIA, 2014). The main destinations for exports were China, Zambia and Belgium.

Table 2: Major Export Destinations 2012

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>(% of total exports)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>China</td>
<td>54.3</td>
</tr>
<tr>
<td>2</td>
<td>Zambia</td>
<td>22.6</td>
</tr>
<tr>
<td>3</td>
<td>Belgium</td>
<td>5.7</td>
</tr>
</tbody>
</table>

Source: CIA (2014).
**Imports**

Total imports to the country totaled more than $8.924 billion (USD) 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.

**Agricultural Economic Systems**

The DRC is primarily rural therefore agriculture remains the largest sector in terms of employment, with more than 70% of the population (around 40 million people) 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 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. Adequate water resources and arable land are available, however, a poor internal transportation system also 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 (FAO, 2012).

Intense food insecurity has worsened through decades of conflict, low agricultural productivity and migration out of rural areas and agricultural professions. 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 percent increase in food prices is estimated to increase the incidence of poverty at the national level by 5 percent 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

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>(% of total imports)</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>South Africa</td>
<td>22.3</td>
</tr>
<tr>
<td>2</td>
<td>China</td>
<td>15.3</td>
</tr>
<tr>
<td>3</td>
<td>Belgium</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>Zambia</td>
<td>6.9</td>
</tr>
<tr>
<td>5</td>
<td>Zimbabwe</td>
<td>5.6</td>
</tr>
</tbody>
</table>

Source: CIA (2014).
nutritional requirements, leaving the majority of the population with nutrient deficiencies, the most common being protein, iron or zinc (MacNeil, 2013).

Underinvestment in agricultural research and development is serious. 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 10,000 farmers are only 2.94, 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.

Roughly only 10% of arable land is cultivated (Herderschee, 2012). However, agricultural production has been declining, with cassava declining 23% between 1990 and 2006, and Katanga experiencing a decline of maize by 12% (World Food Programme, 2008). And while production per worker has increased, less people work in the agricultural sector (D’Haese, Banea-Mayambu, & Remaut-de Winter, 2013). Livestock is mostly in small scale operations, and only 18% of households own livestock (World Food Programme, 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, with estimates of 156 million working in the agriculture sector in 2010 (Herderschee, 2012). 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).

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 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 (Lapeyre et al., 2011). 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 (World Food Programme, 2008).

One clear constraint 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 (World Bank, 2010). More extension and research services and organizational support are needed to enhance farming techniques, and therefore smallholder productivity (World Bank, 2010).

**Supply Side for Education**

*History of Education*

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 are 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 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 technical and vocational training (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 percent in 1972 to 64 percent in 2002. In 2000/01, according to national sources, the rate stood at 33 percent for primary schools. Only 29 percent 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 percent in 2001/2002 as compared to 26 percent in 1977-1978, with an internal efficiency coefficient of 36 percent.
In addition, there has been: (i) deterioration in the school survival rate (25 percent) while the school completion rate is only 29 percent; and (ii) a low level of supervision and the existence of inequalities in gross enrollment ratios by gender (72.0 percent for boys and 56.0 percent for girls) and by place of residence (school admission rate of 71.6 percent in urban areas and 43.6 percent in rural areas). Moreover, postponed schooling affects more than 16.0 percent of boys as compared to 12.0 percent 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 USD 208 whereas a teacher now only earns an average of USD 67.

**Structure of Education**  
The education system in the DRC is governed by the law 25/95 of 17 November 1995 amending the School Act No. 008/90 of September 6, 1990 and on the reorganization of the education system. This law stipulates 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).

**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 primary enrollment: 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, is discussed in this section. The short cycle, or vocational training, is examined in the following section.

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 commun, provide common education before students split into three streams. These streams 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 (World Bank, 2005). 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.
**Vocational Education**
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 student 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 (Bashir, 2009). 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.

Enrollment in vocational schools is very low, 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 (Bashir, 2009).

TVET suffers from the weak connection between secondary and technical education (World Bank, 2008). Many students do not want to participate in TVET. Students and parents see TVET as a pursuit inferior to service jobs and other higher-education related positions (African Union, 2007). In addition, 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 (Verspoor, 2008). Those formal training
programs that are in place do not have sufficient funding. A World Bank assessment of Sub-Saharan TVET repeatedly stressed the need for hands-on training and upgraded facilities (2008). 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 (World Bank, 2008).

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 (African Union, 2007). One successful informal training program is the SNV Netherlands Development Organization, 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), and so companies typically create their own technical training institutions with customized curriculum (African Union, 2007). This is seen mostly with mining operations, which design their own curriculum and therefore focus on industrial skills (African Union, 2007). Outside of a formalized program, companies occasionally provide in-company or on-the-job training that focuses on refining a certain set of skills (African Union, 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, concurrently (African Union, 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).

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 (Diallo et al., 2012). 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).
However, 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.

Vocational training in massive scale has 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 skills development 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.

Enterprises, other employers and students show a lack of interest in technical and vocational education and training (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 strategy paper (GPRSP).

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 Centre interdisciplinaire pour le développement de l’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.

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. Subjects include mechanics, sewing, masonry/bricklaying, leatherwork, beauty care and hairdressing. 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. Several studies conducted by the department responsible for TVET noted the disastrous state of technical and vocational training and recommended solutions to revitalize this sector.

**Higher Education**

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 Ministere de l’Enseignement Superieur 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.

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 (World Bank, 2005). 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 (World Bank, 2005).

Higher education in the DRC is a mix of public and private provision, 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. 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). These institutions offer two cycles, or degree levels. Completion of the first, which lasts three years, is honored with a diplôme de graduat, while complete of the second, which lasts two years, is honored with a diplôme de licence (World Bank, 2005).

University education was originally intended to produce a “highly trained intellectual cadre which could undertake fundamental research in various disciplines” (World Bank, 2005). 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).

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 constitutes the primary constraint to educational quality. The average teacher-pupil ratio in the country is low at 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 remainder 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 (World Bank, 2005).

There are many privately and publicly funded polytechnics and specialized colleges in DRC, but only 4 state universities in total. These include the Universities of Goma, Kinshasa, Kongo, 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, Kinsangani, 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 indicates that only 3% of students are studying rural development, agricultural sciences, or veterinary sciences (World Bank, 2005).

Table 4: Enrollment by Subject for the Universities of Kinshasa, Kinsangani, Goma, and Lubumbashi

<table>
<thead>
<tr>
<th>Major Field of Study</th>
<th>Total Number of Students (Headcount)</th>
<th>Percentage of Total Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science, Engineering &amp; Technology</td>
<td>6,487</td>
<td>10%</td>
</tr>
<tr>
<td>Business, Management &amp; Law</td>
<td>19,841</td>
<td>32%</td>
</tr>
<tr>
<td>Humanities and Social Sciences</td>
<td>18,458</td>
<td>29%</td>
</tr>
<tr>
<td>Health Sciences</td>
<td>17,013</td>
<td>27%</td>
</tr>
<tr>
<td>Other</td>
<td>859</td>
<td>1%</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>62,658</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>


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, 2014)
describes a few such partnerships which focus on agricultural programs, including “a forestry program in the Faculty of Agronomy is offered in partnership with institutions in Canada; an experimental farm is run with help from institutions in China; and a laboratory renovation programme is under way in partnership with Indian institutions.” The SARUA (2014) adds, “The University is also involved with outreach into various DRC communities, most specifically in terms of food security and the development of fish farming.” (PADEM) is the Ministry of Higher Education and Universities’ reform agenda that started in 2003. The objectives of the PADEM are to:

- Upgrade professional and teaching careers;
- Reform and modernize the system of higher education and University; and
- Make the university a true center of excellence (World Bank, 2007).

The University of Lubumbashi (UNILU), 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. The university produces very few publications, but is seeking outside contacts to improve research, particularly for research in mining and metallurgy and in HIV/AIDS and blood transfusions (SARUA, 2014).

**Table 5: Number of students enrolled per subject of study at the University of Lubumbashi**

<table>
<thead>
<tr>
<th>Major Field of Study</th>
<th>Total Number of Students (Headcount)</th>
<th>Percentage of Total Students</th>
<th>Undergraduate degree/ diploma</th>
<th>Postgraduate degree/ diploma</th>
<th>Masters Degree</th>
<th>Doctoral Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Science, Engineering &amp; Technology</strong></td>
<td>2,972</td>
<td>14%</td>
<td>19,723</td>
<td>0</td>
<td>17</td>
<td>11</td>
</tr>
<tr>
<td><strong>Business, Management &amp; Law</strong></td>
<td>5,892</td>
<td>27%</td>
<td>3,892</td>
<td>0</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td><strong>Humanities and Social Sciences</strong></td>
<td>6,623</td>
<td>30%</td>
<td>2,440</td>
<td>0</td>
<td>30</td>
<td>34</td>
</tr>
<tr>
<td><strong>Health Sciences</strong></td>
<td>6,411</td>
<td>29%</td>
<td>5,594</td>
<td>0</td>
<td>49</td>
<td>14</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>21,898</strong></td>
<td><strong>100%</strong></td>
<td><strong>13,898</strong></td>
<td>0</td>
<td><strong>104</strong></td>
<td><strong>68</strong></td>
</tr>
</tbody>
</table>

**Research Need and Challenges in Higher Education**

Although universities employ a much higher (and younger) proportion of PhD-qualified agricultural scientists compared with 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, were they 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 CRAA, although most of this growth occurred among researchers trained to the BSc or MSc levels. Accounting for just 9 percent 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**

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Public Agricultural Research Spending</td>
<td>1,975.5</td>
<td>3,474.8</td>
</tr>
<tr>
<td>Congolese francs (million constant 2005 prices)</td>
<td>9.2</td>
<td>16.2</td>
</tr>
<tr>
<td>PPP dollars (million constant 2005 prices)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall Growth</td>
<td>76%</td>
<td></td>
</tr>
<tr>
<td>Total Number of Public Agricultural Researchers</td>
<td>340.4</td>
<td>423.9</td>
</tr>
<tr>
<td>Full-time equivalents (FTEs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall Growth</td>
<td>25%</td>
<td></td>
</tr>
<tr>
<td>Agricultural Research Intensity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spending as a share of agricultural GDP</td>
<td>0.10%</td>
<td>0.17%</td>
</tr>
<tr>
<td>Full Time Equivalent researchers per 100,000 farmers</td>
<td>2.44</td>
<td>2.94</td>
</tr>
</tbody>
</table>

Source: ASTI (2014).

Twenty public agencies conduct agricultural R&D in DRC. INERA (194 full time equivalent (FTE) researchers in 2011) is by far the largest and employs close to half the country’s agricultural researchers (in FTEs). INERA 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. Other
important government agencies include CRAA, CRH, and CREN-K, focusing on food technology, hydrology, and nuclear agriculture, respectively. The faculties of agriculture at UNIKIN and UNILU and the faculty of science at UNIKIS are DRC’s largest agricultural R&D agencies in the higher education sector.

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. Agricultural R&D conducted by the private for-profit sector is excluded from the synthesis in this factsheet. Some private agro-industrial companies based in DR Congo are known to conduct research on oil palm, chinchona (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 (BEFS, 2013).

Table 7: Institutional profile in Agricultural R&D (2011)

<table>
<thead>
<tr>
<th>Institution</th>
<th>Share of total country research</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Agricultural Study and Research Institute (INERA)</td>
<td>46%</td>
</tr>
<tr>
<td>Higher education</td>
<td>29%</td>
</tr>
<tr>
<td>Other government</td>
<td>25%</td>
</tr>
<tr>
<td>Nonprofit</td>
<td>0.5%</td>
</tr>
</tbody>
</table>

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%). (BEFS, 2013).

The gender distribution within these agricultural R&D institutions is predominantly male, 91%, with only 9% of the students female. (ASTI, 2014). This brings to light an issue of gender inclusion in both higher education and research institutions.

**Gender Participation in Schooling 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 is 10.7% (2010) and women in labor force are 70.2% (2011). Female participation in the private sector economy is lower than in most countries (World Bank, 2013).

Female inclusion in the private sector in DRC lags behind other countries in all measures of participation considered. 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. Women occupy only 2.8% of waged jobs, which are concentrated in farming, the informal sector and commerce (African Development Bank, 2008).

**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-size Congolese, and a few large foreign-owned firms, most of which are in the mining or telecommunications sectors.

Table 8: Results of the 2010 Investment Climate Assessment Survey

<table>
<thead>
<tr>
<th>Sector and location, by size of firm</th>
<th>Mean Number of workers</th>
<th>Mean age of firm</th>
<th>Mean years in formal sector</th>
<th>Number of Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Manufacturing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small</td>
<td>6.4</td>
<td>10.3</td>
<td>4.4</td>
<td>162</td>
</tr>
<tr>
<td>Medium</td>
<td>50.4</td>
<td>18.4</td>
<td>17.8</td>
<td>25</td>
</tr>
<tr>
<td>Large</td>
<td>286.9</td>
<td>41</td>
<td>39</td>
<td>13</td>
</tr>
<tr>
<td><strong>Service</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small</td>
<td>7.8</td>
<td>12.4</td>
<td>9</td>
<td>142</td>
</tr>
<tr>
<td>Medium</td>
<td>46.5</td>
<td>80.4</td>
<td>17.2</td>
<td>19</td>
</tr>
<tr>
<td>Large</td>
<td>577.2</td>
<td>29.6</td>
<td>17.8</td>
<td>14</td>
</tr>
<tr>
<td><strong>Out of Kinshasa</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small</td>
<td>7.1</td>
<td>11.2</td>
<td>6.5</td>
<td>172</td>
</tr>
<tr>
<td>Medium</td>
<td>41.7</td>
<td>127.5</td>
<td>13.4</td>
<td>6</td>
</tr>
<tr>
<td>Large</td>
<td>183</td>
<td>87</td>
<td>87</td>
<td>0</td>
</tr>
<tr>
<td><strong>Kinshasa</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small</td>
<td>7.3</td>
<td>11.9</td>
<td>7.4</td>
<td>132</td>
</tr>
<tr>
<td>Medium</td>
<td>51</td>
<td>20.2</td>
<td>19</td>
<td>38</td>
</tr>
<tr>
<td>Large</td>
<td>455.8</td>
<td>33.2</td>
<td>31</td>
<td>27</td>
</tr>
</tbody>
</table>

Source: Herderschee, et al. (2012). **Note:** Small firms employ fewer than 20 employees, medium-size firms employ between 20 and 100 employees, and large firms employ more than 100 employees.

The World Bank 2006 Investment Climate Survey suggests that 90% of all business activities are in the informal sector. Of this, 63.2% of business activities are in the retail and commercial sector, 14.8% in the industrial and manufacturing sector, and 12.3% are in the services sector. The economy has recently (since 2003) 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).

An ambitious list of infrastructure projects has bolstered the construction industry. It is estimate that the industry employed 71,000 people in 2005, and Herderschee et al., writing in 2012, expected the growth to continue over the next several years due to infrastructure projects. However, the industry struggles from a lack of skilled laborers. There is a need for skilled and semiskilled workers qualified to work as mechanics,
metal workers, and technicians, as well as managers. Lack of adequately trained intermediaries such as foremen and yard bosses is especially acute. While there are an adequate number of engineers, they are not knowledgeable of new technologies.

Forward linkages such as natural resource processing are less developed. The development of domestic natural resource processing is constrained by its need for a stable business environment and reliable infrastructure (Herderschee et al., 2012). Though a decree in 2003 demanded that all copper and cobalt must be processed before leaving, a 2004 report (Hayes & Burge) indicates that most ore leaves the country unprocessed. Additionally, large-scale mining companies are oftentimes owned by foreign companies/investors, further reducing foreign linkages.

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. It includes both the employed and the unemployed. 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 Document 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, and the use of participatory techniques and other community-based assessment and learning approaches.

African countries are working towards improving the quality and skills levels of their labor forces. 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 (the so-called “dual” training, involving a combination of work-place and institution-based training). Nevertheless, there are enormous measurement problems in looking at TVET from a statistical sense.

Opportunity for employment is also present in the mining industry, as is the constraint of an inadequately trained workforce. The mining industry plays an important role in the provinces of Katanga (copper and cobalt), North and South Kivu (cassiterite/coltan), Ituri (gold) and Kasai (diamonds) (World Bank, 2008). Since there are only a handful of cobalt producers and consumers, the market is more volatile than for most metals (Tsurukawa et al., 2011). The country is also home to 10% of world-wide copper resources and 80% of world-wide Coltan resources. Coltan, a term to refer to columbite–tantalite, belongs to a mineral group referred to as tantalum. 60% of tantalum is used in capacitors of electronic devices. Demand for the mineral has been increasing in the last 10-15 years, and the growth in demand is expected to continue (Bleischwitz et al., 2012).

While there are several large-scale mining operations in the country (in Kolwezi alone there are five internationally-listed mining companies and several medium-scale companies), the majority of the mining activity is artisanal and small-scale mining (ASM). PACT estimates that ASM is responsible for 90% of the mineral exported from the DRC (2008). It is estimated that 2 million people Congolese, or 15-20% of DRC’s population, work in ASM, and that ASM is responsible for 90% of the minerals that are exported from the country. This is not the case globally; global ASM is responsible for about 15% of world-wide mineral extraction.

Artisanal and small-scale miners are frequently trapped in a cycle of debt and have little market power due to the role of intermediaries (PACT, 2008; Cuvelier, 2011). Corruption is rampant, and miners must pay many legal and illegal ‘taxes’ (PACT, 2008). While artisanal mining is legal under the 2002 DRC Mining Code, most artisanal mining is illegal because it does not follow all of the stipulations of the code, which include only mining on land that is set aside for artisanal miners (PACT, 2010). Thus, artisanal miners are not protected when a mining company is granted mining concessions. Conflict over mines is rising as new foreign commercial actors seek exclusive rights to mines that have been granted to them by the
government, despite the long-standing presence of artisanal miners (PACT, 2008; CommDev, 2012). These miners are also vulnerable to market fluctuations and were acutely affected by the sharp fall in metals and minerals prices in late 2008.

Large-scale mining projects have the potential to play pivotal roles in catalyzing economic development and growth in the long-term. However, most of the benefit comes indirectly, from fiscal revenues and backward and forward linkages (Herderschee et al., 2012). Large mining operations are capital-intensive, requiring a small amount of skilled labor rather than a large amount of unskilled labor. Thus, large-scale mining operations will not employ the same volume of workers that are displaced by the project (PACT, 2010). Furthermore, there is a lack of sufficiently skilled labor to fill these positions.

Backward linkages from mining, or demand for goods and services from the sector, include transport, construction, and security services (Herderschee et al., 2012), as well as agricultural goods. Tenke Fungurume Mining (TFM), a project in Katanga, emphasizes its efforts to locally source goods (agricultural and non-agricultural) and services. The project claims to support farmers and small and medium-sized enterprises through providing training and access to credit (Lundin Mining, 2010; Chadwick, 2012). However, the Southern Africa Research Watch has criticized the operation for not supporting the local economy by bringing in workers from other regions who are housed in dormitories apart from the towns (SARW, 2011). Nevertheless, backward linkages are critical in order to maximize employment and economic growth from the mining sector. Entrepreneurship and vocational training, as well as increased access to financial services will support functional and productive backward linkages.

**Skills Shortages and Gaps**
A history of instability has had a devastating impact on agricultural human resources in the country. The DRC 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 sectors, 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, 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.

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 percent in 1960 to 2 percent in 2004, and this figure only represented payroll costs. The country has an insufficient number of technical and vocational schools, which only constitute 10 percent 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 percent of TVET costs are funded by families and students compared to 10 percent 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 enrolment 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 (USAID, 2012). There is a serious shortage of occupational skills, particularly with processing and marketing agricultural products (USAID, 2012). For engineers and mechanics, there is an
adequate supply of those with basic skills, but a shortage of those who are familiar with new technologies (Herderschee, 2012). 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 (Diallo et al., 2012). 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 (USAID, 2012).

Agricultural Education and Training

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 percent 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. Notwithstanding, various agricultural recovery projects have been initiated and continue to offer tertiary AET for Congolese nationals, some offering secondary school AET as well (VVOB, 2014).

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. Rural producer organizations (RPOs) 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. RPOs need good governance and proper security to maximize benefits for their members; however they have the most to offer 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 necessary 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.
breadbasket of Africa, this untapped resource has the capacity to transform communities across central Africa (IFPRI 2012).

**Challenges**

In 2002, a World Bank report titled “Status Report on the National Education System” (RESEN) 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 the Package for Improving Education Quality (PIEQ) project to improve French and math learning in the DRC. The PIEQ will 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, will reach 3,600 schools, 21,000 teachers, and 900,000 students. PIEQ will collaborate with DRC’s National Ministry of Education (NME) 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 (IRI) 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, IRI 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-IRI 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 country like 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 such as:

1. Functional literacy and numeracy,
2. Family life skills (parental care and domestic skills),
3. Human relations and inter-personal skills (interaction with others from different ethnic backgrounds),
4. Communication and language skills (learning of a second language in multi-lingual societies),
5. Human rights and good governance practices, and
6. Politics, culture, and history.

**TVET Priority Areas and Issues**

- Agriculture sector,
- Building and construction (including bricklaying and concreting),
- Carpentry and joinery,
- Welding and fabrication (manufacturing of simple agricultural implements and tools),
- Agriculture (crop production and animal husbandry),
- Electrical installation and electronic equipment repair,
- Car repair and maintenance,
- Water supply and sanitation systems maintenance, including domestic plumbing works,
- Handicrafts and traditional skills,
- Basic computer skills (word processing, data management, internet, etc.),
- Tourism-related skills (hotel management, tour guides, cooks, waiters),
- Business entrepreneurial skills and attitudes (including time management, marketing, basic accounting, micro-business management, joint ventures) (AU, 2007).

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;
- linkage with the world of work;
- 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 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 (the president, the prime minister, and the members of parliament) 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 the other ministries that play a key role in agricultural strategies (Ministere de l’Agriculture et du Développement Rural, 2013).

There is also 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. Finally, the relatively influential policy advocacy platforms, such as FEC and CARGs, the national federation of small and medium businesses (COPEMECO), and CNONGD, are also missing research linkages (IFPRI, 2011).
Conclusions

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 CBOs. It is also important to put in place post-training support services for graduates and provide for the psychological support of trainees who, in many cases, are victims of abuse and the trauma and violence of war.

Before investing in a country’s TVET system or structures, opportunities to make better use of existing resources need to be explored. Inefficiencies are typically associated with existing budgetary practices and weaknesses in planning, management, and oversight at macro and micro levels. Identifying these inefficiencies based on reliable data is necessary, especially in the light of strategic plans for TVET development in a country. Without data on existing weaknesses, innovative and well-managed programs will have only limited impact and little hope of being sustainable. The South Africa project is a good example of how to create sustainability. It is actively building connections between South African FET colleges and U.S. institutions that if continued over time, may provide positive externalities that can be sustained far beyond the life of the project.

An intermediating organization is a local organization that will help connect the different stakeholder groups. Intermediating organizations play a very important role in sustaining successful TVET systems. The ALEF project demonstrates how building the capacities of these organizations strengthens TVET results and helps sustainability. Technical and vocational programs require deep linkages among industry, government, and educational institutions. Because new expectations, habits, conversations, and relationships between previously disconnected stakeholders have to be built, nourished, and resourced, it takes far longer than a typical five-year project time horizon to see real results.

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.
This document acknowledges that vocational education and training alone does not provide jobs or eradicate poverty. Good government policies do both. The strategy therefore urges 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 system must be labor-market relevant, equitable, efficient, and of high quality.
References


SARUA. (2007). University of Lubumbashi enrollment [Chart].


Appendix: Additional Tables of Reference

Table A: Type and Number of Higher Education Institutions

<table>
<thead>
<tr>
<th>Type of higher education institutions</th>
<th>Number of institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Publicly funded universities</td>
<td>4</td>
</tr>
<tr>
<td>Publicly funded Polytechnics or specialized colleges</td>
<td>147</td>
</tr>
<tr>
<td>Privately funded, accredited universities or colleges</td>
<td>227</td>
</tr>
<tr>
<td>Other institutions</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>380</strong></td>
</tr>
</tbody>
</table>

Source: SARUA

Table B: Student Enrollment and Academic Staffing at Agricultural Higher Institutions in DRC

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

<table>
<thead>
<tr>
<th>Country</th>
<th>Total number of Researchers (2011)*</th>
<th>Growth in number of researchers, 2008–2011</th>
<th>Share of PhD Researchers (2011)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR Congo</td>
<td>423.9</td>
<td>25%</td>
<td>13%</td>
</tr>
<tr>
<td>Rwanda</td>
<td>180.4</td>
<td>44%</td>
<td>12%</td>
</tr>
<tr>
<td>Burundi</td>
<td>132.3</td>
<td>32%</td>
<td>18%</td>
</tr>
<tr>
<td>Kenya</td>
<td>1,150.9</td>
<td>13%</td>
<td>32%</td>
</tr>
</tbody>
</table>

* FTEs (Full time equivalent)

**Table D: Selected Areas to Reduce Poverty and Food Insecurity**

<table>
<thead>
<tr>
<th>Major areas that would contribute most to reducing poverty in the DRC.</th>
<th>Percentage of respondents (Responses =330)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural development</td>
<td>28.5%</td>
</tr>
<tr>
<td>Job creation/employment</td>
<td>27.6%</td>
</tr>
<tr>
<td>Economic growth</td>
<td>23.9%</td>
</tr>
<tr>
<td>Education</td>
<td>7.9%</td>
</tr>
</tbody>
</table>