

# SKILLS FOR PRIVATE SECTOR DEVELOPMENT

## Project Overview

**Burundi in the Agribusiness, Coffee and Energy  
Global Value Chains**



**Penny Bamber  
Andrew Guinn  
Gary Gereffi**

**Duke**

**CENTER on GLOBALIZATION,  
GOVERNANCE & COMPETITIVENESS**  
*at the Social Science Research Institute*

This report was prepared on behalf of the World Bank. It draws on primary information from field interviews in Burundi carried out in August-September 2013 and January-February 2014, as well as secondary information sources. Errors of fact or interpretation remain the exclusive responsibility of the authors. The opinions expressed in this report are not endorsed by the World Bank or the interviewees.

The final version of this report will be available at [www.cggc.duke.edu](http://www.cggc.duke.edu).

### *Acknowledgements*

Duke CGGC would like to thank all of the interviewees, who gave generously of their time and expertise. Duke CGGC would also like to extend special thanks to the World Bank for their contributions to the development of each of the sector reports. In particular gratitude is due to Cristina Santos, Senior Education Specialist, Reehana Rifat Raza, Senior Human Development Economist, Sajitha Bashir, Sector Manager, Education (Eastern and Southern Africa), and Ifeyinwa Onugha, Competitive Industries Practice – Financial and Private Sector Development, the World Bank Group, for their guidance and insightful comments on earlier drafts.

### *Duke University, Center on Globalization, Governance and Competitiveness (Duke CGGC)*

The Duke University Center on Globalization, Governance & Competitiveness (Duke CGGC) is affiliated with the Social Science Research Institute at Duke University. Duke CGGC is a center of excellence in the United States that uses a global value chains methodology to study the effects of globalization in terms of economic, social, and environmental upgrading, international competitiveness and innovation in the knowledge economy. Duke CGGC works with a network of researchers and scholars around the world in order to link the global with the local and to understand the effects of globalization on countries, companies and the full range of development stakeholders.

[www.cggc.duke.edu](http://www.cggc.duke.edu)

Center on Globalization, Governance & Competitiveness, Duke University

© February 2014

## Table of Contents

I. Introduction .....	1
II. Burundi in the Agribusiness, Coffee and Energy Global Value Chains .....	2
A. Burundi in the Agribusiness Global Value Chain .....	3
B. Burundi in the Coffee Global Value Chain .....	5
C. Burundi in the Energy Global Value Chain .....	7
III. Workforce Development to Support Upgrading in Burundi .....	9
A. Existing Workforce Development System .....	9
B. Labor Market Challenges to Workforce Development for GVC Upgrading .....	13
C. Recommendations .....	14
IV. Appendix .....	17
V. Select Bibliography .....	20

## List of Tables

Table 1. Overview of the Agribusiness, Coffee and Energy GVCs in Burundi .....	2
Table 2. Recommended Upgrading Trajectories for Burundi's Agribusiness GVC .....	4
Table 3: Recommended Upgrading Trajectories for Burundi's Coffee GVC .....	6
Table 4: Recommended Upgrading Trajectories for Burundi's Energy GVC .....	8
Table 5: Total Number of Educational Programs, by Sector and Level of Instruction, 2013 .....	9
Table 6. Key Workforce Development Challenges in the 3 GVCs .....	14
Table 7. Key Recommended Workforce Development Actions to Drive Upgrading .....	15
Table 8. Sector-Specific Recommendations to Support Upgrading in GVCs .....	15
Table 9. Job Profiles in Agribusiness Value Chain .....	17
Table 10. Job Profiles in the Coffee Global Value Chain .....	18
Table 11. Job Profiles in the Electrical Energy Global Value Chain .....	19

## List of Figures

Figure 1: Burundi in the Agribusiness GVC Source: Authors .....	3
Figure 2. Burundi in the Coffee GVC .....	5
Figure 3. Burundi in the Electrical Energy GVC .....	7
Figure 4. Global Value Chains and Skills .....	12

## I. Introduction

Since the end of the conflict in the early 2000s, Burundi has experienced several years of modest growth, improved political stability and a more capable enabling institutional environment. As a result, the country is now in a position to actively promote economic development, employment generation and poverty reduction. Three industries that will prove crucial to the country's development are agribusiness, coffee and energy. Agribusiness supports the livelihood of the vast majority of the population and presents important opportunities to generate export revenue, although these have thus far remained unrealized. The coffee sector is currently the country's largest export earner; however, declining productivity and global price volatility could undermine its long-term economic sustainability, despite near-ideal growing conditions. The energy industry serves as an important enabler of economic development throughout the economy, yet capacity within the sector remains highly underdeveloped.

The Skills for Private Sector Development Project was thus formulated to identify specific strategies for upgrading within these industries, in order to help Burundi promote its development and generate export earnings while expanding employment, particularly for youth, and raising incomes. This project employed the global value chain (GVC) framework to identify sector-specific opportunities for upgrading Burundi's participation in agribusiness, coffee and electrical energy value chains.<sup>1</sup> A GVC describes the full range of activities required to bring a product from conception to consumption. The GVC framework examines the shifting organization of global and regional industries by analyzing the characteristics and dynamics of different actors involved in these activities, including lead firms whose requirements shape the terms by which other actors participate, and local suppliers who seek to "upgrade", or capture more value from their contributions to the chain (Gereffi & Fernandez-Stark, 2011). While numerous factors help to support upgrading within the chain, a vital prerequisite for upgrading is workforce development (WFD) (Gereffi, Fernandez-Stark, & Psilos, 2011). Improving productivity in production processes, employing new and increasingly sophisticated technologies, and marketing higher value-added products requires that workers within a given industry acquire new skills (Gereffi et al., 2005). In the resource-scarce context of least developed countries, using the GVC approach to identify the specific skills required for upgrading facilitates a more efficient distribution of scarce resources to drive growth, in contrast to the prevailing supply-driven approaches that seek to train workers with little consideration of the market demand for the skills needed in specific industries. By outlining a demand-driven program for education and training, the GVC approach used in this Skills for Private Sector Development project can serve as a useful basis for policy makers, development partners and private sector actors engaged in WFD in Burundi.

This project executive summary provides an overview of the key findings from each of the industry-specific reports written for the Skills for Private Sector Development Project. The findings for this new GVC-WFD methodology come from a combination of desk research and field-based interviews in Burundi.<sup>2</sup> For each of the industries, the sectors were first analyzed to understand the structure of the GVCs and where Burundi is currently positioned to identify how the country can competitively improve its positioning in each sector through prioritized and feasible upgrading strategies.<sup>3</sup> Next, the key job profiles required for each upgrading strategy were identified through comparisons with other countries already occupying higher value positions within each chain. Burundi's current capacity to provide this training through existing institutions was then assessed. Finally, recommendations were provided for ways that

---

<sup>1</sup> The GVC approach is global in its scope, that is, it examines industries from a global perspective, allowing one to fully understand how a wide range of actors in different countries participate in a particular sector and how the sector can evolve in varying contexts. The particular geography of a value chain, however, can be local, regional or global depending on factors such as location of production, services and the final end-markets.

<sup>2</sup> This methodology was developed by the Duke Center on Globalization, Governance and Competitiveness (Duke CGGC) <http://www.cggc.duke.edu/gvc/workforce-development/>.

<sup>3</sup> Our findings are detailed in each individual report. In this short summary, we focus on the specifics of where Burundi is and the potential upgrading trajectories available to it.

Burundi's National Skills Development Policy can leverage existing WFD institutions and promote new initiatives to support the upgrading trajectories identified for each of the industries.

## II. Burundi in the Agribusiness, Coffee and Energy Global Value Chains

The first step of the GVC approach to demand-driven WFD requires a highly specific mapping of activities and workers capabilities within each sector, and its role in the larger domestic economy. As indicated in Table 1, each sector accounts for vastly different levels of employment and serves a different function within Burundi's socio-economy. For example, agribusiness provides the highest employment potential, while energy – although providing the fewest direct jobs – is essential for the development of all other sectors in the country. In general, although Burundi exhibits strong growth drivers, such as climatic and geographic conditions in all three sectors, current GVC participation continues to be concentrated in low-value segments of the chains, and policy changes and government action will be required to facilitate upgrading in the future. Furthermore, in addition to the skills development required for upgrading within each GVC discussed later in the report, other constraints, which vary according to the chain, must also be overcome.

**Table 1. Overview of the Agribusiness, Coffee and Energy GVCs in Burundi**

	<b>Agribusiness</b>	<b>Coffee</b>	<b>Energy</b>
<b>Estimated Employment</b>	7.9 million	1.0 million -1.6 million (high degree of overlap with agribusiness)	1,120
<b>Key contribution to country/economy</b>	Employment & food security	Principal export earner (\$66 million in 2012)	Required for all other industries; significant supply shortage, imports using key foreign exchange.
<b>Current GVC participation</b>	Production, artisanal processing, limited industrial processing	Production, wet processing, milling	Generation (weak), transmission (weak), distribution (weak)
<b>Key strengths to drive growth</b>	<ul style="list-style-type: none"> <li>• Good climate</li> <li>• Low labor costs</li> <li>• Strategic location for regional exports</li> </ul>	<ul style="list-style-type: none"> <li>• Ideal climatic &amp; geographic conditions</li> <li>• Low labor &amp; land costs</li> <li>• Experience &amp; infrastructure in wet processing</li> </ul>	<ul style="list-style-type: none"> <li>• Abundant hydro and solar resources for renewable energy generation</li> <li>• Strong domestic demand to drive growth</li> </ul>
<b>Key constraints to growth</b>	<ul style="list-style-type: none"> <li>• Weak statistics</li> <li>• Land tenure</li> <li>• Access to finance</li> <li>• Weak rural infrastructure</li> <li>• Soil degradation</li> <li>• Poorly developed SPS regulatory system</li> </ul>	<ul style="list-style-type: none"> <li>• Weak rural infrastructure</li> <li>• Soil degradation and access to fertilizer &amp; mulch</li> <li>• Access to finance</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of clarity in legal framework</li> <li>• Capacity constraints at ministerial level</li> <li>• Lack of autonomy of lead firm</li> <li>• Access to finance</li> <li>• Weak statistics</li> </ul>

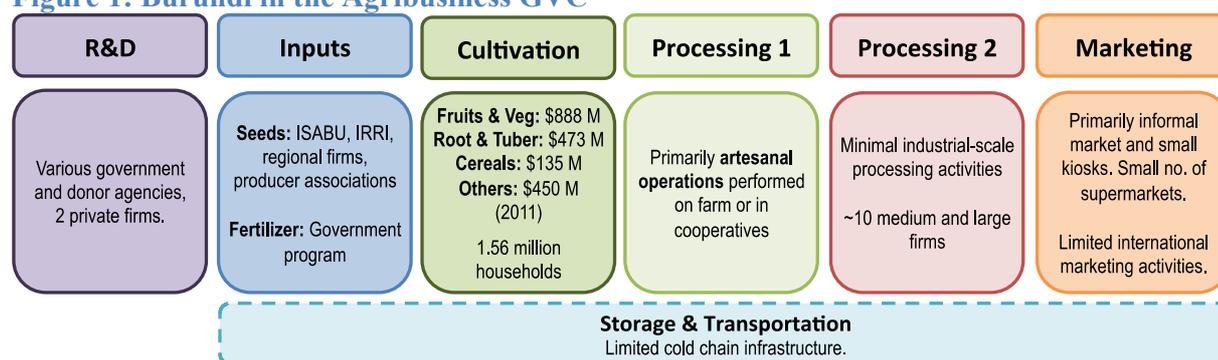
Source: Authors.

The following sections provide an overview of Burundi's position within the agribusiness, coffee and energy value chains, including a description of Burundi's activities at each stage of the chain and a consideration of major constraints to growth and development. This discussion is followed by tables describing both recommended upgrading strategies as well as the job profiles that must be introduced or improved in order to enable upgrading. A complete list of job profiles required to support upgrading, including those that will need to be introduced anew to the country and those that need to be scaled up in number, can be found in Tables 9, 10 and 11 in the Appendix. These tables also indicate the level of education required of workers in each job.

## A. Burundi in the Agribusiness Global Value Chain

The agribusiness GVC encompasses the full range of activities to bring an agricultural product from production to its final consumption (see Figure 1). The sector contains a diverse set of products that vary considerably in terms of downstream value-added activities, supporting services, and required skill sets and technologies. Burundi's main agricultural products are fruits & vegetables, root and tuber crops, sugarcane and palm fruit (FAO, 2013). With favorable geographic and climatic conditions and growing domestic demand for these products, the sector should be well positioned for growth. However, agribusiness chains in the country remain poorly suited to meet food security goals or expand value-added exports: locally produced agribusiness items are not competitive abroad, linkages throughout the chains are weak, post-harvest processing is absent or inefficient, and the domestic market remains largely informal and fragmented.

**Figure 1: Burundi in the Agribusiness GVC**



Source: Authors.

Key challenges to the development of agribusiness chains include a poorly developed input sector, low and declining productivity, lack of storage and processing capabilities, and an absence of organized downstream markets. In the inputs segment, prevailing post-conflict institutional challenges, characterized by weak farmer demand and heavy reliance on international assistance, constrain the emergence of a sustainable commercial inputs sector. Local supply of other essential inputs such as market-oriented extension services, farming equipment, and irrigation technologies is virtually non-existent. In turn, cultivation is dominated by subsistence smallholder farming system, which is threatened by low and declining productivity, small harvests and only a fraction of production is destined for markets. Adding to these challenges, underdeveloped post-harvest capabilities, including packaging and storage systems for fresh produce, result in high losses of perishable products, increasing food security risks and increasing dependence on often expensive, imported food products.

While a handful of competitive medium and large processing firms have emerged, most processing activities are performed by individual producers or cooperatives with very limited economies of scale and lack of access to modern technologies. Other important cross-cutting challenges constraining investment include: unreliable statistics and market information; lack of freehold land tenure due to communal ownership; weak transportation and quality certification services; and severe soil degradation linked to high population density and expanded cultivation on steep and unterraced land.

Given these challenges to competitiveness, Burundi should not yet focus on agribusiness exports to high-value markets in the short-term, but rather prioritize improving productive capacity and competitiveness in domestic and regional markets. Table 2 outlines three specific upgrading strategies to improve Burundi's performance in the agribusiness sector and foster increased private sector investment. In order for the agribusiness industry to adapt to these upgrading strategies, improvements to the country's workforce development institutions will be necessary, including developing new job profiles and improving existing job profiles.

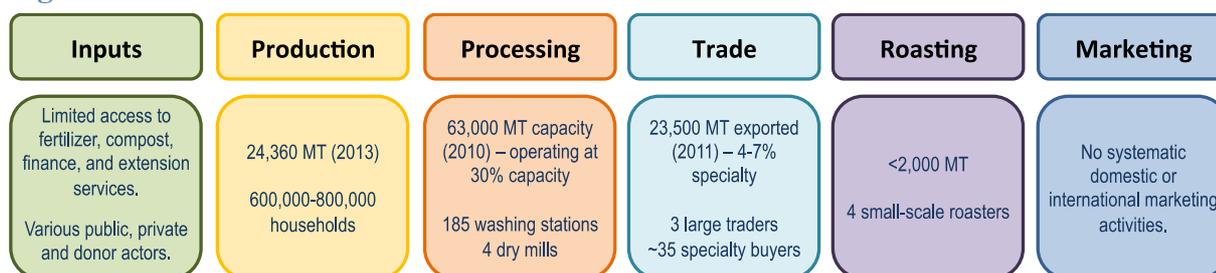
**Table 2. Recommended Upgrading Trajectories for Burundi’s Agribusiness GVC**

<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>PROCESS UPGRADING</b></p>		<p><b>Description:</b> Upgrade production skills and practices to improve productivity and sustainable use of land and water resources. Key process improvements include microfertilization, small-scale irrigation, minimum tillage and direct planting, and land terracing.</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• Increases productivity and farmer income</li> <li>• Lowers risk &amp; financial cost of technology options to smallholders</li> <li>• Reduces soil erosion and restores land fertility</li> <li>• Generates off-farm employment opportunity in rural areas</li> </ul>	<p><b>Required New Job Profiles:</b></p> <ul style="list-style-type: none"> <li>• Irrigation Technician (Production)</li> <li>• Soil Erosion Control Technician (Production)</li> <li>• Nursery &amp; Seed Multiplication Staff (Production)</li> </ul> <p><b>Job Profiles Requiring Improvements and/or Increase in Supply:</b></p> <ul style="list-style-type: none"> <li>• Agronomist (Research)</li> <li>• Extension agents (Production)</li> </ul>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>FUNCTIONAL UPGRADING: PROCESSING</b></p>		<p><b>Description:</b> Upgrade processing capabilities for staple crops, prioritizing cassava. Includes introduction of new technologies and strengthening linkages in the value chain.</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• Reduces post-harvest loss</li> <li>• Increases staples farming income</li> <li>• Reduces dependence on wheat imports</li> <li>• Experienced with proven success in SSA</li> </ul>	<p><b>Required New Job Profiles:</b></p> <ul style="list-style-type: none"> <li>• Mobile Unit Operator (Processing)</li> </ul> <p><b>Job Profiles Requiring Improvements and/or Increase in Supply:</b></p> <ul style="list-style-type: none"> <li>• Business/Operations Manager (Processing)</li> <li>• Warehouse Manager (Processing)</li> <li>• Marketing/Distributors (Marketing)</li> <li>• Collector/Aggregators (Processing)</li> </ul>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>FUNCTIONAL UPGRADING: PACKING &amp; COLD STORAGE</b></p>		<p><b>Description:</b> Upgrade storage, processing and packaging capabilities in high potential fruit and vegetables sector, including the introduction of cold chain facilities.</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• Reduces post-harvest loss</li> <li>• Reduces seasonality of local markets</li> <li>• Increases sale price at farmgate</li> <li>• Strengthens local capabilities for regional export</li> <li>• Improves export positioning to high-value markets</li> </ul>	<p><b>New Job Profiles Required:</b></p> <ul style="list-style-type: none"> <li>• Cold Unit Manager (Packing &amp; Storage)</li> <li>• Cold Unit Operator/Technician (Packing &amp; Storage)</li> <li>• Packer (Packing &amp; Storage)</li> <li>• Quality Control Technician (Processing)</li> </ul> <p><b>Job Profiles Requiring Improvements and/or Increase in Supply:</b></p> <ul style="list-style-type: none"> <li>• Mechanic/Machine Operator (Processing)</li> </ul>

## B. Burundi in the Coffee Global Value Chain

The coffee GVC includes the span of activities required to grow, process and globally market coffee to consumers throughout the world. Burundi has a long history of coffee production, even during the crisis, and developments in Burundi's coffee sector have important implications for the country's aggregate export earnings and for job growth. The sector generates about 80% of total foreign exchange earnings, and more than one million people are engaged in coffee cultivation (UNIDO, 2013; USAID, 2013). While Burundi has long maintained a strong presence in the production and processing stages of the coffee value chain (see Figure 2), weaknesses in other segments of the chain, including poor quality inputs and a near-total absence of marketing activities, undermine employment generation and minimize potential value-capture.

**Figure 2. Burundi in the Coffee GVC**



Source: Authors.

Most of Burundi's employment in the coffee value chain can be found in the production segment, where between 600,000 and 800,000 households are engaged in coffee cultivation on a smallholder model during a given growing season. Despite a number of competitive advantages at this stage of the chain, including ideal biophysical conditions and low land and labor costs, productivity remains 30% of global averages (ICO, 2013) and net incomes for producers are declining amidst falling annual production volumes and fluctuating world prices for commodity coffee. Limitations on the input side, including access to fertilizer and organic compost and the quality and cost of extension services, constrain the ability of farmers to increase productivity and to improve the quality of their crops. While the processing infrastructure, including 185 coffee washing stations (CWSs), is generally strong, existing marketing channels with global buyers and specialty roasters remain weak, as in many other EAC countries years (UNIDO, 2013; USAID, 2013). This lack of marketing acumen, both at the CWS and country levels, means that even high quality coffee is sold into lower-value commodity market with highly volatile prices. This in turn undermines incentives for farmers to invest in improving the quality of their product. With respect to roasting activities in Burundi, given prevailing low levels of domestic and regional coffee consumption, combined with distance from major markets and product perishability, activities within this segment of the chain are likely to remain limited.

In order to overcome these constraints, Burundi should focus on strategies that will enhance productivity and net higher prices while promoting environmental and economic sustainability. Table 3 provides an overview of three upgrading trajectories for the short-medium term that will collectively enable producers to improve output levels, access higher value 'specialty' niche markets to substantially increase revenues, minimize waste and environmental impact, and increase sector employment. A critical precondition to the success of these strategies is enhancing specific workforce skills through adequately tailored training programs at multiple stages of the value chain – specifically those beyond the reach of formal education -- and the creation or expansion of new and existing job profiles essential to the coffee sector.

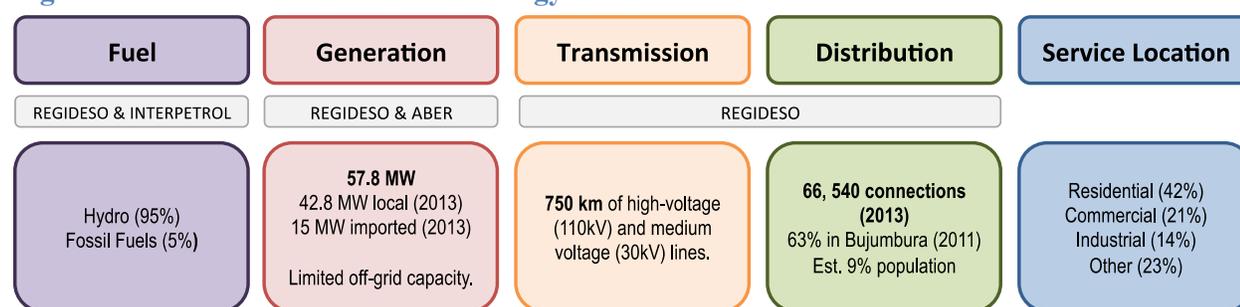
**Table 3: Recommended Upgrading Trajectories for Burundi’s Coffee GVC**

<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>PROCESS UPGRADING IN PRODUCTION</b></p>		<p><b>Description:</b> Upgrade production and harvesting techniques, including introduction of good agricultural practices (GAP) to drastically improve low productivity levels in commodity coffee cultivation.</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• Increased yield and quality of coffee improves revenue for smallholders</li> <li>• Mitigate negative effects of price volatility on exiting producers</li> <li>• Stabilized and/or increased coffee sales helps secure foreign exchange revenue</li> <li>• Streamlined and more sustainable production; spillovers of GAPs to other agribusiness products</li> </ul>	<p><b>Job Profiles Requiring Improvements and/or Increase in Supply:</b></p> <ul style="list-style-type: none"> <li>• Extension Agents (Production)</li> <li>• Nursery Staff (Production)</li> <li>• Transporters (Production)</li> </ul>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>PRODUCT UPGRADING INTO SPECIALTY COFFEE</b></p>		<p><b>Description:</b> Upgrade coffee quality and harvesting skills to achieve ‘specialty grade’, facilitating the creation of a high-value niche supply in Burundi without the cost of expensive certification.</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• Increase in quality of coffee produced can lead to higher incomes</li> <li>• Attract youth participation in both on- and off-farm activities</li> <li>• Promote off-farm employment in processing and quality management activities</li> <li>• Promote employment in organizations providing training and extension services</li> </ul>	<p><b>New Job Profiles Required:</b></p> <ul style="list-style-type: none"> <li>• Quality Control/Grader (Production &amp; Trading)</li> <li>• Quality Manager/Technician (Processing)</li> <li>• Coffee Cupper/Evaluator (Processing &amp; Trading)</li> <li>• Marketing Personnel (Marketing)</li> </ul> <p><b>Job Profiles Requiring Improvements and/or Increase in supply:</b></p> <ul style="list-style-type: none"> <li>• Extension agents (Production)</li> </ul>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>ENVIRONMENTAL UPGRADING IN PROCESSING</b></p>		<p><b>Description:</b> Upgrade water management techniques at CWSs to reduce waste and chemical runoff, improve sustainability, contribute to supply of soil management inputs and, meet demands for market access.</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• Reduce operating costs</li> <li>• Promote water conservation</li> <li>• Diminish health risks through proper handling</li> <li>• Improve access to specialty niche markets</li> <li>• More coordinated management and monitoring increases value added within the chain</li> </ul>	<p><b>New Job Profiles Required:</b></p> <ul style="list-style-type: none"> <li>• Waste Manager &amp; Composter (Wet Processing)</li> <li>• Equipment Installation and Maintenance Worker (Wet Processing)</li> <li>• Environmental Regulators &amp; Enforcement Officers (Regulation)</li> </ul>

### C. Burundi in the Energy Global Value Chain

The electrical energy value chain encompasses the range of activities required to generate and distribute electricity. Burundi's footprint in the electricity GVC is relatively limited (see Figure 3), despite the size of its population and the country's plentiful but largely untapped potential hydropower and solar resources. While a number of new domestic and regional generation projects are under consideration, Burundi's generation, transmission and distribution infrastructure remains inadequate as a result of years of conflict and underinvestment. Nearly half of the country's energy must be imported from abroad, and existing electricity supply serves less than 10% of the population, reaching virtually none of the rural population (GTDSE, 2013; MEM, 2013). Current capabilities for supplying off-grid electricity using alternative energy sources are limited. Developing the energy value chain is a crucial priority for the country's economic and social development, given the sector's role in enabling economic growth and enhancing access to health and education.

**Figure 3. Burundi in the Electrical Energy GVC**



Source: Authors

Activities within the energy value chain are carried out by a small number of key actors. The country's publicly owned electrical and water utility, REGIDESO, is currently responsible for the majority of activities within the chain and accounts for approximately 70% of total jobs in the sector. The private sector, concentrated in solar energy services, comprises roughly 25% of employment in the sector (250 jobs), though increased participation of private actors remains constrained by continued uncertainty in the regulatory framework. Although initiatives are underway to improve this framework and encourage further private sector investment in generation and distribution, donors play an important role in providing capacity building and finance for the sector.

In spite of currently limited capabilities within the electricity value chain, there are many opportunities for Burundi to develop its energy supply infrastructure and expand access to electricity through the development of hydro power and solar resources, and participation in regional power generation and transmission initiatives (GTDSE, 2013). Taking full advantage of these opportunities will require overcoming a number of tractable, if challenging, limitations including: poorly maintained infrastructure; lack of finance; weak institutions at the regulatory, policy and operational levels; and a mismatch between skills provision and equipment availability. In order to increase energy supply and expand access to electricity, Burundi should pursue a complementary set of upgrading strategies, including the rehabilitation of existing assets, extension of the grid, and expansion of off-grid capabilities. Though some progress has been made by public, private and donor organizations in the country in implementing these improvements, continued development is hampered by weak workforce institutions. Descriptions of the three upgrading trajectories, as well as corresponding improvements and additions to the existing set of job profiles in the sector, are described in Table 4.

**Table 4: Recommended Upgrading Trajectories for Burundi’s Energy GVC**

<p><b>REHABILITATION OF GRID &amp; EXISTING GENERATION PLANTS</b></p>		<p><b>Description:</b> Reconstruct and provide maintenance for damaged sections of the transmission and distribution grid; repair existing hydroelectric facilities.</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• Reduce technical losses, which currently account for up to 30% of generating capacity</li> <li>• Reduce deficit in generation capacity</li> <li>• Direct and indirect employment generation</li> <li>• Build up skills which can be used for ongoing maintenance projects</li> </ul>	<p><b>Job Profiles Requiring Improvements and/or Increased Supply:</b></p> <ul style="list-style-type: none"> <li>• Electrical Engineers</li> <li>• Electrical Technicians</li> <li>• Dispatchers (Distribution)</li> <li>• Project Managers</li> </ul>
<p><b>EXTEND TRANSMISSION AND DISTRIBUTION NETWORK</b></p>		<p><b>Description:</b> Promote access to electricity in and around urban areas through extensions and improvements to transmission and distribution network.</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• Expand access to electricity for both households and firms in and near key urban areas such as Bujumbura, Gitega and Ngozi</li> <li>• Improve distribution of power from new domestics generation projects to drive development in agribusiness, and mining, etc.</li> <li>• Improve integration with regional power-sharing partnerships in East Africa, increasing</li> <li>• Direct and indirect employment generation</li> </ul>	<p><b>Required New Job Profiles:</b></p> <ul style="list-style-type: none"> <li>• Geographic Information System (GIS) Analysts</li> </ul> <p><b>Job Profiles Requiring Improvements and/or Increased supply:</b></p> <ul style="list-style-type: none"> <li>• Electrical Engineers</li> <li>• Electrical Technicians</li> <li>• Dispatchers (Distribution)</li> <li>• Project Managers</li> <li>• IT Operator (Distribution)</li> </ul>
<p><b>EXPAND OFF-GRID GENERATION CAPABILITIES</b></p>		<p><b>Description:</b> Build and operate new solar and micro-hydro generators, especially in rural areas where it is not cost-effective to extend the bulk grid.</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• Improve rural quality of life</li> <li>• Reduce deficit in generation capacity</li> <li>• Promote productive rural employment</li> <li>• Promote new business formation</li> <li>• Diversification of fuel sources towards renewables</li> </ul>	<p><b>Job Profiles Requiring Improvements and/or Increased supply:</b></p> <ul style="list-style-type: none"> <li>• Entrepreneurs</li> <li>• Solar panel installer &amp; maintainer (Generation)</li> <li>• Micro-hydro installer</li> <li>• Electrical technicians</li> <li>• Electricians</li> </ul>

### III. Workforce Development to Support Upgrading in Burundi

Adequately forecasting future job creation and the corresponding skills requirements – that is, matching the demand for labor with supply – is a process that is still unresolved, even in much of the industrialized world (Gereffi, Fernandez-Stark, Bamber, et al., 2011). The new GVC-oriented approach to WFD used in this project provides a conceptual and analytic basis upon which to forecast labor demand in individual sectors, based on context-specific upgrading trajectories. However, a key complication that arises is that while GVC upgrading strategies are sector specific, the education and training sector is typically cross-cutting in terms of its infrastructure, programming and policy outlook.

To facilitate the implementation of the strategies highlighted in earlier sections, it is important to strike a balance between these two orientations, highlighting issues of specificity where they are important, but also identifying cross-cutting challenges and recommendations that correspond with the concerns of education policymakers at a higher level. This section analyzes the existing WFD system in Burundi and the main challenges that face this system to support the human capital needs for upgrading listed in Tables 2, 3, and 4. The section closes with key recommendations to overcome these challenges and mobilize the existing WFD structure to ensure that skills deficiencies do not inhibit the country's upgrading potential.

#### A. Existing Workforce Development System

The existing formal education and WFD system in Burundi that contributes human capital to the three sectors can be organized into six key categories: (1) primary; (2) vocational; (3) professional; (4) technical secondary; (5) general secondary; and (6) university. Given the general (rather than practical or industry-specific) nature of education at the primary and secondary levels, this report focuses on programs in vocational, professional and technical schools as well as universities, including institutions in both the private and the public sector. The number of programs offered relevant to the agribusiness, coffee and energy sectors can be found in Table 5.<sup>4</sup> Given the high level of overlap in skill requirements in agribusiness and coffee, educational programs focusing on these industries are grouped together.

**Table 5: Total Number of Educational Programs, by Sector and Level of Instruction, 2013**

Type of Institution	Level of Education, Duration	Qualification Received	No of programs relevant to Agribusiness/ Coffee	No of programs relevant to Energy <sup>c</sup>
<b>Vocational</b>	Post-primary, 3-month modules <sup>a</sup>	Certificate CM/CPF <sup>a</sup>	1	15
<b>Professional</b>	Post-primary, 3-month modules <sup>a</sup>	Certificate CM/CPF <sup>a</sup>	0	4
<b>Technical</b>	Secondary, 3-4 year programs	A2, A3 <sup>b</sup>	7	42
<b>University</b>	Post-secondary, 4 year programs	Bachelor's degree (Masters programs to be introduced).	7	5

<sup>a</sup> Modular education system currently being implemented. Some schools (especially private ones) still use a 2-year system for vocational and professional programs. Qualifications include a *Certificat Modular* (CM, Modular Certificate) or *Certificat de Formation Professionnelle* (CPF, Professional Training Certificate).

<sup>b</sup> The A3 degree will be phased out by 2016; <sup>c</sup> these figures do not include IT training programs which train a small number of bottleneck positions in the industry.

Sources: (MEBSEMFP, 2012; MESRS, 2013; Université du Burundi, 2013)

<sup>4</sup> Further information including the specific types and locations of programs can be found in the detailed reports.

Primary school enrollment has increased significantly over the past decade, reaching 137% in 2012,<sup>5</sup> thanks to policy reforms seeking to expand access by abolishing fees and establish new school infrastructure across the country. This will help to improve overall literacy rates in the country, which currently undermine other skills development initiatives. Some donor-led WFD initiatives in the agribusiness sector, for example, had to be revised to begin with basic literacy training before any sector-specific advances could be made.

Professional and vocational schools serve graduates of the primary system who do not intend to continue on to the secondary level, yet still wish to learn practical skills that they can apply in their careers. These schools also serve adult learners who wish to learn new skills. The system is currently undergoing a reform during which curricula are being transitioned from a two-year system to a modular system, in which students may enroll for short, 3-month certificate programs focused on gaining specific, career-oriented competencies. Upon completion of a 3-month module, students receive a CM certificate. Completion of four modules entitles students to a CPF1, and upon completion of 8 modules they may earn a CPF2. Though government support for reforms has been limited by lack of capacity and the speed of the reform process, the donor community, particularly through the Belgium Development Cooperation and the Belgian Association for the Promotion of Education and Training Abroad (APEFE), has assisted with transitioning these schools to a more demand-driven model; however, many challenges remain.

The geographic distribution of these schools and their corresponding programs is still disconnected from the reality of the private sector; only 15-20% of graduates are inserted into jobs (BTC, 2013). Furthermore, the distribution of programs by sector is misaligned. For example, almost 8 million people are employed in the agriculture sector, with just a single professional/vocational school offering programs, which is grossly inadequate to meet the demands of the sector. For the energy sector, on the other hand, which employs just 1,120 workers in total, there are 19 vocational and professional training programs (see Table 5). In addition, many instructors in professional and vocational schools lack formal pedagogical training, and incentives for performance are weak, as salaries remain very low (Field Research, 2014).

Technical schools provide graduates from primary schools with three- to four-year programs focusing on practical, career-oriented skills and knowledge. As with all levels of the education system, enrollment in technical schools has increased rapidly in the last five years. This has introduced challenges since expansions of resources, equipment and facilities have not kept pace. Similar to professional and vocational schools, existing curricula are outdated (many are based on Belgian colonial curricula) and poorly matched to contemporary technologies and industry needs. As with vocational training, agribusiness training programs are underrepresented, considering the total share of employment; there are four times as many technical programs for the energy sector than for the agribusiness and coffee sectors combined (see Table 5).

The donor community has played an important role supporting technical schools by assisting with curriculum updates and providing new equipment. However, this process has been uneven as donor resources are limited and do not reach all schools in the system. For example, due to a lack of solar panels for training in technical schools, students receive only a theoretical education, rather than hands-on training, in solar panel installation and maintenance. This, in turn, introduces additional costs to the private sector, which must then provide on-the-job training. The Ministry of Basic and Secondary Education, Trades, Vocational Training and Literacy (MEBSEMFP) is in the midst of introducing reforms to streamline the technical system by eliminating the A3 degree in 2016, so technical schools will provide A2 degrees only.

---

<sup>5</sup> As a result of the conflict, many children were unable to attend school; once the conflict abated, and access was improved, many of these individuals enrolled, hence an enrollment rate of over 100%.

University programs are expanding with increased private sector investments in education, but these still face problems of out-of-date curricula, shortage of trained teaching staff -- many teachers left the country during the conflict -- and inadequate technical equipment. In the agribusiness sector, for example, the agronomy curriculum has not been updated for 20 years, while in the energy sector, universities often do not have the facilities or equipment to provide practical training on equipment, and students must attend sessions at those technical high schools which receive new equipment from donor partners, rather than their home institutions. Lack of sufficient equipment for technical university programs (such as engineering programs) has driven enrollment towards the humanities, the social sciences and law, for which there exists little unmet labor market demand.

Regulation of private universities has been weak in the past, and many of these institutions lack the necessary staff, facilities and equipment to educate their students (OAG, 2012; Field Research, 2014). Many recruit their instructors from the public system, stretching the available human resources in the educational sector in a way that some observers fear could undermine the quality of the system overall. The National Commission on Higher Education, formed in 2012 in an effort to harmonize education across the EAC, is making progress in formulating and applying rules for the accreditation of both public and private universities. Furthermore, admissions decisions to public universities are made by the Ministry of Higher Education, rather than by the universities themselves. As a result, more students are being oriented towards public universities than the institutions can support. As training equipment is being spread more thinly across students in technical programs, education is becoming more theoretical, and some employers note that students are graduating with insufficient practical skills. The university system is currently transitioning to the Bologna system (Bachelors, Masters, Doctorate), during which curricula are being updated with support from the donor community.

Given the level of development of Burundi's value chains in general, there is an unjustifiable bias towards university education. The total number of graduates at the university level and at the technical level was virtually the same for 2012 (2,924 and 2,489 respectively). This trend is likely to continue, as enrollment remains very strong at the university level with approximately 14,000 new students entering university in 2012, bringing the total number of university students enrolled at this time to 36,766 (MEBSEMFPFA, 2012; MESRS, 2013). The current policy providing 15,000 scholarships to university students is likely contributing to this bias (Field Research, 2014). This trend is not uncommon in developing countries where the number of university graduates typically exceeds that of technical programs, despite the fact that these countries are mostly based in low to medium stages of the value chain which require a predominantly technical workforce (Fernandez-Stark et al., 2012). Box 1 discusses this imbalance from the GVC perspective.

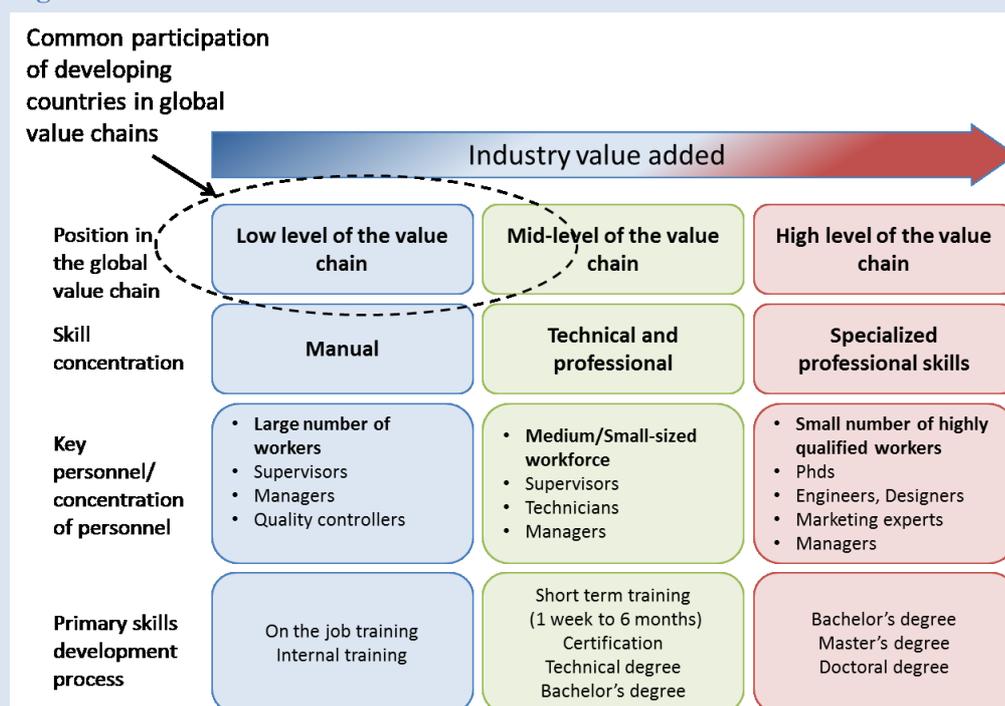
Beyond these educational programs, numerous initiatives are carried out by the government and a wide range of non-governmental actors to provide skills development to individuals beyond the reach of the formal education system, which is primarily focused on the education of youth prior to entering the workforce. Such programs include agricultural extension services provided to farmers by the Ministry of Agriculture, trainings to coffee growers by the Coffee Growers Association (CNAC), and courses on new technologies and capacity building for alternative energy companies provided by the German International Development Agency (GIZ). These programs are largely ad-hoc and limited in scale, and they are not well integrated with the formal education system. For instance, across all three industries, few programs include certifications for participation and acquisition of skills and thus do not directly help to provide signals to the labor market regarding participant competency. Furthermore, such services lack capacity; in the agricultural and coffee sectors, for example, extension agents are poorly trained. Workforce development initiatives by the private sector in the three sectors analyzed are, by and large, limited to on-the-job training and leveraging existing skills in the labor force.

### Box 1. Imbalance Between Technical and University Education in Developing Countries: A GVC Perspective

Given their actual position in the value chain, many developing countries demonstrate an imbalance between technical and university level education. Technical education is crucial for industry upgrading for developing countries. Technicians are critical in the middle part of the value chain and without fully dominating those segments, it is difficult to achieve upgrading, particularly in product-based sectors in which “leapfrogging” is not possible. Yet, technical education is the weakest link for many of these nations and serious structural problems have undermined the effectiveness of technical educational institutions. Challenges for these institutions include lack of quality, difficulties in teaching the skills demanded by the private sector, and a lack of prestige compared to universities where technical education is perceived to have low status and low income potential (de Moura Castro & García, 2003; Song Seng, 2008).

Figure 4 provides a general overview of where education should ideally be focused based on current and potential positions within a value chain. First, low-value entry levels of GVCs, such as production or assembly (Column 1, Figure 4), typically rely on a large number of manual laborers. While these workers generally lack formal education and are often characterized as “unskilled,” there is an intense focus “on-the-job training” that contributes significantly to productivity and competitiveness. Supervisors, managers and quality controllers play important roles here. Second, the mid-levels of the value chain (Column 2, Figure 4), which typically entail some processing and/or performing new and more sophisticated activities, tend to require a more skilled labor force. Generally, these workers must possess specific technical competencies. Finally, the highest segments of the value chain tend to be knowledge-intensive, requiring specialized skills to perform complex activities and usually the core labor force must possess tertiary education degrees.

Figure 4. Global Value Chains and Skills



Due to their relatively low positions in GVCs, many developing countries are not prepared to absorb the large number of university graduates entering the labor market, while they lack important human capital with technical abilities. Surprisingly, the resulting skills mismatch is due not to a skills deficit, but rather a skills surplus, with a corresponding high cost for economies that cannot afford to waste scarce resources. “Over-skilling, or the under-use of skills, in specific jobs in the short to medium term can be a problem because it may lead to skills loss and a waste of the resources that were used to acquire these skills” (OECD, 2012, p. 83).

Source: (Fernandez-Stark et al., 2012).

## **B. Labor Market Challenges to Workforce Development for GVC Upgrading**

While challenges exist at each individual level of the education system to support human capital development for upgrading, a number of broad challenges confront the labor market as a whole. Implementation of WFD is made increasingly complex by the enormous demands placed on scarce resources, loose coordination of development efforts by various public, private and donor stakeholders, and a newly emerging private sector that is not yet sufficiently developed to identify and communicate specific skills needs to stakeholders in the education system. The challenge of ensuring that the supply of labor meets the demands of the agribusiness, coffee and energy value chains is heightened in Burundi by insufficient and up-to-date information on labor market conditions or school enrollments to inform decisions in policy development.

With respect to labor market demand, an important constraint facing the private sector is the limited capacity to identify the specific skills needed. As no programs at either the technical or university levels offer human resources management training, private firms do not have access to managers capable of accurately identifying and crafting the job profiles required for growth, and recruitment continues to be based on social networks rather than competency-based hiring. This ultimately sends distorted signals to the labor market regarding what skills are required for growth.

On the supply side, the labor market faces several challenges that go beyond the specific difficulties facing the formal education system discussed in the previous section. For several years, no data were gathered on semi-skilled and skilled graduates, so there remains a profound lack of knowledge about the characteristics of Burundi's human capital stock. None of the firms or organizations interviewed could provide figures regarding employment or labor market supply in any of the three sectors examined in this report.

In addition, low levels of formal employment (dominated by the public sector) have contributed to excessively low turnover and an aging workforce. An important consequence of this situation is that skills are not being transferred to the youth. Thus, many of educated graduates – particularly at the university level – have been unable to enter the workforce in their areas of expertise and are underemployed. In all three industries analyzed, firms noted that it was easy to find agronomists and engineers in the labor market – with up to a hundred applicants for a single position. However, these employees frequently then require extensive hands-on training, as graduates lacked industry experience (Field Research, 2013; 2014).

Finally, there are no feedback or coordination mechanisms, either formal or informal, through which firms, donors and educational and training institutions can interact regarding curriculum development, equipment or specific job profiles. Even as reforms are currently being carried out at all levels of the formal education system, field research indicates that these are being implemented with insufficient consideration to the characteristics of demand in the labor market.

Table 6 summarizes key transversal challenges arising from both the structure and organization of the formal education system and shortcomings in the labor market that affect the potential for upgrading in all three sectors.

**Table 6. Key Workforce Development Challenges in the 3 GVCs**

<b>Challenge</b>	<b>Agribusiness/Coffee</b>	<b>Energy</b>
<b>Content of curriculum not appropriate to needs of industry</b>	Agronomists lack practical training as a result of the conflict & no curriculum change in 20 years.	Engineers and technical workers lack practical training due to old curricula and lack of training equipment.
<b>Geographic distribution of trainings &amp; resistance of professors to go to rural areas</b>	Educational programs are overwhelmingly based in Bujumbura; graduating professionals do not like to work in rural areas.	Educational programs are based in Bujumbura; very few are available in rural provinces. Professionals do not like to go to rural areas to complete projects.
<b>No human resources management skills</b>	Lack of reliable data on labor market conditions impedes HR planning. Companies lack internal feedback mechanisms to identify and overcome skills gaps.	Lack of HR skills undermines REGIDESO's ability to identify skills needs, cater training to specific operational needs and adjust compensation packages in order to improve productivity.
<b>Institutionalization of knowledge from aid agencies to local educational institutions and training organizations</b>	Aid agencies have been filling gap since end of conflict; small-scale, lots of repetition, this needs to be institutionalized and expanded; Educational institutions require capacity building in order to absorb it.	Aid agencies assisting with curriculum development and training equipment to some technical, professional and vocational schools, but efforts are piecemeal. Very little engagement at university level. Equipment often provided according to availability from donor country rather than Burundi's needs.
<b>Lack of linkages between the private sector &amp; the education sector</b>	Weak linkages undermine feedback from the industry to educational institutions regarding exactly what skill sets they are looking for.	Internship programs exist between REGIDESO and technical schools and universities, but not private sector. Training equipment is poorly matched with employers' need for expertise in specific technologies.

Source: Authors.

### **C. Recommendations**

While these challenges appear daunting, significant improvement of Burundi's WFD development system is both feasible and likely to promote economic development. Table 7 indicates specific recommendations that should be implemented by stakeholders in Burundi's education system, on both the demand and supply sides as well as in government. These recommendations are based upon the upgrading trajectories described above in Tables 2, 3 and 4, and are aimed at better aligning the skills of workers occupying jobs in Tables 9, 10 and 11 with the needs of employers. Table 7 illustrates key recommendations that cut across the agribusiness, coffee and energy sectors, while Table 8 highlights those that are specific to one or two industries.

**Table 7. Key Recommended Workforce Development Actions to Drive Upgrading**

<b>WFD Action</b>	<b>Implementing Organization</b>
Increase availability of technical training programs and ensure strong practical experience included into the curriculum via apprenticeships	Ministries of Education, technical schools, private sector.
Improve human resources management skills through the introduction of new programs at the technical and university levels	Universities and technical schools with management programs; Private sector participation as guest lecturers.
Improve the collection of labor market statistics in order to better identify characteristics of labor supply	Ministry of Labor, Ministry of Agriculture Ministries of Education
Promote the acquisition of practical skills and industry experience through the introduction of internship programs and applied pedagogical methods	Vocational, professional and technical schools; universities; private sector participation as hosts
Increase the availability of training equipment relevant to the needs of the private sector	Vocational, professional and technical schools; universities; private sector; donors.
Expand opportunities for educational exchanges with universities in other African countries	Universities; Ministry of Higher Education
Improve the coordination of donor activities across each level of the education system as well as trainings provided to professionals	Education basket fund; donor agencies
Establish mechanisms for interaction between all relevant stakeholders to communicate needs and challenges regarding WFD for private sector development	Ministries of Education; Educational Institutions of all levels; Private Sector Firms; Research Organizations.

Source: Authors.

**Table 8. Sector-Specific Recommendations to Support Upgrading in GVCs**

		<b>Sector</b>		
		<b>Agri-business</b>	<b>Coffee</b>	<b>Energy</b>
Improve agronomy curricula.	Universities; technical schools; professional schools	X	X	
Improve business marketing training	Technical schools and universities with management programs	X	X	
Establish a demonstration plot program to introduce best practices	Donors, Ministry of Agriculture	X	X	
Introduce performance incentives, such as merit pay or reward programs, for extension agents	Ministry of Agriculture, CNAC	X	X	
Improve trainings on use of inputs in order to promote increased yields and improved	Ministry of Agriculture	X	X	

environmental management techniques				
Improve trainings on development and management of nurseries	ITABs, FABI	X	X	
Develop technical and managerial capacities necessary for implementation of cold storage systems	Universities, ITABs	X		
Develop technical capacity in processing activities for root crops and fruits/vegetables	ITAB, CNTA, FABI	X		
Introduce affordable trainings in coffee cultivation to improve yields	CNAC		X	
Conduct a needs assessment of CWS practices and introduce trainings on quality control	CNAC, Intercafe		X	
Support REGIDESO's human resources development process, including improved incentives for high performance	REGIDESO; international experts/donors			X
Develop training and education programs for technicians in generation, transmission and distribution	Technical schools, REGIDESO			X
Promote technical capacity in alternative energy services	Technical schools, Universities, ABER (both industry association and public utility)			X
Promote improved on-the-job training for engineers	Universities, private sector, REGIDESO			X
Expand capacity to train electricians	Professional, vocational and technical schools			X
Improve knowledge of IT systems in order to accommodate introduction of pre-paid metering	Technical schools, private sector, REGIDESO			X

Source: Authors.

## IV. Appendix

**Table 9. Job Profiles in Agribusiness Value Chain**

Position	Formal Education Requirements	Training/ Experience	Skill Level
<b>R&amp;D / Inputs</b>			
<b>INCREASE: Agronomist</b>	Post graduate degree	Experience & Practical Training	
<b>INCREASE: Extension Agents</b>	Bachelor's degree in agronomy	Experience & Practical Training	
<b>NEW: Irrigation Technician</b>	Technical education / Bachelor's degree	Training and Experience	
<b>NEW: Soil Erosion Control Technician</b>	Technical education/ Bachelor's degree	Experience/ technical training	
<b>NEW: Nursery &amp; seed multiplication staff</b>	May require high school diploma	Theoretical & Practical Training	
Transporter	Literacy and numeracy skills	Experience	
Producer	No formal education required but literacy and numeracy helps	Training and experience	
<b>Cereal/Root Crops Processing</b>			
<b>INCREASE: Operations Manager</b>	Bachelor's degree	Training and experience	
<b>NEW: Mobile Unit Operator (Cassava Processing)</b>	Technical education	Training and experience	
<b>INCREASE: Marketing/ Distributors (Cassava &amp; Wheat Milling)</b>	Technical education/ Certification	Marketing skills/ experience	
<b>INCREASE: Warehouse Manager</b>	Certified technical education	Technical training/ experience	
<b>INCREASE: Collectors/ Aggregators</b>	Literacy and numeracy skills	Training and experience	
Transporter	Literacy and numeracy skills	Training and experience	
<b>Cold Storage, Packing and Processing Fruit and Vegetables</b>			
<i>Cold Storage</i>			
<b>NEW: Storage Unit Manager</b>	Technical education /undergraduate degree	Training and experience	
<b>NEW: Operator/ Technician</b>	Literacy and numeracy skills	Training and experience	
<i>Packing</i>			
<b>NEW: Packer</b>	Literacy and numeracy skills preferable	Training and experience	
<i>Processing</i>			
Business Manager	Bachelor's degree	Training and experience	
<b>Quality Control Technician</b>	Technical education/ Certification	Technical training/ experience	
Aggregator/ Buying Agent	Literacy and numeracy skills	Technical training/ experience	
Warehouse Manager	Technical education/ Certification	Technical training/ experience	
<b>INCREASE: Mechanics/ Machine operator</b>	Technical education	Technical training	
Packer	Literacy and numeracy skills preferable	Training and experience	
Distributor	Literacy and numeracy skills	Technical training/ experience	
Line Worker	No formal education required	Training	
<b>Institutional Support</b>			
Regulator	Bachelor's degree or higher	Training and experience	
Environmental Specialist	Bachelor's degree or higher	Training and experience	
SPS Certifier	Bachelor's degree or higher	Training and experience	

Source: Duke CGGC.

Skill Level	Low	Low-Medium	Medium	Medium-High	High
	No formal education; experience	Literacy and numeracy skills; experience	Technical education/ certification	Technical education /undergraduate degree	University degree and higher

**Table 10. Job Profiles in the Coffee Global Value Chain**

Position	Formal Education Requirements	Training/ Experience	Skill Level
<b>Production</b>			
Researchers & Agronomist	Bachelor's degree and higher	Experience & Practical Training	
<b>INCREASE: Extension Officer</b>	Technical Education/ Bachelor's degree	Experience & Practical Training	
Nursery Staff	May require high school diploma	Theoretical & Practical Training	
<b>NEW: Quality Controller/Grader</b>	Literacy and numeracy skills	Training and experience	
<b>INCREASE: Transporter</b>	Literacy and numeracy skills	Experience	
Coffee Grower	No formal education required but literacy & numeracy help	Training and experience	
<b>Processing</b>			
<b>Wet Processing</b>			
General Manager	At least Bachelor's degree	Management Skills and Experience	
Production Manager	Technical education/ certification and higher	Training and experience	
<b>NEW: Quality Manager/ Technician</b>	Technical education/ certification and higher	Training and experience	
Warehouse Manager	Technical education/ certification	Training and experience	
<b>NEW : Coffee Cupper/ Evaluator</b>	Technical education/ certification and higher	Training and experience	
<b>Equipment Installers/ Maintenance</b>	Technical education/ certification and higher	Training and experience	
Machine Operator & Technician	Literacy and numeracy skills; mechanics training helpful	Training and experience	
<b>NEW: Waste Management Composting</b>	Literacy and numeracy skills	Training and experience	
Coffee Collectors	Literacy and numeracy skills	Training and experience	
<b>Dry Processing</b>			
Manager	Technical education/ certification and higher	Training and experience	
<b>NEW: Coffee Cupper/ Evaluator</b>	Technical education/ certification and higher	Training and experience	
Mechanics/ Technician	Technical education/ certification and higher	Training and experience	
Graders	No formal education required literacy & numeracy skills help	Training and experience	
<b>Trading</b>			
<b>NEW: Marketing Personnel</b>	Bachelor's degree in Business Management (Marketing)	Training and experience	
Cooperative Manager/Director	Bachelor's degree or higher	Training and experience	
<b>NEW: Cooperative Financial Personnel</b>	Bachelor's degree or higher	Training and experience	
Cooperative Audit	Bachelor's degree or higher	Training and experience	
SPS Certifier	Bachelor's degree or higher	Training and Experience	
<b>NEW: Environmental Regulator</b>	Bachelor's degree or higher	Training and Experience	
Regulator	Bachelor's degree or higher	Training and Experience	
Warehouse Manager	Technical education/ certification or higher	Training and experience	
<b>NEW: Q-Grader</b>	Technical education/ Q-grader certification for specialty coffee	Training and experience	
Shipping/ Documentation Personnel	Technical education/ certification or higher	Training and experience	
Truck Operator	Literacy and numeracy skills	Training and experience	

Source: Duke CGGC.

**Table 11. Job Profiles in the Electrical Energy Global Value Chain**

Position	Formal Education Requirements	Training/ Experience	Skill Level
<b>Regulation</b>			
<b>NEW: Regulatory Analyst</b>	Master's degree or higher	Training and experience	
Electrical Inspector	Bachelor's degree or higher	Training and experience	
<b>Generation</b>			
Plant engineer	Bachelor's degree or higher	Training and experience	
Generation technician	Technical education	Training and experience	
Electrician	Technical education	Training and experience	
Plant operator	Literacy and numeracy skills	Experience	
<b>Off-Grid Generation</b>			
<b>NEW: Microhydro plant Entrepreneurs</b>	Bachelor's degree or higher	Training and experience	
Microhydro installers & maintenance	Technical education	Training and experience	
<b>INCREASE: Solar Entrepreneurs</b>	Technical education	Training and experience	
<b>INCREASE: Solar Panel Assembler</b>	Technical education	Training and experience	
<b>INCREASE: Solar PV Installer &amp; Maintenance</b>	Technical education	Training and experience	
Electrician	Technical education	Training and experience	
<b>Transmission</b>			
Management/ planning	Master's degree or higher	Training and experience	
<b>NEW: GIS Analysts</b>	Technical education	Training and experience	
Electrical Engineer	Bachelor's degree or higher	Training and experience	
Transmission Engineer	Bachelor's degree or higher	Training and experience	
Systems Operator	Technical education	Training and experience	
<b>INCREASE: Technician/ Line Operator</b>	Technical education	Training and experience	
Manual Laborer	No formal education	Experience	
<b>Distribution</b>			
Management/Planning	Master's degree or higher	Training and experience	
<b>NEW: GIS Analysts</b>	Technical education	Training and experience	
Electrical Engineer	Bachelor's degree or higher	Training and experience	
<b>INCREASE: Distribution Technician</b>	Technical education	Training and experience	
<b>INCREASE: Power dispatcher</b>	Technical education	Training and experience	
<b>INCREASE: Electrician</b>	Technical education	Training and experience	
Meter Reader	Literacy and numeracy skills; experience	Experience	
Customer Service Representative	Literacy and numeracy skills; experience	Experience	
<b>Management</b>			
Senior Manager	Master's degree or higher	Training and experience	
Asset Manager	Bachelor's degree or higher	Training and experience	
<b>New Project Manager</b>	Bachelor's degree or higher	Training and experience	
Financial Manager	Bachelor's degree or higher	Training and experience	
<b>NEW: Procurement Manager</b>	Master's degree or higher	Training and experience	
Middle Management	Bachelor's degree or higher	Training and experience	

Source: Duke CGGC

## V. Select Bibliography

- BTC. (2013). Etude prospective sur l'économie burundaise, les besoins en formation et l'adéquation formation-emploi: Belgian Technical Cooperation.
- de Moura Castro, Claudio and Norma García. (2003). *Community Colleges: A Model for Latin America?* Washington, DC: Inter-American Development Bank.
- FAO. (2013). FAOSTAT Database on Agriculture. Retrieved July 20, 2013, from Food and Agriculture Organization of the United Nations from <http://faostat.fao.org/>
- Fernandez-Stark, Karina, Penny Bamber and Gary Gereffi. (2012). *Upgrading in Global Value Chains: Addressing the Skills Challenge in Developing Countries*. Durham, N.C.: Duke CGGC.
- Gereffi, Gary and Karina Fernandez-Stark. (2011). *Global Value Chain Analysis: A Primer*. Durham, North Carolina, USA: Center on Globalization, Governance & Competitiveness (CGGC) Duke University. [http://www.cggc.duke.edu/pdfs/2011-05-31\\_GVC\\_analysis\\_a\\_primer.pdf](http://www.cggc.duke.edu/pdfs/2011-05-31_GVC_analysis_a_primer.pdf)
- Gereffi, Gary, Karina Fernandez-Stark and Phil Psilos. (2011). *Skills for Upgrading: Workforce Development and Global Value Chains in Developing Countries*. Durham: Duke University Center on Globalization Governance & Competitiveness.
- Gereffi, Gary, Karina Fernandez-Stark, Penny Bamber, Phil Psilos, and Joe DeStefano. (2011). Meeting the Upgrading Challenge: Dynamic Workforces for Diversified Economies. In G. Gereffi, K. Fernandez-Stark & P. Psilos (Eds.), *Skills for Upgrading: Workforce Development and Global Value Chains in Developing Countries*. Durham, N.C.: Duke CGGC and RTI.
- Gereffi, Gary, John Humphrey and Timothy Sturgeon. (2005). "The Governance of Global Value Chains." *Review of International Political Economy*: 78-104.
- GTDSE. (2013). "Rapport du Groupe Thematique 'Developpement eu Secteur Energetique'". Paper presented at the Conference Sectorielle pour le Suivi des Engagements de la Conference de Geneve. Bujumbura. 28-30 October, 2013.
- ICO. (2013). Exporting Countries- Exports of All Forms of Coffee to All Destinations Calendar Years 2010 to 2012: International Coffee Organization. <http://www.ico.org/historical/2010-19/PDF/EXPCALY.pdf>.
- MEBSEMFPFA. (2012). *Politique Nationale de l'Enseignement Technique, de l'Enseignement des Metiers et de la Formation Professionnelle*. Bujumbura: Ministère de l'Enseignement de Base et Secondaire, de l'Enseignement des Métiers, de la Formation Professionnelle et de l'Alphabétisation.
- MEM. (2013). Note Conceptuelle en vue de la preparation de la conference sectorielle de l'energie. Bujumbura: Ministere de l'Energie et des Mines. Octobre 2013.
- MESRS. (2013). *Statistiques du Secteur Educatif Burundais*. Bujumbura: Ministere de l'Enseignement Superieur et de la Recherche Scientifique, Cellule de la Planification et des statistiques Octobre 2013.
- OAG. (2012). *Rapport de l'analyse du fonctionnement et du financement de l'enseignement supérieur privé au Burundi*. Bujumbura: Observatoire de l'Action Gouvernementale
- OECD. (2012). *Better Skills, Better Jobs, Better Lives: A Strategic Approach to Skills Policies*. Paris: OECD. <http://dx.doi.org/10.1787/9789264177338-en>
- Song Seng, Law. (2008). *Technical-Professional Education and Economic Development: The Experience of Singapore*. In L. Sing Kong, G. Chor Boon, B. Fredriksen & T. Jee Peng (Eds.), *Toward a Better Future: Education and Training for Economic Development in Singapore Since 1965*. Washington, D.C.: Stanford University Press and The World Bank.
- UNIDO. (2013). *Analyse de la chaine de valeur du secteur cafe au Burundi*. Lusaka, Zambia.
- Universite du Burundi. (2013). *Annuaire Statistiques 2010-2011 et 2011-2012*. Bujumbura.
- USAID. (2013). *Burundi Agribusiness Project. Final Report*. Washington, D.C.: USAID. April 2013.