

innovATE

Innovation for Agricultural Training and Education



USAID
FROM THE AMERICAN PEOPLE



VirginiaTech
Invent the Future



Challenges and Opportunities for AET in Post-Conflict Sub-Saharan Africa

Austen Moore - University of Florida

M.D. Mutaleb - Tuskegee University

Ntam Baharanyi - Tuskegee University

August 2014

PENNSTATE



TUSKEGEE
UNIVERSITY

UF UNIVERSITY of
FLORIDA
The Foundation for The Gator Nation

Acknowledgements

This document was written as part of a series of InnovATE thematic studies. These research papers examine a particular AET system, cross-cutting theme, model, or technique and offer an analysis of the subject in question. These studies often highlight AET innovations in good practices. Case studies examine how agricultural education and training intersects with other development issues which are important to AET capacity building. The purpose of this series is to stimulate discussion on AET and share constraints to and examples of strategies for AET capacity development. We hope that you will share your comments and feedback with us.

For more information about the InnovATE project and to obtain other publications in this series, please visit our website at <http://www.oired.vt.edu/innovate> or join the discussion in our Community of Practice at www.innovate-community.oired.vt.edu. You may also contact us at innovateprogram@vt.edu or call 540-231-6338.

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

Executive Summary

The Innovation for Agricultural Training and Education (InnovATE) Project promotes sustainable food security, poverty reduction, and natural resource conservation in the developing world by assisting in the development of effective and sustainable agricultural education and training (AET) systems. AET systems contribute to the overall development of Sub-Saharan Africa and other regions. The impacts are tangible in agriculture and other sectors, and at both the national and local level. AET also contributes heavily to the reduction of rural poverty in Sub-Saharan Africa (SSA) and in other developing countries. In fact, effective AET is a fundamental requirement for poverty reduction in the region.

However, there have been sizeable differences in production gains in different regions. While per capita food production increased dramatically in most regions, agricultural production in Africa barely increased at all in the past 50 years. In SSA, per capita food production and productivity actually declined in most of its regions. Only Western Africa saw food production increases. In addition, agricultural productivity is also clearly related to food security and hunger alleviation. Addressing hunger and malnutrition begins with progress in agriculture and food production.

Agriculture employs about 60% of the workforce and is the largest source of livelihood in SSA. Not only are the poor and hungry concentrated in agriculture, nations dependent on agriculture house the majority of the world's poor and hungry. It is not surprising that the majority of armed conflicts occur in regions and nations with very high dependence on the agricultural sector. While agriculture is related to the causes of conflict, it is also heavily affected by conflict itself. The agricultural sector and food production capacity of conflict-affected nations decreases considerably. It is estimated that violent conflict leads to an average annual reduction of 12.3% in the sector's productivity. Smallholders suffer the most from disruption to agriculture during violent internal conflicts. Conflict also impacts food supplies and creates and/or exacerbates hunger, causing impacts that can last for years after the violence has ended.

Challenges to AET in SSA post-conflict environment include the need to contribute to peace building and re-integration of youth in civilian society, its desirability and relevance of related issues, curriculum limitations, poor integration of new learner groups, complex political and policy issues, inadequacy of funding, poor institutional capacity, low teacher quality, inadequate educational infrastructure, poor linkages to agricultural stakeholders and donors as many unrealized potentials. Post-conflict

development thus requires multi-faceted strategies and attention to virtually all sectors to address the underlying conditions that create and are exacerbated by conflict. Agriculture is central to post-conflict development, poverty reduction, and peacebuilding. Investments in agricultural development have proven to enhance post-conflict rehabilitation. Other social initiatives that address education and healthcare are essential. Post-conflict AET promotes development by building the capacity and human capital of farmers, extension officers, governmental personnel, and other actors in nations' agricultural sectors. It also has a major role as a creator of capacity and supplier of the human resources necessary to enable rural people to increase agricultural productivity and the sustainability of their farming systems.

Specific AET opportunities in post-conflict SSA environment include (a) assistance for institutional capacity building, (b) improved collaboration and partnerships between AET providers, (c) enhanced linkages within agricultural sectors, (d) privatization, (e) curriculum reform, (f) new teaching strategies, (g) alternative and transitional education models, and (h) building upon successes.

Table of Contents

Introduction	1
Agriculture and General Challenges	1
Conflict and Agricultural Development.....	3
AET and Agricultural Development in Sub-Saharan Africa	4
<i>Capacity Building</i>	5
<i>Employment and Workforce Development</i>	6
<i>Agricultural Research and Innovation</i>	7
AET, Sub-Saharan Africa and Conflicts.....	7
<i>Competing Educational Priorities</i>	8
<i>Desirability and Relevance Issues</i>	8
<i>Curriculum Limitations</i>	9
<i>Poor Integration of New Learner Groups</i>	10
<i>Political and Policy Issues</i>	10
<i>Funding Inadequacies</i>	11
AET and Development in Post-Conflict Sub-Saharan Africa	12
<i>Peacebuilding and Reintegration</i>	12
<i>Poor Institutional Capacity</i>	13
<i>Low Teacher Quality</i>	14
<i>Inadequate Educational Infrastructure</i>	14
<i>Poor Linkages to Agricultural Stakeholders and Donors</i>	15
<i>Unrealized Potential</i>	16
Opportunities for AET in Post-Conflict Sub-Saharan Africa	16
<i>Education for Peacebuilding</i>	17
<i>Opportunity for New Educational Policies</i>	17
<i>Availability of Funding</i>	18
<i>Assistance for Institutional Capacity Building</i>	18
<i>Improved Collaboration and Partnerships between AET Providers</i>	19
<i>Enhanced Linkages within Agricultural Sectors</i>	20
<i>Privatization Opportunities</i>	22
<i>Curriculum Reform</i>	22
<i>New Teaching Strategies</i>	24
<i>Alternative and Transitional Education Models</i>	25
<i>Building upon Successes</i>	26
Summary	26
References	29

Introduction

The Innovation for Agricultural Training and Education (InnovATE) Project promotes sustainable food security, poverty reduction, and natural resource conservation in the developing world by assisting in the development of effective and sustainable agricultural education and training (AET) systems.

InnovATE utilizes a three-step “learn, design, train” process to identify and disseminate effective AET strategies and models, train agricultural professionals, and build human and institutional capacity (InnovATE, 2013). The InnovATE model includes the creation of case studies and meta-analyses, the implementation of needs assessments and country scoping missions, and the development and dissemination of appropriate training materials.

This paper provides a meta-analysis of AET in post-conflict Sub-Saharan Africa. The first section illustrates the importance of agricultural development and the magnitude of challenges following conflict in Sub-Saharan Africa. The second section describes the nature of agricultural development in a conflict environment. The third and fourth sections provide background on the role of AET in agricultural development and related challenges Sub-Saharan Africa in a conflict environment respectively. The final section identifies opportunities and provides appropriate recommendations for the strategic improvement of post-conflict AET systems.

Agriculture and General Challenges

Global development efforts are often built around the alleviation of poverty and hunger. The first of eight Millennium Development Goals (MDGs) seeks to eradicate poverty and hunger, and illustrates the implicit relationship between the two (UN, 2013a). Indeed, poverty and hunger are closely aligned. The most recent UN Human Development Report estimated that 30% of the world’s population, or 1.57 billion people, live in multidimensional poverty (UNDP, 2013). The World Bank (2013b) reported even higher (48.5%) poverty rates in Sub-Saharan Africa. Also, the report stated that if global poverty were to drop by 17%, or by the same percentage from 1990 to 2008, Sub-Saharan Africa would show minimal improvements in poverty reduction over the same timespan (World Bank, 2012).

There are several factors contributing to such dire statistics. Among them is the prevalence of hunger in Sub-Saharan Africa (26.8%), which is much higher than in other regions (Food and Agriculture Organization [FAO], 2012). In 2013, hunger and malnutrition affected nearly one in three people in the region, versus one in eight worldwide (FAO, 2012; FAO, 2013b). While global hunger decreased to 13.29% from 1990 to 2012, in Sub-Saharan Africa the number actually increased by 90 million, a rate of 2% per year since 2007 (Wiggins & Leturque, 2010; World Hunger, 2013).

Agriculture and hunger in Africa, in general are closely tied. Agricultural development is therefore of paramount importance, especially because the majority of nations that suffer from poverty and hunger are dominated by agriculture (World Bank, 2013a). Addison (2005) wrote, "Overall development success or failure is often an outcome of what happens in agriculture" (p. 1). Agriculture and food production alleviate poverty and hunger by improving food security and reducing food costs, especially in the developing world where the agricultural sector dominates national economies (FAO, 2013b; World Bank, 2013a). Furthermore, agricultural development and growth primarily benefit those in the most extreme poverty (Ligon & Sadoulet, 2007). The International Fund for Agricultural Development (IFAD, 2013) found that a 1% increase in per capita agricultural GDP had more than five times the impact on poverty reduction than GDP increases in other sectors. Cervantes-Godoy and Dewbre (2010) found that agricultural growth was responsible for 52% of poverty reduction, greater than any other development factors. In Sub-Saharan Africa, a 10% increase in yields was found to create a 7% reduction in poverty (IFAD, 2013), suggesting that "agricultural sector growth is pro-poor" in the region (Cervantes-Godoy & Dewbre, 2010, p. 5).

Among the poor, agriculture promotes development and reduces poverty through two main avenues: increasing incomes and promoting food security (Cervantes-Godoy & Dewbre, 2010). First, agriculture is the largest employer of poor people in many developing countries (Wiggins & Leturque, 2010) and serves as "the major source of employment for a large fraction of the population, including the provision of subsistence livelihood" (United States Agency for International Development [USAID], 2009, p. 45). In Sub-Saharan Africa, agriculture employs the majority of the workforce (59.0%) and is the largest source of livelihood (Wiggins & Leturque, 2010). Agricultural productivity is also clearly related to food security and hunger alleviation. The FAO's 2013 State of Food and Agriculture report summarized this relationship by explicitly arguing that addressing hunger and malnutrition begins with progress in agriculture and food production. The FAO (2013b) argued that the production of staple crops must

increase by 60% by 2050 to meet the growing demands related to population growth dynamics (FAO, 2013b).

This ongoing focus on agricultural productivity has seen per capita food production increase by 141% worldwide from the 1960s to 2013 (FAO, 2013a). However, there have been sizeable differences in production gains in different regions. While per capita food production (which tracks agricultural productivity against population dynamics) increased dramatically in most regions, per capita food production in Africa barely increased at all (+6%) in the past 50 years (FAO, 2013a; Wiggins & Leturque, 2010). In Sub-Saharan Africa, per capita food production actually declined in Eastern, Middle, and Southern Africa. Only Western Africa (+21%) saw food production increases. This dynamic has led some (e.g., Hounkonnou et al., 2012) to argue for an African Green Revolution.

Conflict and Agricultural Development

Swaminathan (1994) wrote “Hunger anywhere threatens peace everywhere.” Poverty, hunger, and agricultural development are all directly tied to conflict. Violence and warfare do not emerge unprovoked but are rather a consequence of a variety of causal factors “that make society a fertile terrain for conflict” (United Nations Environment Program [UNEP], 2002, p. 3). Poverty is frequently an underlying factor in causing conflict (Longley et al, 2007; UNEP, 2002; Zaur, 2006). Conflict is also common where food security is lowest and hungry people become increasingly desperate and willing to turn to violence to feed themselves and their families.

Not only are the poor and hungry concentrated in agriculture, nations dependent on agriculture house the majority of the world’s poor and hungry (World Bank, 2013a). With this in mind, it is not surprising that the majority of armed conflicts occur in regions and nations with very high dependence on the agricultural sector (Zaur, 2006). While agriculture is related to the causes of conflict, it is also heavily affected by conflict itself. The agricultural sector and food production capacity of conflict-affected nations decreases considerably (UNEP, 2002). Zaur (2006) estimated that violent conflict leads to an average annual reduction of 12.3% in the sector’s productivity (Zaur, 2006). Smallholders suffer the most from disruption to agriculture during violent internal conflicts (UNEP, 2002). Conflict also impacts food supplies and creates and/or exacerbates hunger (Wiggins & Leturque, 2010), causing impacts that can last for years after the violence has ended (UNEP, 2002).

Conflict is a vicious cycle where the same factors that allow conflict to arise are most exacerbated by the violence itself (USAID, 2009). Breaking this cycle requires appropriate and sustainable development during the post-conflict period to build peace and help nations move towards long-term stability and progress. Post-conflict development requires multi-faceted strategies and attention to virtually all sectors to address the underlying conditions that create and are exacerbated by conflict (USAID, 2009). Agriculture is central to post-conflict development, poverty reduction, and peacebuilding (UNEP, 2002). Investments in agricultural development have proven to increase the effectiveness of post-conflict rehabilitation (UNEP, 2002; Zaur, 2006). Other social initiatives that address education and healthcare are essential (Arthur, 2011; Geda, 2011). Additionally, post-conflict development is tasked with incorporating peacebuilding through reconciliation and social cohesion into its operations (Longley et al., 2007; Waters, Garrett, & Burnham, 2007).

AET and Agricultural Development in Sub-Saharan Africa

A range of strategies and mechanisms are used to develop nations' agricultural sector. Policies and development programs are commonly implemented to directly impact production and rural livelihoods at the field level (Swanson & Rajalahti, 2010). Agricultural extension improves the productive capacity of the agricultural sector and helps promote sustainable incomes for farmers (Longley et al., 2007; Scoones, 1998). Agricultural education and training (AET) systems are another important component to multi-faceted agricultural development strategies.

AET is a major component of school systems in Sub-Saharan Africa. In many countries in the region, school systems offer two tracks, general education and agricultural/vocational education (Oketch, 2007). General education is often divided into primary, low-secondary, and high-secondary levels (Wallace, 2007). Tertiary institutions (e.g. colleges and universities) are also a part of the general education system in many Sub-Saharan African countries. General education is designed to develop "general human capital" and produce graduates capable of continuing on to higher education institutions (Oketch, 2007, p. 221). Students of general education programs learn a variety of skills for use in different jobs and contexts. Proponents of general education in Sub-Saharan Africa cite the ability of graduates to better adapt to changing labor markets and contexts.

In contrast, AET often begins at the low-secondary level and continues through high-secondary or even tertiary levels (e.g. technical colleges) (Oketch, 2007). Students focus on a specific vocation (e.g. agriculture) and learn skills relevant to that occupation. Graduates of AET programs receive a terminal degree and enter the workforce rather than continue their education. Many AET programs have historic ties to European institutions from the colonial era but have been a province of independent Sub-Saharan African governments following independence (Samoff & Carrol, 2004).

AET systems contributed to the overall development of Sub-Saharan Africa and other regions. The impacts are tangible in agriculture and other sectors, and at both the national and local level (Wallace, 2007). AET also contributes heavily to the reduction of rural poverty in Sub-Saharan Africa and in other developing countries (Spielman, Ekboir & Davis, 2009). In fact, Wallace (2007) asserted that effective AET was a fundamental requirement for poverty reduction in the region. Hounkonnou et al. (2012) recognized the impact of strong AET institutions on rapid productivity growth during the Green Revolution, suggesting that AET also contributes to crop production and food security. The contributions of AET to development, poverty reduction, and food security could therefore move Sub-Saharan African nations towards the achievement of the Millennium Development Goals (Rivera, 2006).

Capacity Building

AET promotes development by building the capacity and human capital of farmers, extension officers, governmental personnel, and other actors in nations' agricultural sectors (Davis et al., 2007). AET also "has a major role as a creator of capacity and supplier of the human resources necessary to enable rural people to increase agricultural productivity and the sustainability of their farming systems" (World Bank, n.d., p. 1). Eicher (2006) also cited the benefits of AET programs to agricultural growth, while Rivera (2006) argued that trained AET graduates are essential for development of agricultural sectors in Sub-Saharan Africa. For instance, supported by USAID/Rwanda, HED (then ALO) awarded \$2,900,000 in 2000 — increased to \$3,879,183 in 2003 — to Michigan State University and Texas A&M University, for a partnership with the National University of Rwanda to improve teaching, research, and outreach capacity by developing faculty, re-designing the agriculture curriculum, and establishing a community outreach center. In cooperation with the Maraba Coffee Producer Association, the project has sold 18 tons of bourbon coffee beans to Community Coffee of Louisiana and 19 tons to Union Roasters in London at a fair trade price. Since the project inception, the partners constructed 25 new coffee washing stations throughout the Maraba, Karaba, and Gashonga districts. As the Maraba coffee growers received fair trade certification and began to grow shade-grown coffee, their specialty coffee has

become a model for the Rwandan coffee industry which has been replicated countrywide with strong support from the country President. Its success received extensive media coverage, including The Chicago Tribune, CNN and TIME Magazine.

Employment and Workforce Development

The development of human capital through AET primarily improves the ability of graduates to be productive in the agricultural workforce. In theory, graduates of AET programs will possess specific agricultural skills that better prepare them to find employment and contribute to development (Oketch, 2007). AET thereby addresses unemployment in Sub-Saharan Africa by facilitating youth finding jobs in agriculture and similar fields (Oketch, 2007). By extension, AET contributes to the reduction of poverty by enabling students to obtain sustainable incomes (Oketch, 2007). Youth employment is particularly important in post-conflict development. Without access to jobs and without the credentials to re-enter traditional schools, large numbers of unemployed former youth combatants are common in Sub-Saharan African countries emerging from conflict (Arthur, 2011). This population is vulnerable to remobilization and threatens peacebuilding efforts (Unruh, 2009). Unemployed youth also restrict economic development (Oketch, 2007).

AET is uniquely positioned to assist in serving this population. Many youth in Sub-Saharan Africa have previous experience in agriculture. Following the civil war in Liberia, Humphreys and Richards (2005) found that 80% of former fighters had agricultural backgrounds. Blattman and Annan (2012) found that former youth combatants were overwhelmingly (94%) interested in working in agriculture but lacked the skills to obtain employment. This suggests the sector could accommodate these individuals if appropriate training (e.g. AET) is available (Birner, Cohen, & Ilukor, 2011; Tizikara & Lugor, n.d.)

In many Sub-Saharan African countries, AET systems are also designed to produce extension officers (Spielman et al., 2009). Effective AET graduates will have the technical capacity to serve farmers and the ability to acquire and utilize appropriate production information. Successful AET systems also develop the innovative capacity of graduates, which consequently improves the overall innovativeness of Sub-Saharan African agriculture (Davis et al., 2007; Hounkonnou et al., 2012). AET programs that teach innovativeness and entrepreneurship can produce graduates capable of training Sub-Saharan African farmers in these essential skills. Therefore, graduates of AET programs are uniquely positioned to introduce innovative agricultural technologies and management methods that socially and economically benefit farmers in Sub-Saharan Africa (Spielman, Ekboir, Davis & Ochieng, 2008).

Agricultural Research and Innovation

AET can also prepare graduates to provide innovation to their future employers by incorporating new information and processes, and building more adaptive institutional cultures in governments, extension systems, and the private sector (Davis, Ekboir, & Spielman, 2008). This can allow AET systems to positively impact governmental institutions and policies (Spielman et al., 2009).

Furthermore, AET systems can improve the capacity of participants to conduct research relevant to the local conditions of Sub-Saharan Africa. Agricultural research is often conducted by AET institutions themselves, especially at the tertiary (university) level. AET graduates can therefore develop the skills to contribute to regional or national research efforts in Sub-Saharan Africa. This capacity is especially valuable in post-conflict countries where rebuilding research systems is often a pressing need.

The potential impact of agricultural research is especially high in Sub-Saharan Africa. Alene and Coulibaly (2009) found that agricultural research benefitted African farmers by significantly improving productivity, improving rural incomes, and reducing poverty. Specifically, investments in agricultural research (and AET) yielded an aggregate rate of return of 55%, meaning over half of every dollar spent directly impacted production. The same level of investment also reduced the number of poor in Sub-Saharan Africa by 2.3 million (or 0.8%) each year (Alene & Coulibaly, 2009).

AET, Sub-Saharan Africa and Conflicts

Political instability is an additional concern for AET systems in Sub-Saharan Africa. While not all Sub-Saharan African nations are politically unstable, the region is characterized by greater instances of conflicts than others (Obwona & Guloba, 2009). Sub-Saharan Africa also contains a disproportionate number of post-conflict countries, nearly all of which have some level of ongoing political instability. Lack of stability affects AET by creating a climate of opposition rather than cooperation (Buckland, 2006), especially due to pre-conflict challenges such as competing educational priorities, desirability and relevance of AET, curriculum limitations, poor integration of new learner groups, political and policy issues and poor funding.

Competing Educational Priorities

Irrespective of conflict, Sub-Saharan African school systems usually offer two tracks: general education and agricultural/vocational education (Oketch, 2007). The two tracks have positives and negatives for both governments and individual students. This has led to an ongoing debate in Sub-Saharan Africa about the future of both systems. Some nations have implemented policies to maintain a 50-50 split between both students of both tracks (Oketch, 2007), but in most nations the emphasis has been on general education rather than AET. The Millennium Development Goals in particular have prioritized general education (Bekalo et al., 2003; UN, 2013a), which has significantly affected educational policy in Sub-Saharan Africa and caused governments to refocus away from AET.

Sub-Saharan African students in post- and non-conflict countries alike are also avoiding AET programs in favor of general education. According to Oketch (2007), enrollment in all forms of vocational education programs (including AET) is rapidly declining. Meanwhile the demand for general education has continued to rise.

Desirability and Relevance Issues

First, AET programs are not viewed favorably by potential students. The degrees themselves are undesirable as they are terminal and eliminate the possibility of further education. AET degrees are also highly specialized, which restricts the flexibility of employment options for graduates (Oketch, 2007). Furthermore, Sub-Saharan African youth often possess a negative attitude towards agriculture, viewing employment in the sector as low paying, dirty, and requiring too much manual labor (Davis et al., 2008). AET degrees are sometimes viewed as a continuation of the colonial mindset towards workforce-development that potential students within sovereign Sub-Saharan African nations are disinclined to pursue (Oketch, 2007; Samoff & Carrol, 2004). Overall, these factors create a poor image of agricultural education (Wallace, 2007).

Also, AET degrees have a reputation for catering to and producing less academically-gifted students (Oketch, 2007). While policy-makers stress the positives of providing less successful students an option to continue their education, students are less willing to self-identify as academically-challenged by pursuing AET programs. Therefore, the best quality students in Sub-Saharan Africa often avoid AET in favor of general education (Maguire, 2000). As a result, AET has become a location for the region's least talented and least motivated students.

Curriculum Limitations

AET programs in Sub-Saharan Africa are often viewed by students and stakeholders as lower quality than general education (Oketch, 2007). Much of this criticism stems from a curriculum base that is largely poor, outdated, and inadequate to the needs of the agricultural sector (Vandenbosch, 2006; Wallace, 2007). Critics assert that new agricultural realities in Sub-Saharan Africa and in an increasingly globalized agricultural system are not adequately addressed in AET curriculum and programs. Specifically, programs do not include training on biotechnology, information communication technology (ICT), agricultural marketing and trade, and post-harvest techniques (Oketch, 2007; Vandenbosch, 2006). Also, AET curriculum does not prepare graduates to work with smallholders even though this client base is increasingly targeted by agricultural development employers in Sub-Saharan Africa (Jayne, Mather, & Mghenyi, 2010).

AET curriculum in Sub-Saharan Africa is also criticized as not relevant to rapidly-changing labor market conditions (Oketch, 2007). Sub-Saharan African AET programs do not conduct adequate labor market assessments to determine the skills graduates might require (Wallace, 2007). Poor communication with the employers of potential AET graduates further reduces the relevance of training and employability of graduates (Maguire, 2000).

Furthermore, AET curriculum in Sub-Saharan Africa is not adequately guided by the demands of participants. Wallace (2007) again cited that Sub-Saharan AET programs do not conduct needs assessment of potential students, and minimal efforts have been made to better incorporate the training requests of potential students when developing curriculum. Instead, a one-size-fits-all approach is used regardless of needs or demands.

Resulting curriculum focuses heavily on technical agriculture, and often on skills that may be more relevant to outdated production methods. Sub-Saharan African AET curriculum is particularly criticized for lacking an adequate orientation to human capacity building (Rivera, 2006), even when students and other agricultural stakeholders recognize that other skills are also required for agricultural graduates to succeed (Blum, 2013; Ganpat, 2013). Still, many Sub-Saharan AET systems remain resistant to change. This further decreases interest by potential students, caused by the uncertainty that AET programs reflect the demands of the job market and can lead to successful employment.

Indeed there is little evidence that Sub-Saharan African AET curriculum is actually adequate for specific jobs or for further education (Oketch, 2007). More commonly, graduates leave with few practical skills

(Maguire, 2000) and a lack of entrepreneurship to survive in the agricultural sector (Wallace, 2007). The skills that are learned are often too specialized or too outdated for graduates to find jobs (Oketch, 2007). Thus, employability among AET graduates is low (Maguire, 2000). Oketch (2007) found that AET graduates were less employable and suffered greater poverty than general education graduates (Oketch, 2007). Those that did find work were paid considerably less than peers from general education tracks.

Poor Integration of New Learner Groups

Sub-Saharan African AET systems also fail to effectively serve modern students. Non-traditional participant groups in particular struggle to succeed (Wallace, 2007). For example, the Millennium Development Goals have increased female participation in Sub-Saharan African education, including within AET systems (UN, 2013b). However, these traditionally male-dominated systems have been slow to adequately incorporate female students. Females involved in AET programs are often faced with unequal opportunity and access to information and training, along with cultural perceptions about their role in the discipline (Kelly, 1990). Evidence suggests that the quality of instruction received by females is lower than that of males, even within the same programs (Kelly, 1990). Some of this is related to the difficulty in providing field experiences to females related to the ease for men, especially in post-conflict countries where safety and security are concerns. As a result, gender inequalities in AET programs cause the percentage of female enrollment to be dramatically lower than in general education (Davis et al., 2007; Oketch, 2007).

In post-conflict situations, AET and other educational institutions struggle to reintegrate and adjust to the needs of displaced populations (Buckland, 2005). As discussed, reincorporating youth who have missed years of education into AET programs is particularly challenging, especially where technical knowledge builds upon itself. As a result, formerly displaced students often drop out of AET programs and create a pool of unemployed youth used to violence, which can threaten peace and stability (Buckland, 2005).

Political and Policy Issues

Institutional factors also affect AET systems in Sub-Saharan Africa. Many of these exist as a result of political and/or policy issues. Wallace (2007) argued that the focus on general education has created a “malaise” among governments and policy makers with regards to AET (p. 589). In other words, governments have not adequately focused on improving AET systems and the surrounding issues that reduce their effectiveness. This leads to a lack of appropriate and cohesive policy for AET in many Sub-

Saharan African nations (Rivera, 2006; Wallace, 2007). In this region, policies are more difficult to create as consensus is hard to achieve. Poor or non-existent AET policy is even more common and detrimental in post-conflict nations where governments have other pressing priorities in the education sector (Buckland, 2005).

Even when appropriate policies exist they are often not adequately enforced, further reducing their efficacy (Rivera, 2006). Poor governance is frequently a cause. Corruption and centralization make it difficult for AET institutions to function. Corruption and misappropriation of funding in particular can leave AET programs without the needed materials and money to teach students. This phenomenon is especially common at the low- and high-secondary level, and in rural or isolated areas (Rivera, 2006). Post-conflict countries have even higher frequencies of corruption in AET systems due to the lack of established accountability measures (Buckland, 2005).

Funding Inadequacies

Inadequate funding is another major institutional barrier for AET in Sub-Saharan Africa. Overall funding to the agriculture sector in Sub-Saharan Africa has decreased since its peak in the 1980s (Eicher, 2006). Maguire (2000) asserted that funding from agriculture has been realigned to address urban populations as rural exodus becomes more common in Africa. Current agricultural budgets of Sub-Saharan African countries range between 3% and 8% (World Bank, 2013a), although these levels may increase somewhat with the Maputo Declaration whereby signing governments pledged to increase agricultural expenditures to 10% of their national budgets (Wiggins & Leturque, 2010). Some Sub-Saharan post-conflict countries such as Mozambique and Liberia have also signed this agreement.

Even with greater commitments to the sector, many African governments have focused spending on agricultural production and have neglected to fund agricultural education, which is often viewed as the responsibility of Ministries of Education (Eicher, 2006). However, estimated funding for agricultural education is approximately 0.9% to 12.7% of the total education budget in Sub-Saharan Africa (Oketch, 2007). These levels are insufficient for effective programming (Amhoff & Carrol, 2004; Wallace, 2007), especially when AET requires land and equipment that is more costly than the materials required for general education (Oketch, 2007).

AET and Development in Post-Conflict Sub-Saharan Africa

Peacebuilding and Reintegration

In post-conflict countries, education and AET are potentially significant contributors to peacebuilding. Collier (2006) argued about the importance of providing social services following conflict, of which education is central. Buckland (2006) also asserted that “education is a key strategy in repairing societies in post-conflict countries” (p. 7). Moreover, education helps restore normalcy to communities and populations, provides a forum for learning and the promotion of democracy, and promotes social and economic development (Buckland, 2005). AET is a central feature of post-conflict education strategies, especially in Sub-Saharan African countries where agriculture is the main livelihood (Arthur, 2011). However, educating the populace in any post-conflict country can be a challenge and at the same time can result in measurable changes, if given the right environment. Obura (2003) claims that the goal of a comprehensive peace education curriculum in Rwanda has largely gone unfulfilled, although the Ministry of Education urged a “civic and moral education” that would lead to a “responsible, creative and progressive citizen,” ready for professional, technical and agricultural training at the secondary school level and beyond.

Financial concerns are exacerbated in post-conflict countries where economies are recovering and governments lack adequate or consistent budgets to cover ongoing education and AET costs (Buckland, 2005). In many post-conflict countries, education sectors were already insufficiently funded before the conflict, and basically destroyed during fighting (Whalan, 2011). This leaves many post-conflict governments without the resources to pay teachers or provide materials, and certainly not both (Whalan, 2011). One cause is the high cost of security and peacebuilding, which diverts funds away from the education sector. In countries where conflict continues to sporadically occur (e.g. Somalia, South Sudan) security costs make it difficult to properly fund education and AET (Bekalo et al., 2003).

Some post-conflict countries have been more able to fund education and agriculture by tapping untapped natural resources (e.g. Mozambique). However, in many cases funding education (and AET) falls to donor agencies (Whalan, 2011). Donor funding to education sectors in Sub-Saharan Africa is common, often as part of the World Bank’s Poverty Reduction Strategy Papers (PRSPs) (Obwona & Guloba, 2009). Smaller international donors have also prioritized education, making the sector well-supported in many Sub-Saharan African countries. This can help nations better utilize their national

budgets (e.g. Uganda), but may also lead to donor dependency and other challenges (Obwona & Guloba, 2009; Whalan, 2011).

Donor funding to AET, however, has been less consistent. In the 1990s donor investment in AET was very significant but has declined since as nations refocus on general education (Oketch, 2007). In place of donor investment, many tertiary AET institutions in Sub-Saharan Africa (including post-conflict countries) have sought academic partnerships with developed-world institutions (Samoff & Carrol, 2004). These partnerships have created better opportunities for funding and collaboration but are often criticized for shifting educational priority-setting to external funders and away from Sub-Saharan African institutions (Samoff & Carrol, 2004).

Donor aid to post-conflict Sub-Saharan African countries follows a slightly different pattern. Whereas PRSPs and academic partnerships are common in post-conflict countries, donor funding often occurs in two phases. Initially countries receive a flood of international funding immediately after peace agreements are signed. This “relief bubble” is designed to restart the delivery of basic services (e.g. education) while governments recover (Buckland, 2006, p. 7). However, as countries become more stable funding disappears and governments are left to maintain the systems created by international funding (Buckland, 2005). This model is difficult to sustain and often leaves post-conflict governments with schools and teachers that they are unable to properly fund. In some cases the systems can collapse after initial funding ends.

Furthermore, post-conflict education support is almost exclusively for primary education, with little to no funding directed at secondary or tertiary levels. Thus, secondary and tertiary education suffer the worst in conflict and recover the slowest (Buckland, 2005). This is particularly problematic for AET systems, as the majority of training occurs at these levels. As a result, funding challenges leave post-conflict AET systems even less able to produce adequately-trained graduates, which further reduces the desirability of the degree and public support for the system.

Poor Institutional Capacity

Poor policies, political instability and overall underfunding lead to low institutional capacity for AET in post-conflict Africa (Buckland, 2005). In general, institutions that are strong pre-conflict are more easily repaired post-conflict (Aron, 2003) vis-à-vis weak pre-conflict institutions.

Weak institutions predominate in post-conflict Sub-Saharan Africa, which severely compromises their capacity to deliver general education and AET programs. As a result, many Sub-Saharan African

educational systems lack the ability and infrastructure to provide quality education and develop graduates capable of improving their nations' agriculture (Chaudhry & Al-Haj, 1985; Maguire, 2000). This phenomenon is clearly demonstrated in Somalia, where weak pre-conflict education systems have made post-conflict reconstruction tedious and ineffective (Bekalo et al., 2003).

Low institutional capacity in post-conflict Sub Saharan Africa is primarily reflected in the individual abilities of personnel. At the administrative level AET personnel lack the organizational capacity to plan, conduct needs assessment of markets and learners, and to monitor and evaluate progress and impact (Wallace, 2007). Furthermore, AET systems struggle to attract motivated and committed staff. Underfunding is reflected in salaries, and the talented personnel that do exist often pursue more lucrative opportunities with NGOs or the private sector (Davis et al., 2008). Those who are entrenched in AET systems often fail to innovate or question the status quo (Wallace, 2007), which reduces the ability of the entire system to adapt to changing agricultural realities (Oketch, 2007).

Low Teacher Quality

Teachers in post-conflict Sub-Saharan AET systems are generally untrained and of poor quality (Bekalo et al., 2003; Buckland, 2006). Conflict often includes the targeting and killing of educated and skilled people, especially when they might have above average socio-economic status in their communities or countries (Buckland, 2005). These individuals also are more likely to choose to and have the means to flee. This creates a void of qualified teachers during the post-conflict period, as seen throughout post-conflict Sub-Saharan Africa (Bekalo et al., 2003; Buckland, 2005). The lack of teachers is most severe at the highest levels of AET systems, and especially at the tertiary level where they are most needed.

As a result of warfare and targeting, post-conflict countries often contain an oversupply of untrained and underqualified teachers, which affects the capacity of AET schools and the quality of education. Often AET systems are also subject to inbreeding to fill teaching positions. This occurs when graduates of institutions are hired to teach at the same institution. This practice can "exclude the entry of new ideas" and complementary information that could enhance curriculum and teaching (Maguire, 2000, p. 2).

Inadequate Educational Infrastructure

Institutional capacity is also constrained by poor physical infrastructure in post-conflict AET and education. Even in Sub-Saharan African nations not characterized by conflict, infrastructure is often decaying and insufficient to serve growing numbers of students (Rivera, 2006). Funding to maintain and

rebuild schools is seldom adequate, despite donor involvement. Also, curriculum and teaching materials are often nonexistent to properly teach students (Rivera, 2006), and minimal international funding has been directed towards this need (Bekalo et al., 2003).

In post-conflict settings, the destruction of educational infrastructure is nearly ubiquitous as schools are burnt and looted in the midst of conflict (Wiggins & Leturque, 2010). Post-conflict governments must then first rebuild schools in order for students to resume their education, and this process is slow and costly (Bekalo et al., 2003). Again the emphasis tends to be on rebuilding primary and general education facilities. Because AET systems require secondary and tertiary levels, destruction of infrastructure can force students to leave the system before completing their degrees (Buckland, 2005). Educational attainment is therefore very low in post-conflict AET systems relative to non-conflict nations (Bekalo et al., 2003).

Poor Linkages to Agricultural Stakeholders and Donors

Beyond institutional capacity, AET systems are often poorly linked to other agricultural systems and lack a “whole-systems perspective” (Wallace, 2007, p. 589). Ideally AET should be closely tied to agricultural research and extension, although there remains a disconnect in Sub-Saharan Africa as these elements often exist under different Ministries (Chaudhry & Al-Haj, 1985; Eicher, 2006). AET systems are often also disconnected from the farmers and agribusinesses that will ultimately employ their graduates (Wallace, 2007).

Linkages between AET systems and other educational institutions are also lacking. Primary and secondary AET schools are often disconnected from general education counterpart schools (Wallace, 2007). Agricultural universities are also removed from those tertiary institutions focusing on general education (Maguire, 2000; Wallace, 2007). Furthermore, agricultural universities in Sub-Saharan Africa are often isolated from other agricultural tertiary institutions (Maguire, 2000; Vandenbosch, 2006). These poor linkages reduce the potential of beneficial collaboration even when institutional goals and activities are interrelated (Rivera, 2006).

Finally, AET systems in post-conflict Sub-Saharan Africa suffer from poor coordination between governmental actors and international donors in the delivery of educational services (Buckland, 2005). A massive influx of NGOs and multilateral agencies is typical of the post-conflict period. However, lack of coordination and development agencies acting in parallel to governments often results from poor communication and competing agendas (Macrae, 1997; Wallace, 2007).

International agencies often choose to circumvent governments due to the belief that conflict is a result of governmental failure. Avoiding further conflict therefore necessitates the replacement of the pre-conflict modus operandi with new policies, different processes, and external oversight (Longley et al., 2007). Unfortunately this strategy does not help develop the institutional capacity of governments to manage AET systems after donor involvement wanes, which further reduces the capacity of governments and can create long-term impacts on development (Schuller, 2012).

Instead of collaborating with governments, donor agencies often provide their own educational and AET services. NGO schools are common in many post-conflict countries (Bekalo et al., 2003) and often attract talented students away from governmental schools. Partner universities in the developed world also offer students the opportunity to study abroad rather than at domestic agricultural universities, which can create a detrimental brain-drain (Eicher, 2006).

Unrealized Potential

As a result of the aforementioned challenges, AET in Sub-Saharan Africa is failing to meet the needs of the agricultural sector (Spielman et al., 2009). Specifically, the benefits expressed at the national level (e.g. better prepared workforce, poverty reduction) are not realized because of local and individual realities (e.g. poor reputation of AET, low institutional capacity) (Oketch, 2007). AET systems are therefore not prepared to address labor market issues in Sub-Saharan Africa. Oketch (2007) found that the Kenyan AET system failed to create jobs, increased rural poverty, and expedited urban migration. Consequently, significant changes are required in Sub-Saharan African AET (Rivera, 2006; Vandenbosch, 2006). Wallace (2007) asserted that “major adjustments in every aspect of its structure and functioning” are necessary to address the changing socio-political context in which AET operates.

Opportunities for AET in Post-Conflict Sub-Saharan Africa

Despite the challenges, AET in post-conflict Sub-Saharan Africa can be improved with appropriate interventions (Rivera, 2006). Rebuilding these systems can also be achieved without major influxes of donor funding if the region creates conducive political and environmental conditions to be successful (Wallace, 2007). This would require nations to demonstrate sufficient political will and effective leadership by governments, public support by diverse population groups, and long-term commitments to sustainable reforms. These conditions are not currently present in many Sub-Saharan African

countries, and are far more difficult to ensure in post-conflict nations (Buckland, 2005; Wallace, 2007). Nonetheless, the potential for positive AET reform still exists.

Education for Peacebuilding

Buckland (2005, 2006) asserted that conflict can actually create an opportunity for AET reform in post-conflict countries. As discussed, education is often the first thing disrupted and conflict decimates entire educational systems (Buckland, 2005). Somalia saw a total cessation of formal education at the height of conflict, with 0% enrollment from 1991-1992 (Bekalo et al., 2003). This leaves post-conflict countries with a largely clean slate for new educational policies and operations (Buckland, 2006). Additionally, the importance of providing basic social services (e.g. education) during the emergency relief phase is well defended (Aron, 2003; Collier, 2009; Geda, 2011). As a result, education is one of the first social services to be resumed after security is established (Buckland, 2005; Whalan, 2011). Educational rebuilding and reform is therefore a priority of early post-conflict development.

Newly established governments are often eager for major reforms and education can be a common cause among previously opposing groups. Education reforms can also help legitimize and garner public support for new governments by promoting education as a “peace dividend” and a deterrent for future violence (Buckland, 2006, p. 8). Education can therefore be the flagship governmental program in early post-conflict periods. Governments will also be judged by their success in reestablishing and improving pre-conflict education systems (including AET), which causes further emphasis on building effective systems during the post-conflict period (Buckland, 2005; Mendenhall, 2012).

Opportunity for New Educational Policies

The first step governments must take to rebuild and improve post-conflict AET systems is to create and implement appropriate policies. Inadequate or nonexistent national AET policy is a common constraint to AET in Sub-Saharan Africa, causing Wallace (2007) to assert that improving nations’ systems would first require “a clearly developed policy framework for AET” (p. 586). Policies should be inclusive of the perspectives of multiple stakeholders and include school-level input to be most effective and sustainable (Mendenhall, 2012). Also, policies regarding AET should be linked as closely as possible to other national development objectives (Davis et al., 2007; Spielman et al., 2008). Both education and agriculture policies should include AET’s role whenever possible (Mendenhall, 2012), especially in regards to workforce development and employment programs (Rivera, 2006). Finally, policy decisions should be inclusive of donor perspectives and cognizant of their priorities (Wallace, 2007).

Availability of Funding

Funding for social services is often highly available in post-conflict countries, and initiatives that promote education reform are typically able to acquire assistance for new programs, competencies, and infrastructure. World Bank funding of many post-conflict countries in Sub-Saharan Africa, including Sierra Leone, Angola, and Mozambique, actually required the inclusion of educational policy and planning in PRSPs (Buckland, 2006). However, funding mechanisms must be both diverse and sustainable. Governments must be willing and able to match donor funding over the long-term for educational reforms to be effective (Mendenhall, 2012). This may require governments to seek funding that is longer-lasting than typical post-conflict funding cycles, which often decline quickly following the emergency phase (Vandenbosch, 2006). However, when efforts to secure funding are fruitful, post-conflict countries are able to rehabilitate AET systems with far fewer government funds (Wallace, 2007). Sufficient and stable funding can also allow better support to teachers and better equip schools (Vandenbosch, 2006; Waters et al., 2007).

Assistance for Institutional Capacity Building

While post-conflict situations create a potential climate for policy reform and donor funding, long-term impact requires the creation of strong institutions and the building of institutional capacity for agricultural development and agricultural education (Betru & Hamdar, 1997; Hounkonnou et al., 2012). Yet as discussed, AET institutions in Sub-Saharan Africa are often weak and ineffective in terms of policy framework, organizational management and human capacity in particular. Post-conflict institutions are even more in need of rehabilitation and strengthening, which requires the building of human capacity within AET institutions (Wallace, 1997). This is a formidable challenge but one which is necessary and has become a focus of governmental and donor efforts.

Capacity building is required of all stakeholders within post-conflict AET systems in Sub-Saharan Africa. At the administrative level, Davis et al. (2008) called for a change in “organizational cultures, behaviors, and incentives” that would promote innovation and realign AET systems with modern agricultural realities (p. 38). Improved leadership is also needed to promote policy-making, long-term planning, and results-based decision making (Wallace, 2007). Governments and donor agencies are therefore encouraged to include managerial training in any AET reforms (Spielman et al., 2008). This need is especially acute in post-conflict situations where governance may have included high levels of centralization and corruption, and donor agencies might already be available to provide governance training as part of their post-conflict development programming.

Fortunately, many international agencies working in post-conflict countries include the improvement of governance and the development of governmental capacity in their mandates. This creates a unique opportunity to build the capacity of Sub-Saharan African AET systems, as expertise and funding from NGOs and multilateral donors is already available.

Capacity building at the school and/or classroom level is also needed for AET improvements in Sub-Saharan Africa (Rivera, 2006). This is essential throughout the region but especially in post-conflict countries where skilled teachers are scarce and untrained teachers abundant (Buckland, 2005). First, AET teachers must be trained or retrained with relevant and current technical information to properly teach students (Mendenhall, 2012). Also, efforts to improve pedagogical practices can help enhance the overall quality of instruction and value of graduates (Blum, 2013; Ganpat, 2013). NGO partners can be especially valuable in providing training to AET teachers when governmental capacity is inadequate (Buckland, 2005).

Building capacity at the local level will only improve AET systems if institutions are willing to accept greater decentralization. Large bureaucratic processes remain common in many Sub-Saharan African education systems, which unfortunately limits the ability of AET schools to be innovative, entrepreneurial, and flexible to the needs of learners and local conditions (Davis et al., 2008; Spielman et al., 2008). Decentralization may be especially challenging in post-conflict countries where ruling groups might be wary of relinquishing power to regions from which they draw less support (World Bank, 2012). However, decentralization is truly needed for individuals within AET systems to teach and lead at their highest potential. Generating local empowerment and ownership of educational services within AET systems can also help reduce the burden on national governments and improve the quality of education to students (Mendenhall, 2012).

Improved Collaboration and Partnerships between AET Providers

The delivery of AET services in non- and post-conflict Sub-Saharan Africa can also be improved through expanded collaboration and the development of appropriate linkages between AET and other agricultural/educational stakeholders. Strong linkages can help transform AET systems into webs of information and learning (Wallace, 1997), increase innovation and connection to labor markets (Davis et al., 2007; Spielman et al., 2008), and promote effective agricultural research and extension (Betru & Hamdar, 1997).

The first step is to improve collaboration between AET service providers themselves. Fundamental to these linkages is open communication between stakeholders at the international, national, and school level. Communication and coordination can generate partnership between AET service providers and also with NGOs that conduct AET activities (Wallace, 2007). This will improve systems so that different providers of AET can implement complementary rather than duplicate or competing programs (Mendenhall, 2012). Improved collaboration will also allow for the sharing of strategies and resources, thereby creating a “learning web” within Sub-Saharan African AET systems (Wallace, 1997, p. 35). It is especially important to also develop linkages between secondary AET institutions and agricultural universities to ensure that curricula are complementary and secondary graduates possess the necessary skills for advancement and success at higher levels (Wallace, 1992, 2007).

AET institutions are also encouraged to pursue closer ties with international actors, especially where post-conflict countries are trying to rebuild their AET capacity at the tertiary level (Buckland, 2005). There is currently renewed donor support for partnerships between external donors and AET institutions in Sub-Saharan Africa (Samoff & Carrol, 2004). This trend creates an influx of needed funding and can be very helpful in reconstructing and/or reforming AET institutions in post-conflict countries. Gore et al. (2009) described the impact of partnerships between USAID and 12 higher education institutions. The report found that modest funding created “significant value for the money” towards agricultural and educational development goals, and greatly enhanced the capacity of recipient AET faculty, staff, and students (Gore et al., 2009, p. 3). Similar opportunities exist for AET systems willing to pursue them.

Enhanced Linkages within Agricultural Sectors

AET systems are complex and necessarily linked to other components of the agricultural and educational sectors (Wallace, 1992, 2007). Within the agricultural sector AET is closely tied to farmers, producers, agricultural transportation and storage workers, Ministries of Agriculture, NGOs, agricultural research centers, agricultural extension, and rural households. In education AET is tied to general education (or non-AET) institutions, Ministries of Education, NGOs, and other formal or non-formal education actors. In recognition of the complexity of systems and the role played by AET, Davis et al. (2007) recommended creating linkages beyond the AET system itself and efforts to “forge stronger links between AET and other stakeholders” (p. 35). Each of these aforementioned groups have diverse capabilities that can benefit and reduce the costs to AET systems and institutions if properly utilized. Mendenhall (2012)

therefore recommended pursuing “partnerships that leverage the comparative advantages of each group” to develop more effective AET systems (p. 76).

Additionally, Sub-Saharan African AET systems must collaborate more effectively with agricultural extension (Betru & Hamdar, 1997; Wallace 1992, 2007). Agricultural extension systems are often the destination of AET graduates (Davis et al., 2007), although they often lack the skills needed by extension systems and are unprepared for this vocation (Maguire, 2000). This can be remedied through closer collaboration between AET and extension, especially if AET institutions tailor curriculum and teaching to the anticipated needs of extension systems. Betru and Hamdar (1997) advocated for greater training on extension processes, andragogy, and research skills in AET programs. Also, extension and research systems are likely sources of up-to-date technical information that will be needed by AET students. Thus, stronger collaboration can improve both the quality and relevance of teaching and the employability of graduates.

Greater collaboration with agricultural research institutions can also enhance the relevance and value of AET systems. Public and private agricultural research is expanding in Sub-Saharan Africa, and even in countries recovering from conflict (Spielman et al., 2009; Thirtle & Echevarria, 1994). Agricultural research in the region remains low, but has vast potential benefits that governments and AET systems can help to maximize. Alene and Coulibaly (2009) found that doubling funding for agricultural research in Sub-Saharan Africa could reduce poverty by 9% each year in the region. These gains, however, are only achieved through proper linkages that put research in the hands of farmers. Increasing collaboration between public systems (including AET) and researchers could improve the suitability of research to the contexts in which it might be used (Thirtle & Echevarria, 1994). AET could also provide an outlet for agricultural research to be disseminated as graduates move into extension and other related fields that involve working with potential adopters of new technologies and practices (Alene & Coulibaly, 2009).

AET systems must also be reformed to include closer links to communities, farmers, and end-users. AET institutions in Sub-Saharan Africa are often set apart from their host communities. They are often staffed by instructors from other parts of the country and teach agricultural skills that are not always relevant to the local context or cropping systems (Mendenhall, 2012).

Instead, AET should create stronger ties to host communities. Vandenbosch (2006) envisioned AET institutions as multi-purpose agricultural training centers that educate not only students but also

provide extension-like services to local farmers and communities. Adding a focus on promoting local sustainable livelihoods can also strengthen these ties (Wallace, 2007). Not only would this help garner local support for the institutions, AET schools would be better linked to the needs of end-users and students would have the opportunity to practice the skills taught in the classroom at home or within their communities. In support of this strategy, Van Rijn, Bulte, and Adekunle (2012) observed that AET institutions with stronger connections to their host communities were more innovative and produced more entrepreneurial graduates, which is another benefit of closer collaboration.

Privatization Opportunities

While collaboration with other AET providers, agricultural extension systems, and pertinent stakeholders may help governments improve the delivery of public agricultural education and training, privatization of AET in post-conflict Sub-Saharan Africa should also be considered (Oketch, 2007; Wallace, 2007). AET has traditionally been dominated by public institutions in the region. However, private AET services have become increasingly common, and are actually the dominant form of AET in some post-conflict countries (e.g. Mali) where government capacity is low (Oketch, 2007).

Private AET providers have many benefits for governments. First, these institutions can lessen the financial burden on governments in post-conflict and least-developed countries by improving the coverage of and access to quality AET (Thirtle & Echevarria, 1994). Their funding structure can also allow for the inclusion of more target groups, and when donor funding is high can increase the involvement of low-income students (Oketch, 2007). Second, private institutions can be more flexible to the needs of labor markets. Curriculum can be quickly modified to be made more relevant without the lengthy and overly-bureaucratic processes found in public AET systems (Oketch, 2007). Private AET providers are also better able to conduct monitoring and evaluation activities to improve their educational delivery. Finally, private AET institutions are often more closely tied to emerging agricultural innovations (Thirtle & Echeverria, 1994). This better prepares students to work with these innovations upon graduation.

Curriculum Reform

Post-conflict governments are often eager to make policy changes that will distinguish themselves from previous regimes (Buckland, 2005, 2006). AET systems would be wise to capitalize on this opportunity and the corresponding flow of donor funding and support to implement reforms.

Curriculum reform is clearly needed in Sub-Saharan African AET (Davis et al., 2008; Wallace, 1997). Criticisms of current curricula's outdatedness and poor relevance to labor markets are widespread

(Jayne et al., 2010; Maguire, 2000; Oketch, 2007). Consequently, Wallace (2007) advocated that “curriculum processes and curriculum contents [be] reformed at national and local levels” (p. 587). This process will be most successful if participatory curriculum development approaches are inclusive of stakeholders at all levels and from all relevant groups are involved in the process to align the curriculum with the needs of society (Aron, 2003). In post-conflict countries curriculum reform requires decentralization, which will be challenging but can also help unify diverse groups if done appropriately (Buckland, 2005).

Most importantly, reformed AET curriculum must be flexible and needs-based (Oketch, 2007). AET systems need to move away from outdated models and focus on present labor demands (Wallace, 1997). Using participatory reform methods will help make AET systems more relevant to stakeholder needs and labor market requirements. Links to the labor market created during the reform process can also allow curriculum to quickly be modified as labor needs change (Oketch, 2007; Vandenbosch, 2006).

In addition to reflecting the needs of the labor market, AET curricula must better serve agricultural stakeholders. Buckland (2005) argued that curriculum reform in post-conflict countries should contain economic and social goals that garner popular support and contribute to national development objectives. Wallace (2007) advocated a focus on “appropriate training for deprived groups in rural society at large, aiming towards poverty reduction” and as a means of peacebuilding and development (p. 587). Incorporating new target audiences is also crucial (Wallace, 1997), especially former child soldiers and displaced youth (Blattman & Annan, 2012; Buckland, 2005). Therefore to properly reform AET curriculum, it will be necessary for governments and institutions to conduct national and local needs assessments of the agricultural sector (Vandenbosch, 2006; Wallace, 1992, 1997). Again, this process should be participatory whenever possible.

Reformed AET curricula should highlight entrepreneurship and innovation skills (Davis et al., 2007; Spielman et al., 2009). Currently many AET systems focus heavily on the large-scale production of staple and export crops (Vandenbosch, 2006). This is especially true in post-conflict countries which struggle to reestablish food security and curb importation (Seuneke, Lans, & Wiskerke, 2013). Unfortunately, this narrow focus does not leave adequate room for AET systems to prepare students to be entrepreneurial and innovative. Nonetheless, entrepreneurship and innovation are two of the most sought skills in agricultural graduates, and are least commonly developed by current Sub-Saharan African AET systems (Ganpat, 2013; Oketch, 2007; Seuneke et al., 2013).

Seuneke et al. (2013) argued that the ability to be entrepreneurial is the single most important skill Sub-Saharan African farmers need to survive. The authors also asserted that entrepreneurship not only could be learned by farmers but it could be taught by development practitioners, placing the burden on AET graduates to do so.

Developing innovative thinking and creativity in AET graduates should also be a goal of curriculum reform (Wallace, 1997). Agricultural innovations are increasingly important to African farmers, yet farmers often lack the ability to innovate themselves or to easily incorporate innovations into their farming (Spielman et al., 2009). Similarly, the ability of AET graduates to seek innovative solutions outside of past technical training is increasingly important in Sub-Saharan Africa. Current AET graduates must therefore be better able to utilize new technologies and seek novel solutions to the production problems of stakeholders in the agricultural sector. This is especially true of those graduates who would work in post-conflict extension systems. Reformed curriculum must reflect this focus on innovativeness (Wallace, 1992).

Finally, efforts to reform AET curriculum in post-conflict Sub-Saharan Africa should consider the inclusion of a general education component to degree tracks. Providing students this pathway can achieve several benefits. First, by providing a dual degree track students have the opportunity to continue their education (Oketch, 2007). This will increase the desirability of AET programs and allow graduates other employment possibilities. Similar programs have been implemented successfully in several countries including those emerging from conflict (Kone, 2013). Second, the inclusion of a general education component will ensure that the skills learned are not overly specialized but are instead useful in multiple contexts or vocations (Wallace, 2007). Overspecialization has shown to be problematic when instruction does not meet employment demand. Graduates often remain unemployed as a result (Oketch, 2007).

Including a general education component is most feasible at the primary and secondary levels (Wallace, 2007). Tertiary AET institutions should remain specialized in agriculture. Furthermore, those AET institutions that have proven to be successful and of high quality should not be forced to provide general education degrees (Oketch, 2007).

New Teaching Strategies

In addition to curriculum reform, Sub-Saharan African AET systems could benefit from modifying their teaching strategies to better suit the needs of learners (Vandenbosch, 2006). Modern educational

theorists (e.g. Knowles, Swanson, & Holton, 2005; Kolb, 1984) acknowledge that individuals possess diverse learning styles. Still, many African AET schools predominately use lecture-based teaching with elements of demonstration. Reforms should therefore increase the level of student involvement (Wallace, 1992, 1997). Wallace (2007) argued that AET should focus primarily on experiential learning over other teaching methods as this is better preparation for future employment. Additional efforts to make student assessments competency- rather than knowledge-based might also help graduates learn more useful skills (Blum, 2013; Ganpat, 2013).

Teaching and learning in AET should also be more participatory than in current AET systems. Participatory education is especially important at tertiary AET institutions where students are ostensibly adults and can contribute significantly to instruction (Chambers, 1994; Knowles et al., 2005). Greater participation in teaching can not only help tailor instruction to the needs of learners but can also teach students the participatory skills they will use in future interactions with agricultural stakeholders (Wallace, 1992).

Alternative and Transitional Education Models

A more radical approach could be to introduce alternative education models for vocational and AET schools. Some post-conflict countries lack sufficient governmental or donor support for traditional AET systems to function effectively. In these cases, educational alternatives should be considered. This can include independent community-run schools designed to provide relevant vocational skills to students who missed years of education due to fighting or displacement.

In post-conflict Somalia, the Flexible Approach to Education (FAE) model is used in remote regions affected by conflict and without government-run schools (Bekalo et al., 2003). FAE schools use a flexible demand-driven curriculum, local community members as teachers, and operate within communally-owned land or buildings. The approach has the advantage of providing students a closer and less expensive educational option, and prompts greater enrollment than other schools. Using FAE schools in place of general education or AET schools also saves governments money for teacher salaries. The system also has drawbacks, including low quality of instruction due to untrained teachers. The potential lack of acceptance of FAE degrees may also compromise the employability of graduates (Bekalo et al., 2003).

FAE is most useful during early post-conflict periods when governments are transitioning back to normalcy and are desperate to provide some form of relevant education (Bekalo et al., 2003). It should

not be considered a long-term solution except in areas where other AET institutions are not present to serve students. Remote rural regions or those isolated due to violence are possible sites for FAE schools. Although not ideal, when FAE is the only alternative available to post-conflict governments it should be considered as a viable means of providing agricultural/vocational training to post-conflict populations.

Building upon Successes

Perhaps the most important means of improving AET systems in post-conflict Sub-Saharan Africa is by learning from and building off of the successes of other systems in the region. Vandenbosch (2006) wrote that “interesting and promising new models of post-primary agricultural education and training are emerging in different countries in sub-Saharan Africa” (p. 3). Similarly, many governments have successfully rebuilt and implemented AET systems following conflict. Individual AET schools have also been productive, innovative, and successful in producing trained graduates able to enhance post-conflict agricultural sectors (Wallace, 2007). In all cases, there are lessons learned that can be beneficial to other AET systems and institutions in Sub-Saharan Africa. This provides new hope and direction towards the revival of post-conflict AET throughout the region (Wallace, 2007).

Building off of these successes requires AET systems and institutions to invest in monitoring and evaluation process and provide open communication of results across Sub-Saharan Africa (Vandenbosch, 2006). One positive model is the AET Africa database which provides statistics and information on tertiary AET institutions within the continent (AET Africa, n.d.). When evaluation and communication are done appropriately, AET systems in post-conflict Sub-Saharan Africa can use proven strategies and avoid pitfalls to maximize their effectiveness and relevance to their respective agricultural sectors.

Summary

The importance of AET to the development of agriculture and economic development in general in the Sub-Saharan Africa region remains large, even as AET in the region continues to face many challenges and constraints. These issues are particularly acute in post-conflict countries that lack the stability, institutional capacity, and overall conditions for effective agricultural education. However, progress towards the improvement of AET is despite the constraints. Targeted reforms, greater attention to student needs and the demands of labor markets, and efforts to improve linkages and form beneficial partnerships all provide areas for AET systems to become more effective and impactful. With

appropriate interventions, AET in post-conflict Sub-Saharan Africa can become a major force for agricultural production growth, improved food security, and poverty reduction. Opportunities for such interventions include the strategies highlighted below.

Assistance for Institutional Capacity Building

Capacity building is required of all stakeholders within post-conflict AET systems in Sub-Saharan Africa. Fortunately, many international agencies working in post-conflict countries include the improvement of governance and the development of governmental capacity in their mandates. This creates a unique opportunity to build the capacity of Sub-Saharan African AET systems, as expertise and funding from NGOs and multilateral donors is already available.

Improved Collaboration and Partnerships between AET Providers

The delivery of AET services in non- and post-conflict Sub-Saharan Africa can also be improved through expanded collaboration and the development of appropriate linkages between AET and other agricultural/educational stakeholders. Strong linkages can help transform AET systems into webs of information and learning, increase innovation and connection to labor markets, and promote effective agricultural research and extension.

Enhanced Linkages within Agricultural Sectors

AET systems are complex and necessarily linked to other components of the agricultural and educational sectors. Linkages must be created beyond the AET system itself and efforts to forge stronger links between AET and other stakeholders. Each group has diverse capabilities that can benefit and reduce the costs to AET systems and institutions if properly utilized. Partnerships must also leverage the comparative advantages of each group to develop more effective AET systems. Reforms are needed to include closer links to communities, farmers, and end-users.

Privatization Opportunities

Private AET providers have many benefits for governments. First, these institutions can lessen the financial burden on governments in post-conflict and least-developed countries by improving the coverage of and access to quality AET. Second, private institutions can be more flexible to the needs of labor markets. Curriculum can be quickly modified to be made more relevant without the lengthy and overly-bureaucratic processes found in public AET systems. Private AET providers are also better able to conduct monitoring and evaluation activities to improve their educational delivery. Finally, private AET institutions are often more closely tied to emerging agricultural innovations.

Curriculum Reform

Given the criticisms of current curricula's "outdatedness" and poor relevance to labor markets, it is imperative that curriculum processes and curriculum contents be reformed at national and local levels. Such processes will be most successful if they use participatory curriculum development approaches and are inclusive of stakeholders at all levels and from all relevant groups. Post-conflict opportunities can and should be taken to strategically involve stakeholders and targeted communities in the process in order to re-align the curriculum with the needs of society. In post-conflict countries curriculum reform requires decentralization, which will be challenging but can also help unify diverse groups if done appropriately.

New Teaching Strategies

Teaching and learning in AET should also be more participatory than in current AET systems. Participatory education is especially important at tertiary AET institutions where students are ostensibly adults and can contribute significantly to instruction. Greater participation in teaching can not only help tailor instruction to the needs of learners but can also teach students the participatory skills they will use in future interactions with agricultural stakeholders.

Alternative and Transitional Education Models

In post-conflict environments, the Flexible Approach to Education (FAE) model can be used in remote regions affected by conflict and without government-run schools. FAE schools use a flexible demand-driven curriculum, local community members as teachers, and operate within communally-owned land or buildings. The approach has the advantage of providing students a closer and less expensive educational option, and prompts greater enrollment than other schools.

Building upon Successes

Perhaps the most important means of improving AET systems in post-conflict Sub-Saharan Africa is by learning from and building off of the successes of other systems in the region. Interesting and promising new models of post-primary agricultural education and training are emerging in different countries in sub-Saharan Africa. Similarly, many governments have successfully rebuilt and implemented AET systems following conflict. Individual AET schools have also been productive, innovative, and successful in producing trained graduates able to enhance post-conflict agricultural sectors. In all cases, there are lessons learned that can be beneficial to other AET systems and institutions in Sub-Saharan Africa.

References

- Addison, T. (2005). *Agricultural development for peace* (Paper 2005/07). Retrieved from World Institute for Development Research Economics website: <http://www.wider.unu.edu/stc/repec/pdfs/rp2005/rp2005-07.pdf>
- AET Africa. (n.d.). *AET Africa: A guide to tertiary agricultural education in Africa*. Retrieved from the AET Africa website: <http://www.aet-africa.org/>
- Alene, A. D. & Coulibaly, O. (2009). The impact of agricultural research on productivity and poverty in Sub-Saharan Africa. *Food Policy*, 34, 198–209
- Aron, J. (2003). Building institutions in post-conflict African economies. *Journal of International Development*, 15, 471-485. doi:10.1002/jid.997
- Arthur, P. (2011). Capacity development and reconstruction in post-conflict African environments. *World Journal of Entrepreneurship, Management, and Sustainable Development*, 7(2/3/4), 267-306.
- Banya, K. (1995). "Quality in an Integrated Rural Development Program: The Sierra Leone Experience." *Assessment & Evaluation in Higher Education* 20(2): 213-224.
- Bekalo, S. A., Brophy, M., & Welford, A. G. (2003). The development of education in post-conflict Somaliland. *International Journal of Educational Development*, 23, 459-475.
- Betru, T. & Hamdar, B. (1997). Strengthening the linkages between research and extension in agricultural higher education institutions in developing countries. *International Journal of Educational Development*, 17(3), 303-311.
- Birner, R., Cohen, M. J., & Ilukor, J. (2011). *Rebuilding Agricultural Livelihoods in Post-Conflict Situations: What are the Governance Challenges? The Case of Northern Uganda* (USSP Working Paper 07). Retrieved from the International Food Policy Research Institute website: <http://www.ifpri.org/sites/default/files/publications/usspwp07.pdf>
- Blattman C. & Annan, J. (2012). *Reintegrating and employing high risk youth in Liberia: Lessons from a randomized evaluation of a Landmine Action an agricultural training program for ex-combatants*. Report of Innovations for Poverty Action. New Haven, CT: Yale University.
- Blum, M. (2013, January). *Advisory services in an innovation concept framework*. Presentation at the University of Florida, Gainesville, FL.
- Buckland, P. (2005). *Reshaping the future: Education and post-conflict reconstruction*. Rome, Italy: World Bank.
- Buckland, P. (2006). *Post conflict education: Time for a reality check?* International Network for Education in Emergencies. FMR Education Supplement, 7-8. Retrieved from http://www.ineesite.org/uploads/files/resources/Buckland,_P.pdf
- Cervantes-Godoy, D. & Dewbre, J. (2010). *Economic importance of agriculture for poverty reduction* (Food, Agriculture and Fisheries Working Papers No. 23). Paris, France: Organization for Economic Cooperation and Development [OECD] Publishing.
- Chambers, R. (1994). The origins and practice of participatory rural appraisal. *World Development*, 22(7), 953-969.
- Chaudhry, M. A. & Al-Haj, F. A. (1985). A critical analysis of agricultural education and extension in developing countries. *Agricultural Administration*, 20, 169-186.

- Collier, P. (2006). *Angola: Options for prosperity*. Retrieved from: <http://users.ox.ac.uk/~econpco/research/pdfs/Angola-OptionsforProsperity.pdf>
- Davis, K., Ekboir, J., Mekasha, W., Ochieng, C., Spielman, D. J., & Zerfu, E. (2007). *Strengthening agricultural education and training in Sub-Saharan Africa from an innovation systems perspective*. International Food Policy Research Center, Washington, DC.
- Davis, K., Ekboir, J., & Spielman, D. J. (2008). Strengthening agricultural education and training in Sub-Saharan Africa from an innovation systems perspective: A case study of Mozambique. *Journal of Agricultural Education and Extension*, 14(1), 35-51.
- Eicher, C. (2006). *The evolution of agricultural education and training: Global insights of relevance for Africa*. World Bank. Retrieved from the FAO website: <http://www.fao.org/sd/erp/documents2006/globalaetinsightseicher.pdf>
- Food and Agriculture Organization [FAO]. (2012). *The state of food insecurity in the world 2012*. Retrieved from the FAO website: <http://www.fao.org/docrep/016/i3027e/i3027e.pdf>
- Food and Agricultural Organization [FAO]. (2013a). *FAO Stat* [database]. Retrieved from the FAO website: <http://faostat.fao.org/site/339/default.aspx>
- Food and Agriculture Organization [FAO]. (2013b). *The state of food insecurity in the world 2013: The multiple dimensions of food security*. Retrieved from the FAO website: <http://www.fao.org/docrep/018/i3434e/i3434e.pdf>
- Ganpat, W. (2013, February). *Advisory services in an innovation concept framework*. Presentation at the University of Florida, Gainesville, FL.
- Geda, A. (2011). Capacity building in fragile and post-conflict states in Africa. *World Journal of Entrepreneurship, Management, and Sustainable Development*, 7(2/3/4), 217-266.
- Gore, J. S., Odell, M. J., Duval, J., Crane, M., ... (with others). (2009). *Higher education partnerships in Sub-Saharan Africa: An impact assessment of 12 higher education partnerships*. Bureau for Economic Growth, Agriculture, and Trade [EGAT], United States Agency for International Development (USAID) and Higher Education for Development (HED). Retrieved from the USAID website: <http://www.hedprogram.org/resources/loader.cfm?csModule=security/getfile&pageid=3339>
- Hounkonnou, D., Kossou, D., Kuyper, T. W., Leeuwis, C., Nederlof, E. S., Roling, N., Sakyi-Dawson, O., Traoré, M. & van Huis, A. (2012). An innovation systems approach to institutional change: Smallholder development in West Africa. *Agricultural Systems*, 108, 74-83.
- Humphreys, M. & Richards, P. (2005). *Prospects and opportunities for achieving the MDGs in post-conflict countries: A case study of Sierra Leone and Liberia*. Retrieved from <http://www.columbia.edu/~mh2245/papers1/HR.pdf>
- InnovATE. (2013). *InnovATE program fact sheet: Innovation for agricultural training and education*. Retrieved from the Virginia Polytechnic Institute and State University website: <http://www.oired.vt.edu/InnovATE>
- International Fund for Agricultural Development [IFAD]. (2013). *Smallholders, food security, and the environment*. Retrieved from the United Nations Environment Program [UNEP] website: http://www.unep.org/pdf/SmallholderReport_WEB.pdf
- Jayne, T. S., Mather, D., & Mghenyi, E. (2010). Principal challenges confronting smallholder agriculture in Sub-Saharan Africa. *World Development*, 38(10), 1384-1398, 2010. doi:10.1016/j.worlddev.2010.06.002
- Kelly, G. P. (1990). Education and equality: Comparative perspectives on the expansion of education and women in the post-war period. *International Journals of Educational Development*, 10(2/3), 131-141.

- Knowles, M., Swanson, R., & Holton, E. (2005). *The adult learner: The definitive classic in adult education and human resource development* (6th ed.). San Diego, CA: Elsevier.
- Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice-Hall.
- Kone, D. (2013, December). *Field-to-market strategy for empowering rural farmers*. Presentation at the ECHO International Agriculture Conference, Fort Myers, FL.
- Ligon, E. & Sadoulet, E. (2008). *Estimating the effects of aggregate agricultural growth on the distribution of expenditures* (Background paper for the World Development Report 2008). Retrieved from the World Bank website: http://siteresources.worldbank.org/INTWDR2008/Resources/2795087-1191427986785/LigonE&SadouletE_EstimatingEffectsOfAggAgGr.pdf
- Longley, C., Christoplos, I., Slaymaker, T., & Meseka, S. (2007). *Rural recovery in fragile states: Agricultural support in countries emerging from conflict*. Retrieved from the Overseas Development Institute website: <http://www.odi.org.uk/sites/odi.org.uk/files/odi-assets/publications-opinion-files/10.pdf>
- Maguire (2000) *Agricultural education in Africa: Managing Change*. Rural Development Department, World Bank. Retrieved from the World Bank website: http://siteresources.worldbank.org/INTARD/825826-1111044795683/20424536/Ag_ed_Africa.pdf
- Macrae, J. (1997). Dilemmas of legitimacy, sustainability, and coherence: Rehabilitating the health sector, in K. Kumar (ed.), *Rebuilding societies after civil war: Critical roles for international assistance*, London, UK; Lynne Rienner Press.
- Mendenhall, M. A. (2012). Education sustainability in the relief-development transition: Challenges for international organizations working in countries affected by conflict. *International Journal of Educational Development*, 35, 67-77.
- Obura, A. (2003) *Never Again: Educational Reconstruction in Rwanda*. Paris: UNESCO IIEP.
- Obwona, M. & Guloba, M. (2009). Poverty reduction strategies during post-conflict recovery in Africa. *Journal of African Economies*, 18(i1), 77-98.
- Oketch, M. O. (2007). To vocationalise or not to vocationalise? Perspectives on current trends and issues in technical and vocational education and training (TVET) in Africa. *International Journal of Educational Development*, 27, 220-234.
- Rivera, W. (2006). *Transforming post-secondary agricultural education and training by design: Solutions for Sub-Saharan Africa*. World Bank. Retrieved from the World Bank website: http://siteresources.worldbank.org/INTAFRREGTOPTEIA/Resources/Post_Secondary_Ag_Ed_final.pdf
- Samoff, J. & Carrol, B. (2004). The promise of partnership and continuities of dependence: External support to higher education in Africa. *African Studies Review*, 47(1), 67-199.
- Schuller, M. (2012). *Killing with kindness: Haiti, international aid, and NGOs*. New Brunswick, NJ: Rutgers University Press.
- Scoones, I. (1998). *Sustainable rural livelihoods: A framework for analysis* (Working Paper 72). Retrieved from the Institute of Development Studies [IDS] website: <http://www.ids.ac.uk/files/dmfile/Wp72.pdf>
- Seuneke, P., Lans, T., & Wiskerke, J. (2013) Moving beyond entrepreneurial skills: Key factors driving entrepreneurial learning in multifunctional agriculture. *Journal of Rural Studies*, 32, 208-219.

- "Sierra Leone" (2001) Findings on the Worst Forms of Child Labor. Bureau of International Labor Affairs, U.S. Department of Labor (2002).
- Spielman, D. J., Ekboir, J. & Davis, K. (2009). The art and science of innovation systems inquiry: Applications to Sub-Saharan African agriculture. *Technology in Society*, 31, 399-405.
- Spielman, D. J., Ekboir, J., Davis, K., & Ochieng, C. (2008). An innovation systems perspective on strengthening agricultural education and training in Sub-Saharan Africa. *Agricultural Systems*, 98(1), 1-9.
- Swaminathan, M. S. (1994). *Uncommon opportunities: An agenda for peace and equitable development: Report of the International Commission on Peace and Food*. London, UK: Zed Books.
- Swanson, B. E., & Rajalahti, R. (2010). *Strengthening agricultural extension and advisory systems: Procedures for assessing, transforming, and evaluating extension systems*. Retrieved from the World Bank website: http://siteresources.worldbank.org/INTARD/Resources/Stren_combined_web.pdf
- Thirtle, C. & Echeverria, R. G. (1994). Privatization and the roles of public and private institutions in agricultural research in sub-Saharan Africa. *Food Policy*, 19(1), 31-44.
- Tizikara, C. & Lugor, L. G. L. (n.d.). *Post-conflict development of agriculture in South Sudan: Perspective on approaches to capacity strengthening*. Retrieved from http://www.erails.net/images/fara/secretariat/kigali-movement/file/Kigali%20Movement/Post-Coflict%20Agriculture_South%20Sudan.pdf
- United Nations [UN]. (2013a). *Millennium Development Goals*. Retrieved from the UN website: <http://www.un.org/millenniumgoals/>
- United Nations [UN]. (2013b). *The Millennium Development Goals report 2013*. Retrieved from the UN website: <http://www.un.org/millenniumgoals/pdf/report-2013/mdg-report-2013-english.pdf>
- United Nations Development Program [UNDP]. (2013). *Human development report 2013: The rise of the South*. Retrieved from the UNDP website: http://hdr.undp.org/en/media/HDR_2013_EN_complete.pdf
- United Nations Environment Program [UNEP]. (2002). *Agricultural development and the cost of conflict*. Retrieved from the UNEP website: http://www.unep.org/training/programmes/Instructor%20Version/Part_2/Activities/Interest_Groups/Justice_and_Peace/Supplemental/Agricultural_Development_and_the_Cost_of_Conflict.pdf
- United States Agency for International Development [USAID]. (2009). *Understanding the post-conflict country analytical template*. Retrieved from the USAID website: http://pdf.usaid.gov/pdf_docs/pnadp089.pdf
- Unruh, J. D. (2009). Land rights in postwar Liberia: The volatile part of the peace process. *Journal of Land Use Policy*, 26, 425-433.
- van Rijn, F., Bulte, E., & Adekunle, A. (2012). Social capital and agricultural innovation in Sub-Saharan Africa. *Agricultural Systems*, 108, 112-122.
- Vandenbosch, T. (2006). *Post-primary agricultural education and training in Sub-Saharan Africa: Adapting supply to changing demand*. World Agroforestry Centre [ICRAF]. Retrieved from the World Bank website: http://siteresources.worldbank.org/INTAFRREGTOPEDUCATION/Resources/444659-1212165766431/Post_Primary_Agriculture_Education_Africa.pdf
- Wallace, I. (1992). Agricultural education as a learning system in Africa: Enhancing effectiveness through innovations at the formal/non-formal interface. *International Journal of Educational Development*, 12(1), 51-64.

Wallace, I. (1997). Agricultural education at the crossroads: Present dilemmas and possible options for the future in Sub-Saharan Africa. *International Journal of Educational Development*, 17(1), 27-39.

Wallace, I. (2007). A framework for revitalization of rural education and training systems in Sub-Saharan Africa: Strengthening the human resource base for food security and sustainable livelihoods. *International Journal of Educational Development*, 27, 581-590.

Wang, Lianqin (2007), Education in Sierra Leone: Present Challenges, Future Opportunities, World Bank Publications, p. 34, ISBN 0-8213-6868-0

Waters, H., Garrett, B., & Burnham, G. (2007). *Rehabilitating health systems in post-conflict situations* (Paper 2007/06). Retrieved from World Institute for Development Research Economics website: <http://www.wider.unu.edu/stc/repec/pdfs/rp2007/rp2007-06.pdf>

Whalan, J. (2011). Aid for education in post-conflict Solomon Islands. *Prospects*, 41(2), 237-247.

Wiggins, S. & Leturque, H. (2010). *Helping Africa feed itself: Promoting agriculture to reduce poverty and hunger*. Retrieved from Overseas Development Institute [ODI] website: <http://www.odi.org.uk/sites/odi.org.uk/files/odi-assets/publications-opinion-files/6265.pdf>

World Bank. (n.d.). *Agricultural education and training*. Retrieved from the World Bank website: <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTARD/0,,contentMDK:23130794~pagePK:148956~piPK:216618~theSitePK:336682,00.html>

World Bank. (2012). *An update to the World Bank's estimates of consumption poverty in the developing world*. Retrieved from the World Bank website: http://siteresources.worldbank.org/INTPOVCALNET/Resources/Global_Poverty_Update_2012_02-29-12.pdf

World Bank. (2013a). *Agriculture, value added (% of GDP)*. Retrieved from the World Bank website: <http://data.worldbank.org/indicator/NV.AGR.TOTL.ZS/countries?display=map>

World Bank. (2013b). *Poverty data*. Retrieved from the World Bank website: <http://data.worldbank.org/topic/poverty>

World Hunger. (2013). *2013 world hunger and poverty facts and statistics*. Retrieved from World Hunger website: <http://www.worldhunger.org/articles/Learn/world%20hunger%20facts%202002.htm>

Zaur, I. (2006). *Agriculture and conflict: A conceptual framework for development* (Master's thesis). Retrieved from: <http://dl.tufts.edu/catalog/tufts:UA015.012.DO.00148>