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Innovation for Agricultural Training and Education



Review of Research and Practice for Youth Engagement in Agricultural Education and Training Systems

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December 2015

USAID/BFS/ARP-Funded Project

Award Number: AID-OAA-L-12-00002



Acknowledgements

The Innovation in Agricultural Training and Education project—InnovATE—is tasked with compiling the best ideas on how to build the capacity of Agricultural Education and Training (AET) institutions and programs and disseminating them to AET practitioners around the world. As part of this effort, InnovATE issued a Call for Concept Notes to accept applications for discussion papers that address *Contemporary Challenges in Agricultural Education and Training*. These concept papers define the state of the art in the theory and practice of AET, in selected focus domains and explore promising strategies and practices for strengthening AET systems and institutions.

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

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Problem Statement

Youth development for citizenship, employment and leadership is a crucial topic for addressing and overcoming the challenges posed to agriculture education and training (AET). The countries supported by Feed the Future and InnovATE are heavily reliant on agriculture, with high youth unemployment rates, and large youth populations. Today's group of young people is the largest in history and much of these youth have abandoned agriculture as a way of life (Ahaibwe, Mbowe, & Lwanga, 2013; Brooks, Zorya, & Guatman, 2012; Harris & Todaro, 1970; World Bank, 2008a).

The growing food crisis, impacts of climate change and increasing global unemployment and underemployment rates disproportionately affect the world's youth population (Bennell, 2010; FAO, 2009). They are the next generation of farmers, yet most have limited opportunities or declining interests in continuing in agriculture (Brooks *et al.*, 2012; World Bank, 2008a). There are significant challenges in global AET both to reengage youth in the agricultural sector and to provide necessary resources for facilitating successful youth capacity and skill development in the agricultural sector.

Building youth capacity in AET systems will equip a large unskilled and unemployed population with the means to earn a living for themselves, take ownership of their local society, and become the next generation of farmers to effectively feed themselves and the world. Addressing the need for youth development also addresses rural well-being: reducing poverty by empowering unemployed youth with transferable skills and training for employment whether in direct farming practices, entrepreneurial work related to agriculture or spin off industries such as processing, production, sales, distribution and value-added activities. By increasing the number of skilled and trained AET workers, the local capacity for country ownership will be built and will lead to sustainable food security. This context needs to be addressed proactively rather than reactively. If this youth bulge builds capacity now, through the provision of the necessary agricultural training and education, they can serve as a skilled group of farmers and community developers to meet the agricultural demands of a

rising global population.

While youth are defined as between 15 and 24 years old, it is acknowledged and understood that the global youth population is a heterogeneous group, and that the issues and challenges addressed in this review plague the subset youth populations differently (Bennell, 2010; UNESCO, 2015). The heterogeneity of the global youth population requires that their perspectives, knowledge and voice must be incorporated into program, practice and policy development to successfully and efficiently addressing their diverse needs.

This concept note advances AET scholarship by providing a clear understanding of the importance and process for engaging youth in development conversations. Youth represent a massive untapped potential to improve the rural agricultural system of developing countries, if appropriately equipped with the necessary skills, training and education to enter society as competent, empowered and capable citizens.

This concept note explores the state of knowledge on youth and community capacity building and development focusing on AET systems, and identifies promising strategies and practices. The following sections will synthesize and review the current state of knowledge of existing research and programs, and will identify critical next steps. Gaps in literature and in practice are identified and suggestions for future research, programs and policy improvements are provided.

Current State of Knowledge

Youth unemployment and underemployment are major issues across the globe, particularly in the developing world; and small-scale agriculture is the leading source of employment. However, youth are increasingly disinterested in agriculture as a way of life, despite lacking opportunity elsewhere, constructing the “youth crisis” (Bennell, 2010; FAO, IFAD & CTA, 2014; FAO, IFAD & MIJARC, 2014). This growing disinterest in agriculture and agriculture-related careers holds serious implications for both global youth populations and for the future of global agriculture production.

Looking ahead to 2050, with projections of rapid population growth, impacts of climate change, high rates of global consumption, and the need for sustainable agricultural production, there is a direct and urgent need to provide the rightful support to global youth in AET (Bennell, 2010; FAO, IFAD & CTA, 2014; FAO, IFAD & MIJARC, 2014; Leavy & Smith, 2010). Increased attention must be placed on youth populations to encourage and facilitate AET to efficiently equip the next generation of farmers and build local capacity from within to foster positive rural development. As concluded in the FAO, IFAD and CTA's report *Youth in Agriculture*,

“a coordinated response to increase youth's involvement in the agriculture sector is more important than ever, as a rising global population and decreasing agricultural productivity gains means that youth must play a pivotal role in ensuring a food-secure future for themselves, and for future generations” (2014).

Who are Youth?

The United Nations' defines youth as those between the ages of 15 and 24 years old (UNESCO, 2015). However, this definition presents several limitations. First, it limits youth to specific ages, inherently marginalizing those under 15 and over 24, yet who might still require necessary and tailored focus and support. The World Bank has expanded this definition to include all people between 12 and 24 years old; however, policy discussions generally use the flexible definition of youth as those transitioning between childhood and adulthood (Bennell, 2007; Chinsinga & Chasukwa, 2012).

Regardless, these definitions imply youth are a homogenous population when they are in fact heterogeneous in gender, locality, access to resources and region. Depending on these variations, youth needs differ drastically and require targeted and tailored policy, programming and development initiatives (Bennell, 2007; Bennell, 2010; Chinsinga & Chasukwa, 2012; FAO, IFAD & MIJARC, 2014)

Depending on locality, region, access to resources and gender, youth have different awareness, desires, needs, perceptions and aspirations, particularly towards agriculture (Bennell, 2010; Chinsinga & Chasukwa, 2012; Frick *et al.*, 1995; Thornton, 2008). Youth living in rural areas, resource-dependent communities or those farther away from metropolitan

areas have shown to have a greater baseline understanding of agriculture and the agricultural sector (Frick *et al.*, 1995; Thornton, 2008). Those living in rural areas are more likely to have lower levels of educational attainment than those living in urban areas (Bennell, 2010; Crockett, Shanahan & Jackson-Newsom, 2000; Haller & Virkler, 1993). They are also more likely to work or be interested in working in an agriculture or agricultural-related occupation than those living in urban areas (Bennell 2007; Crockett *et al.*, 2000; Haller & Virkler, 1993; Holz-Clause & Jost, 1995; World Bank, 2009b). Youth from wealthier families often are able to remain unemployed and rely on familial support, whereas youth from poorer families are forced into finding work, causing them to either accept low-waged labor or migrate to cities in search of higher-wages (FAO, IFAD & MIJARC, 2014; ILO, 2004;). When discussing youth policy, programming and efforts, it must be through a lens that recognizes and accounts for heterogeneity within the global youth population. This can be done through understanding, soliciting and incorporating youth perceptions, desires and needs into policy, programming and effort development.

Participatory research and program development methods allows for this incorporation of the youth voice. Before developing or implementing a program, initiative or policy regarding youth in a certain area, participatory research must be done in order to gain feedback and insight into the specific needs and desires of that youth population. This can be done through Rural Rapid Appraisals, needs assessments, semi-structured facilitated focus groups, semi-structured key informant interviews and participatory action research (Bergold & Thomas, 2012; Whyte, 1991).

Causes of the Youth Crisis

The global community has recently placed a strong interest and emphasis on developing “youth friendly” policies and implementation strategies to combat the negative social, economic and political consequences stemming from precarious youth livelihoods (Bennell, 2010). However, the timeliness of this shifted focus towards youth populations means there is a strong need for developing the current state of knowledge surrounding youth in agriculture, including what are the most effective and best practices, policies and development efforts for

engaging, training and educating youth in agriculture. Currently, there is a significant lack of data for understanding the determinants, causes and effects of the global “youth crisis” (Bennell, 2010).

Key indicators of this global “youth crisis” include the high unemployment or underemployment rates, the high rates of youth internal migration (predominately from rural to urban areas), the rising average age of farmers, and the almost universally negative views youth have towards agriculture as a way of life (Bennell, 2010; FAO, IFAD & CTA, 2014; Leavy & Smith, 2010). Exacerbating this youth problem is the fact that there “is a general lack of reliable and comparable data,” specifically on internal migration patterns, making it difficult to comprehend determinants and outcomes of youth choices and aspirations (DRET, ESW, & FAO, 2013; Webster & Ganpat, 2014). Understanding youth motivations, aspirations and decision-making, particularly regarding migration decisions and attitudes towards agriculture, is crucial in order to develop effective and targeted programming and policy.

Universal Disinterest in Agriculture

Despite a significant lack of data, there is strong evidence for the general negative attitudes youth have towards agriculture as a way of life (Burch, Rickson & Thiel, 1990; Chinsinga & Chasukwa, 2012; Frick, Birkenholz, Gardner & Machtmes, 1995; Guo, Jolly & Zhu, 2007; Lenihan, Brasier & Stedman, 2009; Sharma, 2007). In the past few decades, youth have become increasingly disinterested in pursuing agriculture or agriculture-related careers (Chinsinga & Chasukwa, 2012; FAO, IFAD & CTA, 2014; FAO, IFAD & MIJARC, 2014; Juma, 2007; Leavy & Smith, 2010; Man, 2012; Naamwintome & Bagson, 2013; Sharma, 2007).

Youths’ negative perceptions of agriculture and agricultural related occupations stem from stereotypes reinforced by cultural beliefs and/or the media (Kusis, Miltovica, & Feldmane, 2014). Kusis *et al.* found that Lithuanian and Latvian youth based their perceptions of agriculture from reinforced stereotypes of “old” ways of farming, including back-breaking hours in the field, low skill requirement and low wages (2014). Kusis *et al.* concluded that youth “do not see [the] large potential that agriculture could bring” (2014). Chinsinga & Chasukwa found that Malawian youth perceive the agricultural sector as “dirty work and demeaning,” to which the viable alternatives are to migrate to urban areas in search of

employment, engage in business, or migrate to South Africa in search of “the good life” (2012). Youth view agriculture’s relatively small profits difficult to reconcile with the high labor requirements (Chinsinga & Chasukwa, 2012; Kuisi *et al.*, 2014; Man, 2012; Webster & Ganpat, 2014). Additionally, youth in the Caribbean islands report the negative stigma surrounding agriculture is due to its close association with the region’s history with slavery (Mangal, 2009; Webster & Ganpat, 2014). Mangal indicates youth in the Caribbean viewing agriculture as an area “for failures and persons who are punished for not doing well in the pure sciences and other more prestigious academic fields” (2009).

The differences reported by studies conducted across various regions and localities speak to the heterogeneity of the global youth population in their perceptions, experiences, attitudes and needs. It is imperative that all programming actively solicit and integrate their target population’s perceptions, attitudes and needs into the development process. Additionally, there must be a revitalization in efforts and initiatives to interest and reengage youth in the agricultural sector.

Unemployment

By 2050, the global population is expected to reach 9 billion, with youth accounting for 14% of this total (FAO, IFAD & CTA, 2014). While this demographic is expected to increase, the available employment and entrepreneurial opportunities are not, particularly for those living in rural areas of developing countries (FAO, IFAD & CTA, 2014).

Seventy-three million people are looking for work worldwide, and youth are three times more likely to be unemployed than adults, triggering the International Labor Organization to warn of the worsening “youth employment crisis” that will leave a “scarred generation” (ILO, 2015; FAO, IFAD & MIJARC, 2014).

Youth unemployment and their increasing inactivity makes them exceedingly susceptible to extremism and/or high-risk behaviors, accepting precarious work in developed countries and intense working poverty in developing countries (Bennell, 2010; Chinsinga & Chasukwa, 2012; Department of Economic and Social Affairs, 2008; DRET, ESW, & FAO, 2013; FAO, IFAD & CTA, 2014; ILO, 2015; Leavy & Smith, 2010). Internal youth migration

accounts for almost half of the current alarming rate of urbanization in developing countries (Byerlee, 1974; FAO, IFAD & CTA, 2014; FAO, IFAD & MIJARC, 2014). Rural youth across regions reported seasonal migration within their own country or abroad as a mechanism to cope with the challenging rural unemployment situation (FAO, IFAD & MIJARC, 2014). Due to internal migration, there now exists a disproportionate representation of youth in rural versus urban areas (Department of Economic and Social Affairs, 2008).

Typically, the youth that are engaged with agriculture or agricultural related activities rely on multiple sources of income outside of agriculture. They indicate that this pluriactivity is a means to build resilience against fickle employment or wage security in the agricultural sector (FAO, IFAD & MIJARC, 2014). Yet despite the need for labor within the agricultural sector and lack of opportunity in urban areas, youth migrate towards urban areas and away from rural and agricultural livelihoods.

As the global agricultural sector needs more skilled, educated and competent workers to sustainably produce enough to meet rising global demands, it must harness the potential within the global youth population. Youth are seeking employment. The agricultural sector must actively reengage youth in the sector while providing them with the necessary education and training for enabling their success, empowerment and capacity development.

Deskilling of Youth

According to Smith & Leavy, there is a “fundamental tension between [Millennium Development Goal 2] (universal primary schooling) and the desire to see young people maintain an engagement in farming” (2010). Agriculture and agricultural- related activities are not included in formal education settings and are also not encouraged, driving youth (particularly rural youth) away from these careers (Amadi, 2012; Biriwasha, 2012; Lieten *et al.*, 2007). Thus when youth leave formal education, they are not skilled for agricultural work; however due to lack of available employment and opportunity, they cannot acquire jobs elsewhere (FAO, IFAD & CTA, 2014). The deskilling of youth exacerbates the issue of youth unemployment and inability or disinterest for seeking employment in the agricultural sector. With a lack of agricultural education incorporated in primary and secondary schools, formal education plays a considerable role in “deskilling” youth populations in skills, knowledge and experience in agriculture and agricultural-related occupations (Crawford, 2011; Katz, 2004; Lieten *et al.*, 2007).

Since the establishment of the United Nations' Millennium Development Goals in 2000, increasing universal access to primary education has been a priority on the international community's agenda (UN General Assembly, 2000). Increasingly, parents in traditional agricultural-based households in developing areas invest in their children to maintain their education and to seek better opportunities outside of agriculture, rather than employing them as family labor after a few years of primary schooling (Handwerker, 1986). With decreasing fertility rates across the globe (albeit at very different rates), this trend supports Caldwell's (1982) wealth flows theory where parents have less children but invest more in those children, rather than have more children to serve as laborers, security, and social and political capital (Kaplan & Bock, 2001; World Bank, 2015b).

Traditionally, household farmers stopped schooling at the primary level to work on the farm; whereas nowadays, farmers' children are continuing past primary level onto secondary and sometimes tertiary schooling (de Janvry & Sadoulet, 2000; Psacharopoulos, 1994; Reardon, Berdegue & Escobar, 2001). To overcome this challenge, it is imperative that agriculture be reintegrated into primary and secondary education curricula. Not only does this provide youth with an opportunity to learn more about the agricultural sector, but if integrated properly, it equips them with employable skills for the future.

Limited or Lack of Access to Resources

Global youth populations face limited or no access to essential resources that would enable their participation in agriculture or agricultural related occupations (Amadi, 2012; Bahaman *et al.*, 2010; Bennell, 2010; Chinsinga & Chasukwa, 2012; FAO, IFAD & CTA, 2014; FAO, IFAD & MIJARC, 2014; Lyocks, Lyocks & Kagbu, 2013; Man, 2012; Naamwintome & Bagson, 2013; Sharma, 2007). While some exceptions exist (for example, South Africa), low-income countries' policy makers do not target youth as vulnerable populations. In effect, youth are marginalized from receiving necessary governmental support and programming to encourage, enable or facilitate their integration into the agricultural sector (Amadi, 2012; Bennell, 2010; Chinsinga & Chasukwa, 2012; Naamwintome & Bagson, 2013). Poverty Reduction Strategy Papers rarely, if at all, mention youth (Bennell, 2010). For example, Malawi's Poverty Alleviation Program, Poverty Reduction Strategy and the Growth Development Strategy have been "almost silent on the role and involvement of young people

in the sector” (Chinsinga & Chasukwa, 2012). This silence creates a policy vacuum directed towards young people, exacerbating the problem of youth reengagement and access to resources to facilitate such engagement.

Additionally, this lack of access to resources varies across locality, gender and region. Particularly for rural youth populations, there is a lack of capacity and skills training opportunities, especially as rural youth experience much higher rates of unemployment than urban youth (Amadi, 2012; Bennell, 2010; Chinsinga & Chasukwa, 2012; FAO, IFAD & MIJARC, 2014). Rural areas have poor infrastructure, service provision, and fewer mechanization and social facilities, stripping rural youth the opportunity to capitalize on such support for integration into the agricultural sector (Dirven, 2010; FAO, IFAD & MIJARC, 2014; World Bank, 2009b). This also assists in spurring the rural exodus of young rural people into the cities in search of employment and opportunity (FAO, IFAD & MIJARC, 2014). Youth report lacking access to training and capacity- building programs for the development of soft skills, such as leadership development, business management and effective communication. They also cite a need for apprenticeship opportunities (FAO, IFAD & CTA, 2014). Government, research, programmers and policymakers must take an integrated approach to facilitate youth access to necessary resources that will enable their reengagement in the agricultural sector.

Gender Disparity

The role of women and diversified gender roles in agriculture and agricultural-related occupations has been at the core of much development related research and discussion (Agarwal, 2011; Bennell, 2010; Deere, 2005; FAO, IFAD, & CTA, 2014; Lastarria- Cornhiel, 2006; Leavy & Smith, 2010; Rao, 2009). Generally, women receive less support, have access to fewer resources, and are more likely marginalized than their male counterparts across all sectors, but particularly in agriculture (Agarwal, 2011; Deere, 2005; Dolan & Sorby, 2003; FAO, IFAD, & CTA, 2014; Lastarria-Cornhiel, 2006; Leavy & Smith, 2010; Rao, 2009). Except despite lesser access to resources, women workers are more dependent on agriculture than their male counterparts for survival due to their lesser access to non-farm jobs (Agarwal, 2011). While increased levels of livelihood diversification and development has yielded a trend away

from agriculture and agriculture-related occupations, it has been shown to increase women's responsibility for taking previous non-traditional roles in agricultural production (Deere, 2005; Dolan & Sorby, 2003; Leavy & Smith, 2010). The proportion of women in the global agricultural workforce has been rising as men are increasingly taking off-farm employment (Agarwal, 2011). Women play a vital role in food production and food security, as they are increasingly responsible for agricultural production and securing access to available quality food for their households, particularly for children's well-being (Agarwal, 2011).

Despite increased responsibility in agricultural activities, women still receive less support and access to resources (FAO, IFAD, & CTA, 2014; Leavy & Smith, 2010). These gendered constraints impact women's productive potential as they are increasingly responsible for agricultural activities. Firstly, women are disproportionately represented in agricultural higher education and training (Beintema & Di Marcantonio, 2010). While there are limited training and opportunities for young people, those that do exist are targeted towards young men, particularly in sub-Saharan Africa, Arab states and across Asia (FAO, IFAD & CTA, 2014; Hartl, 2009). Girls, particularly those in rural areas in developing countries, are less likely to attend secondary school, as early marriage limits their mobility (FAO, IFAD, & CTA, 2014). Factors contributing to this are young marriage, early motherhood, restricted mobility and capacity, and limited education levels for women (FAO, IFAD & CTA, 2014). Secondly, women farmers operate smallholding farms and are mostly landless. Due to policy and cultural constraints, women typically do not own the land on which they work and operate as 'self-employed' workers on land owned by men, either husbands or family (Agarwal, 2011). Female headed households likely have smaller land size holdings than male headed households (up to two times smaller), and they are likely more labor constrained as they have higher percentages of young dependents (Agarwal, 2011; Anriquez, 2010). Thirdly, there is a significant gender difference in access to technical information, credit, extension services, critical inputs, participation in input-providing cooperatives, and tools (Agarwal, 2011; Peterman, Behrman & Quisumbing, 2009; World Bank, 2009a). Yet when given resources or opportunity, women have shown to be more productive than men (Agarwal, 1983; Agarwal, 2011). Due to social constrictions, women are restricted from public

participation, which inhibits their ability to procure inputs, hire labor or receive education or training (Agarwal, 1994; Agarwal, 2011). And finally, the accumulation of these gendered constraints restricts women's ability to secure higher value production or adaptive and innovative practices (Agarwal, 2011; Maertens & Swinnen, 2009).

Female youth experience these constraints magnified by the challenges posed to youth engagement in agriculture. It is essential that the gender inequality in agriculture is proactively addressed and female youth are provided with the necessary supports and access to resources to be as successful as their male counterparts.

Opportunity for AET

Facilitating and encouraging youths' participation in agriculture has the potential to reduce rural poverty levels across all demographics. The agricultural sector is crucial to supporting global rural economies, has significant potential to address the disproportionately high levels of youth unemployment and poverty, and can serve as a venue for untapped development and employment (Bennell, 2010; de Janvry & Sadoulet, 2000; FAO, IFAD & CTA, 2014; FAO, IFAD & MIJARC, 2014; Swarts & Aliber, 2013). Additionally, youth nonparticipation in conjunction with the aging farmer population risks the loss of transferable skills when it comes to agricultural production, best practices and indigenous knowledge (Department of Economic and Social Affairs, 2008; FAO, IFAD & CTA, 2014; Swarts & Aliber, 2013). The loss of transferable skills can have potentially seriously detrimental effects for the next generation of farmers as well as the future of agricultural production (FAO, IFAD & CTA, 2014; Swarts & Aliber, 2013).

This "youth crisis" poses a significant opportunity for AET models to focus efforts on reengaging youth populations in the agriculture sector, particularly in low-income areas with high youth unemployment. The two major challenges posed to the agricultural sector, including AET models, are a) to reengage youth's participation and interest in agriculture and agricultural related activities and b) to provide the necessary means for youth's capacity and skill development to be successful and employable in the agricultural sector.

In overcoming these challenges, the global agricultural sector can employ best practices, policies and programming to reengage youth in agriculture, pull them out of unemployment, build their capacity and enable their development into contributing and engaged citizens through effective education and training programs.

Expected Next Steps

As the global community has recently placed an emphasized interest in addressing the “youth crisis,” a wide range of discussion, research and literature has emerged to understand these challenges and how to address them with effective solutions. The literature provides suggestions and best practices for mobilizing youth participation in agriculture and agricultural related occupations. Following is a synthesis of the overall major recommendations for best practices to incorporate and reengage youth in agriculture and agriculture related occupations. Additionally, the synthesis addresses the steps AET models can also take to build youth capacity as an effective, successful and skilled next generation. The expected next steps include: 1) taking an integrated approach; 2) gathering more data on determinants, proximate causes and effects, disaggregated by sub-population, locality and region; 3) increasing access to resources available to youth; 4) facilitating soft skill development for youth; 5) increasing youth awareness of opportunities within and knowledge of the agricultural sector and (6) addressing gender disparity within the agricultural sector. These expected next steps are targeted directly for agriculture education and training initiatives, programming and policy.

Integrated Approach

First and foremost, the agricultural sector must work in tandem with government, development initiatives and organizations, media outlets and the educational system through an integrated approach for ultimate success. Man concludes there should be “a concerted and continuous effort between the government and other agencies” to promote knowledge dissemination and positive views on agriculture (2012). Additionally, this approach must engage youth in a “consultative process [that] sensitizes them on the realities confronting agriculture in the region” (Mangal, 2009).

An example of this type of concerted effort is the Barbados Agricultural Development and Marketing Corporation (BADMC)'s creation of the sub-program "Youth in Agriculture – Developing Agripreneurs" in 2009 (Mangal, 2009). Through this program, BADMC collaborates with other Barbadian agencies, such as the Barbados Youth Business Trust, the Youth Entrepreneurship Scheme, the Barbados Youth Development Services, Fund Access and the Barbados Agricultural Society, to coordinate the delivery of services to youth interested in engaging with agriculture. The Land for Landless program allocates three out of every five applications to young people, working with media to advertise the program and generate young interest. The successful applicants receive financial support, advice and guidance on business plan development, and specific trainings from involved agencies. The objective of this program is to engage youth in agriculture while providing the necessary supports to facilitate that engagement as well as promote entrepreneurship amongst the applicants (Mangal, 2009).

Education and extension must work together for effective results (Man, 2012; Mangal, 2009; Naamwintome & Bagson, 2013; Webster & Ganpat, 2014). An example is the partnership between the North East Farmers Organization (NEFO) and the Constantine School and Vendome School in Grenada (Mangal, 2009). NEFO partnered with the two schools to conduct projects that would engage young people in agricultural related activities, such as hands on planting and cultivation projects on NEFO managed lands (Mangal, 2009). This partnership allows both NEFO and the schools to share resources (i.e. access to land, education and teaching technology) to teach young people in and outside the classroom about agriculture and its related activities. These trainings provide awareness and an employable skillset for agriculture and related activities.

Private and public organizations should seek opportunities to partner with schools to provide hands on learning experiences and exposure in the agricultural sector through after-school projects, internships or volunteer opportunities. Partnerships enable the sharing of resources and capacity to achieve common goals of engaging youth with agriculture and providing skill development.

In addition to partnerships with schools, the agricultural sector should seek and foster partnerships with media. Media plays a significant role in shaping perceptions and reinforcing stereotypes of agriculture and agricultural-related occupations (Bahaman *et al.*, 2010; FAO, IFAD & MIJARC, 2014; Kuis *et al.*, 2014; Mangal, 2009). Currently, the media works to promote a western and urban lifestyle, ultimately depicting agricultural and rural areas as slow, poor and dirty ways of life (FAO, IFAD & MIJARC, 2014). There needs to be a revitalization in the way mass and social media shape youth perception of agriculture as a way of life. Education, governments and media must work together to positively shape perception towards agriculture by highlighting the opportunities within the sector for employment.

For example, media, government and extension can initiate publicity campaigns to advertise the various opportunities that the agricultural sector holds for youth employment and engagement. Kuis *et al.* (2014) recommend the dissemination of not only information campaigns regarding agriculture and agricultural related occupations, but to arrange for hands on learning in the schools and fields trips to farm and incorporate youth in farming through apprenticeships, work or learning objectives. Exposure to the opportunities and potential areas for employment within the agricultural sector outside is crucial in spreading awareness and knowledge to the youth populations. The IFAD supported PROSPERER project in Madagascar utilized public radio in conjunction with household visits to publicize available apprenticeships in the program. Apprenticeships were in subsidiary areas such as basket weaving, silk weaving and beekeeping to enable youth to gather skills in these areas. As a result, 2,694 young people completed an apprenticeship with this program (FAO, IFAD & CTA, 2014).

Understanding the influence popular media holds in shaping and shifting public perception, social media campaigns can be initiated to disseminate information that aligns with youth current interests. Social media has changed the way youth communicate and interact with their peers on a daily basis (Haythornthwaite, 2005). Popular social media sites such as Twitter, Instagram, Facebook, YouTube, Vimeo, Tumblr, Google, Pinterest, Flickr and

Snapchat can be utilized as a platform for sharing information, advertising opportunities, creating online communities around the agriculture sector or shifting public perception on the agricultural sector. The agricultural sector must be actively engaged with social media platforms to expand their reach and mobilize youth interest.

For example, the 2013 African Agricultural Science Week (AASW) in Accra, Ghana had a team of 165 social reporters, which included many young Africans that utilized social media outlets to engage with the public. The team used Twitter and clear hashtags to raise awareness. Over 2,800 tweets were sent out reaching over 800,000 people, and over 87 blog posts were written generating over 300 comments. Social media has the power to reach a widespread audience, shift perception through thoughtful messages and hashtags, and mobilize youth interest and engagement in agriculture (Waldorf, 2013).

Additionally, social media offers a platform to spread awareness and knowledge for youth regarding information and opportunities within the agricultural sector. For example, the Kenyan young farmer group Mkulima Young uses Facebook to target youth and received 50 likes. The group started another group Mkulima Young Soko (Market) to create a platform for young farmers to exchange on where to buy and sell their goods. This group has 54,238 likes and has a Mkulima Young application able to be downloaded from Google Play (SciDev, 2013).

In addition to media involvement, government, research and private organizations must work together to develop programs that target youth populations for their engagement in AET. An example of this type of partnership and collaboration would be incentivized competitions targeted at youth. For example, the Bill & Melinda Gates Foundation sponsors the Changemakers Competition to encourage more young people to engage in agriculture (Mangal, 2009). The competition holds open challenges targeted towards youth to develop a high impact solution to a social issue and compete for funding and support to implement their solution. The Competition is a partnership between global foundations and Fortune 500 Companies to enable the best support, incentives and resources available for the participants (Changemakers, 2015). Incentivized competitions among young farmers or youth populations

recognize best practices and commendable initiatives, promote agriculture and rural development, and serve as vehicles to allow youth engagement across the globe to share ideas, best practices and experiences (Mangal, 2009). These incentivized competitions should be examined by region so as to create suitable criteria that would indeed incentivize the target youth population (Mangal, 2009).

It is imperative for the agricultural sector to foster partnerships and take an integrated approach in engaging youth in agriculture and providing them with the necessary training and education for success. Partnerships with education (primary and secondary schools), global foundations, academic and research institutions, media and the public sector are integral.

Data Collection

Overall, there is a lack of reliable data regarding youth engagement with agriculture and agricultural related occupations. Specifically, there is a need to gather more sound data on the determinants of youth aspirations, motivations and choices when pursuing (or not pursuing) a career in the agriculture sector (DRET, ESW, & FAO, 2013; FAO, IFAD & MIJARC, 2014; FAO, ILO & UNESCO, 2009; Swarts & Aliber, 2013). There is a need to gather this data across regions, locality and gender, as the current data is not disaggregated to demonstrate the different needs across heterogeneous populations (FAO, IFAD & MIJARC, 2014; FAO, ILO, & UNESCO, 2009). Mixed-methods research approaches should be employed via surveys, focus-groups and key informant (KI) interviews to investigate youth aspirations, perceptions and motivations for engaging (or not engaging) with agriculture and agricultural-related activities.

Disaggregated data must also be collected on land ownership. Land is a major constraint for youth, particularly female youth (Agarwal, 2011). However, there is a significant lack of data on land ownership and land holding size disaggregated by gender across regions. Household surveys must be conducted to gather data on the land ownership, the primary decision-maker for the land, the workers on the land, and the size of the land.

It is imperative to solicit and integrate the youth voice in research through participatory methods. Youth needs, experiences and perceptions shape their decision-making in accepting or pursuing agriculture as a way of life or occupation (Bahaman *et al.*, 2010; Kuis, *et al.*, 2014; Lyocks, *et al.*, 2013; Swarts & Aliber, 2013; Webster & Ganpat, 2014). As the global youth population is extremely heterogeneous with diverse needs, it is imperative that programs, policy and development efforts solicit, incorporate and empower youth in the development process to ensure their needs and desires are met (Bennell, 2010; Chinsinga & Chasukwa, 2012; Lenihan *et al.*, 2009). Rural rapid appraisals, needs assessments and participatory action research are applicable and useful qualitative research methods to gather first hand understanding of targeted youth needs, knowledge and desires into program and policy development (Whyte, 1991). Integrating youth perceptions allows research and program and policy developers to fully understand how youth decisions are influenced and to harness that information to target need areas in order to create effective positive change (Bahaman *et al.*, 2010; FAO, IFAD & MIJARC, 2014; Kuis *et al.*, 2014; Lyocks *et al.*, 2013). Partnering, collaborating or engaging with The Young Professionals in Agricultural Research for Development (YPARD) organization is a practical and efficient way to build networks and solicit youth participation.

There is a need for further research on effective teaching methods, teacher training and classroom assessments for highest impact in agricultural education integration in primary and secondary curricula (Ball & Knobloch, 2005). Data must be collected on (1) the most effective lesson plans and methodological approach for teaching agricultural and agricultural-related courses in primary and secondary education, and the (2) most effective training for teachers on content and pedagogy in the classroom for agricultural education (Ball & Knobloch, 2005).

Inclusion of Agri-Science in Primary and Secondary Education Curriculum

Universally, agriculture and agricultural science must be included in all primary and secondary education curricula across the world (Amadi, 2012; Bahaman *et al.*, 2010; Lyocks *et al.*, 2013; Man, 2012; Mangal, 2009; Webster & Ganpat, 2014). Including agri- science in the curricula generates awareness among youth of possible career choices within the agricultural sector,

spurs interest through hands-on education, and equips youth with basic skills and understanding of agriculture and agricultural practices.

Governments should mandate that agriculture be taught in all primary and secondary education curricula (Amadi, 2012; Lyocks *et al.*, 2013; Man, 2012; Webster & Ganpat, 2014). Bahaman *et al.* (2010) recommend that Malaysian universities incorporate courses specific to contract farming or other related themes to strengthen youth participation in agriculture. Several authors found that participation in agri-science courses was the main motivation for youths' subsequent participation in or interest in pursuing agriculture (Amadi, 2012; Lyocks *et al.*, 2013; Webster & Ganpat, 2014).

However, there must be a significant transformation for how agriculture is taught within the classroom. This is crucial. Current practices include lecture style information dissemination, followed by limited fieldwork that is often labor intensive and under harsh conditions (Man, 2012; Webster & Ganpat, 2014). This type of instruction does not wholly reflect the agricultural sector and indeed disincentives youth from pursuing such occupation as a career. Webster & Ganpat suggest curricula to be transformed to reflect more “experiential and technology driven learning, with greater emphasis being placed on the use of non-formal setting to facilitate the engagement and learning process” (2014). Mangal (2009) suggests that school gardens be re-established in primary and secondary schools, and that schools must work together with 4H organizations to share resources in programming and education that will engage young people. Learning in the classroom must be “active, self-regulated, problem-oriented and responsive to a host of diverse learner needs and interests” with on-going assessment of both learner and teaching (Shelley-Tolbert, Conroy & Dailey, 2000). Agricultural education must consist of classroom instruction, experiential learning through supervised experiences, leadership activities, and a core integration of agricultural science throughout the curricula (Shelley-Tolbert *et al.*, 2000). Agriculture must be included in the formal education system in common curricula to expand awareness, knowledge and opportunities for youth to be interested and involved in the agricultural sector.

Additionally, the quality of education in rural areas and for agriculture-related curriculum is low (FAO, IFAD, & CTA, 2014). Often, the curricula are not adapted for a rural context, and those related to agriculture are outdated, irrelevant or nonexistent in schools (FAO, IFAD, & CTA, 2014). Finding quality, motivated teachers willing to stay in remote areas and those that have a background in both agriculture and pedagogy are extremely hard to secure (FAO, IFAD, & CTA, 2014; World Bank, 2008b). In addition to providing training and education for youth in agriculture, training must also be available for agricultural teachers for instruction on course content as well as pedagogy for teaching in primary and secondary schools. This training must equip teachers with training in pedagogy and an understanding on how to employ “contextual teaching and learning” (Shelley-Tolbert, *et al.*, 2000). Contextual teaching and learning is “teaching that enables learning where pupils employ their academic understandings and abilities in a variety of out-of-school contexts to solve complex, real world problems, both alone and in various dyad and group structures” (Shelley-Tolbert, *et al.*, 2000). Pedagogy refers to the knowledge teachers must draw upon to create learning environments and to teach students (Ball & Knobloch, 2005). Additionally, strong training in pedagogy enables teachers to understand their role as the “mediator in student learning, instructional strategies to promote active cognitive processing of the content, classroom environments that foster learning, and assessment methods that monitor students’ thinking” (Ball & Knobloch, 2005).

Agricultural educators in primary and secondary schools must be equipped with pedagogical knowledge through training that instructs on the following seven areas: (1) how to write and develop lesson plans, program plans, and instructional objectives, and structure and organize content and its delivery; (2) how to create and maintain student interests; (3) how to use a variety of teaching methods; (4) how to teach using the problem-solving approach and effective questioning, giving clear explanations, and developing student thinking and understanding; (5) how to engage learners of all abilities and involving them in activities, applying knowledge and practicing skills; (6) how to care about students and their success in and outside the classroom; and (7) how to provide feedback on student progress, quality of work and learning (Ball & Knobloch, 2005; Hedges, 2000; McCormick, 1994; Newcomb *et al.*,

1993; Phipps & Osborne, 1988). Effective teaching methods (3) include lecture, group discussion and cooperative learning, student led-lectures or discussions, demonstrations, supervised study, role play, laboratory activities and/or experiments, field trips, portfolios, and appropriate instructional media (Ball & Knobloch, 2005; Hedges, 2000; McCormick, 1994; Newcomb *et al.*, 1993). Ball & Knobloch (2005) found that Newcomb *et al.* (1993)'s *Methods of Teaching Agriculture* is a widely used resource for teaching pedagogy and teaching methods for agricultural educators.

One recommendation to improve teacher training for agricultural science and education is to have agricultural teachers work together via team teaching or cooperation with science education teachers (Shelley-Tolbert, *et al.*, 2000). Teachers must take program planning courses in order to adapt their course plans to meet the diverse needs and interests on their students (Shelley-Tolbert, *et al.*, 2000).

Increased Access to Resources for Youth

Youth cite having a lack of access to necessary resources as a major hindrance for pursuing agriculture or an agricultural related career (Amadi, 2012; Chinsinga & Chasukwa, 2012; FAO, IFAD, & CTA, 2014; FAO, IFAD & MIJARC, 2014; Lyocks, *et al.*, 2013; Man, 2012; Naamwintome & Bagson, 2013; Swarts & Aliber, 2013; Webster & Ganpat, 2014). While not an exhaustive list, these resources for youth include having access to training and education, governmental support, and land.

Training and Education for Youth:

Government, research and private organizations need to build agricultural training and skill acquisition centers targeted specifically for youth farmers (Amadi, 2012; FAO, IFAD & MIJARC, 2014; Lyocks *et al.*, 2013; Man, 2012; Webster & Ganpat, 2014). These training and skill centers should be integrated with local government and primary and secondary education curriculum to improve access and awareness to the many opportunities the agricultural sector has for employment (Amadi, 2012; Lyocks *et al.*, 2013; Man, 2012). For example, Barbados has several institutions outside of secondary schools that offer training and education in agriculture or related activities. The Barbados Community College (BCC) and the Samuel Jackman Prescod Polytechnic have associate degree qualifications in agriculture, and the

Barbados Vocational Board provides tractor driving certifications (Mangal, 2009). In particular, the skill centers should provide opportunities for on farm training as well as capacity development in other areas of the agricultural sector, such as value-added and post-harvest activities including food processing and packaging. Mangal (2009) indicates the dire need for investments in research labs. According to Lyocks *et al.*, these types of activities will “facilitate access to and encourage the use of appropriate technology for transformation in agriculture” (2013).

Additionally, existing organizations and platforms should increase access and opportunity for education and training targeted to youth. Current farmer associations or co-operatives should offer incentives or encouragement to gain youth participation or should develop associated programs or groups targeted to youth to facilitate participation (FAO, IFAD, & CTA, 2014). The Confederação Nacional dos Trabalhadores na Agricultura (CONTAG), the largest rural labor union in Brazil, established the Jovem saber program to provide young farmers with skills enhancement. From this program, free online training courses on topics across technical agricultural information to health and gender roles were developed for youth ages 16-32 that required teamwork and group study to participate.

Since its initiation in 2004, over 26,000 youth (at least 30 percent of whom are women) have completed the training modules. In addition to education, training and practical skill development, these online modules provide youth with the opportunity to develop their capacity, self-esteem and confidence, teamwork and social skills, and cultural identity (FAO, IFAD, & CTA, 2014).

Education, research and programmers can take existing trainings, modules and programs that are intended for non-youth farmers or technical support and adapt them for youth audiences in schools or youth associations. A current USAID project in Guatemala is adapting an Integrated Pest Management (IPM) training originally developed for rural potato farmers to be implemented in rural agricultural schools. The training exercises consist of four hours of lecture with follow up field demonstrations in an intensive two-day training. While this approach is suitable for rural farmers that must travel to attend, it does not capture the

attention and interest of youth in the classroom. The project is collaborating with Penn State's Global Teach Ag Initiative to tailor the pedagogy so that it aligns with youth needs, desires and interests. Penn State's objective with adapting this training is to transform the lecture-based instruction (passive method) into a student- focused inquiry-based instruction (active method).

It is imperative to modify the methods to meet the needs and interests of youth in order to retain their attention, successfully teach the information or skill, and most importantly, to motivate youth around the opportunities existing in the agricultural sector. Examples of modifying the curricula to interest and motivate youth include incorporating student-led discussion activities, field trips, demonstrations, group teaching techniques, role plays, games, social media, videos and other visual representations of course content, and course-long collaborative research projects into training lesson plans (Ball & Knobloch, 2005; Newcomb, McCracken & Warmbrod, 1993).

Government Support

Youth report lacking financial support or encouragement from government for entering the agricultural sector (Amadi, 2012; Chinsinga & Chasukwa, 2012; FAO, IFAD, & CTA, 2014; Lyocks *et al.*, 2013; Man, 2012; Mangal, 2009; Naamwintome & Bagson, 2013). Loans, scholarships and grant opportunities should be provided for youth by governmental agencies to facilitate access for entering the agricultural sector (Chinsinga & Chasukwa, 2012; Lyocks, *et al.*, 2013; Man, 2012; Mangal, 2009; Naamwintome & Bagson, 2013). An example of grant opportunities targeted to youth populations to facilitate engagement in the agricultural sector includes The Regional Universities Forum for Capacity Building in Agriculture (RUFORUM)'s competitive grant system. RUFORUM is a consortium of 32 universities across Africa that aims to enhance postgraduate education and training for African students in agriculture. Three main grants are available to PhD holding faculty (to support training of two MScs each) and to doctoral students. These grants offer a preference for women applicants and those looking for international experience. In 2014, 100 students were enrolled under the competitive grant program (FAO, IFAD, & CTA, 2014).

Governments should also support youth by investing in young farmer organizations and partnering with them to identify and fulfill their needs (FAO, 2012). The Brazilian Ministry of Agriculture provides the financial support to CONTAG to develop and sustain the online training courses targeted to youth (FAO, IFAD, & CTA, 2014). The Zambian Government provided several grants to the youth-led NGO Ndola Youth Resource Centre (NYRC) to create seven youth resource centers focusing on agriculture (FAO, IFAD, & CTA, 2014). The centers provide a space for youth to engage with each other, utilize available resources (each center has computers, internet, televisions, radios, printers and a small library), and interact with staff trained in ICT use and business and agricultural development. Youth use ICT tools like text messages, e-mail and radio to link with local organizations and receive assistance for developing proposals for the Youth Development Fund, a government-run initiative to give loans and credit specifically for youth (FAO, IFAD, & CTA, 2014).

It is also imperative that governments include and prioritize youth capacity development, particularly in agriculture, in strategy and policy development. Engaging youth in the policy and strategy development process evidently motivates and stimulates their interest in agriculture as it increases confidence, capacity and their voice in determining their future (Mapila, 2014). However, as is the case in Malawi for example, there is a deliberate exclusion of governmental policy including youth and no unified youth platform to demand inclusion (Mapila, 2014). It is essential that governments include youth issues and capacity-building strategies in policy and strategy development for agriculture. Engaging youth in the process not only stimulates their interest in the sector, but also takes a holistic approach in identifying their motivations, desires and needs (Mapila, 2014).

Access to Land

Additionally, gaining access to land is a significant challenge for youth that hinders their ability to enter the agricultural sector (Chinsinga & Chasukwa, 2012; Lyocks, *et al.*, 2013; Man, 2012; Mangal, 2009; Naamwintome & Bagson, 2013). In countries where the agricultural sector dominates the economic portfolio, like Malawi, the issue of land access is critical. If land is even available, the amount and quality of land on which to farm determines a household's level of food security, resilience or vulnerability to foreign shocks and risks,

and ability to earn a living wage (Chinsinga & Chasukwa, 2012). Youth rarely have direct access to land or the resources to gain access to land, and thus are marginalized from receiving support or the ability to engage in agricultural production activities that require land (Chinsinga & Chasukwa, 2012). Youth land rights are rarely, if ever, included in policy and legal documents, and when they are, there are no concrete mechanisms for implementation in place (FAO, IFAD, & CTA, 2014).

Understanding these issues specific to each region, AET models must tailor programming for realistic results. In areas where access to land is a significant and sometimes ultimate barrier to engaging in production, AET models should promote and provide education and training for value-added and post-harvest activities. These activities can be an effective use of resources and skill development for youth in areas that have little to no access to land. For example, the Eastern Tibet Training Institute (ETTI), established in 2005 and based in the Yunnan Province of China, developed training programs for youth aged 18-40 in vocational activities. Due to the fragile upland environment of the Tibetan plateau, it is extremely difficult and challenging for farmers to expand their income via agricultural production. Given this challenge, ETTI partnered with the Apiary Research Center of Yunnan Agricultural University to implement the Advanced Beekeeping Enterprise Development (ABED) training program to help young farmers maintain beehives and develop honey-making enterprises to supplement their source of income. The Tibetan plateau is renowned for their unique flavor of honey and since establishment of this program in 2010, the demand for their honey has increased. Over 300 local beekeepers have benefitted from the training and graduates continue to assist new beekeepers in best practices via beekeeper mentor groups. The program also instructs on the environmental benefits of honey production. This training program is an example of providing education and training in a value-added skill when access to land is a veritable challenge. This program not only equips local farmers with additional skillsets enabling them to supplement their income, but also has a sustainable and environmentally friendly focus that allows for future success (FAO, IFAD, & CTA, 2014).

Development of Soft Skills

The development of soft skills, in tandem with AET, is equally as important in providing youth the necessary tools to realize their full capacity (Shaw, Brady, McGrath, Brennan & Dolan, 2014). Soft skills include building confidence, oral and written communication, learning abilities, teamwork and group work, cultural acceptance and leadership. The creation and promotion of farmer associations and organizations targeted and tailored for youth farmers facilitates community, capacity building and support for youth farmers (FAO, IFAD & MIJARC, 2014; Lyocks, *et al.*, 2013; Mangal, 2009; Ommani, 2011; Webster & Ganpat, 2014). Associations or organizations operate to build community within the existing young farmer populations, but also exist to promote youth involvement, a sense of belonging, awareness and interest in the agricultural sector (FAO, IFAD & MIJARC, 2014; Lyocks, *et al.*, 2013; Ommani, 2011; Shaw *et al.*, 2014).

These organizations enhance positive development of youth, can promote farming or agricultural-related activities as a potential occupation, as well as enrich the development of leadership skills among youth (FAO, IFAD & MIJARC, 2014; Lyocks, *et al.*, 2013). Particularly for unemployed youth in low-income areas, who lack opportunity or community elsewhere, young farmer associations or organizations can provide this sense of belonging while teaching and fostering hard and soft skill development. These types of organizations create a platform where leadership skills are created and strengthened (FAO, IFAD & MIJARC, 2014; Lyocks, *et al.*, 2013; Shaw *et al.*, 2014). They also serve as a venue for young people to exchange ideas with peers, fostering innovation and creative thinking as well as building support networks (Ommani, 2011).

Young farmer organizations currently serve as a best practice across the agricultural sector throughout the world. Examples include the Young Farmers Entrepreneurship Programme in Jamaica, the Youth Apprenticeship Programme in Agriculture (YAPA) in Trinidad, the Caribbean Agriculture Forum for Youth (CAFY), the Youth for Change in Pakistan, the MERCOSUR thematic youth group in Uruguay, the Réseau des Jeunes Producteurs et Professionnels Agricoles du Togo (REJEPPAT) in Togo, and the National Coordinating

Committee of Young Coffee Growers in Peru (CONAJOC) (FAO, IFAD, & CTA, 2014; FAO, IFAD & MIJARC, 2014; Webster & Ganpat, 2014). CONAJOC holds training and workshops targeted at young coffee farmers, technical support and the Youth Innovation Fund (FAO, 2012). Additionally, CONAJOC encourages parents to anticipate farm inheritance to their children to facilitate membership and have their children join the committee (FAO, 2012). REJEPPAT worked with its parent organization, the Coordination Togolaise des Organizations Paysannes et de Producteurs Agricoles, to connect with the International Trade Center and conduct market prospecting visits in Morocco and Cote d'Ivoire to identify alternative markets for their products (FAO, 2012).

The FAO's Junior Farmer Field and Life Schools (JFFLS) also provide a space for youth to gain agricultural technical education and training as well as to develop life skills. The JFFLS approach is gender sensitive and innovative in that it incorporates creative and expressive exercises throughout the curriculum to allow students to develop confidence and self-esteem, to promote creativity and innovation, and to keep curriculum linked with local culture and traditions (FAO, 2010). Example of these exercises include utilizing theater, books, and storytelling to teach difficult issues, such as HIV/AIDS, sexual health or gender equality (FAO, 2007). In addition to agricultural training, the JFFLS curricula include discussion on topics such as gender sensitivity, nutrition, business skills, education, child protection and psycho-social support (FAO, 2010). JFFLS curriculum is developed to meet the needs of the region in which it will be built. The curricula are segregated into themes and each agricultural skill objective has a corresponding life skill objective. JFFLS have been piloted and implemented in numerous countries throughout Africa and the Middle East (FAO, 2010). The FAO has published a step-by-step guide on how to develop a JFFLS (FAO, 2007).

It is additionally important to incorporate soft skill development throughout agricultural education and training to empower youth with the skills and capabilities to become confident and equipped leaders of the next generation.

Increasing Awareness and Knowledge of Agricultural Sector & Opportunities

Youth report the lack of awareness or information as a barrier to engaging with the agricultural sector (Amadi, 2012; Man, 2012; Mangal, 2009; Naamwintome & Bagson, 2013; Webster & Ganpat, 2014). Man (2012) found Malaysian youth are unaware of programs, opportunities and possibilities provided by government or private agencies for integrating into the agricultural sector. Additionally, youth perceive agriculture as crop production and are unaware of the many different facets and opportunities in the sector beyond crop production (Ashby, 2009; Mangal, 2009; Webster & Ganpat, 2014).

Agriculture involves much more than producing commodity and staple products. It has serious implications for reducing poverty and inequalities, environmental sustainability and conservation, and increasing global health (Ashby, 2009; Brunstad, Gaasland, & Várdal, 2005; Webster & Ganpat, 2014). The agricultural sector plays a significant role in providing environmental services such as climate change mitigation, erosion control, habitat conservation and maintenance, landscape preservation, water cycle regulation, among others (Brunstad, *et al.*, 2005). Substantial efforts must be made to increase the dissemination of knowledge regarding the many facets of the agricultural sector.

Considering significant barriers to youth engagement in agriculture due to lacking access to land or other resources specific to crop production, increasing awareness and knowledge to youth populations about other opportunities within the agricultural sector outside of crop production helps shift perception and promote engagement in other technical areas.

Instituting a special “Careers in Agriculture Day” at schools is a way to increase awareness and knowledge of opportunities in the sector (Mangal, 2009). These career days can highlight a) types of careers in agriculture, from production and technical support to post-harvest and value added activities, as well as b) available opportunities for training, education, and apprenticeship in the area.

A major source of youths’ disinterest in agriculture or agricultural related occupations is their perception of agriculture as a labor intensive, primitive occupation with little to no opportunity for financial gain (Bahaman *et al.*, 2010; Lyocks, *et al.*, 2013; Swarts & Aliber, 2013; Webster & Ganpat, 2014). It is imperative to highlight, promote and demonstrate the

opportunities and potential the agricultural sector has for lucrative profits to ignite youths' interest to engage in agriculture and breakdown previously held stereotypes (Bahaman *et al.*, 2010; Lyocks *et al.*, 2013; Webster & Ganpat, 2014). In a study of 400 Malaysian youth from rural and urban areas, Bahaman *et al.* (2010) found that youth, regardless of locality, expressed desire to accept agriculture as a way of life if it was shown to generate more income for them. Webster & Ganpat (2014) found that youth in St. Vincent and the Grenadines prioritized financial incentives when deciding a potential career option.

Opportunities within the agricultural sector must be highlighted. Successful young farmers or youth engaged in the agricultural sector can guest-speak in classrooms or at association meetings. The integration of field trips or internships in educational curricula can serve as a way to expose youth to different opportunities existing within the sector. Those providing existing opportunities, such as employers, training/workshop leaders or facilitators, associations or others, must utilize social media to promote and highlight the opportunity for training, attendance or application solicitation to effectively tap into the youth audience (FAO, IFAD & CTA, 2014; Lyocks *et al.*, 2013; Webster & Ganpat, 2014).

Webster & Ganpat (2014) recommend that the only effective means to convince youth of success in this area is through youth participation on demonstration farms that highlight integrated technology use. The agricultural sector's high potential for innovation and technological advancement must be highlighted to trigger youth interest (Bahaman *et al.*, 2010; Hassan *et al.*, 2012; Lyocks *et al.*, 2013; Webster & Ganpat, 2014). The integration and use of ICT can highlight the potential for financial gain within the sector, as innovation and modern technology are generally associated with higher skilled, higher quality and higher productivity types of work (Hassan *et al.*, 2012; Lyocks, *et al.*, 2013; Shaffril *et al.*, 2009; Webster & Ganpat, 2014). Technology use, such as mobile phones, leads to greater social cohesion, information exchange, and a means for infrastructure (Goodman, 2005; Ilahiane, 2007; Kwaku, Kewku & LeMaire, 2006; Shaffril *et al.*, 2009). Mobile phones are extremely popular amongst young people across regions, regardless of gender or locality, and can serve for improving efficiency of agricultural markets, promoting investment, and contributing to

empowerment (Hassan *et al.*, 2012; Shaffril *et al.*, 2009). Shaffril *et al.* (2009) found Malaysian youth do indeed rely heavily on their mobile phones, and thus suggest the agricultural sector harness the potential of mobile phones to disseminate information, exchange knowledge and increase interest in the agricultural sector.

The *e-Gardens* project in Kenya, an initiative started by Sustainable Environment and Agriculture Network International (SEANET), is an example of how ICT can be used to attract and engage young people in agriculture (Njoroge, Okari & Kinyua, 2014). The *e-Gardens* project is based at the Gakawa Secondary School that engages an equal number of female and male participants to maintain an *e-Garden* using internet and computers while blogging about the experience. The participants reported learning basic computer skills, information about agricultural needs and maintenance, critical thinking skills and blogging skills (Njoroge *et al.*, 2014). In addition, 98% of the participants indicated an interest in agriculture after participating in the *e-Garden* project while 84% indicated plans to pursue agriculture after school (Njoroge *et al.*, 2014). 92% of participants reported enjoying using the ICTs in the project (Njoroge *et al.*, 2014).

The Savannah Young Farmers Network (SYFN) in northern Ghana is implementing an Audio Conferencing for Extension (ACE) program that utilizes mobile phones, audio conferencing technology and a loudspeaker to facilitate communication between youth farmers and agricultural extension or researchers (FAO, IFAD & CTA, 2014). This project is a two-way process in that the young farmers (in groups of 10-12) ask questions about topics that interest them and gain knowledge and insight into beneficial practices and information. Each session is facilitated by a community agricultural information (CAI) officer. Information from these discussions are compiled into informative videos by the CAI and uploaded onto YouTube or put on CDs, for those with no access to internet. These videos cover a wide range of topics and they help programmers and extension to identify local needs and tailor their services to meet them (FAO, IFAD & CTA, 2014). This is a successful project for several reasons: 1) it captures the youth voice via a participatory process to identify their needs, interests and desires; 2) it utilizes ICT such as YouTube and mobile phones to appeal to youth

interests; 3) it provides expert advice on topics ranging from technical agricultural needs to business plan development and best practices.

Educators and trainers should make use of readily available ICT resources for educating agricultural science. For example, Plant Village is an open-access platform created by Penn State scientists that serves as an online community to exchange and learn about plant care, cultivation and disease. It is accessed via PlantVillage.com and contains informational content on a variety of specific plants, forums for users to ask questions and contribute answers, and a Plant Journal feature for users to track a plant or garden through a growing season. It is free to access and readily use. An exercise having students utilize PlantVillage while maintaining a school garden would incorporate hands-on learning (school garden), with ICT tools (PlantVillage). Students would use PlantVillage to learn about best practices for cultivation of specific plants in the school garden, learn about possible diseases that can affect the plant, and to exchange with other members of the community regarding those plants. PlantVillage can be accessed via mobile phones, internet connection and can be downloaded for use offline as well (PlantVillage, 2015). As using ICT tools in the agricultural sector has shown to be successful in increasing youth interest and engagement, utilizing platforms such as PlantVillage can be an effective and mobilizing educational tool for youth participants.

A focus on entrepreneurship has the potential to be successful in mobilizing youth participation in agriculture and agricultural-related occupations (Amadi, 2012; Chinsinga & Chasukwa, 2012; Lyocks, *et al.*, 2013). Chinsinga & Chasukwa (2012) report that Malawian youth perceptions of agriculture as laborious work for the elderly with little financial incentive deters them immediately from even considering agriculture as an occupation. According to Chinsinga & Chasukwa, youths' disinterest in agriculture only reflects their "lack of understanding...of agriculture as a business" (2012). The discourse regarding the agricultural sector requires a significant renewal to draw public perception away from the negative stereotypical negative view of crop production and shift it towards agriculture as a business. Youth must view agriculture and agricultural-related occupations as a viable means to ensure

their livelihoods, with lucrative payoffs and meaningful contributions. Focusing on the entrepreneurial prospects and opportunities in the agricultural sector has the potential to carry out this shift in perception (Amadi, 2012).

Entrepreneurship is perceived across social, cultural and economic contexts as being innovative, adaptive and the willingness to prevail (Amadi, 2012). Promotion and integration of the entrepreneurial spirit within an agricultural education and training setting requires training of both hard and soft skills to enable students to be fully equipped for harnessing their full potential (Amadi, 2012; Haftedorn & Salzano, 2005; Hodgett, 1992; Nelson & Leach, 1981). Highlighting opportunities and venues for entrepreneurship within the agricultural sector is a promising way to spark interest in youth for engagement. One way to highlight these opportunities for youth is to showcase successful entrepreneurs in the agricultural sector. Success stories, like those of Benin- native Hervé Nankpan, should be highlighted in the classroom and disseminated via social media to demonstrate to youth that entrepreneurship is a viable method for success in the agricultural sector. Nankpan saw a need in Benin for value-added agricultural products and support for agricultural entrepreneurs. He applied and attended several trainings focused on business plan development and entrepreneurship and after much success and failures, he was able to start The Greatcheese Company, which processes cheese and soy sausage in Benin. This story, among other successful agricultural entrepreneurs, can be highlighted to demonstrate to youth how their peers were able to overcome challenges and achieve success. It also serves to demonstrate to youth that success in agricultural entrepreneurship is possible, despite common perception (FAO, IFAD & CTA, 2014).

There must be mechanisms in place to support youth in becoming entrepreneurs. For example, the National Federation of Coffee Producers (NFCP) in Colombia partnered with the Inter-American Development Bank and the National Agrarian Bank to launch the “Innovative Models for Young Coffee Producers” initiative to facilitate and support young coffee producers beginning their own enterprises. The program accepts applications from those living in the area for at least three years, aged 18-35 and having completed at least nine years

of schooling. The initiative provides assistance in two areas: (1) enabling producers to set up their own enterprise and identify and evaluate suitable areas for sustainable coffee production, and (2) focusing directly on the marketing and business plan development for youth (FAO, IFAD & CTA, 2014). One main output of this initiative was assisting youth in establishing cooperatives known as “coffee business units” that work together to successfully produce and sell their green coffee on the international market. These also generate social capital on which the respective rural areas can depend for their livelihoods (FAO, IFAD & CTA, 2014). This initiative is an example of providing youth with the necessary support to thrive as successful entrepreneurs.

Addressing Gender Disparity

Females are underrepresented in agricultural research and higher education, yet they still contribute a vital role to agricultural production worldwide (FAO, IFAD & CTA, 2014). They have less access to resources, such as education, knowledge and trainings, or opportunities for capacity building than their male counterparts (Hartl, 2009; FAO, IFAD & CTA, 2014). Perception of female farmers must shift from the currently held notion that females are just “farmer helpers” to the understanding that females are in fact farmers (Agarwal, 2011). Social and public media campaigns can assist in shifting this perception. There must be a concerted effort to increase female participation in the agricultural sector and to also increase access to resources and opportunities for females in the agricultural sector. Suggested strategies for accomplishing this goal are to introduce a quota system to ensure female enrollment in programs and education, and directly targeting women as participants (FAO, IFAD & CTA, 2014). Female targeted co-operatives or farmer associations would provide a platform in which females can access inputs, information and best practices from other female farmers as well as extension services (Agarwal, 2011). Additionally, training workshops must make a concerted effort to train the female farmers, not only their husbands or male farm workers (Agarwal, 2011).

Gender and youth must be aggressively integrated into research, program and policy agendas to ensure that gendered youth voices, needs and interests are heard. Currently, the

International Center for Agricultural Research in the Dry Areas (ICARDA) developed a prioritized gender and youth strategy that implements activities that “ensure gender and youth are integrated into all aspects of the research for development agenda” (Majumdar, 2013). The program solicits engagement from a diverse network of stakeholders including gender specialists and scientists from global agricultural institutions as well as representatives from the Young Professionals in Agricultural Research and Development (YPARD). The outcome of this program is to ensure women and youth have better access to and control over necessary inputs, resources and training (Majumdar, 2013). One strategy this network aims to implement is to create new opportunities and niches for women and youth around different ICTs for development of value-added skills, as men, women and youth naturally gather around different technologies and interests (Majumdar, 2013).

The World Wide Fund for Nature (WWF)’s Women Open Schools (WOS) in Pakistan is an example of combining these two objectives to providing females with access to resources and capacity development as well as promoting engagement in the agricultural sector to other women. Each WOS offers training and workshops to 20-25 women engaged in cotton picking on pesticide reduction, health and hygiene, entrepreneurship, and seed distribution (FAO, IFAD & CTA, 2014). Literate women in the areas were trained as Female Field Facilitators to not only assist in running trainings, but to also actively recruit other women to attend the workshops. The women attending these trainings and workshops built confidence, capacity and knowledge for how to better care for themselves, their children and their crops. These schools were implemented from a joint effort by WWF, local NGOs, local farmer organizations, and school and government representatives. The WOS were successful because they were developed around the needs of the local population and they integrated local knowledge. They were further expanded into WOS and Family Schools that brought together children and male counterparts into similar trainings and workshops (FAO, IFAD & CTA, 2014).

Concluding Remarks

The youth crisis has recently received much attention from the global community, particularly in how it intersects with the future of agriculture. As the global population and demand for sustainable production rapidly increases, in conjunction with high rates of youth unemployment and vulnerability to high risk behaviors, the youth crisis requires proactive responses from the global community rather than reactive. Agricultural education and training models and initiatives have a unique opportunity in the nexus of the youth crisis and food security to deploy effective best practices to reengage youth in the agricultural sector. While significant challenges pose this opportunity, like universal youth disinterest in agriculture, deskilled youth populations, lack of access to resources, gender disparity and lack of reliable data regarding youth in agriculture, AET can address these challenges and work to ensure a future stable and employed youth population.

The expected next steps as outlined in this concept note map promising and needed courses of action to reengage youth in agriculture and provide them with the necessary skills, training and education to be a successful next generation.

AET models must work together with government, education systems, private and public organizations, and the media to reengage youth in agriculture. Increasing agriculture in primary and secondary education allows for youth to adopt a more accurate perception of the agricultural sector: that it is much more than crop production. It is essential to highlight potential for innovation, technological advancement and entrepreneurship within the agricultural sector. Additionally, it is essential to incorporate and utilize ICT tools and social media to increase youth awareness and interest in the sector.

Concurrently, AET models must work together with government, education systems, private and public organizations, and the media to provide youth with the necessary tools, training, education and support to facilitate their ability to build capacity and achieve success. Youth issues must be prioritized in policy and strategy development. Research, programming and policy development must solicit and integrate youth's voice, perceptions, desires and needs. Disaggregated data across gender, locality and region must be collected to better understand

the current environment to tailor best practices. Finally, AET institutions and organizations must tailor their trainings and programs to target youth populations to build a capable and empowered next generation of the agricultural sector.

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