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Capacity Development in Agricultural Education and training in Cambodia: A SWOT Analysis

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Abstract

This paper examines the current state of the agricultural education and training (AET) system in Cambodia and provides recommendations for Cambodian institutions and policymakers for enhancing the AET system. We conducted two assessment trips in June 2013 and January 2014 to analyze the state of the Cambodian AET system. Data were collected in 53 interviews and five focus groups using a modified-SWOT analysis framework. Stakeholder-identified strengths of the Cambodian AET system include the current political and economic stability of Cambodia, the young labor force, the increased educational enrollments, new agricultural education schools and curricula, good AET leadership, and the wide applicability of AET skillsets. Weaknesses of the Cambodian AET system include weak infrastructure, pedagogical stagnation, skills supply, the disconnect between the supply and workforce demand, and weak institutional administrative expertise. Meanwhile, threats to strengthening the Cambodian AET system include limited public investment, the gap between agriculture and education, low status of agriculture, and poor access to higher education. Recommendations for institutional capacity development in the Cambodian AET system include enhancing skill development and furthering links with NGOs and the private sector, while policy recommendations include welcoming prudent regional integration and enhancing investment across the whole AET system. Comparing our findings to other recent AET system studies indicates that Cambodia is facing similar challenges yet has its own unique path to forge when developing a cohesive AET system capacity-development strategy.

Keywords: Capacity development, Cambodia, Agricultural education and training, AET system, Human and institutional capacity

Introduction

Agriculture is the mainstay of the Cambodian economy, contributing 35% of the national GDP and providing two-thirds of the total workforce with their primary occupation (ADB, 2013; FAO, 2014). As a largely agrarian society, with 80% of the population living in rural areas and 85% engaged in agricultural production, development of the agricultural sector in Cambodia remains a priority to reduce poverty and improve food security (Kingdom of Cambodia, 2013a; USAID, n.d.). The World Bank estimated in 2012 that 17.7% of Cambodia's population fell below the poverty line (at the time, 1.25 USD/day). Even though Cambodia has sustained an impressive annual economic growth rate of 7.3% since 1993, growth in the agricultural sector has lagged at an annual average of 4-5% in the past ten years (FAO, 2014). Furthermore, agricultural sector growth is inconsistent, and remains vulnerable to shocks, such as the September/October 2013 floods which set annual agricultural growth back to 1.8% (ADB, 2013).

Developing human and institutional capacity to meet the challenges of rural poverty and food insecurity after three decades of conflict, including the genocidal Khmer Rouge regime, requires an effective and resilient education system with a clear focus on agricultural education and training (AET). There is a growing demand for skilled labor in Cambodia to develop the economy, including the agricultural sector. However, only 41% of those under the age of 25 in Cambodia have completed lower secondary school, and those that do go on to complete higher education are still not well equipped to meet the demands of the workforce (Kingdom of Cambodia, 2013b).

The government of Cambodia has clearly expressed human and institutional capacity building and development of

agricultural research and education as priorities in its national strategic frameworks (e.g., Kingdom of Cambodia, 2004, 2010). Despite this prioritization, there has been no in-depth analysis of the capacity-development needs in the Cambodian AET system. This paper uses a SWOT analysis framework to examine the strengths of, barriers to, and threats to the Cambodian AET system, concluding with opportunities for institutional and policy changes to improve the system's performance.

Conceptual framework: capacity development and performance for AET

AET systems in low-income countries are frequently characterized as weak, ineffective and lacking in capacity. There are increasing calls for "capacity development" not only for these systems themselves, but also for generating sustainable economic growth, food security and poverty reduction in societies that are still heavily dependent upon agriculture. Yet, what is meant by "capacity development" and "capacity" for "AET systems"? We understand AET systems to incorporate all the stakeholders involved in formal agricultural education, ranging from basic/primary school level education through secondary, tertiary and technical and vocational institutions (TVET). The AET system also incorporates various actors that have an interest in AET institutions, their policies, their graduates, and their performance. These actors are not students or employees of an AET institution, but may work in government, non-governmental organizations (NGOs), industry, donor organizations and foreign institutions.

Most frequently, capacity development (CD) is seen as a process to achieve certain objectives. While the World Bank's CD Results Framework proposes that CD is "a locally-driven process...to achieve a development goal" (Otoo,

Agapitova & Behrens, 2009), the United Nations (UN) provides a slightly more nuanced definition of CD as a transformative process achieving measurable development (UNDP, 2008). The UN framework portrays CD in three dimensions: individuals, organizations, and enabling environment (FAO, 2010; UNDP, 2008). For AET systems, this can be conceptualized as: 1) individuals: students, staff, teachers, faculty members, and all individual personnel; 2) organizations: primary, secondary and tertiary level institutions, including TVET; 3) enabling environment: international and domestic policy-makers/government ministries, industry, donors, NGOs. In this model, all three dimensions a) have influence on, and b) are affected by each of the other dimensions. Although arguably rudimentary, this framework does highlight both internal and external stakeholders to a CD system.

However, both the World Bank and UN frameworks have emphasized capacity “building”, implying that they follow prescribed models for enhancing capacity, rather than capacity “development”, implying an organic process (Horton, 1999). Such models are potentially too rigid, lacking recognition of CD as a fluid and experimental learning process. As a result, more recently there have been increasing calls for focus on capacity “development”, and approaches that a) account for the complexity of capacity challenges and b) use holistic systems-thinking (van Deuren, 2013; Watson, 2010). Part of the complexity behind the term “capacity development” stems from the fact that it refers to capacity in the singular, whereas it is more appropriate to think of “capacities” that need to be systematically developed across all dimensions. These capacities include human, physical, financial, social/cultural, and political capitals. Meanwhile, systems-thinking is an appropriate approach for CD

as it emphasizes not only improving the capacity of the parts (or dimensions) of a system but also enhancing the interaction of these parts (Jackson, 2003; Meadows, 2008).

In recent years, however, there is increasing acknowledgment that systems-thinking approaches to CD in AET must be coupled with performance improvement of these systems (Kelly & Palmucci, 2014; USAID, 2010; Watkins, West-Meiers & Song, 2013). For example, what good is it if financial investments in an AET system result in new laboratories being built, without the trained scientists and technicians to understand how to effectively use all the new tools at their disposal, the students to design research projects to utilize the lab, and the field space to replicate lab experiments under field conditions? Capacity development for AET thus must focus on measurable improvement in performance of the system that aligns the generation of a highly-skilled workforce with the current and future demands of the agricultural workforce.

As such, approaches to human and institutional capacity development (HICD) are increasingly borrowed from the performance improvement literature. Chevalier’s (2003) updated Behavioral Engineering Model (BEM), first described by Gilbert (1978), is perhaps the most widely used. This model provides a way to identify barriers to performance improvement of a system by evaluating two principal levels of factors – environmental and individual – and their subfactors. The updated BEM recognizes that, while individual factors (including an individual’s knowledge and training, capacity, and motives) are important, the environmental or institutional factors are perhaps the most pressing to address when trying to build systemic capacity. To help make this point, Chevalier quotes Rummler & Brache (1995), “If you pit a good performer against

a bad system, the system will win almost every time.”

Major international donors, like the United States Agency for International Development (USAID), have also referenced the updated BEM and put renewed emphasis on performance improvement as a key component of capacity development. This marks a transition away from donor approaches to CD in AET systems since the 1980s, which have focused on individual training as the prioritized method of CD. Indeed, USAID’s current focus on performance improvement coupled with systems-thinking approaches is somewhat reminiscent of the massive AET institutional capacity building programs undertaken by the agency in the 1960s and 70s, such as those between US land grant universities and universities in India (Goldsmith, 1988), which were attributed as significant to the progress of the Green Revolution in South Asia.

Cambodian context of conceptual framework

Research for this study was conducted under the HICD framework that is currently being used by USAID, as Cambodia is one of the priority countries under Feed the Future (FtF), the US government’s global hunger and food security initiative. Cambodia’s history since independence in 1953 has been ruptured by three decades of civil conflict in the second half of the 20th century; thus, capacity-development activities have scarcely been implemented or even possible (Chandler, 2007). The civil war that began in March 1970 led to a steady dismantling of Cambodian education systems, which accelerated under the Khmer Rouge (Ayres, 1999). The Khmer Rouge period also resulted in a systematic destruction of all types of capital within Cambodia’s AET system. Even though the Khmer Rouge rule of their “new Cambodia” lasted less than

four years, development was set back in Cambodia by more than 20 years. Peace and stability since the end of the 20th century, however, have led to steady economic growth and the beginning of regional integration, with Cambodia accepted as the tenth member of ASEAN (The Association of Southeast Asian Nations) in 1999. Although Cambodia remains towards the bottom of the pile in the ASEAN network in terms of economic, educational and agricultural development, progress is being made in all spheres. But how far has Cambodia come in developing a more robust AET system to help meet its economic growth, poverty reduction, and food security needs?

Purpose and Objectives

The purposes of this paper are to understand the current state of the AET system in Cambodia and to provide recommendations for Cambodian institutions and policymakers for enhancing the AET system. There has been little published literature on AET in Cambodia, and what literature exists primarily focuses on either agricultural production or educational reforms (Ayres, 2000; Tan, 2007), with little focus on agriculture and education combined. How can the capacity of the agricultural sector in Cambodia be developed if so little is known about the agricultural education system in the country that trains the workforce?

The objectives of this paper are fourfold: 1) Identify strengths of the current Cambodian AET system, 2) Identify weaknesses currently preventing the improvement of the Cambodian AET system, 3) Identify threats to the future strengthening of the Cambodian AET system, and 4) Recommend opportunities for a) Cambodian AET institutions and for b) Cambodia national policy-makers to develop the AET system as an engine for

agricultural economic growth, food security, and poverty reduction.

Methods

Initial data on Cambodia's AET system were collected through secondary sources prior to field research. Following this, we (the authors) conducted the in-country field assessment in two stages, with a 10-day preliminary data collection trip in June 2013, followed by a two-week assessment in January 2014. Based on our assumption that there are a select number of people who can articulate the issues in the Cambodian AET system, we used a purposeful (snowball) sampling method to identify key informants and groups of individuals to interview. This qualitative approach involved discussion-based interviews around guiding questions, which allowed respondents to drive the conversations to issues they deemed important and relevant, while also allowing respondents to uncover issues that we may not have thought important or known about before interviews or focus groups began.

Our preliminary trip enabled us to build trust and relationships with stakeholders, to validate and update information found in literature reviews, and to identify an AET network in-country. During this visit, we made contacts with several important local institutions, and conducted 15 key informant interviews and one focus group. Having compiled a full list of AET stakeholders to visit, our second trip to Cambodia involved the completion of a further 38 key informant interviews with employees at a range of institutions, including various government ministries, universities, donor agencies, NGOs, and private agri-businesses. We conducted four focus groups with AET stakeholders including an NGO, a group of agricultural private sector employees, and current and recent graduates of AET institutions.

A modified-SWOT analysis was used to guide the interviews and focus groups, where respondents were asked to identify strengths, weaknesses, opportunities, and threats facing the Cambodian AET system. A SWOT analysis is a useful tool for improving decision-making in complex systems by compiling and organizing information (Helms & Nixon, 2010). SWOT is commonly used for assessing elements of agricultural education systems (e.g., Aiyelaagbe, Harris & Olowe, 2016; Tukundane et al., 2015; Alonge, 2006). However, we believe a SWOT analysis can also provide a holistic, system-wide overview, and in this context, we used SWOT components to represent both internal attributes (strengths and weaknesses related to individuals and organizations) and external factors (opportunities and threats facing individuals and organizations in the broader enabling environment context) of an AET system. We modified the SWOT because we found that, during interviews, respondents used the discussion of "opportunities" as a chance to once again discuss strengths as well as highlight recommendations for AET system improvements. In the organization of this paper, we therefore present the strengths, weaknesses, and threats before our discussion of the opportunities/recommendations.

Upon return to the US, data collected from the interviews and focus groups were analyzed using content analysis in order to draw out and categorize the most important findings. We took the following steps to conduct our content analysis: i) triangulated data gathered through multiple sources and different collection methods; ii) ensured validity of any primary data gathered when using a Khmer translator; iii) counted words and phrases from interview and focus group notes to identify which issues were highlighted most often; iv) identified

instances when issues were stressed, highlighted or prioritized by respondents; v) categorized notes for data reduction, especially when respondents identified interrelated and similar issues; and vi) confirming lists of issues with the literature, each other, and with Cambodian counterparts. Use of multiple data collection methods, including interview and focus groups, triangulation of field data with literature findings, and repeated visits by the research team to Cambodia ensured trustworthiness for the data collection and analysis. The findings presented in this paper represent the interview and focus group data, supported by secondary sources.

Subjectivity statement and limitations

The research team was led by US-based researchers, as this was funded under a USAID grant from Washington DC, to assess AET capacity in Cambodia, not tied to one or more specific Cambodian institutions. We recognize that US-based researchers potentially view AET capacity through “Western” epistemological standpoints. We did not have any Cambodian researchers on our team, to eliminate bias from any one particular institutional standpoint from within Cambodia. To offset bias, all interviews were conducted in English, and only when necessary did we request Cambodian (Khmer) translators to help clarify points of discussion. While our guided questions led respondents to articulate issues under a SWOT framework, there were issues that were discussed by respondents across multiple sections of the SWOT framework, e.g., issues that could be viewed both as a weakness and an opportunity. We had to carefully review respondents’ answers and clarify these issues for accurate reporting of findings under the SWOT framework.

Findings

Strengths

(1) Stability encourages increased investment. Cambodia is witnessing increasing levels of Foreign Direct Investment (FDI) and Overseas Development Assistance (ODA) across all sectors due to both relative political stability and country needs classifications (e.g., its designation in 2010 as a US government FtF country; listed as 104th in world GDP rankings). This increasing external investment is providing opportunities for CD activities in Cambodia, some of which are targeting agricultural education. One example is the Food Security III program, under FtF, which provides funding for CD activities including short course training in food security project impact and evaluation (Michigan State University, n.d.).

(2) Young labor force. Although the profound impacts of the Khmer Rouge genocide and decades of conflict are still being felt, the burgeoning youthful population in Cambodia provides a human influx that can potentially be harnessed for AET human CD. Sixty percent of Cambodia’s population is under 30 years old, while 32% of individuals are between 11 and 24 years of age (PRB, 2013). This age distribution presents a large pool of potential agricultural workers to be trained across AET sub-sectors. The youthful population provides a real opportunity for Cambodians to be trained in agricultural disciplines and boost agricultural economic growth.

(3) Increased educational enrollments. Enrollment rates at Cambodian universities are rising, with an estimated 168,000 students enrolled in 2009, a 16-fold increase from 1997 estimates (Buntong & Chea, 2014). At the Royal University of Agriculture (RUA), Cambodia’s only higher education institution exclusively dedicated to the agricultural sciences, student enrollment has quadrupled since 2007-08,

with almost 2,000 students currently enrolled (Buntong & Chea, 2014). The location of RUA's campus, on the outskirts of Phnom Penh, enables the institution to draw students from both urban and rural backgrounds. This is particularly important since Cambodia continues to experience rapid urban growth (around 3%/year), outpacing population growth rates in the country (World Bank, n.d.). Furthermore, respondents noted (though no accurate data were provided) that a high percentage of AET graduates find employment within government or NGOs, helping to provide greater access to job opportunities for future graduates of the AET system.

(4) New agricultural education schools and curricula. Beyond RUA, other schools are beginning to provide agricultural education. One example is the University of Battambang, which has completed major infrastructural developments to provide up-to-date facilities for agricultural education, including a new tissue culture laboratory, greenhouse, and classroom space.

Agricultural education can also increasingly be sought through vocational schools, short-term programs, and farmer field schools.

(5) Leadership of AET. Many high-ranking university administrators have dual roles in various ministries that strengthen information channels and partnerships. Respondents also noted that governmental leadership, administrators, faculty, and students have a very high level of energy and enthusiasm for addressing Cambodia's pressing AET needs. Several faculty at RUA have experience working with donors and other collaborators to develop AET capacity, particularly through certificate programs and short-term workshops.

(6) AET skillsets applicable country-wide. Respondents noted that as Cambodia has a small geographical area, AET skillsets are typically applicable in most regions of the country. Khmer is spoken throughout

Cambodia, also ensuring that AET skills developed for the workforce can be applicable countrywide. Respondents also thought that Cambodia had fewer agroecological zones than neighboring countries. While this is true in comparison to Vietnam (which has nine agro-eco zones), Cambodia actually has the same number of agro-eco zones as Thailand (four) (UNDP, 2011). As Cambodia's agro-ecological zones have overlapping characteristics with its neighbors, there may be opportunity to apply AET skillsets region-wide.

Weaknesses

(1) Weak infrastructure.

Infrastructure upgrades related to a variety of AET programs remain a significant challenge. Several facilities need new equipment, and staff members need to be trained on how to properly utilize new equipment and integrate the technology into the curriculum. Many respondents indicated how dependent Cambodian AET programs were on donor projects for the supply of modern equipment. There is also a lack of experiential learning venues (e.g., well-equipped labs, field research sites) to provide spaces for hands-on learning. Furthermore, where off-campus research facilities, e.g., field research sites, do exist, they are often connected by weak public infrastructure including road access and power grids. This makes it difficult to provide students and faculty with the opportunities to rigorously test theoretical principles learned in the classroom in applied spaces.

(2) Pedagogical stagnation.

Throughout the Cambodian AET system, there is an emphasis on rote learning and a lack of experiential education opportunities. Furthermore, pedagogical stagnation continues as the majority of junior faculty are recent graduates from bachelor's programs and due to high turnover rates of

faculty due to low salary caps. Faculty members need training on how to educate students to be more capable of critical thinking and innovation. Different styles of learning need to be introduced, which will break the current emphasis on memorization of facts. Faculty members need to be given space and opportunity by their institution's higher administration and by government ministries to explore ways for creative engagement in and beyond the classroom.

(3) Skills supply. The most significant barrier noted by students and employers was the multifaceted issue of skills supply. First, there is a lack of agricultural education throughout the educational pipeline, both in formal education through primary and secondary schools, and in informal settings through community development activities. Thus, students who enter technical and vocational education and training (TVET) or universities are often underprepared in terms of their technical knowledge in agricultural disciplines. In addition, there is a lack of development of soft skills, such as leadership, communication, management, analytical thinking, and decision-making. Agricultural employers interviewed especially noted that finding suitable candidates with a combination of well-developed technical knowledge and soft skills is difficult. This finding was confirmed by a study that highlighted that 15.5% of Cambodian firms and 22% of foreign firms reported skills as a major constraint to growth (World Bank, 2012). Although there are increasing calls for employers to look beyond universities and instead to TVET institutions as the suppliers of these soft skills (Sopheap, 2012), these institutions are underutilized, undervalued and suffer from low attendance and poor-quality resources. Cambodia has one of the smallest shares of students currently enrolled in TVET (1%) both regionally

(World Bank, 2012) and compared to other FtF countries (JICA, 2007).

Another important component of the skills supply barrier is the need for updated curricula. Cambodian educational institutions have been run under several different systems in the past (Russian, Japanese, French, Khmer, etc.), so curricula are disjointed and outdated. Additionally, weak English skills among most students limit their employment options. Teachers, researchers and administrators in the AET system may also have limited English skills, hampering the ability of these institutions to develop fluent English-speaking graduates. In order to a) be able to work across borders and b) be on a level-playing field with graduates from other ASEAN countries, Cambodian graduates will need to meet standard language (ASEAN's current working language is English) and education requirements (ASEAN, 2012).

(4) Disconnect between skills supply and workforce demand. Linked to the shortfall in skills supply, agricultural employers noted that they cannot find Cambodians with the skills they need for the jobs they have. Types of skills reported included not only a high level of technical expertise in specific disciplines, but also "soft" skills such as those mentioned under (3) above. This is partly due to the low numbers of degree graduates in agricultural disciplines, but respondents noted that it was more linked to the mismatch between skill provision in the formal AET system and the skills demanded by the workforce. For example, the Ministry of Agriculture, Forestry and Fisheries (MAFF) noted that extension workers need relevant, hands-on training, which is not currently provided by AET institutions, and both students and employers mentioned that on-the-job training is often more useful than school-based training. This barrier is reinforced by the dearth of certificate programs and

continuing education opportunities. Additionally, employers lack the means by which to communicate their desires for certain skills in successful future job candidates; currently, there is no labor market information system to survey labor market demand and connect it to supply.

(5) Weak institutional administrative expertise. Respondents noted that AET institutions do not have mechanisms in place to administer external funding opportunities. For example, it is not standard for institutions to take administrative overhead out of incoming university grants. Many Cambodian universities are currently engaged with donor organizations, receiving funds from outside sources such as USAID, JICA, etc. However, an increase in the number of opportunities for external engagement is limited by the weak administrative capacity of Cambodian institutions to efficiently manage extramural funding.

Threats

(1) Limited public investment in AET. Respondents overwhelmingly highlighted the continual underinvestment in AET by the government as a serious barrier to strengthening the AET system in Cambodia. Public investment in education was 20% of the national budget in the 1960s, when Cambodia was building its university infrastructure (Duggan, 1997). Though official data are lacking, there was a complete tear-down (physically and administratively) of educational infrastructure throughout the 1970s, and educational investment was largely ignored by the ruling Vietnamese from 1979. As a result, public investment in education had declined to 7% by 1999. This investment is still yet to return to 1960s levels, with current estimates at approximately 13-14% (ADB, 2013; World Bank, 2012). Meanwhile, Cambodian government

spending on agriculture remains under 2% of GDP, and the majority is spent on irrigation and rural roads. Interestingly, a World Bank study into Cambodian government spending highlighted the prioritization of the agriculture sector, yet failed to mention anything about the role of AET in ensuring sustainable agricultural economic growth (World Bank, 2011).

(2) Gap between agriculture and education. Twelve governmental ministries and two institutions oversee the 97 higher education institutions (HEIs) in Cambodia (Buntong & Chea, 2014). The government ministry structure appears to struggle to coordinate across ministries. Of particular importance to the functioning of AET systems is the gap between the Ministry of Education, Youth and Sport (MOEYS) and MAFF. HEIs often do not communicate effectively and remain siloed, in part due to their differing affiliations. In particular, the gap between agriculture and education is entrenched as RUA, under MAFF, lacks strong ties to MOEYS and its affiliated HEIs.

(3) Low status of agriculture. Lack of interest in AET by young people causes significant brain drain to other, more lucrative industries, such as information technology. Only 20% of graduating secondary seniors base their decision on what to study on the labor market, while 70% followed their parents' advice (ILO, 2008). As a result, high quality students are not entering agricultural disciplines. Additionally, salaries in the traditional agricultural sector remain comparatively low, further reducing the status of agriculture as a meaningful and profitable line of work.

(4) Access to agricultural higher education. Enrollment rates in agricultural higher education in Cambodia are still comparatively low regionally. The national higher education enrollment rate in

Cambodia was 11% in 2008, which is much lower than Thailand (32%) and the Philippines (29%) (World Bank, 2010). Additionally, only 2.3% of all bachelor's students in Cambodia are studying in the agricultural sciences (World Bank, 2012). The same pattern exists in TVET: the share of upper-secondary and tertiary students enrolled in TVET in Cambodia is 6%, one-third that of Vietnam (World Bank, 2012). There is also a notable gender access gap to higher education in general, and AET in particular. For example, the latest enrollment figures for RUA indicate that the share of female students is only 27% (Buntong & Chea, 2014).

Recommendations for AET system capacity development in Cambodia

There is an urgent need for revitalizing the Cambodian AET system in strategic new directions. Four recommendations emerged from interviews and focus groups as the priorities for capacity development in the Cambodian AET system. These recommendations include two opportunities for AET institutions to develop their capacity and two implications for policymakers for strengthening the AET system.

Implications for AET institutions

(1) Enhance skill development and reduce skill gap. There is an urgent need to build transferable skills in AET graduates in order to develop a workforce that is creative, flexible and innovative for agricultural growth and development. This starts early: the introduction of agricultural education as early as primary school should be considered, while there is also potential to introduce agricultural education across Cambodia at the secondary school level through the “life-skills” curricula currently offered by some schools.

There is a particular need to focus on CD for value chains, and to reform the

image of agriculture as simply “on-farm production”. This will help to break down the silos between agriculture and education, and between agricultural disciplines and other subjects of study. Student skills can be developed through updating and generating interdisciplinary curricula that address agricultural value chains from producer to consumer, including topics such as business development, food processing, environmental management, and biotechnology. These curricula will provide graduates with broadened understandings of agriculture and increased synergies with other disciplines (and hopefully will attract youth to the agricultural sector), while the inclusion of new topics will ensure that students maintain depth in technical disciplines. To upgrade these curricula, financial resources should be applied not only to materials (e.g., enhanced staff and student access to the newest books and journals), but also to training of staff in innovative, experiential teaching approaches. Such approaches might include hands-on learning and the application of participatory methods to support a shift from teacher-centered to student-centered learning environments (Navarro, 2009). Increasing offerings of English classes and developing curricula in English are also important to prepare graduates to engage internationally and will enhance their employability.

There is a need to consider AET programming beyond formal university degrees to engage a broader client base and fulfill a range of agricultural workforce demands. This could take a variety of programming forms, harnessing the advances in information and communications technologies, and include certificates, distance education (e.g., Grunfeld & Ng, 2013), and short-term training courses, on a variety of topics. These are especially important for skill

development in particular niche opportunities, and for professionals who need rapid skill development for the workplace. One opportunity is increasing engagement with TVET institutions that attract both experienced and young farmers as well as other youth and those already employed in the sector. This would allow education to be demand-driven and let the trainees make themselves increasingly valuable to employers. Another opportunity is training administrative staff at AET institutions in management of external funding to improve their competitiveness and ability to effectively partner with international institutions.

(2) Further links with NGOs and the private sector. Through increased connections with NGOs and the private sector, AET institutions can move from a supply-driven model to a more viable demand-driven model by teaching skills based on workforce and market demand. Increased linkages with these groups would attract younger generations to agricultural disciplines, due to the enhanced potential of employment following education and training. Increased linkages between technical and theoretical classroom-based learning and market innovation and business development through hands-on learning opportunities are especially important. One way this can be achieved is through public-private partnerships (PPP); for example, food product and agricultural input companies in Cambodia could provide paid internship opportunities for interested students on a competitive scholarship basis. These internships may lead to future job opportunities and facilitate direct linkages between AET institutions and private companies. One example of a PPP is between GIZ and East-West Seed (Keo, Acosta, Sayoc, & Morris, 2012), that has developed linkages with a variety of AET

institutions to provide training for both students and farmers.

Implications for Policy

(1) Welcome prudent regional integration. As the ASEAN Economic Community becomes a reality, Cambodia's economy is set to become further integrated with economies throughout Southeast Asia. With integration, Cambodia is forecast to see the largest economic growth in region, with increased wages and increased employment opportunities, particularly in the informal sector (Plummer, Petri & Zhai, 2014). Prudent regional integration could also bring significant gains for the Cambodian AET system. ASEAN integration may lead to greater opportunities for AET exchanges: regional technical experts could train students and teachers at Cambodian institutions, and Cambodian AET teachers and researchers could train at regional universities for higher degrees. Improved links with regional universities could also build capacity in research methods and extension expertise. In addition, an improved AET system that produces skilled laborers for critical food sectors would facilitate Cambodia's ability to compete in regional agricultural markets. However, ASEAN integration may present greater opportunity for skilled Cambodians to find employment in other countries, which could promote brain drain from Cambodia. Cambodia will also need to adapt to ASEAN university standards, which will not only push present capacity of Cambodian AET programs beyond their capabilities, but also put graduating students in direct competition with more advanced ASEAN students.

(2) Enhance investment across the whole AET system. Cambodian government ministries need to work with private sector partners and AET institutions to leverage increasing foreign investment to develop

AET system capacity. Regional players in the East account for the largest share of FDI into Cambodia, much of which is invested into the agricultural sector. Yet, Cambodia must also look to partners worldwide. One example is the agricultural investment in Cambodia through the United States FtF initiative and the HARVEST program (Lesnick, 2013). The Cambodian government and AET stakeholders need to further discuss ways in which such foreign investment can be used not only for agricultural sector development, but more specifically AET system CD. Despite this increased foreign investment, any CD in the Cambodian AET system is dependent upon increased commitment to AET investment from the Cambodian government itself. This involves increased financial commitment to both developing physical infrastructure in the AET system, and also to enhancing access to, and quantity and quality of AET programming. This needs to be complemented by improved coordination between government ministries that oversee the AET system, notably MAFF and MOEYS, and a commitment to bridge the gap between agriculture and education.

How does Cambodia compare to other AET systems?

Cambodia is a relatively small country, with a limited number of AET institutions. While we feel we were adequately able to analyze Cambodia's AET system under this research, conducting such an analysis in many other low and middle income countries may not be possible due to their larger geographic size and/or greater number of AET institutions. However, there are some other recent examples of AET system analysis that exist and are worth noting when considering how Cambodia's AET system compares to other developing countries.

A country-wide study of Thailand's AET system uncovered some similarities to and differences from Cambodia's AET system (Traimongkolkul & Tanpichai, 2005). The study addressed AET strengths and weaknesses in Thailand at three levels: basic education, vocational programming, and higher education. The authors found some similar constraints to be addressed, including the need for updated curricula and resources for agricultural education; the need to recruit and retain young people in agricultural studies; and the need for increased budgets and investments. Ultimately, Traimongkolkul & Tanpichai (2005) proposed the formation of a task force composed of agriculture and education professionals to create a united plan and direction for the nation's AET system, and a suite of recommendations to strengthen all levels of AET while also considering how to better link formal and non-formal education in agriculture. Little was mentioned, however, about the need for regional integration. Much of this may be due to the comparative strength, robustness and diversity of the Thai AET system in comparison to Cambodia. Cambodia, being a smaller neighbor with a weaker AET system, evidently has much to gain from an outward-looking regional focus to match current ASEAN levels and demands.

In an analysis of post-secondary agricultural education and training (PSAET) institutional challenges across sub-Saharan Africa, Rivera & Davis (2008) highlighted the critical concept of workforce development. They also highlighted the need to connect AET supply to workforce demand by addressing structural gaps in the current AET system. Meanwhile, in another study on strengthening AET system capacity in sub-Saharan Africa, Spielman, Ekboir, Davis, & Ochieng (2008) stress the importance of developing innovative capabilities of AET organizations and

professionals, changing organizational cultures, behaviors and incentives, and building innovation networks and linkages. In particular, they note the importance of aligning the mandates of AET institutions with national development aspirations (i.e. tying the training of individuals to the workforce needs of the nation), and incentivizing the linkages between AET institutions and diverse user communities, as well as the private sector. All of these factors resonate well with our findings in Cambodia, and suggest that many of the challenges facing the Cambodian AET are similar to AET challenges in other low-income countries.

Recommendations for further analysis

There needs to be a comprehensive approach to CD that leads to performance development, bridging the gap between theory and practice, to make recommendations at both the policy and institutional level. There is increasing focus (especially in international development) on understanding HICD models that identify best practices for CD from performance models to improve implementation (Lechtenburg, Ayeni, Christy & Kramer-Leblanc, 2014).

The assessment we conducted was just one snapshot in time. Continued assessment of needs and opportunities for reforming AET programs and institutions will go a long way toward developing lasting human and institutional capacity. It is important to incorporate adaptive learning and management into ongoing capacity-development strategies. It is especially critical to simultaneously develop capacity to monitor and evaluate targets for performance improvement over time, as performance improvement in coordination with local stakeholders is an integral part of capacity development for AET systems overall in low and middle income countries.

As such, an appropriate CD approach for Cambodia's AET system must be developed together with the development of tools and metrics that can demonstrate whether CD does in fact lead to improved performance and lasting impact. Future studies could investigate appropriate benchmarks for performance monitoring and measurement for capacity development -- and capacity development for performance monitoring and evaluation -- in Cambodia and elsewhere.

The possibility of going beyond our basic analysis to include the application and integration of ranking, scoring or weighting assets to prioritize strengths, needs, and opportunities is also a consideration for future research. This would be of particular benefit to policy-makers, as it would help to identify areas of greatest opportunity and may help officials make strategic decisions that are high impact, while also considering resource limitations.

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