

Identifying Pathways Linking Agricultural Education, Training and Extension

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Problem Statement

In the global south, especially in Sub-Saharan Africa, development of the agricultural sector is important to achieving significant economic development. However, development of the agricultural sector dominated by smallholder farmers faces complex challenges such as poverty, food and nutrition insecurity, and climate change while sustaining the natural ecosystem (Leeuwis & van den Ban, 2004; Anandajayasekeram et al, 2008). Further, the spread of commercialization, trade liberalization, and technological advancement have created both opportunities and challenges for smallholder livelihoods (Rivera and Alex, 2008).

In order to respond to these challenges and opportunities, the need for quality human resources is widely acknowledged, implying the crucial role of agricultural education and training (AET) (Kroma, 2003; Maguire, 2012; APLU, 2014; World Bank, 2007). However, there is growing dissatisfaction with the quality of AET institutional outputs: graduates, research and technical advice (World Bank, 2007). This is in sharp contrast with the crucial role AET institutions are expected to play in the national agricultural innovation system (AIS) through their tri-mandates -- teaching, research and extension. Assumed to be complementary, teaching, research and extension can contribute (for example) to the skill learning of students/graduates and extension needs of agricultural communities. However, in the absence of information on pathways of AET, it is difficult to understand how AET impacts the skill learning of students as well as the extension needs of farmers. Thus, this research brief assesses the latest evidence on the linkage between extension and education to identify potential pathways that bond AET and extension for improved skill learning of students and extension needs of farmers.

Overview of AET's Persisting Challenges in Africa

The crucial role of AET in determining the success of efforts to boost agricultural productivity is widely recognized. However, AET is not realizing its potential contribution (Vandenbosch, 2006; World Bank, 2007). A review of the literature attributes various interlocked challenges for the persistent failure or underachievement of AET institutions in the global south, especially in Africa. These include: fragmented governance structures; outdated and rigid curricula; traditional/inadequate teaching methods; declining and distorted enrolment profile; and inadequate physical, financial and human resources (APLU, 2014; Maguire, 2012; Rivera & Alex, 2008; Spielman et al, 2008; Vandenbosch, 2006; World Bank, 2007).

Attempted Reforms

Attempted reforms to address the challenges to AET in Africa have largely been focused on structural change. Although empirical evidence is lacking whether such reforms have been successfully adapted to the specific context of sub-Saharan Africa, reforms have contributed little to creating innovative AET systems responsive to emerging opportunities and challenges. In a few cases where priorities are given to creation of more dynamic, responsive and competitive AET systems, it also remains unclear whether these initiatives are the beginning of a substantial transformation of AET systems, or are just isolated experiments (Spielman et al., 2008).

Linking extension and education is found to be among the key imperatives to address the challenges faced by AET institutions in making concrete contributions to their agricultural innovation systems.

Potential Pathways to Improve the Link between Extension and Education

Critical next steps to linking education and extension include: generating problem solving research that meets priority needs of agricultural communities; producing graduates with skills that enable them to make concrete contributions; and improving the livelihood of farming communities.

In this regard evidence reviewed indicates the following possible alternative pathways:

- **Include practical learning in the structure of the curriculum** such as field based courses, entrepreneur projects, internship programs implemented in collaboration with local farmers and other agricultural sector actors
- **Create structures that allow for meaningful interaction between educational institutions and the private sector**, such as curriculum advisory committees and internship programs
- **Institute system-wide reforms that strengthen institutions and programs** through accreditation bodies and in-service training for faculty and staff
- **Establish a link between AET research and extension** by undertaking community-based research and practical student learning

The chart below details programs that successfully use one or more of the above pathways and their impacts.

Program/Project	Program Elements Linking Education and Extension	Impacts
EARTH University, Costa Rica	<ul style="list-style-type: none"> • Experiential learning connecting students & educators with farmers, agribusiness & NGOs • Balanced curriculum of theory and practice with opportunities to apply technical & scientific knowledge in real situations • Focus on entrepreneurial skills • Engagement in research & extension • Staff incentives to apply participatory teaching 	<ul style="list-style-type: none"> • 97% of graduates have returned to their countries of origin, fulfilling their promises to “go back and give back” • 85% of graduates promote cultural diversity & social equality in their companies • 74% of alumni are positively impacting biodiversity conservation • Graduates have social impact in their communities through job creation, workplace improvements, volunteerism & improvement of living standards through farmer training • Graduates have environmental impact through waste management, organic farming, & biodiversity conservation
State Agricultural Universities (SAUs) of India	<ul style="list-style-type: none"> • System-wide reforms • Established an accreditation board to implement national agricultural education standards • Conducted labor market needs assessments to inform policies and programs • Investments in staff training and educational infrastructure 	<ul style="list-style-type: none"> • Academic norms for all undergraduate and postgraduate programs were revised and implemented • Curricula were updated with new courses and skills-oriented, hands-on training • In-service training improved in quality & relevance through needs-based training programs & greater farmer, agro industry & input supplier involvement • Improved teaching materials, methods & facilities

Program/Project	Program Elements Linking Education and Extension		Impacts
Chiang Mai University, Thailand	<ul style="list-style-type: none"> Community-Based Research (CBR) program, integrating faculty, students & rural communities CBR programs involved many different courses (e.g., Extension Communications, Media Production for Extension, Agricultural Communities Studies) Practical training for faculty, including organizing CBR projects in rural communities, communicating with community members & undergraduate students 		<ul style="list-style-type: none"> Improved student & faculty awareness of how isolated from rural communities the university had become Curriculum reflects knowledge and skills needed by graduates who will work in rural areas Practical training for faculty enabled students to receive practical training Local communities have increased their abilities to leverage student practice to identify community problems, analyze causes of problems & develop solutions through a participatory research process in which students & faculty become their co-researchers
Institutional Linkage Project, a component of the USAID-funded Agricultural Exports and Rural Income (AERI) project, Egypt	<ul style="list-style-type: none"> Leaders from the academy & the private sector participated in a Steering Committee that guided the project's implementation Skill gap analysis identified knowledge & skill deficits in graduates Academic staff participated in redesigning & improving courses & learning materials University deans & private sector leaders gained firsthand views of overseas university systems External Advisory Committees were created to provide feedback on sector developments & labor-market needs to university management Student internship programs were developed 		<ul style="list-style-type: none"> Improved curriculum Staff developed capacity to carry on reforms Improved links to agribusiness
Mid-Career BSc Program in Agricultural Extension, supported by the Sasakawa Africa Fund for Extension Education (SAFE), in 20 universities in 9 African countries (Benin, Burkina Faso, Ethiopia, Ghana, Malawi, Mali, Nigeria, Tanzania, Uganda)	<ul style="list-style-type: none"> Demand-driven curricula Focus on rural leadership development Student-centered experiential learning Supervised Enterprise Project (SEP)—students conduct extension needs assessment, propose an extension project to address a need that must include an extension research component, & implement the project with farmers, employers & lecturers as the students' supervisors 		<ul style="list-style-type: none"> Curricula responsive to national priorities Improved livelihoods of farmers Improved students' skills in the following: applying agricultural technologies; communicating with farmers; using participatory needs assessments; prioritization; bringing about changes in farmers' agricultural practices Improved students' confidence in and understanding of ability to fulfill job requirements Employers said graduates are highly qualified and competent Influenced curriculum changes in other departments and degree programs to include more experiential learning Introduction of "Technology Villages" as field laboratories on campus & in communities Fostered alliances between universities, communities, government & industries Encouraged organization of farmers into groups for individual & collective good

Implications for Future Research and Intervention

In general, reforming AET in Africa calls for looking beyond "a single model fits all" approach and it should be implemented with the understanding that it is a long-term undertaking (Eicher, 2006; Spielman et al., 2008). In an attempt to reform the AET organizations in the region, application of an innovation system approach, i.e. as a complement to ongoing reform, would provide a systematic and contextual approach to address key challenges underlying poor performance or underachievement of AET in the AIS. However, empirical evidence on application of innovation system approach to AET reform in Africa is still lacking and thus further research is needed (Spielman et al., 2008).

Interventions to improve the link between extension and education need to be guided by contextual assessment. Information from contextual assessment that adheres to the innovation system approach will guide the intervention to determine the underlying factors to adapt suitable pathways for AET improvement and also required complementary actions, such as training staff on pedagogical skills, writing teaching material with blended theory and local authentic examples, and establishing functional links between AET institutions, farmers and other stakeholders.

Any interventions linking extension and education are imperative, regardless of the level of reform (system-wide, institution or program level). If effectively done, an attempt to improve the link between extension and education (for example, focusing on a program in an AET organization) can be a good entry point to initiate institution and system wide reform. If functional links are established between extension and education, as can be seen from the experience of SAFE and other programs, feedback on the relevance of curriculum, its delivery and research focus, and overall functional strategic links between tri-mandates of an AET organization can be provided.

References

- Anandajayasekeram, P., Puskur, R., Workneh, S. & Hoekstra D. (2008) *Concepts and practices in agricultural extension in developing countries: A source book*. Washington, DC: IFPRI and Nairobi, Kenya: ILRI. Retrieved from <https://www.ifpri.org/cdmref/p15738coll2/id/125973/filename/125989.pdf>
- APLU. (2014). *African higher education: Opportunities for transformative change for sustainable development*. Washington, DC: USAID. Retrieved from <http://www.aplu.org/library/african-higher-education-opportunities-for-transformative-change-for-sustainable-development/file>
- Eicher, C. K. (2006). *The evolution of agricultural education and training: Global insights of relevance for Africa*. Michigan State University, Department of Agricultural Economics Staff Paper Series. Retrieved from <http://purl.umn.edu/11816>
- Kroma, M. M. (2003). *Reshaping extension education curricula for 21st century agricultural development in sub-Saharan Africa*. Proceedings from the Association for International Agricultural Extension Education 19th Annual Conference. (pp. 353–365) Raleigh, North Carolina: AIAEE. Retrieved from <https://www.aiaee.org/attachments/article/1204/Kroma353.pdf>
- Leeuwis, C. & van den Ban, A. (2004). *Communication for rural innovation: Rethinking agricultural extension*. Oxford, United Kingdom: Blackwell Science Ltd.
- Maguire, C. J. (2012). Agricultural education and training to support agricultural innovation systems. In World Bank (Ed.), *Agricultural innovation systems: An investment sourcebook* (pp. 107–177), Washington D.C.: The World Bank. Retrieved from <https://openknowledge.worldbank.org/bitstream/handle/10986/2247/672070PUB0EPI0067844B09780821386842.pdf?sequence=1&isAllowed=y>
- Rivera, W. M., & Alex, G. E. (2008). Human resource development for modernizing the agricultural workforce. *Human Resource Development Review*, 7(4), 374–386. <http://doi.org/10.1177/1534484308324633>
- Spielman, D. J., Ekboir, J., Davis, K., & Ochieng, C. M. O. (2008). An innovation systems perspective on strengthening agricultural education and training in sub-Saharan Africa. *Agricultural Systems*, 98, 1–9. http://ac.els-cdn.com/S0308521X08000358/1-s2.0-S0308521X08000358-main.pdf?_tid=05df63f2-63d8-11e6-a5bd-00000aabb0f26&acdnat=1471369194_f21e7435ed7bd0891445c085138b5fc5
- Vandenbosch, T. (2006). *Post primary agricultural education and training in sub-Saharan Africa: Adapting supply to changing demand*. Nairobi, Kenya: World Bank. Retrieved from http://siteresources.worldbank.org/INTAFRREGTOPEUCATION/Resources/444659-1212165766431/Post_Primary_Agriculture_Education_Africa.pdf
- World Bank. (2007). *Cultivating knowledge and skills to grow African agriculture: A synthesis of an institutional, regional, and international review*. Washington D.C. Retrieved from <http://documents.worldbank.org/curated/en/629031468340199694/pdf/409970WPOP094300AETOFinal0web040997.pdf>