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Higher Agricultural Sciences Education in Africa
Literature Review of Qualitative Sources

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Research Questions:

- Are there any calculated rates of return to tertiary agricultural sciences education, particularly in Sub-Saharan Africa?
- Is there evidence to support or describe a positive return or value of tertiary agricultural sciences education?
- Is there any qualitative support for the value of agricultural sciences education?

Answer:

We found no calculated rates of return (ROR) to tertiary agricultural science, including in Sub-Saharan Africa. We did find estimates for the return on tertiary education in general ranging from 12-30%[1] in SSA, along with qualitative support for the value of agricultural science education. The private value of this education can be somewhat inferred from the unmet demand of African students for agricultural science training in North America, Europe, and Australia, and the private and social value from the demand for educated researchers in NARS and SSAQ labor markets. Educated agricultural scientists are hypothesized to affect agricultural productivity via research and development and their influence on policy.

Despite the dearth of quantitative rates of return evidence, we did find several articles describing the need for increased higher agricultural education and proposing recommendations toward this aim. In this document, we will summarize only these qualitative results as evidence of the value of tertiary education before moving forward with the request to identify best practices of capacity building for research and higher agricultural education.

Approach:

We searched for academic articles using Google Scholar and the UW Library system using the words "empirical," "return," "agriculture," "education," "tertiary," "university," "investment," "higher," "Africa," "India," "Asia," etc. We searched specific organizations' websites for program documents and gray literature, including the World Bank, UNESCO, ILO, IFPRI, ASTI, various Ministries of Education, country-specific NARS, and ADBG.

Because we have limited quantitative findings on higher agricultural education rates of return, we looked for evidence of the potential value of higher agricultural education, which ignores the investment costs but may proxy returns. Estimates of the value of higher agricultural education are measured by student and labor market demand. We also looked at the value of university trained agricultural scientists as they contribute to agricultural productivity via the research output and environment policy change and other public goods, including training others.

The qualitative sources we found fall into two categories:

I. Studies describing the need for and recommendations to increase capacity for tertiary agricultural education
II. Estimates of the value of tertiary agricultural education in SSA as proxied by students studying abroad

[1] Bloom, Canning and Chan (2006) Higher education and economic development in Africa. World Bank.

Sources and Results by Category:

I. Studies describing the need for and recommendations to increase capacity for tertiary agricultural education

Sources that describe the general state of higher education or agricultural education in Africa and need for improvement:

- World Bank, (2009). *Accelerating catch-up: Tertiary education for growth in sub-Saharan Africa*. Retrieved from website: http://siteresources.worldbank.org/INTAFRICA/Resources/e-book_ACU.pdf.

- Cloete, N., Bailey, T., Pillay, P., Bunting, I., & Maassen, P. (2011). *Universities and Economic Development in Africa*. Retrieved from website: http://chet.org.za/books/universities-and-economic-development-africa-0.

- Kamara, A., Bousrih, L., Nyende, M. (2007). Growing a Knowledge-Based Economy: Evidence form Public Expenditure on Education in Africa (Working Paper No. 88). Retrieved from African Development Bank website: http://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/26326414-EN-ERWP-88.PDF.

- Birdsall, N. (1996). Public spending on higher education in developing countries: Too much or too little?. *Economics of Education Review*, 15(4), 407-419. DOI: 10.1016/S0272-7757(96)00028-3. Retrieved from website: http://www.sciencedirect.com/science/article/pii/S0272775796000283.

*For a fuller, descriptive list of statistics related to tertiary education in Africa, see Appendix 1.

Qualitative Studies Linking Agricultural Science Education and Agricultural Productivity

Several articles discuss ongoing efforts and projects to increase the effectiveness and coordination of higher education efforts as well as attitudinal surveys valuing higher agricultural education in Africa. Several sources advocated for increased tertiary agricultural education along with recommendations on how best to provide increased higher education opportunities. These include:

- Demment, M. (2011). Contributions of Higher Education Investments to Development—Implications for Agricultural Development [PowerPoint slides]. Retrieved from CAADP website: http://www.caadp.net/pdf/presentation%207.pdf

- Corlett, J.T. & MacFarlane, I.G. (1989). University science and agriculture education in developing countries. *Higher Education*, 18, 411-421. Retrieved from website: http://www.jstor.org/stable/3447365.

- Zinnah, M. M., Steele, R., Carson, A., Annor-Frempong, F. (2001). Assessment of Tertiary Agricultural Education in Ghana. Retrieved from Association for International Agricultural and Extension Education website: http://www.aiaee.org/attachments/article/1357/pa48.pdf

- Southern African Development Community (2008). Implementation and coordination of agricultural research and training (ICART) in the SADC region: Situation analysis of agricultural research and training in the SADC Region (Zambia). Retrieved from SADC website: http://www.sadc.int/fanr/agricresearch/icart/inforesources/situationanalysis/ZambiaSitAnlaysisFinalReport.pdf

Descriptive Suggestions Linking Higher Agricultural Education as Part of a 'Pathway' to Increased Productivity/Development

Several articles provided quantitative returns on agricultural research, though not agricultural education. Many authors elaborated on these linkages between higher education, research, and extension as part of a combined approach to increase agricultural productivity.

- Alene, A.D. & Coulibaly, O. (2009). The impact of agricultural research on productivity and poverty in sub-Saharan Africa. Food Policy, 34, 198-209. Retrieved from website: http://www.ask-force.org/web/Regulation/Alene-Impact-Research-Africa-2009.pdf.

- Eicher, C. K. (2009). Building African scientific capacity in food and agriculture. *Review of Business and Economics*, LIV (3). Retrieved on website: http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=4&ved=0CDwQFjAD&url=http%3A%2F%2Fpreview20.bluematrix.co.za%2Fsystem%2Ffiles%2FBuilding%2520African%2520Scientific3%2520Eicher.pdf&ei=3iqYUPrlH8j5igKBvIC4Cg&usg=AFQjCNGcsyZkCUq24F-fkYkCi8Bj2exEsA&sig2=Iy7PVvgP7ptCzdCBupKVeQ

- Maclure, R. (2006). No Longer Overlooked and Undervalued? The evolving dynamics of endogenous educational research in sub-Saharan Africa. *Harvard Educational Review,* 76 (1). Retrieved from website: http://democraticdialogue.com/DDpdfs/Maclure.HarvardEdReview.pdf

- World Bank (2008). More and better investment in agriculture. Agriculture for Development Policy Brief. Retrieved from World Bank website: http://siteresources.worldbank.org/SOUTHASIAEXT/Resources/223546-1171488994713/3455847-1192738003272/Brief_MoreBetterInvest_web.pdf

- Association of African Universities is also currently working on a project to improve the availability and relevance of agricultural learning resources in Africa, though no literature was found.

II. Estimates of value of tertiary agricultural education in SSA via proxy of agricultural students studying abroad

The quantity of African students studying agriculture internationally could arguably provide a measure of the "unmet demand" for tertiary agricultural education in Africa. We were able to find some measurement of African students studying abroad, however we have not yet found any data sources disaggregating agricultural students from other students.

Statistical Sources Describing African Students Studying Abroad

The 2010 UNESCO Global Education Digest provides helpful data on internationally mobile tertiary students (table on p. 172) and percent changes in tertiary enrollment in various world regions including Africa.

The 2011 UNESCO Global Education Digest focuses on secondary education but has a helpful table on p. 274 on % of tertiary students in specific countries. However, these documents do not take into consideration the subjects students are studying.

Black Expat Magazine's African Student Census created maps showing numbers and destinations of Sub-Saharan Africans to other parts of the world, using the 2006 UNESCO Global Education Digest and various national statistical portals. It found that 5.6% of tertiary students from SSA are studying abroad. The top destination for overseas SSA students is Western Europe, with 21% of African students going to France, 12% to the UK, 6% to German, and 5% to Portugal.

Sources supporting the concept of 'unmet demand' as proxy for value of tertiary agricultural education:

- Alam, G. M., Hoque, K.E., Khalifa, M.T.B., Siraj, S.B., Ghani, M.F.B.A. (2009). The role of agriculture education and training on agriculture economics and national development of Bangladesh. African Journal of Agricultural Research, 4(12),1334-1350. Retrieved from website: http://www.academicjournals.org/ajar/pdf/pdf%202009/dec/alam%20et%20al.pdf

APPENDIX 1. State of Higher Agricultural Education in Africa.

Source: World Bank, (2009). *Accelerating catch-up: Tertiary education for growth in sub-Saharan Africa*. Retrieved from website: http://siteresources.worldbank.org/INTAFRICA/Resources/e-book_ACU.pdf.

Only 3% of total tertiary graduates majored in agricultural sciences. This could help explain why quantitative data so far have not been found on this subsection of higher education. Studies on attitudes toward studying agriculture suggest this topic is associated with poverty and is not "glamorous" (FAO 2003).

The following statistics provide a snapshot of Tertiary Education in Sub-Saharan Africa:

- The number of tertiary institutions is now over 650 (some 200 public and 450 private)
- One-third of African nations have now introduced quality assurance agencies
- On average, SSA countries now spend 18.2 percent of government budgets on education
- 20 percent of their education budgets are allocated to tertiary education
- Only 5 percent of the relevant age cohort is receiving tertiary education.
- The tertiary gross enrollment ratio in SSA is rapidly increasing but still the lowest in the world. It also differs from Anglophone to Francophone countries.
- Demand for tertiary education is rapidly increasing and creating pressure for universities to accept more students.
- Increasing number of youth are completing primary and secondary education Social pressure promotes education as a valued way for people to attain success
- Quality of education and return to education have suffered at the expense of increasing enrollment.
- Enrollment has increased as amount spent per student has decreased
- Student to teacher ratios have increased
- Teaching has been prioritized over research
- Output in research measured in volume of publications in research journals is meager
- Difficult to attract and retain qualified professors as these positions are underpaid, overstretched, and in suboptimal conditions

Please direct comments or questions about this research to Leigh Anderson or Mary Kay Gugerty, at eparx@u.washington.edu.