

Research Application Summary

**Positioning rural women agri-entrepreneurs to address short-term
hunger and undernutrition in rural primary schools in Uganda**

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Abstract

Short-term hunger and under nutrition is a key development challenge that has continued to undermine efforts to improve enrolment, retention and acquisition of basic academic skills by children in primary schools in developing countries, with schools in rural areas worst affected compared to those in urban centres. Poor socioeconomic conditions, lack of proper food handling technologies and the requisite technical know-how in economically disadvantaged rural areas make it impossible for schools in such locations to provide affordable nutritious conventional diets that are accessible to schools in economically advantaged urban centres. This situation provides opportunity for agri-innovations that can offer cheaper alternative nutritious foods tailored to rural schools. In response to this challenge, the Graduate Research Grant project “innovations to enhance rural women agri-entrepreneurs to participate in the cassava value chain in North and North-Eastern Uganda” was conceived and implemented by a consortium composed of Gulu University, rural women groups and primary schools in North and North-Eastern Uganda. Graduate students working with rural women cassava processing groups: (i) improved the protein and mineral content of gari cassava meal to match the protein and micronutrient needs of school children; (ii) evaluated acceptability of the products in rural primary schools; and (iii) assessed preconditions necessary for rural women groups to engage in production of nutritionally-improved gari for rural primary school food market. The nutritionally improved gari products were accepted by school children and teachers thus indicating ready market for the products. Exposure to new processing technologies through training, alternative off-farm income sources, Household size as a proxy for labour, group membership as proxy for social capital and distance to markets were identified as preconditions necessary for rural women to invest in production, processing and marketing of nutritionally improved gari for rural primary school food markets. This study therefore illustrates how participatory action research can be used to tailor agribusiness innovations to address community nutrition problems in developing countries.

Key words: Agri-entrepreneurs, cassava, gari, rural primary schools, rural women, Uganda

Résumé

La faim et la sous-alimentation à court terme constituent un défi majeur de développement qui freinent les efforts visant à améliorer l'inscription, le maintien et l'acquisition de compétences scolaires de base par les enfants des écoles primaires des pays en développement, ceci étant plus accentué au niveau des écoles en milieu rural que celles des villes ou centres urbains. Les mauvaises conditions socio-économiques, le manque de technologies appropriées de gestion des aliments et de savoir-faire technique qui prévalent dans les zones rurales économiquement défavorisées empêchent les écoles de ces régions d'offrir des régimes alimentaires nutritifs qui sont accessibles aux écoles implantées dans les centres urbains économiquement favorisés. Cette situation donne l'occasion aux agro-innovations qui peuvent offrir des aliments nutritifs moins coûteux et adaptés aux écoles en milieu rural. Pour répondre à ce défi, le projet de subvention de recherche en faveur des étudiants «Innovations visant à améliorer la participation des femmes agro-entrepreneurs des zones rurales à la chaîne de valeur du manioc dans le nord et le nord-est de l'Ouganda» a été conçu et mis en œuvre par un consortium composé de Gulu University, des groupes de femmes rurales et des écoles primaires du nord et du nord-est de l'Ouganda. Les étudiants qui travaillent avec des femmes rurales des groupes de transformation du manioc: (i) améliorent la teneur en protéines et en minéraux de la farine de manioc gari pour répondre aux besoins en protéines et en micronutriments des écoliers; (ii) évaluent l'acceptabilité des produits dans les écoles primaires en milieu rural ; et (iii) évaluent les conditions préalables requises pour que les groupes de femmes puissent s'engager dans la production d'un gari amélioré du point de vue nutritionnel pour le marché alimentaire des écoles primaires en milieu rural. Les produits nutritionnellement améliorés de gari ont été acceptés par les écoliers et les enseignants, indiquant ainsi la disponibilité de marché pour ces produits. L'exposition aux nouvelles technologies de transformation par la formation, les sources alternatives de revenu hors ferme, la taille des ménages comme un indicateur de la main-d'œuvre, l'appartenance à un groupe comme indicateur du capital social et la distance aux marchés ont été identifiés comme des conditions préalables aux femmes pour investir dans la production, la transformation et la commercialisation du gari nutritionnellement amélioré pour les marchés alimentaires que constituent les écoles primaires en milieux ruraux. Cette étude illustre donc comment la recherche-action participative peut être utilisée pour adapter les innovations agro-industrielles aux problèmes de nutrition des communautés dans les pays en développement.

Mots clés: Agro-entrepreneurs, manioc, gari, écoles primaires en milieu rural, femmes rurales, Ouganda

Introduction

The role of education in building human capital to drive economic growth and development is globally well recognized (Benavot, 1992; Hanushek and Woessmann, 2007). Achieving the development outcome of education is generally contingent on the quality of human resource that has been trained. The quality of primary education is

one critical aspect that has been found to be very instrumental. This is because quality primary education sets the foundation and bedrock for building high calibre and skilled human resource in the later cycle of education (World Bank, 2014). Whereas the United Nation's Millennium Development Goal (MDGs) agenda number two (which sought to achieve Universal Primary education-UPE by 2015) brought positive impacts in-terms of increased number of children enrolled in primary school in developing countries (Adelman *et al.*, 2008), in general, educational achievement levels of the children have been found to be very abysmal (World Economic Forum, 2015). For instance, a survey conducted to assess academic quality of children in primary schools in East Africa revealed that only 20% of children in their third year of primary school in the region had acquired basic literacy and numeracy skills of standard two level (Uwezo, 2015). The situation has been found to be worse in rural schools compared to schools located in urban areas (Omwami *et al.*, 2011).

Short-term hunger and undernutrition is a key development challenge that has continued to undermine efforts to improve enrolment, retention and acquisition of basic academic skills by children in primary schools in developing countries, with schools in rural areas worst affected compared to those in urban centres (Jomaa *et al.*, 2011). This is albeit the well-known fact that the impacts of child undernutrition are long-term, irreversible and negatively affect human capital and economic development (Glewwe *et al.*, 2001). Governments in several developing countries have acknowledged this fact and put in place policies to support primary school feeding. However, most of the policies focused more on provision of food but have not given due consideration on whether the food provided respond to the nutritional needs of the school children. For instance, Chile, which operates one of the oldest and largest school feeding programmes in Latin America had been targeting higher-calorie meals to poorer schools. Impact evaluation exercises showed that provision of such high-calorie meals did not improve education outcomes in the targeted schools (McEwen, 2013). As illustrated in the example from Chile, it is very apparent that poor socioeconomic conditions, lack of appropriate technology and the requisite technical know-how in economically disadvantaged rural areas make it impossible for schools in such locations to provide affordable nutritious conventional diets that are accessible to schools in economically advantaged urban centres. This situation provides opportunity for agri-innovations that can offer cheaper alternative nutritious foods tailored to rural schools.

In an attempt to contribute to finding solutions to short-term hunger and undernutrition in rural primary schools in developing countries, Gulu University in partnership with selected rural primary schools and rural women farmer groups conceptualized and implemented the Graduate Research Grant project “innovations to enhance rural women agri-entrepreneurs to participate in the cassava value chain in North and North-Eastern Uganda”.

Methodology

A participatory community action research approach involving exploratory and problem solving phases was applied. The key actors involved were MSc. graduate students, rural women cassava processing groups and rural primary schools (children and teachers). For the graduate students, one (male) was pursuing MSc. Food Security and Community Nutrition programme while the other (female) was undertaking MSc. Agri-enterprises Development programme. The mix of students and academic programmes was purposely designed to: (i) ensure gender sensitivity in delivering the project, and (ii) properly tailor the project to meet the two-thronged direction of the project, i.e., responding to nutritional problems in rural primary schools and developing market for rural women cassava processors. The working hypothesis of the project was that smallholder farmers, especially rural women groups if organized and provided with optimized and well-targeted agri-food technologies should be able to exploit primary school food market segments to address the short-term hunger and undernutrition in rural primary schools.

The exploratory phase involved attachment of the students to the community and served two purposes: (i) fulfilling the curriculum requirement for the two MSc. programmes which mandates all students to work with the community to identify problems that require research; and (ii) contributing to championing the “community-connectedness” philosophy of student training in Gulu University. The MSc. Food Security and Community Nutrition student was attached to women groups undergoing training on cassava processing. He discussed with the women and primary school administrators nutritional problems in rural primary schools that could be solved through innovations in nutritious cassava products. From the discussion, it was observed that “gari” (a granulated cassava-based food product designed for making instant porridge) had potential for application in school feeding in primary schools in North and North-Eastern Uganda. The choice for gari was on the premise of being cheap, can be produced easily under rural settings, and above all, the main raw material (Cassava) for its production is widely cultivated in North and North-Eastern Uganda. The problem identified which required research was that gari is basically starch and very low in protein and other micronutrients of public health importance, and without nutritional improvement, would be unsuitable for feeding school children as a base diet.

In the case of the MSc. Agri-enterprises Development student, during her attachment with rural women cassava farmers discussed the problem of cassava marketing and the potential for engagement in production of nutritionally improved gari targeting rural primary school food niche markets. At the end of the attachment process the male student produced a proposal on cassava product development to address under nutrition in primary schools while the female student produced a proposal on market development to enhance participation of rural women in cassava value chain.

The “problem solving phase” involved students working with the community to find

solutions to nutritional inadequacy of gari and generate actionable strategies for adaption to enable rural women cassava farmers exploit the rural primary school food market. The MSc. Food Security and Community Nutrition student worked with women undergoing training to improve the protein and micronutrient content of cassava meal using soybean and silver fish and tested for acceptability in rural primary schools. The MSc. Agri-enterprises Development student undertook economic analysis to identify preconditions for rural women to engage in gari production as a business targeting rural primary school food markets.

Results

The rural women cassava farmers and trainees, and school administrators welcomed and embraced the students' project ideas. Through working together with the students, rural women cassava processors learnt how to produce nutritionally enhanced gari cassava meal products. The nutritionally improved products were overwhelmingly accepted by rural primary school children, teachers and school administrators. Exposure to new processing technologies through training, alternative off-farm income sources, household size as a proxy for labour, group membership as proxy for social capital and distance to markets were identified as preconditions necessary for rural women cassava processors to engage in commercial production, processing and marketing of nutritionally improved gari targeting rural primary school food markets.

Discussion

Food and nutrition security is increasingly being recognized as critical for human and economic development in Africa and other developing regions of the world. Governments in Africa have prioritized it among key development issues in the continent as reflected in the Malabo Declaration of the African Heads of State (NEPAD, 2014) and the launching of the Africa Day for Food and Nutrition Security (ADFNS) in 2010 by African Ministers of Agriculture meeting in Malawi. Globally, Universities are expected to play active roles in providing solutions to community problems such as undernutrition in rural primary schools presented in this paper. However, Universities in Africa have been criticised for operating as 'ivory towers' and thus making very limited contribution to community development (Kolars, 2011). In addition, African Universities have also been criticised for delivering obsolete curricula that do not respond to current development challenges (Favish and McMillan, 2009). Contrary to the 'ivory tower' orientation and lack of community relevance in curricula as articulated above, Gulu University right from its inception identified and distinguished itself as a community-oriented University and as such incorporated community engagement in most of its curricula. This is well reflected in the participatory community-oriented manner in which the graduate students conducted their research.

The students designed their research projects based on needs of the target communities and worked with the communities to develop solutions to the issues. There was joint

sharing of lessons and planning for implementing the protocols developed through an enterprise approach. The students also shared their research and the representatives of the women groups shared experience with Gulu university staff administrators and students.

It is increasingly being recognized that many graduates from African Universities hardly exercise the intellectual skills of problem-solving and critical thinking. A survey conducted in 2014 by the Inter-University Council for East Africa revealed that half of the graduates from Universities in the East African Community countries (Uganda, Kenya, Tanzania, Rwanda and Burundi) lacked employability skills. We argue here that, lack of exposure to real problem-solving environment is largely responsible for the fore stated deficiencies. As illustrated in this paper, integrating community engagement in curricula enabled graduate students to position themselves within the community and produced results that were overwhelmingly accepted by the target beneficiaries (rural primary schools and rural women cassava farmers). Literature is replete with facts indicating community rejection of well-intentioned innovations in the agricultural domain (Douthwaite *et al.*, 2011) and lack of community involvement is one of the major factors that have been adduced to for lack of adoption (Johnson *et al.*, 2003). Notwithstanding the controversies surrounding the effectiveness of participatory research approaches (Neef, 2003), based on the outcome of graduate students' work being referred to in this paper, we believe that integrating community engagement in graduate research positions universities to model students to solve real-world community development problems.

Conclusions

Making use of rural primary schools undernutrition problem as a case study, this paper illustrates how integrating community engagement in graduate student training positions universities to model students to become future leaders based on real-word problems. In addition, this engagement has enabled the Gulu University to demonstrate relevance and to spur the entrepreneurial potential of rural women in north and north-eastern Uganda. Therefore, this project illustrates how universities can work with rural farming communities to tailor agribusiness innovations to address nutrition problems in rural primary schools in developing countries.

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References

- Adelman, S. W., Gilligan, D. O. and Lehrer, K. 2008. How effective are food for

- education programs? A critical assessment of the evidence from developing countries. In Food policy review #9. International Food Policy Research Institute, Washington, DC.
- Benavot, A., 1992. Curriculum content, educational expansion and economic growth. *Comparative Education Review* 36: 150–174.
- Douthwaite, B., Keatinge, J.D.H. and Park J.R. 2001. Why promising technologies fail: the neglected role of user innovation during adoption. *Research Policy* 30: 819–836.
- Favish, J. and McMillan, J. 2009. The university and social responsiveness in the curriculum: a new form of scholarship? *London Review of Education* 7: 169–179.
- Glewwe, P., Jacobya, H.G. and King, E.M. 2001. Early childhood nutrition and academic achievement: a longitudinal analysis. *Journal of Public Economics* 81: 345–368.
- Hanuscheck, E.A. and Woessmann, L. 2007. The role of school improvement in economic development. Mimeo. CESifo Working Paper No. 1911.
- Johnson, N.L., Lilja, N. and Ashby, J.A. 2003. Measuring the impact of user participation in agricultural and natural resource management research. *Agricultural Systems* 78: 287-306.
- Jomaa, L. H., McDonnell, E. and Probart, C. 2011. School feeding programs in developing countries : impacts on children's health and educational outcomes. *Nutrition Reviews* 69 (2): 83–98.
- Kolars, J.C. 2011. Taking down 'the Ivory Tower': leveraging academia for better health outcomes in Uganda. BMC International Health and Human Rights. doi: 10.1186/1472-698X-11-S1-S1.
- McEwan, P. J. 2013. The impact of Chile's school feeding program on education outcomes. *Economics of Education Review* 32: 122–139.
- Neef Andreas. 2003. Participatory approaches under scrutiny: Will they have a future? *Quotery Journal of International Agriculture* 42 (4): 489-497.
- Omwami, E.M., Neumann, C. and Bwibo, N.O. 2011. Effects of a school feeding intervention on school attendance rates among elementary schoolchildren in rural Kenya. *Nutrition* 27: 188–193.
- Uwezo, 2014. Are our children learning? Literacy and numeracy across East Africa. http://www.twaweza.org/uploads/files/Uwezo_EA_Report-EN-FINAL.pdf. Accessed on 12th July 2016.
- World Bank, 2014. Rationale for public investments in primary education in developing countries: background paper for the evaluation of the World Bank's support to primary education. World Bank, Washington D.C.
- World Economic Forum, 2015. Human capital report 2015. <http://reports.weforum.org/human-capital-report-2015/results-by-regions>. Accessed on 12th July 2016.