

Research Application Summary

Preparing Agriculture Graduates for the Job Market: A Case Study of On-farm Experiential Learning by Students

Kimenju, J.W.^{1*}, Ngugi, R.K.¹, Chimoita, E.L.¹, Muiruri, E.², Waitugi, S.² & Amwoka, E.¹

¹Faculty of Agriculture, University of Nairobi, P.O. Box 30197-00100 Nairobi, Kenya

²Equity Group Foundation, Equity Center, 8th floor, Wing B, Hospital Road, Upper Hill, Nairobi, Kenya

*Corresponding author: wkimenju@yahoo.com

Abstract

Technical support is a critical ingredient to the transformation of agriculture. However, a major decline in the provision of extension services has been taking place over the last two decades in Kenya. In an effort to support the transformation of agriculture into agribusiness, students of the University of Nairobi were engaged as Junior Extension Officers in a project supported by Equity Group Foundation, a subsidiary of Equity Bank Group. The three-year project targeted 2000 medium-sized farms in 10 out of 47 counties in Kenya. The project had a wide range of objectives which included increasing production and yield through quality input usage; improving soil health management and good agricultural practices; enhancing access to markets; reducing farming costs through more efficient farm operation practices and improved technologies, reduce risks through crop diversification and irrigation, and to improve agribusiness management skills by offering training and use of business decision-making tools. Students were selected through an open process and taken through a structured induction process that combined technical and soft skills. The students were then deployed to provide technical support to the host farmers as well as three more farmers in the neighborhood. Technical backstopping was provided by experienced extension officers attached to the project. A gradual and steady increase in agricultural productivity was recorded in all the farms that were covered under this project. For instance, one farmer who was harvesting 33, 90-kg bags at the commencement of the project had stepped up production to 63 bags per hectare in three years. The farmers gained the courage to adopt new technologies and invest in new enterprises. Some of the farms have become centers of excellence that are positively impacting their neighborhoods. The students gained invaluable hands-on skills along with a wide range of agricultural value chains.

Key words: Agribusiness management skills, centers of excellence for farmers, Junior Extension Officers, Kenya, medium-size farms

Résumé

Le soutien technique est un élément essentiel de la transformation de l'agriculture. Cependant, un déclin majeur dans la fourniture de services de vulgarisation a eu lieu au cours des deux dernières décennies au Kenya. Afin de soutenir la transformation de l'agriculture en agro-industrie, des étudiants de l'Université de Nairobi ont été engagés comme agents de vulgarisation juniors dans le cadre d'un projet soutenu par la Fondation Equity Group, une filiale d'Equity Bank Group. D'une durée de trois ans, le projet visait 2000 fermes de taille moyenne dans 10 des 47 comtés du Kenya. Le projet avait comme objectifs l'augmentation de la production et du rendement grâce à l'utilisation d'intrants de qualité, l'amélioration de la qualité des sols et des bonnes pratiques

agricoles, l'amélioration de l'accès aux marchés, la réduction des coûts agricoles grâce à des pratiques d'exploitation agricole plus efficaces et à des technologies améliorées, la réduction des risques grâce à la diversification des cultures et à l'irrigation, et l'amélioration des compétences en matière de gestion agroalimentaire en proposant des formations et en utilisant des outils de prise de décision commerciale. Les étudiants ont été sélectionnés par un appel à candidature ouvert et ont suivi un programme d'initiation combinant compétences techniques et générales. Les étudiants ont ensuite été déployés pour fournir un soutien technique aux agriculteurs hôtes ainsi qu'à trois autres exploitants du voisinage. Le soutien technique a été assuré par des agents de vulgarisation expérimentés du projet. Une augmentation progressive et régulière de la productivité agricole a été enregistrée dans toutes les exploitations couvertes par ce projet. Par exemple, un agriculteur qui récoltait 33 sacs de 90 kg au début du projet a augmenté sa production à 63 sacs par hectare en trois ans. Les agriculteurs ont eu le courage d'adopter de nouvelles technologies et d'investir dans de nouvelles entreprises. Certaines de ces exploitations sont devenues des centres d'excellence qui ont un impact positif sur leur voisinage. Les étudiants ont acquis des compétences pratiques ainsi que des connaissances sur un grand nombre de chaînes de valeur agricoles.

Mots clés: Gestion agroalimentaire, centres d'excellence pour agriculteurs, Kenya, vulgarisation

Introduction

Agricultural extension is a technical support service that plays a vital role in facilitating the transfer of knowledge, technologies and innovations from research institutions to the farmers (Dixon, 2010). The extension service therefore serves as a catalyst for promoting agricultural productivity, improving the general wellbeing of rural households and nurturing growth of agro-based economies. In view of the vulnerability of agriculture to predictable and unpredictable changes, the extension service is needed to foster resilience building among growers (Munyua, 2011). Key among the frequently recurring challenges are changing and stringent market requirements, emergence of new pests and diseases and vagaries of weather emanating from climate change and variability. Besides extension agents from both government and private sector engaging middle income farmers and resource-poor small scale farmers in disseminating modern farming technologies and knowledge in Kenya, the agents also assist farmers gain valuable information from relevant institutions (Quion *et al.*, 2001).

Institutions such as national and devolved government agencies, financial, private and faith based play important role in enhancing farmers' access to technologies, improved farming systems, credit and subsidy services (Quion *et al.*, 2001). Further, institutional networks promote exchange of vital information between researchers, extension agents and farmers. However, to achieve rapid institutional service delivery, there is need to leverage joint institutional participatory extension methodologies for jump starting research-extension-farmer continuum learning process that can lead to the uptake of information and technologies on farms (Mweri *et al.*, 2001).

In Kenya, a decline in agricultural productivity has been recorded in many enterprises as a result of limited technology transfer services to farmers. Factors attributed to this include weak linkages between various service providers, unnecessary competition and duplication of services among providers as well as general lack of synergy among stakeholders along the various value chains (Kamau, 2006). The effectiveness of the public extension service provision declined greatly during the advent of the Structural Adjustment Programmes (SAPs) and liberalization policies which led to reduced numbers of extension staff, funding of the extension sector operations and maintenance services. More-over, the weak linkages and limited implementation of extension policy framework in Kenya also resulted into declined coordination among extension service providers such as the

devolved units of the Ministry of Agriculture, private extension providers under various crop programmes, non-governmental organizations (NGOs), faith-based organizations and farm inputs and agro-chemical suppliers (Munyua, 2011). According to Adetumbi (2013), the efficiency on uptake and up-scaling of technologies in Kenya is hampered by limited resources such as farm inputs, reduced number of staff, limited facilities, irregular weather forecast indicators and limited financial resources to the agents and farmers.

Upon realization of the existence of a wide institutional extension linkage gap, the Equity Group Foundation (EGF) launched an innovative agriculture development project dubbed “Unlocking Agriculture Potential through Medium Sized Farms” with an aim of strengthening agribusiness in over 2,000 medium sized farms in Kenya. The project was funded by the Dutch Government and the Equity Bank Group and sought to increase agricultural production and incomes in key food crops across various regions in Kenya. The objective of the project was to improve agricultural productivity and commercial practices in medium-sized farms with the ultimate goal of stimulating a ripple effect across the entire agricultural sector. In order to achieve this initiative, the EGF extension team, envisaged a participatory approach involving undergraduate students’ pursuing agricultural courses through mentorship program. The program aimed at enhancing agricultural productivity through capacity building by providing consistent training to farmers on various agriculture value chains using conventional and information and communications technology (ICT) tools.

Model for change developed by Equity Group Foundation and the University of Nairobi.

There is a growing concern about the preparedness of graduates for the job market across the various disciplines in Kenya. The main underlying factors that have been cited include inadequate training on problem-solving skills, general scholarship passion, business acumen, and personal qualities such as reliability, team-work and interpersonal/soft skills. This, to a very large extent, explains why many of them are taking a long time to secure jobs despite jobs being available. To bridge this gap, EGF and the University of Nairobi (UoN) developed a project that empowered students by providing on-farm experiential learning supported by extensive training. The opportunity provided undergraduate students with practical experience and helped them gain work experience. It also helped the students to identify their strengths, interests, and values in order to develop strategies to pursue diverse career paths and make informed career decisions.

Interns were selected through a competitive process and each underwent a four days training by a team of qualified trainers where they were taken through the role of the experienced Agricultural Extension Officers their role as Junior Extension Officers (JEO), adult learning principles, code of conduct during the internship period and farm protocols, enterprise development, and Geographic Information System (GIS). The project engaged a total of 37 students in a span of three years with 19 and 18 being male and female, respectively. The students were from different degree programmes in the Faculty of Agriculture. Each intern was based on a pre-selected farm as a resident extension service provider but was also supposed to support 2-3 other surrounding farms. The students worked under the guidance of experienced extension officers and were deployed as Junior Extension Officers. Technical and advisory support was focused on all crop and livestock production related issues, implementation of farm record keeping systems and helped to strengthen the development of model farms.

Proper record keeping, a missing entity in farming, was introduced and monitored in all the target farms to aid in calculating gross margins, making the business plan, enterprise development and used as evidence by farmers seeking financial support through loans. The interns developed and mounted posters around the farms conveying messages on “high value agricultural practices” as a method of attracting other farmers into the learning cycle. Field days were organized by farmers and

the interns, with backstopping from the experienced extension officers, to disseminate the results from on-farm demonstration and experimental plots.

As a way of making farming as a business, farmers were advised to introduce high value enterprises that could fetch more income. Among the high value enterprises introduced included high yielding dairy cows, sugar snap beans, green capsicum and tissue culture banana. The farmers were also mentored to take up innovations such as harnessing animal wastes for biogas production and utilization of animal manure for improved soil fertility. The innovations were geared towards increasing production as well as raising the living standards of the farmer.

Outcomes of the project based on farmer and student experiences

Farmer experience. Case studies of the medium size farms involved in this project is a testimony of transformation through capacity building. The multi-dimensional approach adopted, coupled with engagement of partners in a value chain perspective were instrumental in the complex process of transition to agribusiness. Technical and advisory support to the farmers was provided through consistent visits by experienced and highly specialized extension officers and reinforced by students on attachment who were resident in the contact farms. The farmers received training in a wide range of farm operations with the overall goal of farming as a business. Uptake of technology by the farmers was stimulated through the interaction between the farmers and the technical support group. The farmers have realized that they have to embrace technology to overcome the barriers along the value chains and in order to attain competitiveness. Some of the most widely adopted technologies included soil testing, use of high quality inputs and certified seed, zero grazing, fodder production and storage, modern crop and animal husbandry, crop protection, irrigation, and collective marketing. The over 2,000 farmers who were directly involved have testimonies of transformation in many aspects ranging from soil testing, crop and animal husbandry, post-harvest handling and marketing. Technical support to the farmers under this initiative started with soil testing to determine the most appropriate fertilizers or the amount of lime needed to adjust the pH to the optimum level for the target crop. “We did soil testing on finger millet, maize and beans intercropping. On the maize and beans intercropping, the farmer was advised to apply 700 kg of lime against 800 kg of composite manure on an acre. We also advised him on the kind of fertilization schedule to follow from planting to top dressing. The farmer was able to produce 25 bags of maize on an acre as compared to 18 bags previously produced. That was a 28% increase in one season. The farmer is hopeful getting 30bags per acre in the next season.” A soil technician from Bungoma Mobile Soil Testing and Laboratory Analysis.

The farmers were also advised to purchase high quality farm inputs such as seeds, crop and livestock protection products from reputable suppliers. That was matched with advice on appropriate postharvest handling and storage coupled with market linkages to fetch higher prices for the produce. Some of them who owned land that was lying idle started putting it into use after realizing the benefits of farming as a business. They can now draw good business plans and demonstrate capacity to manage a farm to attract credit for expansion. “Equity Group Foundation has trained me on how to be careful at everything I do. I now track my expenses and the profits I get from all my enterprises.” Said, one of the farmers in Murang’a County. Training in book keeping enabled farmers to identify the most viable enterprises to invest in for increased income. For instance, farmers ventured into early maturing horticultural crops whose demand in the nearby cities and urban centres is insatiable. Some of the most attractive crops included spinach, kale, amaranth and African nightshade to supply to the town residents all year round. Transition from rain-fed to irrigated crop production was stimulated through training on drip irrigation and the higher earnings from offseason crops. “Training from EGF has enabled me earn up to Kshs. 300,000 per month.

“My plan for future growth is to engage in exclusive drip irrigation on all my crops and increase the size of the farm. I plan to expand my acreage from four acres of horticultural crops to increase yields for export market” said, a farmer from, Kiambu County. Through support from the project, the farmers have implemented integrated pest management strategies with the help of agricultural experts from Sygenta™ and Greenlife Agro-chemical companies. For example, they have stopped routine pesticide sprays to kill pests and adopted traps in the management of fruit flies. Integrated pest management is known to be less capital intensive and friendly to the environment.

Increased adoption of technology has been a game changer as farmers who were previously keeping livestock under the range system are investing in zero-grazing units to optimize milk production. They have also adopted the supportive technologies in fodder production and conservation. For example, one farmer recorded an increase from 8 to 24 litre of milk per cow per day through proper feeding and management of the herd. As a by-product from the dairy unit, the same farmer invested in biogas production thus transiting from use of firewood at the household level. The use organic manure will cut down the cost on commercial fertilizer. With improved income, dairy farmers diversified into other enterprises such as horticultural crops and also expanded the enterprises to enjoy economies of scale.

Sustainability of the momentum generated from this initiative is anchored on empowerment of the farmers through capacity building, technology adoption, and strength of farmer groups and linkages created with service providers in the public and private sectors. Farmers have established business groups to bulk produce and to strengthen their position in collective marketing ventures. The trickledown effects of the emerging model farms and the general agribusiness ecosystem created are reaching out to the smallholder farmers. Involvement of young farmers into the project has encouraged other energetic youth to take up farming which will not only enhance food security but also provide attractive income. Farmers in the project are convinced that agribusiness can create employment opportunities and are now encouraging the youth to take farming with confidence that they can make money. Using the well managed and profitable agribusiness enterprises, the farmers are securing credit and are investing in other enterprises. These are the success stories that the project left as legacy in the agribusiness ecosystem in Kenya.

Student Experiences. Internship under this project was a unique platform for experiential learning to the students. Hands-on skills were acquired in all farm operations from land preparation, through crop and animal husbandry practices, post-harvest handling up to marketing of farm produce.

According to some of them:

- “The program is very satisfactory and gives a real hands-on experience to students to shape students for future contribution to food security in Kenya”
- “The program was satisfactory and has helped in shaping my extension skills”
- “Internship program is a great opportunity for students with desire to venture in agriculture in future. It was awesome to be an EGF ambassador and desire to work with them in the future”
- “The internship was very informative, relevant and a good platform for gaining experience”
- “The internship was a success since my expectations were met”
- “I learnt a lot, I believe the impacts made to farmers by the project will be felt even in years to come”
- Apart from the practical hands-on skills in crop and animal production, the students also gained people skills. At one time a farmer commented that, ‘Most of the time, university graduates behaving like know it all attitude come here to lecture us, but being in the field with this junior extension officer has helped me realize that as a farmer I have ‘PhDs’ of experience and skills in

agriculture than the graduates. This approach has helped me and intern become farm managers and agro-entrepreneurs' Thanks to EGF'

Conclusion

Capacity development and technology adoption are game changers in the process of transforming agriculture into agribusiness. The next generation of drivers of the agriculture sector should be prepared to take over by exposing them with practical management skills in agribusiness through experiential learning processes. Coordination is needed to harness the power of synergy from all the stakeholders in a value chain approach.

Acknowledgement

Financial support from the Embassy of the Kingdom of The Netherlands in Nairobi and Equity Bank Group is acknowledged with gratitude. Dedicated support from the team of extension officers attached to the project, farmers and the students engaged as interns contributed enormously to the output reported in this paper. This paper is a contribution to the Sixth African Higher Education Week and RUFORUM Biennial Conference held 22-26 October 2018 in Nairobi, Kenya.

References

- Chamberlin, J., Jayne, T.S. and Headey, D. 2014. Scarcity amidst abundance? Reassessing the potential for cropland expansion in Africa. *Food Policy* 48: 51-65. <https://doi.org/10.1016/j.foodpol.2014.05.002>
- Hiller, S.R.C.H., Onduru, D.D. and de Jager, A. 2009. Sustainable tea production: An assessment of farmer field schools in Kenya. Lei Wageningen UR. The Hague, Netherlands
- Jurgen, H., Murwira, K. and Connolly, M. 2000. Learning together through participatory lessons from Asia, Africa and Latin America. Network Paper 21. Overseas Development Institute, London, UK
- Kamau, F. 2006. Challenges in provision of agricultural extension services in Kenya: An evolution from public to public-private partnership. In: 10th Africa Forum, Windhoek, Namibia
- Khisa, G. 2004. Farmer Field Schools methodology and approaches: Training of Trainers Manual (1st Edition). FAO, Rome
- Muyanga, M., Sitko, N., Jayne, T.S. and Hichaambwa, M. 2013. Medium scale farmers growth trajectories in Africa. Future Agricultures Conference on Political Economy of Agriculture Policy in Africa. Pretoria, South Africa.
- Munyua, H. and Stilwell, C. 2010. A mixed qualitative and quantitative participatory methodology. A study of the agricultural knowledge and information system (AKIS) of small-scale farmers in Kirinyaga district, Kenya. *Emerald Library Mangement* 31 (1-2): 5-18
- Mweri, O.J., Zishirir, M., Mkuchu P. and Phiri M. 2001. (Eds) Plant Resources of Tropical Africa / Resources and Foster Innovation in East Africa. Washington, D.C. International Food Policy Research Institute (IFPRI) (datasets). Washington, D.C.
- David, S. and Asamoah, C. 2011. Video as a tool for agricultural extension in Africa: A case study from Ghana. *International Journal of Education and Development using ICT* 7 (1): 26-41.
- Tiwari, S.P., 2008. Information and communication technology initiatives for knowledge sharing in agriculture. *Indian Journal of Agricultural Science* 78 (9): 737-747.
- Quizon, J., Feder, G. and Murgai, R. 2001. Fiscal sustainability of agricultural extension: The case of the farmer field school approach. *Journal of International Agricultural and Extension Education* 8 (1): 13-24.