African Journal of Rural Development, Vol. 8 (1): January- March 2023: pp. 1-17 ISSN 2415-2838

University-induced innovations for nurturing farm based micro-enterprises: Experiences from engaging with refugee hosting contexts

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ABSTRACT
The linear approach of technology transfer is widely criticized for being non-responsive to the development needs of the marginalized and vulnerable communities. As such, universities have been urged to play an active role, within their community engagement mandate, in facilitating inclusive innovation. Accordingly, this papers uses experiences gained while facilitating the development of farm based micro-enterprises in refugee and host communities of West Nile in Uganda to show how university community engagement can be harnessed to facilitate an inclusive innovation system. An analysis in this paper reveals that the interface structures of community engagement models namely: The Student-Centered Outreach and the Student Enterprise Scheme with supervision from faculty-staff, and together with community leadership, facilitate successful university-community interactions, learning and innovation. We highlight that stimulating sustainable innovations in marginalized communities is dependent on how the interventions are packaged. Further, active engagement of marginalized communities in decision-making does not only give beneficiaries opportunity to contribute and own the development process but also enables the University to learn community challenges for appropriate response.

Key words: Inclusive innovation system, innovations, interactive learning, marginalized communities, University community engagement

RESUME
The linear approach of technology transfer is widely criticized for being non-responsive to the development needs of the marginalized and vulnerable communities. As such, universities have been urged to play an active role, within their community engagement mandate, in facilitating inclusive innovation. Accordingly, this papers ues experiences gained while facilitating the development of farm based micro-enterprises in refugee and host communities of West Nile in Uganda to show how university community engagement can be harnessed to facilitate an inclusive innovation system. An analysis in this paper reveals that the interface structures of community engagement models namely: The Student-Centered Outreach and the Student Enterprise Scheme with supervision from faculty-staff, and together with community leadership, facilitate successful university-community interactions, learning and innovation. We highlight that stimulating sustainable innovations in marginalized communities is dependent on how the

interventions are packaged. Further, active engagement of marginalized communities in decision-making does not only give beneficiaries opportunity to contribute and own the development process but also enables the University to learn community challenges for appropriate response.

Key words: University community engagement, inclusive innovation system, marginalized communities, interactive learning, Innovations

INTRODUCTION

Agricultural innovation systems have been recognized as key in driving the socio-economic transformation agenda of low and middle income agro-based economies (Aerni *et al*., 2015; Mutenje *et al*., 2016; Schut *et al*., 2016). This follows the realization that the linear approach to technology transfer, previously emphasized in research and extension delivery, hardly brought the desired transformations in the farm and rural sector (Knickel *et al*., 2009; Chave *et al*., 2012; Aerni *et al*., 2015; Berthet *et al*., 2018). To the contrary, evidence suggests that technological development deepens marginalization of the most vulnerable communities in rural areas in many developing countries (Dalum *et al*., 2010). As an alternative, the Agricultural Innovation System (AIS) emerged as an inclusive approach and holistic development paradigm (Chave *et al*., 2012; Aerni *et al*., 2015; Grobbelaar *et al*., 2017). Inherent in the AIS are the elements of actor interaction, learning and knowledge co-creation in a way that is useful to both the agents of change and the beneficiaries (Hall, 2006; Kruss, 2012; Grobbelaar *et al*., 2017). Within this context, innovation is generally understood as an intentional process of generating, acquiring and applying knowledge aimed at improving products, markets and organizations to create economic and social value (Knickel *et al*., 2009; Chave *et al*., 2012; Swaans *et al*., 2014; Kruss and Gastrow, 2015). As a means of development, innovations clearly have social orientation which presupposes that community members should obtain opportunities to develop, improve their skills, and access creative solutions to their challenges through innovations (Chave *et al*., 2012; Vasin *et al*., 2017). However, the approaches to triggering innovations remain a highly contested subject (Chang and Chen, 2004; Vasin *et al*., 2017).

Given the focus of the AIS paradigm on marginalized communities, universities as knowledge sources are considered key actors in the innovation process (Bloom *et al*., 2006; Kruss, 2012; Gastrow *et al*., 2017). Consequently, there have been calls for universities to increase both the quality and quantity uptake of innovations at community level (Teferra and Altbachl, 2004; Uyarra, 2010; Kruss *et al*., 2012). The potential of universities in fostering inclusive innovations (which focuses on interventions for less-advantaged communities) have been well acknowledged (Kruss, 2012; Gastrow *et al*., 2017; Grobbelaar *et al*., 2017). Unlike in the context of developed countries where farmers and firms often work with universities to stimulate and finance innovation processes, in developing countries, farmers often lack such capacities and motivation (Oyelaran-Oyeyinka, 2006). As such, universities in developing countries are urged to act as innovation brokers and facilitators by stimulating the innovation

processes within local contexts including marginalized communities (Cozzens and Sutz, 2014; Kruss and Gastrow, 2017). Such collaborations between local communities and universities call for an "engaged university" in order to promote inclusive innovation development (Shannon and Wang, 2010; Kruss, 2012).

Existing studies on the notion of innovation inclusivity highlight that it is multi-dimensional in nature. For instance, Altenburg (2009) as well as Cozzens and Sutz (2014) elucidate on the four-dimensional approaches of examining inclusivity of innovation. The first dimension is inclusivity of innovation precursors in which the analysis is concerned with problems of relevance to the poor people. Second, it is inclusivity of innovation processes if the poor people are involved in the development of innovative goods and services. Third, it is inclusivity of innovation adoption if the focus of analysis addresses the capabilities of poor consumers to absorb the innovation. Fourth, it is inclusivity of innovation impacts if the emphasis is placed on the possibility of innovative goods and services to deliver beneficial effects to the livelihoods of the poor. Accordingly, Heeks *et al*. (2014) argued that micro-based studies on inclusivity of local communities should be aligned to at least one of the four dimensions of innovation inclusivity. As such, this paper is aligned to all the four dimensions of analysing inclusive innovation.

Research on inclusive innovation is growing in developing countries partly because it has been recognized as an intervention with a potential to solve social issues (Fisher, 2017); and bridge the social and economic inequality gaps (Schillo and Robinson, 2017). On the other hand, the need for universities to facilitate the innovation process in marginalized communities is gaining prominence in the inclusive innovation literature. Examples of such studies include the cross-country analysis of marginalized local communities in Uganda, Botswana and South Africa (Gastrow *et al*., 2017). However, research that examines the role of universities in facilitating inclusive innovation for the development of farm based micro-enterprises amongst resource-poor and marginalized communities is particularly lacking. In an effort to promote inclusive innovation and strengthen the "engaged-university" focus, Gulu University (GU) runs two community-oriented training models geared towards stimulating innovations in agribusiness development.

First, the Student-Centered Outreach [SCO] model (Kalule *et al*., 2016), an agricultural extension service approach that positions undergraduate and graduate students to work with farming communities for students' own experiential learning while facilitating innovation processes in the community. The SCO model is based on the aspirations of Gulu University to be an engaged university. Consequently, the design of academic programs at Gulu University and most particularly, the Faculty of Agriculture and Environment ensure orientation towards facilitating the transformation of smallholder farming systems using the SCO model. The SCO has three unique features i.e., i) enables students to interact with the farmers, sharing knowledge, skills and experiences; ii) students are able to identify farming problems and respond appropriately with technical backstopping from the faculty; and iii) student identify and collect agricultural enterprise specific challenges for research attention. Products of researched problems as technologies or improved farm practices form the basis for agribusiness innovations, and are packaged and disseminated for uptake by farmers through subsequent cohorts of students (Kalule *et al*., 2016).

Second, the Student Enterprise Scheme [SES] is a practically-oriented training in enterprises development (Kalule *et al*., 2017). In the SES model, students practically develop and run

business projects with outcome results, as business models, availed for dissemination to the farming community for potential uptake. Particularly, students are guided by the faculty staff to identify and conceptualize innovative business ideas into viable business proposals. Approved business proposals are then funded to enable the students actualize such business ideas. The design and institutionalization of SES at Gulu University is premised on the assumption that future professionals must learn to cope with the growing competition in the job market and business by thinking innovatively, and exhibiting creativity as well as dynamism in the ever-changing economic environment (Kalule *et al*., 2017). The SES therefore presents an opportunity for business innovation if emerging business models from student projects are disseminated to wider community and such business models are further refined through interactions with the market environments. In all, the SES works in tandem with the SCO in stimulating and incubating agricultural innovations. Existing research shows that the SCO and SES training models positively influence farmer learning behaviour, and this is largely attributable to faculty supervision support to students while on farm placement, satisfying farmer learning needs and social influence (Odongo *et al*., 2017; Roberts and Edwards, 2017; Kalule *et al*., 2019a, 2019c).

On the basis of the innovativeness of the SCO and SES models, a partnership was developed between Gulu University, and the Food and Agriculture Organization of the United Nations (FAO) to promote farm based micro-enterprises in West Nile region of Uganda. The West Nile region is host to two distinct communities namely: i) the refugee communities, majority of whom come from South Sudan, and ii) the refugee-hosting communities who are Ugandan nationals. The refugee-hosting communities are poor smallholder farmers, deriving their livelihoods from small pieces of land averaging 2.5 acres (1.2 ha) and largely living on marginalized lands that are generally rocky and infertile. The partnership between Gulu University and FAO intended to enhance the resilience of the above marginalized communities through enhancing their participation in the mainstream money economy. Gulu University as a change agent is a community-oriented university that relies on the faculty staff and students to facilitate learning and innovation in the community. Essentially, the intervention was intended to generate business innovations that refugees could use immediately while in the settlements as well as upon return to their home country.

Building on the conceptual notions of inclusive innovation (Heeks *et al*., 2014) and 'innovation for inclusive growth' (George *et al*., 2012), this paper presents actor interactions and learning in the innovation process that took place during this project intervention. The paper focuses the learning process and innovations that arose from the interactions between university staff, students, refugees and refugee-hosting communities. The paper adapts the analytical model of innovation advanced by Gastrow *et al*. (2017) that views innovation as both an outcome and a process. The central research question in this paper is therefore on how the interaction between the university and marginalized communities' ushers in inclusive innovation that facilitates the development of farm based micro-enterprises. Insights from this paper are of policy relevance in the sense that public interventions that motivate universities to engage with marginalized communities could stimulate an innovation processes for economic development thereby contributing to reduction of extreme poverty and vulnerabilities.

Theoretical perspectives. The design of Gulu University's intervention into the refugees and host communities, as marginalized communities, suited well the inclusive innovation framework as a model of analysis

in this paper. The inclusive innovation model emanates from the broader innovation systems theory that emphasizes bringing into economic use organizational forms, processes and products (Kruss, 2012). A central notion of the innovation systems is the interaction of actors and support structures which facilitate the learning and innovation process (Kruss and Gastrow, 2015). In the case of this intervention in the refugees and host communities, the focus was on enabling innovation through facilitating learning and development of farm based micro-enterprises. Particularly, this paper adopts the definition suggested by Berdegué (2005) that inclusive innovation system puts emphasis on supporting availability of knowledge for expanding the capabilities and opportunities of the poor. It stresses the notion of bringing into economic use new goods and services, at least to the specific refugee context, developed for and by marginalized groups who include refugee women, youths, the displaced, the poor and excluded people (Heeks *et al*., 2014). Notably, interventions focusing on inducing innovation amongst marginalized groups often involve innovation brokering or facilitation of learning targeting actor engagement in critical reflection, experimentation and learning (Klerkx *et al*., 2010). For example, university-based actors as agents of knowledge transfer (innovation brokers) may facilitate smallholder farmers to identify opportunities in their environment, master production processes and lead to the emergence of new agricultural-based business models.

Extant literature on inclusive innovation identifies four important tenets for actor interaction to innovate namely: 1) the drivers of interaction; 2) interface structures and mechanisms for interaction; 3) flows of knowledge and skills; and 4) nature and extent of community participation Kruss and Gastrow (2015). Drivers of interaction may motivate the actors to interact for learning and innovation. For instance, (Kruss, 2012) identified two primary drivers of academic engagement with communities. From a university's perspective, the drivers among others are mainly of intellectual imperatives driven by the need to grow academic reputations through training, research and community engagement (Kruss *et al*., 2012). For communities, drivers for engagement with universities are categorized into two, i.e., the passive-type that focus on short-term objectives such as supply of hand-outs like material, allowances, and farm inputs and the proactive-type motivated by long-term objectives such as knowledge for the development of production capabilities. Arza and van Zwanenberg (2014) distinguished that passive interactions tend to be uni-directional with flows expected from only the university whereas the proactive interactions are bi-directional, characterized by reciprocal flows between the university and local communities. For instance, universities as intermediaries of innovation may facilitate learning with technical knowledge that enhance production capabilities with the local communities playing a critical role in problem identification, innovation process and sharing of lessons. Given the fact that the Gulu University approach entails developing capabilities of marginalized communities through interaction on aspects of knowledge, skills and farming practices (Kalule *et al*., 2019a; Odongo *et al*., 2017); and barely supplies production inputs and material to local communities, this study relied on proactive interaction for analysis.

Interface structures and mechanisms of interactions may also be critical for actor engagement to learn and innovate. The interface structures and mechanisms include organizational frameworks and policies as well as processes that underpin the universities to interact with external partners (Kruss and Gastrow, 2015, 2017). These may entail institutionalized offices dedicated to promotion of innovation, research and community engagement as well as project offices, teams and

guidelines that facilitate engagement with local communities (Kruss and Gastrow, 2015). In this study, interface structures and mechanisms are operationalized as the organizational frameworks that enabled the university to engage with refugees and host communities. These included project guidelines, University training models (SCO and SES), project multidisciplinary teams, refugee and host community leadership structures, which offered the platform and processes to engage in learning and innovation process.

The flow of knowledge and skills underpins interactions of actors and the innovation process (Byukusenge and Munene, 2017). Commonly, knowledge is categorized according to type and form. With respect to types, two dimensions exist namely technical and local [also known as indigenous] knowledge. Technical knowledge tends to be scientifically generated and packaged for utilization while local knowledge is developed and resides with the local communities (Kruss and Gastrow, 2017). For effective actor engagement in agricultural innovation, it follows that technical knowledge flow is facilitated by university actors, researchers and the extension personnel (Klerkx *et al*., 2013). On the other, the local communities share the indigenous knowledge which feeds into and refines the technical knowledge for practical application in the innovation process. With respect to forms of knowledge, two categorizes are commonly identified, namely, the codified which tends to be stored and transmitted in the books, pamphlets and other written forms, and the tacit knowledge which individuals acquire and develop through life-long learning, apprenticeship, practice and experience. It is a silent dimension of knowledge which is highly personal, hard to formalize and therefore difficult to communicate. This study presupposes that through the university-induced innovation process, technical knowledge combines with local knowledge to stimulate the innovation process in marginalized communities. Further, codified knowledge from the university may either nurture tacit knowledge and thus yield innovation or thwart such knowledge and consequently inhibit innovation.

Participation of the local communities in processes that bring innovation is well emphasized in the inclusive innovation system framework (Kruss, 2012). For instance, marginalized groups such as refugee youths and women need to participate actively in all stages of a collaborative project, including problem identification, idea generation, proposal evaluation, design, evaluation, and agreeing solutions to problems (FAO, 2014; Jacob *et al*., 2015). Inextricably, effective participation of marginalized groups require linkage to the challenges of capacity building, institutions like markets, funding, and defining roles of key individuals (Juma, 2016). A notable feature of participatory development is reciprocal relations between the university as an agent of change on one part and the local communities as participants on the other (Kalule *et al*., 2016; Grobbelaar *et al*., 2017; Kruss and Gastrow, 2017). However, previous research reports that individual characteristics and local politics could play a role in limiting the possibilities for participation (Teferra and Altbachl, 2004; Botha *et al*., 2017). These concerns necessitate further examination of community participation in the innovation process. Such concerns seem to be crucial in relation to the context of engaging refugees of diverse backgrounds, cultures and languages as is the case in Northern Uganda.

METHODOLOGY

Study context. This paper is based on an analysis of the intervention of Gulu University in refugee and refugee-hosting communities in Northern Uganda. It sheds light on the role of universities in developing beneficiary capabilities for economic resilience through improved market participation. Refugees and refugee-hosting communities remain

vulnerable, and are at risk due to three main factors namely; i) refugee-hosting communities are more vulnerable to economic shocks; ii) refugee-hosting community's needs are always not systematically addressed in humanitarian responses; and iii) refugee-hosting areas are often economically worse off than the rest of the country. Because of the above three reasons, refugees and refugee-host communities are considered marginalized and hence susceptible to high levels of poverty. These communities barely engage in income generating activities partly due to inadequate and/or lack of access to productive resources, and partly due to hostilities between the communities as a result of limited access to production resources, especially land. Conflicts may also arise as a result of limited focus on refugee-host communities in relief programing.

Majority (over 90%) of refugees are dependent on relief assistance (United Nations High Commission for Refugees [UNHCR], 2021). Characteristically, up to 60% of the refugees are youth of 17 years of age and below; while over 80% of refugee are women and children (UNHCR, 2021). In the Ugandan context, the proportion of refugees with some occupational activities stands at a mere 14% (UNHCR, 2021). Each refugee household in the settlements is allocated a piece of land measuring 30m x 30m, to support their livelihoods. Such small pieces of land are not adequate to support the refugee households in agricultural production using conventional practices. Much as a series of interventions have been put in place by both governmental and non-government actors to provide relief assistance, majority of these interventions are short lived and unsustainable. Consequently, there has been calls for a paradigm shift in humanitarian response to re-orient intervention approaches for refugees from relief services to more sustainable economic empowerment. Therefore, promoting inclusive market participation for refugees and host communities is one such approach that is currently being emphasized. It was against this context that Gulu University partnered with the Food and Agriculture Organisation (FAO) of the United Nations to build the capacity of refugees and refugee-host communities in Northern Uganda through promotion of farm based micro enterprises.

This paper adopts the interpretive analysis approach to unearth information pertaining to the innovation process and outcomes of working with the refugees and host communities. Key information relied upon in this study were experiences gained during project implementation. To enhance internal validity, experiences gained from project implementation were triangulated with project implementation reports, stakeholder perspectives and follow up beneficiary interviews. Additionally, observations on the key areas with guided practice provided first-hand information that was useful in enriching the experiences shared.

ANALYSIS AND DISCUSSION

We based our analysis on the inclusive innovation theory, which identifies four loci for actor interaction to innovate namely 1) drivers of interaction; 2) interface structures and mechanisms for interaction; 3) flows of knowledge and skills, and 4) nature and extent of community participation (Kruss and Gastrow, 2015).

Drivers of interaction. The drivers that motivated each of the actors to actively participate in the interactive learning varied between the university and the marginalized communities. For the university, the interest was to further build a reputation as an engaged university, focused on community development through stimulating innovation processes amongst the marginalized communities (Kruss, 2012; Petersen *et al*., 2018). The second motivation for the university was the opportunity to provide experiential learning to students using the community-oriented training models of SCO and SES. This engagement

provided an opportunity of equipping students with cutting-edge competences not only in agribusiness and enterprise development, but also in facilitating learning and innovation in marginalized communities.

On the other hand, the main driving factor for participation among refugees and refugee-hosting communities was securing their livelihoods through either relief or enterprise development. While the initial motivation was to pursue passive-type, short-term benefits such as getting relief food, and participation allowances, this attitude changed upon engagement with university-based actors towards long-term benefits including developing capabilities for viable market participation (see Box 1).

Box 1: ***Beneficiaries testimony***
One of the group leaders reported, "we have achieved a lot from this project. In terms of money, we have now saved approximately UgX 800,000 shillings (US$225). In our group, every week each member goes home with UgX 20,000 shillings (US$6) from our business." This beneficiary also reported to have plans for taking his children to school as this project continues and he also wants to acquire a bicycle or a motor cycle next year and this will be very helpful as means of transport

...Beneficiary from Agojo refugee settlement, Adjumani District.

The drivers of interaction for refugees and refugee-host communities were motivated by the peculiarities of their context, including their vulnerability in terms of basic social needs and food insecurity. This vulnerability made them to always accept any intervention that comes along without questioning it, or raising concerns about its viability and/or sustainability. Due to the underlying vulnerabilities, the beneficiaries were used to receiving handouts that come along with predominantly relief-oriented project interventions. This sharply differed from the development perspective which the university was focusing on. The university was looking at building community's resilience to shocks and hence long-term sustainability of the intervention, a position stressed in the literature on facilitating inclusive innovation (Kruss and Gastrow, 2015; Botha *et al*., 2017). It is apparent that implementing a development-oriented project in a relief-dominated context require critical planning right from the start if it is to succeed. By understanding the variations in drivers of interaction between the benefactor and the beneficiaries, planning of the intervention had to be tailored accordingly.

Details such as how to introduce the project to the community, getting buy-in, and managing beneficiary expectations had to be given keen attention, key consideration Kruss and Gastrow (2017) emphasized. Achieving buy-in involved consultations and experience sharing with development partners and the target communities. At the inception, the project team approached and interacted with the relevant authorities and individuals with the aim of getting their buy-in, as well as their inputs on whom the final beneficiaries' communities should be. This interaction also facilitated the identification of development partners active in the project area, their focus and approaches to implementing similar projects. Once identified, the beneficiaries were engaged through their leaders in group formation and enterprise selection processes. It is at this point in the project implementation that the scene that would guide the whole process was set. For instance, it was made clear to the beneficiaries that the university does not give hand-outs, rather the university impart skills which can be used to generate income sustainably. It was also made clear that the interventions should be owned by the beneficiaries and not the university, as such,

the choice of the enterprise should be based on their interest and not the university's.

Interface structures and mechanisms. The entry point for this intervention was the partnership project between the university, marginalized communities, and FAO as funders. At the university level, a key structure for successful engagement was the project team constituted from three complementing departments of Food Science and Postharvest Technology, Rural Development and Agribusiness, and Agronomy. Essentially, the Agronomy Department provided technical backstopping in crop production; Department of Food science and Postharvest Technology was in charge of developing capacities for value addition to agricultural produce; and the Department of Rural Development and Agribusiness focused on developing and coaching as well as evaluating successful business models developed by the beneficiaries. At community level, the interface structures included the refugee leadership, the Refugee Welfare Councils (RWC). These leadership structures in refugee settlements are provided for from the first level of RWC1 in charge of a Cell to WC II at block level and WC III at the refugee settlement level. Similarly, for the refugee-hosting communities, the local leadership of local council (LC) system enabled ease of reach of target households of vulnerable people. This LC system starts from LC1 at village level rising through LC II (parish level), LC III (sub county) to LC V at district level.

The University level structures enabled selection of technically complementing personnel for engaging refugees and refugee-hosting communities for learning and innovation. Notably, amongst the personnel included faculty staff with competences in agronomy, postharvest management and processing, agribusiness and process facilitation. On the other hand, structures in the community and their associated leadership played an integral role in hosting and directing human resources from the university including translating information in English to a multitude of languages in refugee settlements and host communities. Further, community-level structures were useful in mobilization of refugees and host communities for learning sessions, guiding university facilitators in formation of groups of champion farmers as well as identification of farm sites that are free of encumbrances, for technology and business demonstration.

A key mechanism that drove interactive learning between the university actors and the beneficiaries were the well stipulated project guidelines. The guidelines for working with the target communities were provided in the Letter of Agreement (LoA) signed between the University and FAO. The LoA emphasized that the university scope of service extends to mobilizing groups of champion farmers, undertaking value chain analysis and providing capacity building in development of business models linked to farm based micro-enterprises for increased resilience and participation of refugees and host communities in the money economy. The project guidelines provided the frameworks of reference on how the university-based human resources would interact with refugees and host communities for learning and agribusiness innovation. This was crucial in ensuring effective communication between the facilitators and the beneficiaries without creating material expectations from the university facilitators, a finding that supports Kruss and Gastrow (2017) study on the role of offices and regulations in facilitating inclusive innovation.

The other important mechanisms for engagement were the community-linkage training models, namely, the SCO (extension

service for experiential learning); and the SES(development of business models). These two training models allowed for cross learning between the university and project beneficiaries. For the community-linkage training models, the SCO prepared student facilitators to engage with refugees and host communities. Particularly, students were guided in preparation of workplans, learning content, creating facilitator teams, and ultimately, executing learning sessions. The SES ensured that results of implementation of student enterprise projects developed at university campus are brought on board and disseminated to beneficiaries. Prior to sharing with community members, student facilitators summarized previous enterprise projects on the one-page sheet of business model canvasses.

In summary, the processes that emerged to be vital to successful engagement was the need for technical planning at project team level which feeds into later processes of the intervention. The project team supervised and provided support to processes of liaison with stakeholders serving refugees such as the Office of the Prime Minister (OPM) in Uganda, the Zonal Agricultural Research and Development Institutes (ZARDIs), Non-Governmental Organizations (NGOs), and district local governments (DLGs). Other processes included the development of training manuals which were used to facilitate learning on different enterprises including vegetables, mushroom production, solar drying, bakery, and business planning using the business model canvas.

Flow of knowledge and skills. Exchange of knowledge and skills between the university actors and the refugee as well as their host communities was a vital factor in the success of interactive learning for innovation. This is in line with Kruss and Gastrow (2017)'s observation that the skills and competences that interacting actors bring to the learning situation are important for inclusive innovation. First, it was important that the university staff and students have the right attitude and interest in working with the beneficiaries (FAO, 2014). Conversely, the refugees and host communities had a number of limitations and interests that would hinder their effective participation in the project and hence transfer of knowledge and skills. A key limitation for the beneficiaries was the fact that most had minimal or no formal education. While some beneficiaries could express themselves in English, majority could not, a factor attributed to the diversity in local dialects as well as the Arabic-speaking background of the majority South Sudanese refugees. The diversity in dialects also meant that even the beneficiaries could not understand each other. This divergence in education and language between the university and the beneficiaries presented a major barrier to effective communication and interaction and hence transfer of knowledge and skills. The existence of several humanitarian organizations that were working with the same beneficiaries on similar or different activities posed another challenge as it created a situation of a "conflict of obedience" where for instance a beneficiary is tempted to leave an ongoing session to go attend to another organization activities.

Given the above challenges, effective interaction thus necessitated modification on the side of the university to allow for successful transfer of knowledge and skills. The university therefore adopted the guided practice approach, where learning took place alongside practice. For instance, if the training activity was nursery bed construction, trainees collect all the materials to the site before the training day. They are then instructed on the step by step stages in nursery bed construction as they construct it. Along the way, questions would emerge either from the facilitator or the trainees on key aspects such

as nursery bed orientation, slope, width, height etc., for which explanations and illustrations are given by the facilitators or a trainee. Chance would then be given to one trainee to translate to those who could not have understood. The choice of the guided practice approach was largely motivated by the awareness that the learners had low competencies (only basic or no education); language barriers (compromises the effectiveness of verbal communication) and conflicting interest (there were several organizations targeting the same persons). As such, the time devoted to a particular activity was always limited; and such circumstances meant that learning and practice had to go hand in hand so that at the end, the learner achieves both in the shortest time possible.

Using the guided practice approach requires the facilitator to not only be ready, but also be willing to adjust to being embedded within the community for which they intend to stimulate innovation (Devaux *et al*., 2018; Petersen *et al*. (2018). Consequently, experience in working with and living in rural and marginalized communities becomes very important. For the case of Gulu University, the above competences have been entrenched in the students and staff overtime due to the community-oriented training approach that positions students and staff to work with rural communities of diverse cultural backgrounds (Odongo *et al*., 2017; Kalule *et al*., 2019b). Indeed, earlier research reports suggest that student attitudes and faculty supervision support to students are related and impact the learning behavior that farming communities' exhibit towards the university induced processes (Odongo *et al*., 2017; Kalule *et al*., 2019b).

The above observations triangulate with the follow up evaluation that affirmed that refugees and host-communities perceived the student-facilitators and faculty staff as useful to their learning. For instance, one female refugee pointed out as follows "students of the University made us learn new farming methods which have contributed to better incomes…". Yet another beneficiary refugee commented that "...we are now making money from selling mushrooms which we have saved into our group savings scheme". " … the University should continue sending us students so that we learn new businesses". This confirms that refugees and host communities have beliefs that the university is a useful partner to their continued learning and innovation.

Nature and extent of community participation. Given their vulnerabilities and the pre-dominance of relief-oriented interventions, there was a need for a rethink of how the communities are approached and involved as well as how the project is implemented. In this regard, two learning points emerged, (i) how to extend support to the beneficiaries without creating/entrenching a dependency syndrome; and (ii) how to facilitate a viable enterprises innovation process in a relief dominated context. The starting point was the conventional participatory enterprise selection and prioritization process. This process yielded a list of preferred enterprises by each beneficiaries group.

With the intention of increasing their resilience and enabling local communities to participate in the money economy, there was a need to have the community play a key role in the project intervention. Active participation of the beneficiaries would ensure ownership and sustainability of the emerging innovations (Cozzens and Sutz, 2014; FAO, 2014; Botha *et al*., 2017). Participatory approaches was employed to allow for active involvement of the beneficiaries in the processes. For instance, they were participatorily guided to select profitable enterprises that suit their setting

('guided choice rather' than 'blind choice'). Additionally, the beneficiaries shared cost by providing in-kind contributions like labour and construction materials and this facilitated ownership on the intervention. The major aim was to extend support to the beneficiaries without creating a dependency syndrome and foster the development of innovative viable enterprises in a relief dominated context for sustainability.

Box 2: ***An example of participatory enterprise selection process***

One group had chosen to rear broilers due to the fact that the land they occupied was infertile and rocky and hence no crop would do well. However, on analysing the environment and interacting with the community, the facilitators realized that they could actually grow oyster mushrooms, which does not require much land to produce and yet has ready market in the community. To a community who are used to eating wild mushrooms, this was an interesting adventure, as they did not believe mushrooms can be grown. Ultimately, they accepted the mushroom enterprise, which turned out to be the most successful venture in the whole project intervention.

A critical loophole with most support to marginalized communities is that rather than solve the intended problems, extending support can compound the vulnerability situation of these communities (Kruss and Gastrow, 2015). For a project intending to stimulate resilience and participation in the market economy, there was a need to innovatively extend support in a way that minimizes the chance of it being looked at as a "free good" (Kruss and Gastrow, 2017). This innovative process involved planning the requirements for a business start up and providing them in kind, as and when it is necessary in the process of business implementation. For instance, a group growing tomatoes would be provided with a wheelbarrow, seeds and gumboots at the nursery establishment stage; and a knapsack sprayer and fungicides after transplanting. As consequence of this, all the beneficiary owned up the initiated enterprises and even continued to run the businesses beyond the project period. To the project implementation team, avoiding the free-good approach was one of the reasons the project intervention was generally successful. For instance, a follow-up of the beneficiaries eight months after the project had ended found that 80% of the champion farmer groups were still operational in the initiated businesses. Additionally, they had also diversified into other undertakings including Village Savings and Loans Associations (VSLA). This is no mean achievement in an environment where projects rarely survive beyond their implementation periods.

CONCLUSIONS AND IMPLICATIONS

The need for this paper arose from the persistent call for universities in developing countries to be more responsive to the development needs of local communities with special emphasis on the marginalized and vulnerable groups. On the basis of this argument, universities as centers of knowledge are increasingly viewed as important players in facilitating inclusive innovation systems. Accordingly, this paper uses experiences gained from implementing a project on facilitating the development of farm based micro-enterprises among refugees and refugee-hosting communities to shed light on how university community engagement can be harnessed to facilitate learning and community innovation process. An analysis in this paper reveals that the interface structures of community engagement models namely: The Student-Centered Outreach and the Student Enterprise Scheme with supervision from faculty-staff, and together with community leadership, facilitate successful university-community interactions, learning and innovation.

This paper contributes by deepening the literature on facilitating inclusive innovation

with application of the community-oriented university training models namely; 1) the student-centered outreach, and 2) the student enterprise scheme as interface structures for facilitating interactive learning and innovation at grassroots. It particularly demonstrates that the four main strands of innovation systems namely; divers of interaction, interface structures, flow of knowledge, and skills and community participation are influenced uniquely under marginalized community conditions. It further demonstrates that the mutual interaction between beneficiary communities on one part, and the students on community placement together with faculty staff on the other part generates: i) joint decision making with the target communities; ii) learning for marginalized communities, students and faculty staff; and iii) innovation that ushers in farm based micro-enterprises at community level. In all, successful interaction between university-based actors (who include students) and the marginalized communities seems to be enhanced by previous experience of serving the rural communities through university community engagement. For practice, a key lesson gained with regard to induced innovation is that the process of innovation has to be guided by competent facilitators who understand both the beneficiaries and their context. This is even more important when working with marginalized communities as their vulnerabilities usually limits their abilities and hence choice horizons when it comes to decision making. Consequently, innovation facilitators should actively, rather than passively engage in the choice of enterprise for the marginalized groups. Additionally, to stimulate sustainable innovations in marginalized settings, there is a need to package the interventions in a way that gives the community adequate opportunities to contribute and own the development process.

We recommend that the universities or change agents need to have facilitators who are equipped with the right skills and attitudes in working with the target beneficiaries. While some required skills may be acquired through formal education, the essential skills and attitudes are acquired through experiences of individual facilitators. Universities should therefore entrench these competences in the student and staff through incorporating community-oriented training approaches in their curricula and practice. Community oriented trainings such as placements, internships and outreach position students and staff to learn and gain experience of working with rural communities of diverse cultural backgrounds, making them better community change agents in the process.

An additional recommendation is that there is need for innovation brokers towards a guided practice process where the facilitator plays more of a guiding role while the beneficiaries participates more actively in the learning process. Therefore, a guided practice approach is proposed as an alternative way to ensure concurrent learning and practice, as an experiential process. As knowledge generation centers, universities should be in position to continually innovate their community engagement approaches to make them adaptable to the situations of the target beneficiaries. A case in point here is the application of the innovative SCO and the SES models in stimulating business innovation amongst the university students, as well as rural farmers, refugees and marginalized communities.

Lastly, innovations cannot be sustainable unless the communities own the process as well as the outcomes. It is important for innovation brokers to involve beneficiary communities at initial stages of a project design, planning and implementation. Early involvement of beneficiaries ensures adequate consultations are made between the implementers and

beneficiaries and ensures ownership of the project and its outcomes, paving way for a cordial working relationship in the process. This kind of organizational innovations is critical if development interventions are to induce sustainable innovations within the communities.

A potential limitation of the paper lies with the problem of reflexivity since the researchers were part of the project intervention. However, interpretive analysis approach has strength in making sense of participants' lived experiences by developing an interpretative analysis of their behaviours in relation to social, cultural, and theoretical contexts (Lambert *et al*., 2010; Thurairajah, 2019) This puts the researchers in position to generate an interpretative account of how the beneficiaries responded to the contexts being studied (Biggerstaff and Thompson, 2008; Lambert *et al*., 2010). Similarly, Morrow (2006) reported that reflexivity as a strategy is useful in understanding different phenomena under exploration, and accurately portraying the meaning derived from the actions of different actors.

ACKNOWLEDGEMENT

The authors thankfully acknowledge the funding from the Food and Agriculture Organization of the United Nations [FAO] that facilitated the implementation of the project on Promoting farm based micro-enterprises among the refugees and host communities of Arua and Adjumani Districts, West Nile region in Uganda. We also acknowledge the support from the RUFORUM project titled "Transforming African Agricultural Universities to meaningfully contribute to Africa's Growth and Development [TAGDev]", funded by the Mastercard Foundation whose financial support enabled the development of this article.

STATEMENT OF NO-CONFLICT OF INTEREST

The authors declare that there is no conflict of interest in this paper.

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