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## **Quality and dissemination of information for strengthening University-farming community engagement in northern Uganda**

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### **ABSTRACT**

Information from Universities is important for social transformation in Africa but the 'Ivory Tower' university status often constrains effective information sharing with farmers. To address this effective communication for regular flows of information in all directions along agricultural value chains must be established. This research was part of a community action research project to promote university-farmer engagement with a focus on the dissemination channels preferred and the usefulness of the information shared to the farmers. Data were collected using semi-structured questionnaires and focus group discussions with 184 farmers. Findings revealed that inter-personal communication approaches were strongly preferred by farmers and they were most particularly interested in receiving information on pest control, post-harvest technology, value addition and marketing. As information channels, radios were significantly preferred while mobile phones were surprisingly less preferred, despite the relatively widespread ownership. The farmers also found the information disseminated to be useful and relevant if delivered in a timely manner. To sustain the relationship beyond the project, a system that provides some interpersonal connection from a distance is required. Subsequent research is focused on an ICT system that provides a platform for long-term engagement between the university and farmers.

**Key words:** Appropriate channels, community action research, information relevance, information timeliness

### **RÉSUMÉ**

L'information provenant des universités est primordiale pour une transformation sociale en Afrique mais le statut 'Tour d'Ivoire' de l'université constitue souvent une barrière au partage d'information avec les agriculteurs. Afin d'assurer cette communication efficace, un flux régulier d'information dans toutes les directions le long des chaînes de valeurs doit être établi. Cette recherche fait partie du projet d'actions de recherches communautaires pour promouvoir l'engagement des agriculteurs universitaires avec un accent sur les canaux de disséminations préférées ainsi que sur l'utilité de l'information transmise aux agriculteurs. Les données ont été collectées à l'aide de questionnaires d'entretien semi-structurés et entretiens de groupes auprès de 184 agriculteurs. L'analyse des résultats a révélé que les approches de communications interpersonnelles étaient fortement préférées par les agriculteurs qui étaient tout particulièrement intéressés à recueillir des informations concernant la lutte contre les ravageurs, les technologies post-récoltes, la valeur ajoutée ainsi que la commercialisation. Les radios, comme canal de transmission d'information étaient plus préférées par les agriculteurs et quand bien même ils déposaient en majorité des téléphones portables, ces derniers étaient moins préférés. Les agriculteurs ont aussi trouvé que l'information disséminée est utile et primordiale si elle est délivrée à temps. Afin de maintenir la relation au-delà du projet, un système fournissant des connections interpersonnelles à distance est requis. Conséquemment, la recherche

se concentre sur un système TIC qui garantit une plateforme pour un engagement à long terme entre l'université et les agriculteurs.

Mots clés : Canaux appropriés, Recherche-Action Communautaire, pertinence de l'information, Calendrier d'information

## INTRODUCTION

The importance of knowledge and information flow as a pathway for enhancing agricultural innovation globally has been well established (Rehman *et al.*, 2013; Opeyemi, 2014). The trigger for the rapid spread of innovation at any level of the agricultural value chain is consistent information flow in all directions (Anandajayasekeram and Berhanu, 2009; Attaluri *et al.*, 2012). Universities as part of the National Agricultural Research Systems (NARS) do generate knowledge, information and technologies useful for ushering agricultural transformation (Daudun *et al.*, 2009). Through effective sharing of information, universities can strengthen their engagement with external societies and serve as instruments for national development (Mugabi, 2015).

For information to cause effective learning and be translated into new knowledge, skills and technologies, it has to be of good quality in terms of relevance, usefulness, credibility and timeliness (Llewellyn, 2007; Mihaly, 2010; Mkotjo and Kalusopa, 2010; Attaluri *et al.*, 2012; Mittal and Mehar, 2012). According to Meitei and Devi (2009) and Siyao (2012), lack of quality information can lead to stagnation in agricultural growth as farmers will not be able to make informed decisions and take actions. In the same vein, how information is exchanged to create the required impact is equally important. The use of appropriate mechanisms of information and knowledge exchange is central to innovation processes leading to the much wanted changes. Effective information exchange mechanisms enable transmission and application of information and knowledge between development actors (World Bank, 2011). Consistent engagement with client communities and other stakeholders is essential to develop the two-way interaction that is needed to ensure that the knowledge produced is locally relevant and that it is communicated effectively.

Universities, like many other organizations, in implementing their outreach activities have used various communication channels including extension workers, mass media, on-farm demonstrations, farmer field schools and field days, among others. Overtime, many factors have constrained effective sharing of innovations, information and knowledge between university experts, farmers and other stakeholders. Daudu *et al.* (2009), Babu *et al.* (2011), and Vidanapathirana (2012) identify weak stakeholder linkages, inappropriate packaging, incomprehensible

technical language, and ineffective dissemination channels among such constraints. In addition, due to the limited interaction of universities with information end-users, the information disseminated is not in line with the targeted community and gender needs (Sabo, 2007; Tolgbonse *et al.*, 2008; Nazari and Hasbullah, 2010; Siyao, 2012; Opeyemi, 2014). The effectiveness of university outreach is further constrained by their limited knowledge of the information sources and channels preferred by and/or appropriate to the target communities (Agwu and Fawole, 2008; Abubakar, 2009; Andeniran, 2009; Okwu and Daudu, 2011).

Being uncertain of the quality of information and how it is delivered makes it difficult to appreciate the status of engagement and how to improve it. For stronger engagement between universities and communities therefore, it is necessary to understand not only their production, consumption and distribution needs but also the farmers' information needs, information sources and preferred access mechanisms. Farmers' information needs vary from place to place depending on farming systems, soil types and climatic conditions among others (Tolgbonse *et al.*, 2008; Babu *et al.*, 2010; Ayubu *et al.*, 2012; Mittal and Mehar, 2012; Sseguya *et al.*, 2012). Quality of information has to be considered within the context of the task at hand (Mukotjo and Talusopa, 2010). In essence, strengthening engagement with farmers in a given area calls for identification and understanding of the context specific factors that influence information sharing for improved value chain performance.

### ***Strengthening university-farming community engagement through information sharing***

In a bid to move away from simple outreach to long-term engagement with farming communities, the Makerere University School of Agricultural Sciences (SAS) with support from the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) piloted a Community Action Research Project (CARP) titled "*Developing an Outreach Framework for Strengthening University-Farming Community Engagement for improved and sustainable livelihoods (SUFACE)*" to be build on previous outreach initiatives (Ebanyat *et al.*, 2010). The main objective of the project was to "operationalize partnerships between Makerere University, selected farmer communities and other critical stakeholders within a framework of action research, to enhance productivity, competitiveness, responsiveness and

impact of university-led research on smallholder agriculture and agricultural development in Uganda". Specifically the project sought to: (1) Pilot an experiential learning model to strengthen quality and better graduate training and engagement of Universities with farming communities; (2) Develop and test the effectiveness of capacity development- information-based outreach model for disseminating university generated technologies and best practices to farmers and agribusiness communities; (3) Build entrepreneurial capacity of smallholder farmers and students by strengthening legume and cereals value chains in two regions of Uganda; and to (4) Develop an information and communication technology mechanism to enable farmers' to access information from a University information centre.

The project is being implemented with eight (8) farmers groups working with Women of Uganda Network (WOUGNET) in three northern Uganda Districts of Apac, Kileleshwa and Lira. To improve farmers' access to information, knowledge and technologies from the university, the project has: (1) conducted trainings for farmers through graduate students on agronomy of groundnuts and soybean, seed production, entrepreneurship and group management; (2) provided seeds of improved soybean and groundnut varieties; and (3) developed and piloted a multi-channel ICT platform for information sharing that enables provision of real time feedback on farmers' queries and sustainable engagement with farmers. Through this platform, farmers can request for information and receive responses from experts in the university through the web or mobile phone applications (see Mirembe *et al.*, 2015).

Studies on University-Community Engagement have not clearly addressed issues related to the quality of information shared and dissemination channels used (Ayubu *et al.*, 2012; Mittal and Mehar, 2012). It is important to generate empirical evidence on farmers' preferred information dissemination channels and on their perceptions of the quality of the information. The aim of this study therefore, was to analyze the farmers' perception of the quality of information and dissemination mechanisms used in enhancing university-farming community engagement based on the pilot SUFACE - CARP project at Makerere University. Understanding the farmers' information needs and preferred sharing channels and tailoring university products to them would endear communities to universities thereby strengthening the university-farming community engagement.

### **Analytical framework**

Effective flow of information across all stages of agricultural value chains is crucial in enabling actors

and more so farmers to discover development opportunities for enhancing household food and income security. It does enhance farmers' knowledge and skills to spur value chain innovation (Attaluri *et al.*, 2012; Sseguya *et al.*, 2012). However, for impact, information should be of high quality and readily accessible. Lee *et al.* (2002), Daudu *et al.* (2009), and Vidanapathirana (2012) outlined elements of good quality information to include accuracy, timeliness, relevance, credibility, usefulness, consistency, reliability, trustworthiness and appropriateness. Accessibility of information depends on the sources and channels most appropriate to specific end users. Lwoga *et al.* (2010) and Okwu and Daudu (2011) thus state that, having knowledge of the target farmers' information needs as well as preferred sources and channels is critical in ensuring effective information flow.

As guided by Lee *et al.* (2002) and Okwu and Daudu (2011), quality of information as well as preferred sources and channels should be determined through understanding end-users' expectations. This among others entails gaining knowledge of the: location specific information needs of farmers; preferred information sources and channels; and farmers' perception of the quality of information disseminated and appropriateness of the channels used. This framework was applied to analyze farmers' perceptions of the quality of information provided as well as dissemination channels used by the SUFACE project vis-à-vis farmers' information needs, preferred sources and dissemination channels.

## **METHODOLOGY**

### **Study area and sample selection**

Data were collected from the two (2) districts of Kileleshwa and Lira in Northern Uganda where the SUFACE project was being implemented. The two districts were purposively selected based on the two crop value chains with Lira being the only district where SUFACE farmer groups were involved in the groundnut value chain and Kileleshwa had more farmers involved in the soybean value chain. Two farmer groups were selected from each district. The two farmer groups growing groundnuts had a total of 40 members while the two groups growing soybean had 60 members in total. During the study, 92-project (treated) and 92 non-project (untreated) farmers were interviewed representing a turn-up rate of 92% of the targeted 200. This was based on the nearest-neighbor propensity score-matching principle where treated and untreated subjects at a ratio of 1:1 were considered (Austine, 2010). The groups being dominated by women, more (68%) of the respondents were female.

Data from individual group members was collected through a household survey using a structured

questionnaire. Focus group discussions (FGDs) were also held with selected members of each of the selected SUFACE group members guided by the respective group leaders on the basis of the Flyvberg (2006) information-oriented selection criteria. Information was collected on household socio-economic characteristics, information needs, sources, channels used, perceptions of the quality of information, challenges in accessing needed information, as well as suggestions for improving information flow.

The quality of information was assessed using a 5–point Likert scale with 1 indicating strong agreement and 5 indicating strong disagreement with the quality measure statements. A multivariate probit model (Rehman *et al.* 2013) was used to determine the socio-economic factors that influence the respondents' preference for a particular information dissemination channels, where;

$$y_{i1} = \beta_1 X_{i1} + \varepsilon_{i1} \text{ (where } y_{i1} = 1 \text{ if radio is selected and 0 otherwise)}$$

$$y_{i2} = \beta_2 X_{i2} + \varepsilon_{i2} \text{ (On-farm demonstration)}$$

$$y_{i3} = \beta_3 X_{i3} + \varepsilon_{i3} \text{ (Training)}$$

$$y_{i4} = \beta_4 X_{i4} + \varepsilon_{i4} \text{ (Workshop)}$$

$$y_{i5} = \beta_5 X_{i5} + \varepsilon_{i5} \text{ (Video)}$$

$$y_{i6} = \beta_6 X_{i6} + \varepsilon_{i6} \text{ (Mobile phone)}$$

$$y_{i7} = \beta_7 X_{i7} + \varepsilon_{i7} \text{ (News paper)}$$

$$y_{i8} = \beta_8 X_{i8} + \varepsilon_{i8} \text{ (Field day)}$$

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$  and  $\beta_8$  are parameters associated with each information source selection decision;  $\varepsilon_{i1}, \varepsilon_{i2},$  and  $\varepsilon_{i3}$  are random disturbances for each equation; and  $X_{i1}, X_{i2}, X_{i3}, X_{i4}, X_{i5}, X_{i6}, X_{i7}$  and  $X_{i8}$  are vectors of observed socio-economic characteristics and variables potentially affecting the preference of information channel. The quantitative data collected was statistically analyzed to generate means and percentages as well as chi-square indicating farmers' information needs and

perceptions of the quality of information and dissemination mechanisms. Qualitative data from Focus Groups Discussions (FGDs) was analysed using content analysis to generate themes to explain or support the quantitative results.

## FINDINGS

### Farmers' information needs

When asked the types of information required to enhance their farming activities, the results indicate farmers' information needs span the entire crop value chain (Figure 1). Overall, the more sought for information was on value addition (processing, (77.2%), crop pests and diseases management which includes the need for appropriate pesticides and produce/product marketing. Finding agricultural financing and fertilizers was the next most needed information while crop agronomy, postharvest handling and seed were the least needed information. During focus group discussions (FGD), participants reasoned that information on pest and disease control as well as improving soil fertility was highly needed because their absence led to very low crop yields. They believed that adding value to their produce and accessing better markets led to better prices for their produce/products and hence increased household incomes.

### Available information sources and frequency of contact with farmers

The results in Table 1 show that farmers had diverse sources of agricultural information. The level of contact with the sources varied within and between the two categories of farmers. On average, those interviewed did not have frequent contact with most information sources implying, the communities had limited access to the information they needed. Fellow farmers were the most frequent source of information to both categories of respondents. In the Focus Groups Discussions (FGDs), respondents stated thus "Group

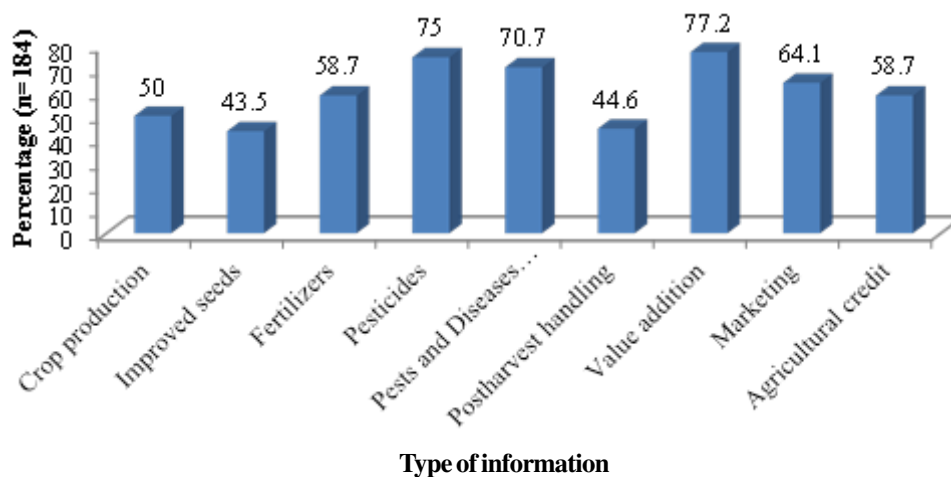


Figure 1: Farmers' information needs



**Table 1: Farmers' information sources and frequency of access**

| Information sources      | SUFACE Farmers frequency (%) |              |      | Non-SUFACE Farmers frequency (%) |              |      | X <sup>2</sup> Value |
|--------------------------|------------------------------|--------------|------|----------------------------------|--------------|------|----------------------|
|                          | Frequently                   | Occasionally | None | Frequently                       | Occasionally | None |                      |
| Public extension service | 0                            | 35.9         | 64.1 | 0                                | 57.6         | 42.4 | 8.733**              |
| Agricultural Research    | 0                            | 4.3          | 95.7 | 0                                | 5.4          | 94.6 | 0.117                |
| Makerere University      | 4.3                          | 95.7         | 0    | 0                                | 0            | 100  | 184.0***             |
| University students      | 0                            | 60.9         | 39.1 | 0                                | 27.2         | 72.8 | 21.19***             |
| NGOs                     | 0                            | 45.7         | 54.3 | 0                                | 44.6         | 55.4 | 0.022                |
| Banks                    | 0                            | 2.2          | 97.8 | 0                                | 1.1          | 98.9 | 0.339                |
| Fellow farmers           | 34.8                         | 65.2         | 0    | 17.4                             | 82.6         | 0    | 7.216**              |
| Input dealers            | 0                            | 14.1         | 85.9 | 0                                | 13.0         | 87.0 | 1.040                |

n = 184. X<sup>2</sup> value is significant at \*\*P < 0.01 and \*\*\*P < 0.001

*leaders are often called for workshops, meetings or trainings and share information with other members on coming back”.*

Makerere University was mentioned as an occasional source of information by the majority (95.7%) of project participants. Only 4.3% cited the university as a frequent source of information to them. For most of the sources, the extent of contact with respondents was either occasional or none at all. Occasionally, Makerere University (through SUFACE project), university students (on field attachment and/or doing on-farm research) and NGOs, were the most in contact with the SUFACE farmers. The public extension service, NGOs and students were the most in contact with the non-SUFACE farmers. Banks, researchers and input dealers were the sources with least contact with farmers. The SUFACE farmers had significantly higher level of contact with Makerere university and students ( $P = 0.001$ ) as well as group members ( $P = 0.01$ ) than non-SUFACE farmers. The non-SUFACE farmers had a significantly higher contact ( $P = 0.01$ ) with the public extension than the SUFACE farmers. However, as explained during Focus Groups Discussions (FGDs), the SUFACE farmers for the duration of the project interacted less with public extension workers. The project farmer groups explained that it was common practice for extension workers to focus on other groups without project support and most especially when an external project does not provide for their facilitation.

Through FGDs, participants categorized the different information sources in terms of level of operation and closeness to them. The information sources at the local level (village and sub-county) were fellow group members and the public extension workers. At district level, the information sources were the district agricultural officers (public extension) and NGOs such as Uganda Oil Seed Producers Association (UOSPA),

CESVI, Kubere Information Center, Apac District Agricultural Network (ADAN) and Apac District Farmers Association (ADFA). At national level, sources identified included CARITAS, ACORD-Uganda, Enterprise Uganda, NUCAFE, and Makerere University.

#### ***Preferred information dissemination channels***

The channels for disseminating information to farmers with their ranking by preference are indicated in Table 2. Overall, training, practical demonstration and radio were the first, second and third most preferred channels.

The SUFACE farmers expected to receive manuals from the university which had not been done by the time of this survey. Unlike the non-SUFACE farmers, they did not want to declare use of manuals hence the big difference. Field days and newspapers share a rank (8) and were the least preferred by the respondents. In fact, no SUFACE farmer mentioned field day just like no non-SUFACE farmer mentioned newspaper as a preferred channel.

From the Focus Groups Discussions, respondents preferred training, demonstrations and workshops/meetings because of their interactive nature and practical/hands-on learning. The challenge with these interpersonal approaches was that they required much time and planning. In addition, demonstrations are often limited in reach and hosted in a few farmers' gardens. Radio was ranked highly because of its ease of access by most households. Men these days leave the radios at home and prefer to use those inbuilt in their mobile phones when out of home. However, men used radios mostly to listen to news, announcements and music. Listening to an agricultural programme/information was occasional unless informed in advance, a situation worsened by existence of many FM radio stations. The preferred time for airing information through radio, especially by women was between 4:00 - 5:00 pm and

**Table 2: Ranking of information channels by farmers' preference**

| Information channel | SUFACE Farmers' preference (N=92) |      | Non-SUFACE Farmers' preference (N=92) |      | Overall (n=184) |      |
|---------------------|-----------------------------------|------|---------------------------------------|------|-----------------|------|
|                     | Percent                           | Rank | Percent                               | Rank | Percent         | Rank |
| Training            | 67.4                              | 1    | 64.1                                  | 2    | 65.7            | 1    |
| Demonstration       | 57.6                              | 2    | 66.3                                  | 1    | 61.9            | 2    |
| Radio               | 48.9                              | 3    | 29.5                                  | 3    | 39.2            | 3    |
| Workshops           | 8.7                               | 4    | 15.2                                  | 5    | 12.2            | 4    |
| Manuals             | 1.1                               | 8    | 19.6                                  | 4    | 10.3            | 5    |
| Video               | 6.5                               | 6    | 4.3                                   | 6    | 5.4             | 6    |
| Mobile phone        | 8.7                               | 4    | 1.1                                   | 8    | 4.9             | 7    |
| Field days          | 0.0                               | 9    | 2.2                                   | 7    | 1.1             | 8    |
| Newspapers          | 2.2                               | 7    | 0.0                                   | 9    | 1.1             | 9    |

then 8:00 - 9:00pm. Similarly, in spite of the high ownership of mobile phones, it was ranked second last as a channel for accessing agricultural information. The Focus Groups Discussions participants who were largely women stated that phones were mainly owned by men and overall used for business issues and not accessing agricultural information. However, mobile phones were said to be more effective in mobilizing group members although they were costly in terms of airtime and often suffered poor network coverage and connectivity.

Results from the multivariate probit model analysis of the relationship between socio-economic characteristics and preference for information dissemination channels are presented in Table 3. Preference for radio was significantly influenced by gender ( $P = 0.01$ ) in favor of females and educational level ( $P = 0.001$ ). Similarly, preference for on-farm demonstrations as sources of information was significantly influenced by the respondents' age and land size under use ( $P = 0.01$ ). The relatively older farmers and those with more land preferred on-farm demonstrations as a channel of information.

Preference for workshops was significantly influenced by the respondents age ( $P = 0.001$ ) and level of education ( $P = 0.01$ ). The relatively younger and more educated farmers preferred workshops as channels of information. Finally, preference for mobile phones was significantly influenced ( $P = 0.01$ ) by the respondents annual income levels. Those with higher incomes who could afford mobile phones and airtime had a preference for mobile phones as a channel of information. There was no significant relationship ( $P = 0.05$ ) between socio-economic characteristics and video, newspapers and field days as channels of information.

### ***Quality of information disseminated through SUFACE***

The farmers participating in the project were asked about the relevance of the information disseminated to their needs by rank, the appropriateness of channels used as well as their overall opinions on the quality of the information and delivery mechanisms. The findings are shown in Table 4. As the results show, the type of information provided covered the entire crop value chain from inputs to marketing. In terms of relevance however, farmers ranked information on value addition, inputs, marketing, packaging and postharvest handling highest in descending order. Information on harvesting, agricultural finance, planting, land preparation as well as pests and diseases were ranked least relevant.

During the FGDs, participants indicated that information on improved seed (inputs) was useful in enhancing crop yields. Furthermore, information on postharvest handling, value addition and market access was considered crucial in enhancing the value of their produce for increased household incomes. The channels used by the project to disseminate information to farmers included both interpersonal and mass media (Figure 2).

There was generally higher use of interpersonal compared to the mass media channels in disseminating information to project farmers. Radio, which is the favorite mass media channel among farmers was not widely used by the project. While they preferred these channels, during FGDs, participants complained of the short training duration, language barrier and irregular monitoring of demonstrations by Makerere University.

Farmers' opinion on the overall quality of information delivered by Makerere University through the SUFACE project and delivery mechanism was assessed using a

**Table 3: Multivariate probit Model analysis of the relationship between socio-economic characteristics and preference for information channels**

| Independent variables         | Coefficient | Std Error | P-Value  |
|-------------------------------|-------------|-----------|----------|
| <b>Radio</b>                  |             |           |          |
| Age                           | 0.249       | 0.173     | 0.149    |
| Gender                        | -0.604      | 0.213     | 0.005*** |
| Education level               | 0.445       | 0.134     | 0.001*** |
| Labor                         | -0.05       | 0.042     | 0.236    |
| Income                        | 5.58        | 1.82      | 0.758    |
| Land                          | 0.068       | 0.19      | 0.72     |
| Cons                          | -0.104      | 0.635     | 0.87     |
| <b>On-farm demonstrations</b> |             |           |          |
| Age                           | 0.504       | 0.175     | 0.004**  |
| Gender                        | 0.035       | 0.212     | 0.867    |
| Education level               | -1.54       | 0.113     | 0.017    |
| Labor                         | -0.01       | 0.042     | 0.812    |
| Income                        | 2.08        | 1.91      | 0.275    |
| Land                          | 0.565       | 1904      | 0.003*** |
| Cons                          | 0.074       | 0.645     | 0.513    |
| <b>Trainings</b>              |             |           |          |
| Age                           | -0.046      | 0.177     | 0.793    |
| Gender                        | -0.298      | 0.219     | 0.173    |
| Education level               | 0.56        | 0.147     | 0.000*** |
| Labor                         | -0.015      | 0.044     | 0.725    |
| Income                        | -1.41       | 1.92      | 0.463    |
| Land                          | -0.062      | 0.196     | 0.752    |
| Cons                          | 0.058       | 0.661     | 0.93     |
| <b>Workshop</b>               |             |           |          |
| Age                           | 0.565       | 0.173     | 0.001*** |
| Gender                        | -0.34       | 0.214     | 0.112    |
| Education level               | 0.241       | 0.108     | 0.025**  |
| Labor                         | -0.041      | 0.042     | 0.331    |
| Income                        | 3           | 0.189     | 1.6      |
| Land                          | -0.01       | 1.87      | 0.033    |
| Cons                          | -1.358      | 0.637     | -0.05    |
| <b>Video</b>                  |             |           |          |
| Age                           | 0.068       | 0.264     | 0.796    |
| Gender                        | 0.249       | 0.316     | 0.431    |
| Education level               | 0.002       | 0.178     | 0.991    |
| Labor                         | -0.066      | 0.077     | 0.392    |
| Income                        | -5.6        | 4.09      | 0.171    |
| Land                          | -0.042      | 0.298     | 0.888    |
| Cons                          | -1.385      | 1         | 0.166    |
| <b>Mobile phone</b>           |             |           |          |
| Age                           | 0.053       | 0.239     | 0.826    |
| Gender                        | 0.24        | 0.288     | 0.404    |
| Education level               | 0.029       | 0.157     | 0.853    |
| Labor                         | -0.055      | 0.069     | 0.423    |
| Land                          | 0.354       | 0.269     | 0.188    |
| Cons                          | -2.471      | 0.897     | 0        |

**Table 3: Contd.**

| Independent variables | Coefficient | Std Error | P-Value |
|-----------------------|-------------|-----------|---------|
| <b>Newspaper</b>      |             |           |         |
| Age                   | 0.081       | 0.218     | 0.709   |
| Gender                | 0.187       | 0.256     | 0.464   |
| Education level       | 0.259       | 0.18      | 0.15    |
| Labor                 | 0.039       | 0.057     | 0.493   |
| Income                | 0.085       | 0.195     | 0.44    |
| Land                  | 0.202       | 0.231     | 0.382   |
| Cons                  | -1.292      | 0.814     | 0.112   |
| <b>Field day</b>      |             |           |         |
| Gender                | 0.234       | 0.2       | 0.241   |
| Education level       | 0.341       | 0.247     | 0.168   |
| Labor                 | 0.281       | 0.149     | 0.059   |
| Income                | 0.037       | 0.049     | 0.442   |
| Land                  | 0.162       | 0.17      | 0.34    |
| Cons                  | 0.279       | 0.211     | 0.187   |
|                       | 0.021       | 0.743     | 0.977   |

**Table 4: Information disseminated and its relevance**

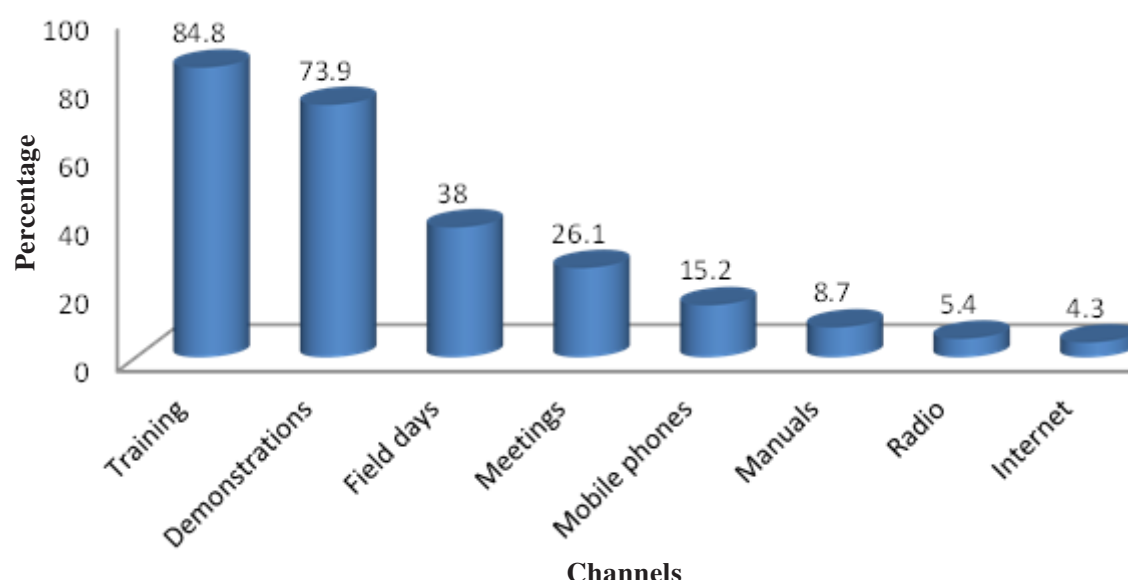
| Type of information      | Relevance (%) | Rank |
|--------------------------|---------------|------|
| Value addition           | 37            | 1    |
| Inputs                   | 26.1          | 2    |
| Marketing                | 22.8          | 3    |
| Packaging                | 19.6          | 4    |
| Postharvest handling     | 17.4          | 5    |
| Planting                 | 6.5           | 6    |
| Agricultural finance     | 6.5           | 6    |
| Harvesting               | 6.5           | 6    |
| Land preparation         | 5.4           | 9    |
| Pest and disease control | 4.3           | 8    |

5-point Likert scale and the findings are presented in Table 5. In farmers' opinion, the information delivered was relevant, presented in a simple language, packaged favorably and delivered using mostly the interpersonal channels which were among some of those preferred by farmers. This is indicated by the means of the responses that are closer to one. However, the information is shown not to be reaching the respondents in time as indicated by the mean value above 3.5 – the least favorable rating.

Participants in FGDs attributed the untimely delivery of information from Makerere University to a number of factors ranging from distance to costs and poor coordination.

“Makerere University is far and those from the university visit us once in a while yet using phones

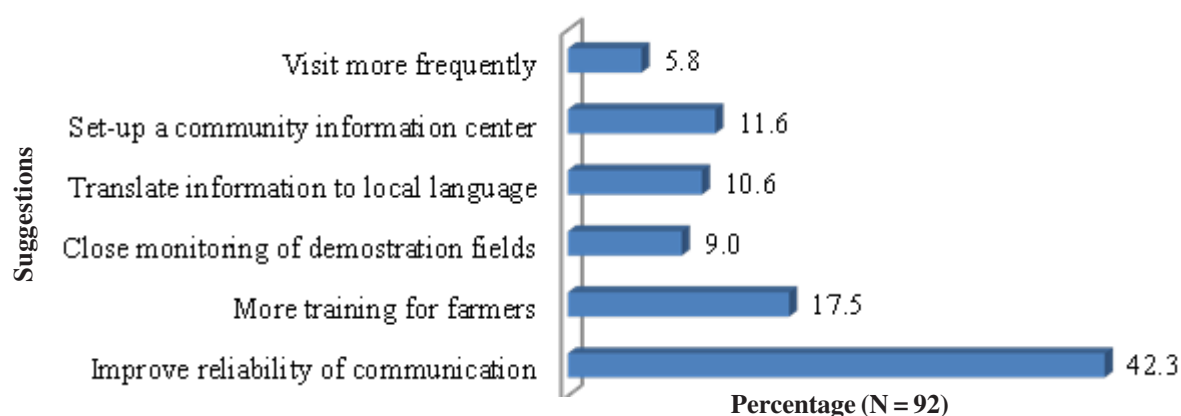




**Figure 2: Information dissemination channels used under SUFACE**

**Table 5: Means and standard deviation of farmers' opinions on quality of information from SUFACE**

| Statement on quality of information and dissemination method | Mean | Standard deviation |
|--|------|--------------------|
| Information was delivered in a <i>timely</i> manner          | 3.49 | 1.12               |
| Information was <i>relevant</i> to our needs                 | 1.57 | 0.54               |
| The language of presentation was <i>simple</i>               | 1.58 | 0.60               |
| Information was packaged in a <i>favorable</i> way           | 1.71 | 0.79               |
| Information was delivered using <i>appropriate</i> channels  | 1.81 | 0.73               |



**Figure 3: Respondents suggestions for improving information flow**

to call them is expensive. Information sent to us is sometimes unreliable as you may be told that they are coming and they do not or the group chairperson delays to inform all the members - information on seed delivery has always been unreliable and often not delivered in time. Many times when they visit, they are in a hurry and rarely visit the farmers/ demonstration gardens so as to advise the farmers in time”.

Following such complaints, the respondents surveyed suggested a number of possible ways of improving information flow between Makerere University and the farming communities (Figure 3). The top priority for the respondents was the need to improve information reliability, increase the duration of trainings, introduce information centers closer to communities as well as use of local languages. Through the FGDs, farmers indicated that quick information sharing and more

training of farmers could be enhanced by universities sending more students to the communities.

## DISCUSSION

### *Information needs, sources and contact levels*

The study findings showed that farmers need information that enables them to control yield reduction due to pests and diseases and to be integrated at higher market levels through value addition and marketing. Farmers therefore preferred having information that could lead to higher incomes through increased yield and better prices. However, some of the information highly needed by the farmers such as that on pests and disease control were not emphasized by the project. Indeed, the project focused more on the 'after production' value chain information with negligible relevant production level information. It is thus clear that farmers need information along the entire value chain. The on-farm level information is important in achieving increased productivity (Tologbonse *et al.*, 2008). Similar findings were made by Lwoga *et al.* (2010) in Tanzania; Meitei and Devi (2009) in India and Kwake and Ocholla (2007) in Kenya and South Africa. It is thus crucial as recommended by Tologbonse *et al.* (2008) to understand and target farmers' priority information needs in a comprehensive manner for effective interventions.

In as far as sources of information and their level of contact with the respondents is concerned, it is evident that there is a multiplicity of information sources albeit with varied levels of contact with the farmers. There is in essence a lot of room for Universities to work with other actors to enhance information sharing with farming communities. As the findings show, fellow farmers, public extension, NGOs and University students were the most available information sources. Several other studies showed fellow farmers/neighbors and extension systems as being key information sources to farmers (Opara, 2008; Daudu *et al.*, 2009; Lwoga *et al.*, 2010; Sseguya *et al.*, 2012; Vidanapathirana, 2012; Anil *et al.*, 2015). Lwoga *et al.* (2010) also found that there was often limited contact of the farmers with formal information sources. With this reality and the diverse context specific information needs of farmers as well as possible sources, there is always need to reach out to farmers and demonstrate availability of useful information in a bid to strengthen engagement. With university students being identified as one of the sources of information, universities have a unique and continuous opportunity to use students for enhancing information dissemination. However, there is need to ensure that the students are well prepared to effectively undertake outreach activities. In addition, because universities may not provide all the information all the time, is necessary to find ways of partnering with other actors such as extension workers on the

ground to ensure comprehensive and timely information delivery to the farmers.

Getting information to farmers requires use of appropriate channels. This study shows high preference for interpersonal channels by respondents. These channels enable face-to-face interaction and sharing of wider information than mass media channels can with the exception of radios which are widely available. This element in farmer preference for interpersonal channels is widely published (Agwu and Andniran, 2009; Daudu *et al.*, 2009; Lwoga *et al.*, 2010; Okwu and Daudu, 2011; Rimi *et al.*, 2015). However, use of interpersonal channels is costly (Mital and Mehar, 2012) and can be intermittent especially with universities implementing short term projects. To that extent, the project is piloting the use of a multi-channel ICT platform to address the lack of constant presence by the university in farming communities. This is meant to enable farmers to access information from and give feedback directly to the university through smart phones. Radio is the most preferred among the mass media channels but results show the need for proper timing and planning for awareness creation about intended broadcasts and the use of local languages for it to be effective. Radio also has a greater reach given its appeal to women. More women listen to radio because it fits well with their household chores. Women can listen to their favorite radio program as they continue doing their usual household chores. The effectiveness of radio and its preference by women has been studied widely (Abubakar *et al.*, 2009; Nazari and Hasbullah, 2010; Parvizian *et al.*, 2011; Ayandiji and Vera-Cruz, 2013). Farmers ranked mobile phones low in their preference, but if made aware and trained on the value of phones as information channels, phones can become an influential information channel among farmers. As Mital and Mehar (2012) note, mobile phones help overcome irregularity in information delivery among farmers. Above all, knowledge of the farmers' socio-economic characteristics as some of the factors influencing choice of channel is important. In this case, respondents' gender, age, education, land size and income influenced respondents channel preference. This is also in agreement with findings by Agwu and Adeniran (2009), Daudu *et al.* (2009), Nazari and Hasbullah (2010) and Jenkins *et al.* (2011).

### *Quality of SUFACE information and dissemination mechanisms*

From the findings, it is apparent that the information disseminated by the project for the development of groundnut and soybean value chains met some of the information needs highlighted by the farmers. The project by design provided more information on value addition, marketing including branding/packaging, postharvest handling and improved seed as needed by

farmers. However, there was less emphasis on pest and disease control, fertilizers and agricultural finance which are part of the productivity and value chain enhancing information equally needed by farmers. It is therefore imperative that information provided comprehensively addresses farmers' needs along the entire value chain. Babu *et al.* (2011) challenges advisory service providers to tailor information to farmers' needs. The channels used by the project were largely interpersonal which matched well with the farmers channel preferences. Indeed by the time of the study, the ICT platform for the project was being established and so there was minimal use of mobile phones for information access, radio, manuals and internet. The use of the interpersonal channels is mostly possible during the project life together with their associated cost. Ayubu *et al.* (2012) and Mital and Mehar (2012) call for exploration and integration of more interactive, real time information delivery channels. The initiatives to integrate internet, mobile phones and radio to deliver information by universities should be stepped up.

On the quality of the information delivered to project farmers based on the timeliness, relevance, simplicity, appropriateness of packaging and delivery channels (Lee *et al.*, 2002; Parvizian *et al.*, 2011; Siyao, 2012), farmers rated project information favorably in all parameters except timeliness. This indicates that the information from the university is of good quality and can significantly contribute to enhancement of agricultural development but has to be delivered at the time it is required. Timeliness is regarded the most important characteristic of quality information. Indeed as Mihaly (2010) points out, when information is delivered late, it is useless no matter how relevant it may be. To strengthen university engagement with communities therefore, building trust through timely delivery of relevant information in the right format is paramount.

The challenges raised by farmers regarding accessing information from the university revolve around late delivery of information/technologies (especially seed), poor coordination of communications, distant locations for required consultation and low face-to-face interaction. These were also highlighted by Lwoga *et al.* (2012) and Rimi *et al.* (2015) elsewhere. The suggestions for improvement made by respondents especially on establishment of community information centers, monitoring of demonstrations and improving reliability point to the need for integrating ICTs to enhance engagement. However, as Ayubu *et al.* (2012) argued, context specific factors that can influence application of ICTs as well as how best to use alongside other traditional methods has to be put into

consideration. The project already established an information center to coordinate communication between the university and farming communities at Kubere Information Center that belongs to Women of Uganda Network (WOUGNE), an NGO partner in the project.

## CONCLUSIONS AND RECOMMENDATIONS

This study presented empirical evidence on the community perceptions of the quality of information and dissemination channels used by Makerere University in engaging with them. The farmers found the university information useful and relevant if delivered timely. The demand for information was strongest for post-harvest technologies and marketing, and pest-control. Thus universities should address the full value chain when designing interventions to help farmers. In terms of information channels, farmers preferred direct contact to receive information, combined with specific training. Use of radio was by far the most preferred mass media when used with consistency, at particular times when they are able to listen and provided with notice of broadcasting schedules. It is too expensive for universities to be involved in direct training and approaches requiring constant physical contact with farmers. Alternatives need to be designed in ways that give them opportunity for continuous linkage for receiving required information in real time without the high cost involved in the interpersonal approaches.

Furthermore, use of university students is a unique opportunity for universities to sustain information sharing with communities. Therefore, avenues of enhancing the role of students and their capacity to competently disseminate information to farmers need to be explored. In addition, to sustain the relationships beyond the projects lifetime, a system that provides some interpersonal connection from a distance is required. Subsequent research on an ICT system that provides a platform for long-term engagement between university and farmers is important.

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## STATEMENT OF NO CONFLICT OF INTEREST

We the authors of this paper hereby declare that there are no competing interests in this publication.

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