Delivery of Agricultural Extension Service can be Improved through Mobile Phones

Key messages, findings and recommendations

- As a response to address constraints facing agriculture extension service, the Web-based and Mobile-based Farmers Advisory Information System (W-FAIS & M-FAIS) were developed to minimize various constraints hindering agricultural production such as lack of timely agricultural information; poor delivery of extension services because of few extension officers, lack of incentives as well as under-utilization of ICTs.

- The W-FAIS and M-FAIS was released for public use in January 2015 that followed an awareness campaign which was conducted in Kilosa District. The project improved working efficiency of the extension officers, provision of equal access to information and agriculture innovation system to the farming community linking all major actors of agricultural sector such as farmers, transporters, traders, input suppliers, extension officers, researchers and policy makers, which makes easier for the establishment of community initiative for solving complex problems in agriculture.

- Issues of quality control were monitored through the use of agriculture innovation system. The agriculture innovation system consists of networking with members of Kilosa community radio, local telecentre, researchers from Sokoine University of Agriculture and representative actors from farmers, processors and traders.

- The study proposes a policy for establishing a national framework for validation of agriculture knowledge information systems. For this policy to work the following aspects should be operational: establishment of an e-Agric-Extension Policy; improving collaboration and capacity building; and strengthening ICT infrastructure

Introduction

Lack of timely agricultural information is one of the constraints on small-scale agricultural production and natural resource exploitation a sector that provides livelihood for 70–80 percent of the Tanzanian population. The main reasons being low budget allocated for extension services, inadequate number of extension officers, and poor working environment. Yet others include lack of reliable means of transport to reach the farmers, limited financial support for carrying out demonstrations and field experiments on new technologies. Many efforts have been done by the Government of Tanzania to address this problem such as involving the private sector in the provision of extension services, restructuring of district and local Governments. This has been done to coordinate extension services at district and village level.

Table 1: Farmer-agent ratio in selected countries

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<tr>
<th></th>
<th>Ethiopia</th>
<th>Kenya</th>
<th>Tanzania</th>
<th>Nigeria</th>
<th>China</th>
<th>India</th>
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<tbody>
<tr>
<td>Total number of extension agents (000)</td>
<td>60</td>
<td>6</td>
<td>7</td>
<td>5</td>
<td>800</td>
<td>60</td>
</tr>
<tr>
<td>Farmers per extension agent</td>
<td>480</td>
<td>950</td>
<td>2500</td>
<td>3300</td>
<td>620</td>
<td>5000</td>
</tr>
<tr>
<td>Agent ratio per 1000 farmers</td>
<td>2.08</td>
<td>1.05</td>
<td>0.40</td>
<td>0.30</td>
<td>1.61</td>
<td>0.20</td>
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</table>

[Source: Bakasa et al., 2015]

In Tanzania various ministries, universities, private sector, non-governmental organizations, community based organizations, faith based organizations and development institution partners already
provide extension service to farmers. They all offer their extension service to farmers and other actors but often they work in isolation. A national framework for e-extension is needed for translating it into a national strategy. Its aim is to bring all actors together to work towards common goals, which would increase efficiency and effectiveness of the agricultural education and extension services offered to farmers and other actors to realize synergies. This would avoid duplication of interventions and increase cost effectiveness of the extension services. Moreover, the potential of ICTs has not been fully exploited for supporting a holistic national e-agriculture strategy especially in supporting communication, knowledge sharing and transfer of new and proven technologies in agriculture. Quality of information given to the farmers using AAS supported by ICT is questionable. The reason being that most AAS provide pre-defined questions and answers which don’t match with different contextualized problems facing farmers in various agro-ecological zones of Tanzania. Also, the cost for advisory services using AAS is higher. Thus, there is a need to address the aforementioned problems through use of electronic extension (e-extension) and conventional agriculture extension service delivery systems. With the help of ICTs, an agricultural extension officer is expected to be more diversified, knowledge-resourceful to meet farmers’ information needs in various subjects (agriculture, social, health, cross cutting issues etc) (Plate 1). As a response to this quest, the web-based and mobile-based Farmers Advisory Information Systems (W-FAIS & M-FAIS) were developed.

W-FAIS and M-FAIS is designed to provide timely and accurate agriculture information to many farmers at low cost compared with the conventional agricultural extension services. W-FAIS and M-FAIS is a web-and mobile-based application which enables farmers to submit questions and inquiries to the system by sending messages via their mobile phones or web. The question from the farmer is immediately sent using either SMS or web form to a competent subject matter specialist. A SMS can immediately reply to the question and the answer is sent back to the farmer through FAIS. The system also keeps record of all questions asked and their answers. FAIS allows the farmer to get a timely answer on agricultural and marketing information at any time of the day from extension officers. FAIS also supports automatic secure storage of the exchanged information between farmers and extension officers.

Research Methodology

The research study area was in Kilosa District located in Morogoro Region in Tanzania. The participatory action research approach was used in which problems on poor delivery of extension services were thoroughly studied to see how best the ICTs can be utilized to solve them. Also a baseline survey was conducted to understand the attitudes of the community in relation to the use of ICTs in agriculture.

Findings

Analysis of questions answered shows that farmers submitted questions in the following areas: -

i. Crop husbandry (annual & food crops)
ii. Livestock
iii. Climate change issues
iv. Tree farming
v. Aquacultures and
vi. Markets and market information

Further, it was found that the pattern of farmers who specified their locations in their SMS shows that they called from different parts of Tanzania (Table 2):

Plate 1: Farmers from Kilolo district visited Kilosa district to learn how Ushauri Kilimo works (17-06-2015)
The average number of questions per farmer was 2.26 questions where 1289 questions were asked by 571 farmers. Out of these, only 895 had been answered by the extension officers, and the average number of questions answered per extension officer was 33.15 (Table 3).

Analysis of questions answered shows that 279 questions asked were in crop husbandry (annual and food crops). The number of SMS sent to Ushauri Kilimo for different types of crops is as shown in Table 4 below, of which 61% were in tomatoes.

Also, there were 80 SMS submitted by farmers asking questions on issues about livestock husbandry (Table 5).

In summary, the types of questions asked for 934 SMS are depicted in Table 6. However, most SMS contained multiple issues making it difficult to categorize them.

**Conclusion**

The study findings show that access to appropriate information and techniques on time is more critical for the smallholder farmers. Piloted W-FAIS and M-FAIS proved that mobile phone use has direct impact for enhancing agricultural productivity and farmers’ livelihoods. Also, the project has improved work efficiency of the extension officers through provision of information to farming communities on time. The best extension officer answered 87 questions apart from his/her daily face-to-face visits to farmers in a village. The average response time after the question had been assigned to an expert to answer was 32.49 hours. The system has been re-engineered to improve the average response time and hence in April 2016 it was reduced to 17.8 hours. Furthermore, W-FAIS and M-FAIS has linked major actors in the agricultural sector such as farmers, transporters, traders, input suppliers, extension officers, researchers and policy makers.
Policy Recommendations

The findings from this research necessitate the establishment of national framework for validation of agriculture knowledge information system. The proposed framework or innovative platform would enable the extension system to be linked and function as one rather than as a stand-alone isolated platform without clear guidelines and coordination. To achieve this, the following are recommended.

i. Include e-Agric-Extension in the National Policy
   The National ICT Policy of 2003 does not explicitly cover ICTs in agriculture. Hence, there is for MAFCS to have an e-Agriculture issues in the policy, with emphasis on agricultural extension service delivery supported by ICTs.

ii. Capacity building in ICTs for agriculture
    MAFC through the Agriculture Sector Development Strategies (ASDS) Programme should allocate funds to local government authorities for ICTs training, and scaling up.

iii. Strengthening ICTs for agriculture
    The LGAs should invest in ICTs: by providing computers with Internet connection, community radio stations, mobile phones to ensure that information, knowledge, innovations and practices are appropriately sent to smallholder farmers.

iv. Use of Communication Methods & ICTs
    For effective agricultural extension service delivery, LGAs should see that agricultural extension officers use ICTs and traditional extension communication methods (farm visits, print media, Internet, social media, radio, TV) to reach many farmers with minimum efforts.

References

URT (2003). National Information and Communication Technology Policy

URT (2001). Agricultural Sector Development Strategy,

URT (2010). Livestock Sector Development Strategy

URT (2010). National Strategy For Growth And Reduction Of Poverty II


Saravanan, R. (2013). ICTs for Agricultural Extension in India: Policy Implications for Developing Countries, ELDIS

## Annex 1: List of publications products from EPINAV Mobile Phone Project

<table>
<thead>
<tr>
<th>Type of Publication/Communication product</th>
<th>Title and Authors; publisher (Full citation)</th>
<th>Target audience</th>
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<tbody>
<tr>
<td><strong>Book chapter</strong></td>
<td><strong>MOBILE PHONE PROJECT</strong></td>
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RESEARCH OUTPUTS DEVELOPED WITH PROJECTS OF SIMILAR (SYNERGY) RESEARCH OBJECTIVES


OTHER RELATED OUTPUTS ON INNOVATIVE COMMUNICATION PATHWAYS DONE BY STUDENTS & STAFF ATTACHED TO OUR RESEARCH GROUP


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<tr>
<td>10 Radio promos (jingles)</td>
<td>The maize contents uploaded on W-FAIS and M-FAIS has been aired in Kilosa community radio from November 2013 up to December 2014. The aim was to validate the type of SMS which farmers can send to the system. URL: <a href="http://ushaurikilimo.org/faq2.php">http://ushaurikilimo.org/faq2.php</a></td>
<td>all maize value chain actors in Kilosa, Tanzania</td>
</tr>
</tbody>
</table>
| Facebook page | 177 subscribed to our project facebook page to get updates of activities of mobile phone project- URL: [https://www.facebook.com/Ict4AgriculturalExtensionServices/](https://www.facebook.com/Ict4AgriculturalExtensionServices/)  
Project story - [http://www.suanet.ac.tz/epinav/docs/mobilephone.pdf](http://www.suanet.ac.tz/epinav/docs/mobilephone.pdf)  
| Copyright policy for more than 900 agro-advisory information and knowledge present on SUA Ushaurikilimo | [http://ushaurikilimo.org/Copyright_Policy_2013_2016.pdf](http://ushaurikilimo.org/Copyright_Policy_2013_2016.pdf) | General public |

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For more information on Mobile Phone project: