SAUTI YA WAKULIMA: LISTENING TO THE VOICES OF THE FARMERS IN TANZANIA

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ABSTRACT

This paper describes the framework and development of the e-agriculture project Sauti ya wakulima, "The voice of the farmers" in Swahili. The latest scientific findings acknowledge that in order to find a sustainable way of producing food in the future, it will be necessary to understand agriculture as a complex system which, besides economic and ecological factors, also includes the social context of rural farming communities. *Sauti ya wakulima* adopts this vision by establishing an open and participative research process, in which a group of farmers living near Bagamoyo, Tanzania, uses smart-phones and a web platform to document their environment, and create thus a collaborative knowledge base.

DEFINING THE FIELD

E-agriculture defines an emerging field in which information and communication technologies (ICT) are applied to the improvement of agriculture and rural livelihoods. The term was introduced as one of the key areas of application of ICTs in the Plan of Action of the World Summit on the Information Society (WSIS), celebrated in Geneva 2003. Mobile communication technologies are presently the main focus of e-agriculture. In Africa, where most of the development projects for agriculture are concentrated, Internet usage is still low, reaching about 13,5% of the population; yet it has grown 2.357% over the last ten years, almost five times more than the rest of the world (Internet World Stats, 2011). However, more than a third part of the population in Africa are cell phone owners, and this rate is growing fast (International Telecommunications Union, 2010).

The original definition of e-agriculture and its more recent applications, tend to consider agriculture as a merely economic-productive activity, whose purpose in rural environments is to provide food security and alleviate poverty. While these goals undoubtedly are crucial, agriculture should not be understood exclusively from an economic-utilitarian angle. The International Assessment of Agricultural Science, Knowledge and Technology for Development Report (IAASTD, 2009) argues in favor of a fundamental shift in agricultural knowledge, science and technology, towards the acknowledgment of the multi-functionality of agriculture, understood as the interconnectedness and complexity of agricultural systems within diverse social and ecological contexts. The report identifies a strong social element of food production, which includes health, gender, tradition, social structures, and culture. While improving productive efficiency and access to information in rural agriculture are certainly key areas in e-agriculture, ICTs can

also empower farmers in less obvious ways. Sharing and disseminating farmer-held knowledge, providing real-time, audiovisual evidence of practices affected by climate change, and expanding the farmers' social networks are some of the ways in which an advanced e-agriculture platform can strengthen also the social context of rural agriculture. Moreover, mobile technologies allow for a multidirectional communication throughout digital networks, thus opening the opportunity of integrating farmer-held information and observation into the local collection of expert agricultural knowledge. Given the vertiginous growth of ICTs in Africa, and the dropping international prices of smart-phones and tablets, experimenting with state-of-the-art technologies that go beyond the limitations of SMS and voice services supported by basic GSM mobile phones is a realistic endeavor that can open new, more socially-oriented areas of action within e-agriculture.

Sauti ya wakulima

Sauti ya wakulima, "The voice of the farmers" in Swahili, is an e-agriculture project which directly addresses the socio-agricultural context of rural communities in Tanzania. The project was started in January 2011, when we travelled to Tanzania to conduct a series of interviews with farmers living near the town of Bagamoyo, with the purpose of engaging them in the creation of an online, collaborative knowledge base about the effects of climate change, using smart-phones as tools for observation and a web page to gather the recorded images and sounds. Accompanied by Dr. Flora Ismail from the Botany department of the University of Dar es Salaam, and Mr. Hamza S. Suleyman, the local extension officer, we held a meeting with a group of farmers that regularly gather at the Chambezi agricultural station to explain to them the purpose of the project, and ask them whether they were willing to participate. Despite the fact that none of them had accessed the Internet before, they had all heard of it largely through the younger members of their communities. They quickly understood that the images and sounds uploaded from the smart-phones would not only be visible to them, but to anyone who visited the project's web page. After deliberating, the farmers voted unanimously in favor of taking part.

In March, we established the project's dynamics together with the farmers, and carried out the first training session on how to use the smart-phone and the project's web page. A group of five men and five women chosen by the community would take turns to share the two available smart-phones, by exchanging them on a weekly basis. Whenever a farmer's turn to use the phone arrived, he or she would have the task of using it to contribute content to the knowledge base. These contents consist of units, which we call messages, comprised of a picture, a voice recording and an optional keyword. A special application running on the smart-phones makes it easy to capture the multimedia elements. It also integrates geographical information into the message, if available, allows the addition of one or more keywords and sends all the elements to a web server, bundled together as an email message. By using pictures and voice recordings, farmers can portray a wide variety of objects, situations, and persons, and complement visual evidence with their own spoken narrations. Adding keywords to audiovisual contents is a bottom-up form of sense-making, also known as tagging. Initially, the farmers agreed on a set of fixed keywords, or tags, that would guide their process of documentation. They chose the names of their main crops: amaranth, cassava, coconut, cowpeas, maize, mango, okra, orange, papaya, rice, sesame, sweet potato, tomato, and watermelon. All of

these tags appear on a multiple-choice list on the phones. However, the application allows farmers to enter a new tag when necessary. Finally, geographical information enriches the multimedia messages by locating them on a satellite map of the area. Farmers not only got together to exchange the phones but also to see and discuss the pictures and voice recordings that the group had uploaded during the week. There, they accessed the project's web page using a laptop computer with a mobile broadband connection. The design of the web page is simple and straightforward, making it easy to navigate. Pictures and sounds can be browsed by date, or by clicking on one of the tags which appear on the tag cloud on top of the page (Figure 1). The tag cloud acts as a search interface, and represents the aggregation of tags used by farmers to describe each message. Additionally, clicking on a picture will show the exact location where it was taken, on a satellite map provided by Google Maps (Figure 2).

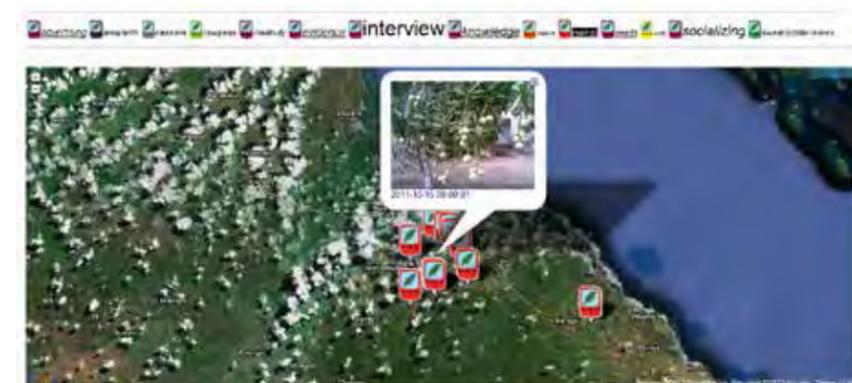Figure 1. The main page of Sauti ya wakulima.

Figure 2. Online map interface showing the audio-image messages.

At the end of May, we made our third visit to Chambezi. We provided further technical training to the farmers, in order to strengthen their mobile and Internet skills. We also suggested to the group that they use the phones for interviewing other farmers, although they had already started to do so spontaneously. A new tag was introduced: "interview", which later became the project's most frequently used tag. Farmers, thus, began a very active period of interviews, which reached three important peaks of activity in the agricultural shows at Morogoro in August, Bagamoyo in September, and Dar es Salaam in October. On our fourth visit in September, we concluded the first phase of Sauti ya wakulima by interviewing the participating farmers, in order to make a first impact assessment and learn about their views on the project's usefulness, and their suggestions for improving it.

Discussion

Appropriation can be considered as indicator for usefulness and meeting the needs of the targeted community as it can deeply affect the politics of their daily lives. In a context where communication technologies play an active role in development, it can be seen as a starting point for community empowerment (Bar, Pisani and Weber, 2007). The farmers found that documenting their practices and problems could lead to the creation of a shared, audiovisual knowledge base, which they could use for various purposes including learning, consulting of farming practices but also for promotion of farming inputs. Farmers also saw the project's potential for reporting problems, such as pests or construction of wells, to the extension officers and/or government officials in order to get timely assistance. This can be particularly relevant to the Agricultural Office in Bagamoyo. According to them, one of the greatest weaknesses in the local agricultural infrastructure is the lack of sufficient extension officers. Currently, there is a ratio of 1 extension officer per 1,145 farmers, almost half of the ideal ratio, established by the office at 1:600 (Bagamoyo, 2011).

A positive event boosting the self-confidence of the Bagamoyo farmers, was their visit to a large agricultural fair in the month of August and early September in Morogoro. Most postings dealt with the visit of that fair where the farmers took the phones and computer with them to show them to fellow farmers and merchants.

This was very well received by their colleagues and the Bagamoyo farmers gained standing and admiration for this project. We further noticed a distinct desire by the farming community to also consult and teach fellow farmers of "best practices" and inform them about innovations – be this a new shelling machine one farmer invented from scrap material or how to grow maize plants on terraces or add value to their products be pressing oil from coconuts or sunflowers. In fact, the interviewer repeatedly also requested that farmers with visible successes (good looking stand of crops or impressive harvests) shared their knowledge. And likewise, they expressed their gratitude for advice given to them that worked well or seeds and new cultivars handed to them for further experimentation. Grafting of trees also seems to be a technique increasingly recognized as very useful and practiced and promoted by a number of farmers.

There has been a move in recent years for "Farmer led research" as for example is formulated by Fetien Abay from Mekell University Ethopia (Abay, 2012) Additionally, climate scientists recognize need for participatory research which not only values indigenous knowledge but uses knowledge which is locally based. High resolution simulations of maize growing in Brazil, the Central African Highlands, and Ethiopia show that areas with crop gains or losses are highly localized and sometimes farmers gaining are "only kilometres from those who will lose completely. This means that adaptation studies and recommendations cannot be made at regional or national level but must be essentially local". (Jones et al., 2005). "Since response to climate change is variable from place to place we cannot make overarching recommendations. The best approach is a participatory one." (Jones et al., 2005) Farmers will not only learn from their own experience but also that of their neighbours as there will be analogues of future climate at other locations. Our methodology offers a promising tool to enable exactly that – make farmers to their own reporters and data collectors with scientists connected to them.

Conclusions

The original research question was to identify the communication needs of farmers as relating to climate change and their adaptation to rapid change. By including artists on the team and artistic methods such as the rich pictures and smart-phones we allowed the farmers creative freedom to document as they chose. We contend that this creative freedom motivated the farmers to participate and to continue to post prolifically. Thus we experienced no lack of participant motivation frequently cited by similar projects. Our findings concur with those of Abay who states, "Farmers are highly motivated when they can take the lead in documenting their problems and their solutions. They appreciate their roles in making decisions about what to document. Farmers often choose different foci in their documentation than the facilitation team would have done." (Abay, 2012) We propose that this rich body of informal knowledge be integrated into formal scientific knowledge and contribute to data gathering. There is the potential that the farmers' data forms a complex picture over time (systems knowledge) and that this could be complemented by interviews, the questions of which would be informed by the farmers setting the research agenda with the researchers.

Overall, we can conclude that *Sauti ya wakulima* was effective in revealing the social context in Chambezi, and also in strengthening and expanding the farmers' social networks. The activity of the group during the first phase of the project may be characterized as that of a post-digital social network: small-scale groups of hyper-connected people appropriating communication technologies for common goals, while fostering strong links for cooperation through face-to-face interaction (Tisselli, 2010). The final interview with the farmers who participated in the first phase of *Sauti ya wakulima* showed that farmers were very satisfied with Sauti ya wakulima. The interview clearly showed that the farmers have appropriated the project, taking it beyond its initial focus on reporting about climate change and using it to engage in a process of mutual learning.

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