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The impact of mobile phones on knowledge access and transfer of small-scale horticultural farmers in Tanzania

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Abstract

Agriculture is the main economic activity in Tanzania and the country's largest employer, providing livelihood for at least 80 % of the economically active population. Many studies have identified key challenges facing the sector for Africa in general – among these lack of access to knowledge. For agricultural producers, access to knowledge is important for an improved productivity and competitiveness. The fast diffusion of information and communication technologies (ICT) such as mobile phones across Africa in the last years has resulted in an improved access and transfer of agricultural knowledge. Studies have shown that rural actors like farmers in remote areas even use mobile phones for their farming business. Based on qualitative interviews in the Mwanza Region in northwestern Tanzania, this study aims to identify and categorise the different types of knowledge which are transferred via mobile phones. Our results show that mobile phones enlarge the ability of farmers to access business-relevant knowledge at an increasing spatial scale. However, the effects of the use depend on the type of knowledge and other factors. The results add to existing studies by deepening the understanding of the benefits of ICT on knowledge access and transfer for the context of rural small-scale farmers in Tanzania.

Zusammenfassung

Die Landwirtschaft bildet für mindestens 80 % der Bevölkerung in Tansania die Lebensgrundlage, sie ist ein bedeutender Wirtschaftssektor und der größte Arbeitsmarkt. Ein grundlegendes Problem jedoch für die Mehrheit der Produzenten stellt der fehlende Zugang zu Wissen dar. Der Zugang zu komplexem Wissen und Informationen ist vor allem für eine wettbewerbsfähige und hochwertige Produktion und Vermarktung notwendig. Die rasante Verbreitung moderner Informations- und Kommunikationstechnologie (ICT), wie z.B. Mobiltelefone, in Afrika in den letzten Jahren hat dazu geführt, dass Wissen schneller ausgetauscht werden kann. Studien zeigen, dass auch Kleinbauern zunehmend Mobiltelefone nutzen. Basierend auf qualitativen Interviews in der Mwanza Region im Nordwesten von Tansania identifiziert der vorliegende Beitrag verschiedene Typen von Wissen, die mit dem Mobilfunktelefon übertragen werden. Unsere Ergebnisse zeigen, dass die Nutzung von Handys den Zugang der Produzenten zu geschäftsrelevantem Wissen verbessert. Allerdings sind die Effekte der Nutzung abhängig von der Art des Wissens und weiteren Faktoren. Die Ergebnisse tragen zu einem tieferen Verständnis der Wirkung von ICTs hinsichtlich Wissenszugang und -transfer im Entwicklungskontext bei.

Keywords ICT, knowledge access, agriculture, Tanzania

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1. Introduction and general framework

In many developing countries like Tanzania, the agricultural sector plays a significant role in the national economy (World Bank 2009). Particularly commercial agriculture can contribute to the development of rural regions as it creates jobs and income. To produce for commercial buyers (e.g. supermarkets) it is important to meet certain requirements (e.g. a certain level of produce quality within a certain period of time). Hence, to meet such requirements it is necessary to have the right information and knowledge on how to produce commercial crops. Furthermore, market-relevant knowledge on perishable distribution channels and actual prices is needed. The current debate on ICT4D suggests that crucial knowledge for farmers and other businesses in developing countries can be accessed via ICT (in particular via mobile phones, e.g. World Bank 2011). In the last decades, mobile phones have become very popular in Sub-Saharan Africa and are already used in remote areas by farmers for a rapid transfer of agricultural knowledge (Dannenberg and Lakes 2013). However, so far, the ICT4D debate is mainly based on applied studies (often by donors or private companies) and a deeper understanding and studies on what kind of knowledge can be transferred and accessed is missing (Heeks 2014).

Based on qualitative interviews in the Mwanza Region in northwestern Tanzania this study aims to identify and categorise the different types of knowledge which are transferred via mobile phones.

Over the past years mobile phone ownership and usage has also expanded in rural Tanzania, including use amongst small scale farmers. In 2010, 56 out of 100 inhabitants in Tanzania subscribed to a mobile phone compared to 57 out of 100 inhabitants in entire Sub-Saharan Africa (Kimura and Minges 2012: 206). A few studies have already been conducted in Tanzania analysing the usage of mobile phones of rural and urban communities in general (e.g. Molony 2008). However, knowledge transfer and access via mobile phones as such has only partly been analysed.

This paper is concerned with how different types of knowledge are transferred via mobile phones. From this perspective, we follow Humphrey (2002) who divided the impacts of e-commerce on marketing structures in 1. transaction and 2. information-orientated exchange. The latter can be further divided, according to Morgan and Murdoch (2000: 160) who applied the

existing ideas on knowledge distribution to agricultural networks. Based on Lundvall and Johnson (1994) they define simple information as information in terms of facts ("know-what"), while complex knowledge includes different types of implicit knowledge that go beyond, such as "know-why" and "know-how". Complex knowledge is important for the understanding of production processes and involves e.g. trained skills, which are often implicit and therefore difficult to communicate. Yet, it is not clear which type of knowledge can be communicated to what extent via mobile phones. Therefore, this paper tries to bring both approaches together to examine the transactions and different types of knowledge that are transferred via mobile phones by horticultural farmers.

This paper is based on results of a master's thesis embedded in an ongoing joint project of the University of Cologne, the University of Vechta and Saint Augustine University (Tanzania). It was partly funded by the German Federal Ministry of Education and Research.

2. Methodology

The focus of this empirical study, which was implemented between August and September 2013, is on small-scale farmers that produce horticultural products for commercial use. With the help of local research assistants and the Agriculture Training Institute of the Ministry of Agriculture in Ukiriguru, 12 qualitative interviews with small-scale horticultural farmers were conducted. In addition, two expert interviews with local scientists were used to interpret and triangulate the results.

3. Results

The interviews reveal actual exchange on all three different forms (transactions, information and complex knowledge). However, the extent to which this exchange takes place differs significantly between these various forms.

Generally, our study shows that most farmers in the focal region have a mobile phone and use it for business purposes. In detail, we could distinguish the following different types of impact that mobile phones have:

a) Transactions: Various transactions take place via mobile phones including mobile payment and the coordination between buyers and suppliers. Payment transactions conducted via mobile phones between

buyers and suppliers are common practice among farmers as they reduce their reliance on cash in remote areas, lower the costs that they otherwise would incur for financial services, i.e. transaction costs, and offer both parties increased flexibility.

"[...] Now, I just call the buyer and we negotiate on the phone about the price, the time and the place for selling. With that knowledge I am able to prepare my farm to get the harvest and selling the products" (Farmer #5).

According to the interviewed farmers, mobile phones increase efficiency, allowing them to save money by avoiding wasted travel and flexible marketing (see also Aker 2010). Loss of harvest can be reduced as the perishable products are sold faster.

b) Simple knowledge: The main need of simple knowledge includes knowledge on farm supplies, on market information and considerations on the organisation of transport. This is accessed through a range of sources like other farmers, input suppliers, family members and buyers. According to the respondents, their access to simple knowledge is satisfied, primarily by using the mobile phone.

"Before I had a phone I never knew the price of the produce I am selling before I went to the market. Sometimes I even had to go to different markets for comparing them despite having no contacts. [...] With the phone we don't work blindly anymore" (Farmer #4).

Using mobile phones for the exchange of simple knowledge improves the marketing of produce by allowing the farmers to make better-informed decisions.

c) Complex knowledge: Complex knowledge comprises the knowledge required to identify pests and diseases, the right usage of pesticides as well as production techniques. This kind of knowledge is usually transferred through technical assistance (e.g. NGOs, extension services), observation and direct interactions. Also farmers provide complex knowledge to each other, for instance sharing experiences of treating certain diseases. Such kind of knowledge is mainly transferred via face-to-face as it is mainly tacit and not easy to transfer.

"It's easy to call somebody for a short question. But sometimes I have more complex problems on my farm

like unexpected problems with my new fertilizer. Then I call a farmer or an extension officers and organise a meeting" (Farmer #1).

With calls to arrange meetings, mobile phones provide the opportunity for farmers to access complex knowledge by enabling the personal communication process needed, but not for the knowledge exchange itself. To sum it up, complex knowledge is predominantly not transferred directly via mobile phones. However, mobile phones indirectly improve farmers' access to complex knowledge (see also Molony 2008). According to the respondents, through using the phone the number of contacts increases as well as the spatial scale of interaction. This can result in a diversified knowledge network.

4. Conclusion and outlook

The increasing use of mobile phones results in positive contributions to the economic activities of horticultural farmers in the Mwanza region. This allows the farmers to access different types of knowledge at an increasing spatial scale. Frequent knowledge transfer between different actors in different regions has become easier. As a consequence, improved access to mobile phones facilitates a diversified knowledge access and leads to better-informed farmers. Additionally, this study shows that the usage of mobile phones depends on the kind of knowledge that is to be transferred. We could identify different forms of knowledge transfers and transactions using the phone. The mobile phone can be considered as an additional resource which will be used more where savings in time and money are high and where the added value of face-to-face contact is low (e.g. simple, codified knowledge).

In conclusion, this paper adds to existing studies by deepening the understanding of the benefits of mobile phones on knowledge access and transfer in the context of rural small-scale farmers in Tanzania. It shows how the usage and the benefits of mobile phones can be differentiated by the types of knowledge that is transferred. Yet it is not clear to what extent farmers and traders benefit from those connections in detail and how the organisation of value chains is affected. Therefore we recommend conducting further research to investigate how mobile phones impact on the configuration of agricultural value chains through their increasing use among farmers.

Moreover, as many studies promote ICT proliferation as a key element of development strategies, a closer look is suggested at limitations regarding the spread of ICT with respect to agricultural value chains. Possible negative outcomes (e.g. exclusion of those who do not have access to a phone) have to be considered more precisely (see *Carmody* 2012).

In addition, from the point of view of social relations, investigations are worthwhile on how far social categories like gender or education influence stakeholders in using and benefitting from ICT and if the reduction of face-to-face contacts affects rural communities.

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