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Roles and Impacts of ICT in the Reduction of Vulnerability in Rural Households in Niger: The Case of Maradi

Sitou Lawali and Issoufa Idrissa

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The Technical Centre for Agricultural and Rural Cooperation (CTA) is a joint international institution of the African, Caribbean and Pacific (ACP) Group of States and the European Union (EU). Its mission is to advance food and nutritional security, increase prosperity and encourage sound natural resource management in ACP countries. It provides access to information and knowledge, facilitates policy dialogue and strengthens the capacity of agricultural and rural development institutions and communities.

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Executive summary

In Niger, the new information and communication technologies (ICTs) play an important role in the socio-economic development of the country, especially in the agricultural sector where the use of mobile phones for information exchange on markets and prices of agro-pastoral products has become one of the major tools in reducing the vulnerability of rural households. This study was conducted in Maradi region; it aims to contribute to a better understanding of the impact of the applications of the mobile phone in the reduction of vulnerability.

This paper presents the main results of surveys conducted on site. The results highlight the roles and impacts of the applications of mobile phone in the reduction of the vulnerability of rural farmers. They demonstrate the importance of ICT applications in the promotion of marketing activities and the development of adaptive capacity and resilience of farmers living in a bleak agro-climatic and socio-economic environment.

Introduction

In Niger, ICTs play an important role in the socio-economic development of the country, especially in the agricultural sector where exchange of information on markets and prices of agro-pastoral products using SMS on mobile phones has become one of the major tools in the reduction of the vulnerability of rural households. This study in Maradi region aims to contribute to a better knowledge of the impact of the application of the mobile phone in the reduction of vulnerability. It also aims to capitalise and share the successful experience of adoption of new ICTs by farmers to gradually fit into agricultural value chains.

This article presents the results of a field study conducted in the region of Maradi; results show the roles and impacts of the applications of mobile phone in the reduction of vulnerability of rural farmers. The SMS messaging services used by farmers in Maradi facilitated access to information and to markets, helped in price formation, a reduced number of intermediaries in transactions and facilitated the integration of small producers in the agricultural value chain. This study showed how ICTs contribute in the reduction of the vulnerability of rural farmers and how they use the applications to develop their activities, their adaptive capacity and their resilience in a bleak agro-climatic and socio-economic environment.

This paper aims to address the following issues:

- The place of agriculture and livestock in the country's economy
- The typology of studied agricultural markets
- An overview of the experiences of the information systems on the market in Niger
- How the system operates, and at what cost?
- ICT – the integrating factor of small producers in the agricultural value chain
- Information on the transhumance¹ routes
- ICTs – a tool to fight vulnerability of rural households
- ICTs – a favoured warning tool for catastrophes and food crises.

Materials and methods

The study was conducted in the municipalities of Tchadoua, Maradi, Guidan Roundji and Dakoro, in the region of Maradi. The Maradi region was formerly the centre of production of peanuts in Niger, and is known today for production of commercial crops, such as tiger nut, cowpea and sesame, as well as livestock. However, “livestock is often not the most important non-land farm assets in rural households” (World Bank, 2008: 103). Promoting access to information through ICT is expected to change the household economies toward an information system to allow them to be integrated in the market value chains. Thus, the data are obtained from surveys conducted in different markets of the region such as Tchadoua, Guidan Roundji, Dakoro, Sakabal, Roubou, Maradi etc. Direct interviews and participatory observations (Le Meur, 2002) involved about 150 farmers. Interviews with farmers focused

¹ Transhumance is the seasonal movement of people with their livestock between fixed summer and winter pastures.

on discussions around: the factors of vulnerability, market opportunities for farmers, communication tools and innovative applications for better integration of farmers to markets.

Results and discussion

The place of agriculture and livestock in the country's economy

Niger is a landlocked West African country situated in the Sahel–Saharan countries. It has an area of 1,267,000 km² divided into four agro-climatic zones.

- The Saharan area, which is 77% of the area of the country, receives less than 150 mm of rainfall per year, which makes it an area reserved exclusively for livestock.
- The Sahel–Saharan area, which occupies 12% of the territory, receives between 150 mm and 350 mm of rain. Its northern part is a vast area for livestock.
- The Sahelian area covers 10% of the country and receives between 350 mm to 600 mm of rainfall; it is an area for agriculture including sedentary livestock breeding.
- The Sudano-Sahelian area, which represents about 1% of the total area of the country, usually receives 600 mm to 800 mm of rain per year.

The last two areas are where agriculture and livestock breeding are practised but under difficult conditions due to insufficient and irregular rainfall and poor soil fertility (Guengant and Banoin, 2003). Demographically, Niger has a population of 17,129,076 inhabitants and an annual growth rate of 3.9% (NIS, 2012).

Farming and livestock occupy nearly 87% of the Nigerian population (Rhissa, 2010). These sectors contribute to about 42% of gross domestic product including agriculture (28.4%) and livestock (14.6%) (NIS, 2008). These activities provide livelihoods and help to fight against poverty in pastoral and agro-pastoral households.

However, rural farmers face on a daily basis huge difficulties that hinder not only the development of their activities but also their integration in the marketing of their products. Indeed, in the Maradi region, small producers are exposed to informal transactions and to multiple constraints that expose them to all kinds of vulnerability.

Among these constraints, there are:

- the shortage and remoteness of markets from the production sites especially in pastoral areas
- the isolation of the pastoral area and the lack of road infrastructure that reduces the dynamics of trade and the flow of agricultural products (cowpea, tiger nut, milk, butter, cattle, etc.)
- the lack of access to agricultural inputs and livestock
- the lack of forage resources due to low rainfall
- the uncontrolled mechanism of market pricing
- the intermediation in transactions on agricultural products that often works against farmers.

The informal nature of cattle marketing creates a significant shortfall for the State. In the context of the study area, a market is said to be close when situated a 5 km radius, not far

when it is less than 5 km and very far if it is over 10 km away. The pastoral communities are isolated and this excludes them from the economy.

All these difficulties reflect today's vulnerability of rural farmers; many farmers try to break away from their difficulties by using ICTs. They use market information systems through simple and fast applications on mobile phones; this allows farmers to get the best profits from their production.

Typology of the studied markets

According to the categorisation of livestock markets conducted by the Netherlands Development Organisation (SNV) and the Ministry of Livestock in Niger through market information systems (MISs), four categories of markets were identified according to the stakeholders who populate them (Guibert *et al.*, 2009). There are four types of markets as follows:

- *Collection markets*: it is the place of primary collection of cattle and it is the place of the primary collection of animals and animal feed and cereals. These markets are located at the border of the production area (the pastoral area and agro-pastoral area). From this definition we can say that all markets targeted by this study are collection markets. There is direct contact between farmers and buyers and there is free competition. These markets drain each week hundreds of animal heads. It is the case of the Woursena market (Dakoro), which drained on the day of its animation over 1,000 head of small ruminants and over 600 head of large ruminants and all these animals are sold around 16:00.
- *Assembly markets*: This type of market is the place of assembly of groups of animals collected by the small traders said to be collectors and destined to be taken to border markets for export. The Tchadoua market is a trading centre between farmers and traders, many of whom come from Nigeria.
- *Consumer markets*: These markets are supplied by assembly markets and are located in large, urban centres; they can therefore play the role of export markets.
- *Export terminal markets*: They are located at the border of national borders. Animals sold on these markets are transported to border markets in Nigeria.

An overview of experiments of MISs in Niger

Farming is the main source of revenue for farming communities and contributes to economic development and functioning of the society. Creative initiatives have been implemented in order to facilitate access to information on agricultural products and to promote better integration of farmers in the value chain.

Among these initiatives, an ICT project funded by Telecom Without Borders (TWB) was developed to reduce losses in transactions of farmers in the absence of an efficient system of the distribution of price information on markets. Conducted in 2007, the project has supported the processing of data from two livestock market information systems and one agricultural market information system (AMIS). After treatment, information was widely disseminated and shared with farmers and herders through radio broadcasts. The second experiment was an additional service of information known as *labarun kasuwa* or the market information system implemented by Orange Niger. This application allows farmers and other

economic agents to instantly obtain information on the price of agricultural products in the different markets of the country. Initiated to facilitate the access to information to farmers, this messaging service was a resounding success in terms of its adoption and use by both rural and urban communities. Designed and implemented in collaboration with the National Network of Chambers of Agriculture of Niger (RECA – Réseau national des chambres d'agriculture du Niger), this application via SMS provides an opportunity for all stakeholders to learn about the evolution of prices of agricultural products in markets.

How does this system work? And at what cost?

Orange Niger currently provides information on the price of a product on a market in Niger. It operates a simple and fast application for farmers and other operators with the aim of improving their negotiation skills in their transactions and facilitating their decision-making for better development of their agricultural products. The main products are commodities and cattle (Livestock MIS).

The procedure is simple and not expensive; the price of the message is FCFA 100 and only FCFA 50 if you know the market code.

Box 1. Application procedure

- Have a mobile phone equipped with an Orange SIM.
- Go to Messages.
- Send an SMS to **139** with the text “**marche**”.
- You will immediately receive a message offering you a list of all markets with one number each.
- If you would like to know the price of the last commodities on the Galmi market you need to compose a new message.
- Send an SMS to the same number **139** but with the text being number “4” (do not type number, only 4).
- A few seconds later, you will receive the price of the three commodities identified in the last market in the area. If a price cannot be found, this means that the product is not available in the market.
- In total, you would have sent two messages which would have cost you **FCFA 100**.
- However, if you already know the code of your market, you can send the number directly to 139 as a text message and you **only pay FCFA 50**.

Source: RECA, 2010

ICTs, factors of integration of small producers in the agricultural value chain

The data analysis obtained from our surveys shows a direct impact of ICTs on the income level of farmers. Weekly radio broadcasts on the price of commodities according to the markets contributed to improving the prices at market level. The rural farmers regularly follow the dissemination of prices of different products on the market, which has allowed some producers to avoid abuse from intermediaries during transactions.

The mobile phone is now an essential tool for a pastoralist community; it has transformed the lifestyle and improved their welfare. The testimony of the village chief of Kouggou illustrates this well.

“With my mobile phone, I check the prices of agricultural products on different markets. It also allows me to obtain information on my animals gone in transhumance. Finally, the mobile phone facilitates access to information relating to the availability and abundance of grazing from one area to another.”

Community radio stations are available in most pastoral areas and provide relevant information for pastoralists such as: the status of pastoral resources in different areas, livestock markets courses, social and professional events and early warnings.

Pastoralists also use a mobile phone to contact their intermediaries for instructions on sale, depending on the availability of animals on the market. Others use mobile phones to contact suppliers of cattle food (bran, cotton seeds) to place their orders.

A breeder working in the market in Dakoro said, “We devote three days to go to the market which is closest to our camp. With this information system, we always follow the price change on the market. This helps us decide on which animal to sell, depending on the need.”

Most of the herders encountered in the markets of Dakoro, Guidan Roundji and Tchadoua report that the use of mobile phone has stopped them being isolated by connecting nomadic herders and markets; they can now understand the cattle marketing chain. Nowadays, herders use mobile phones to make arrangements among themselves for transporting their animals to border markets where prices are more profitable, without having to make use of intermediaries.

Information on transhumance routes

Because of the wide scope of the pastoral zone and the multiplicity of factors that increases the vulnerability of producers, the mobile phone has significantly improved access to information for rural farmers. The results of our surveys show that many stakeholders use the applications to receive information on the availability of agricultural products. Others use this technology to get information on the status of the pastureland or the availability of water throughout the entire transhumance route.

“Our area is very vast; in order to attend a weekly market, we take a lot of time. Nowadays, with the use of mobile phones, I can close transactions without having to be on site. With the messaging system, I got to know many markets. This system gives us the opportunity to know the price of cowpea and other products anywhere in the country. It is from the mobile phone that I organise all my commercial activities. For example, when the days of the weekly market in two locations clash, my brother goes to a market with commodities and it is by SMS that we decide whether to sell or not. The phone is a tool, which helped us a lot in facilitating access to agricultural information.” Mahamadou Adamou, Cereal trader, Guidan Roumdki market

ICTs, tool to fight against the vulnerability of rural households

The AMIS, the cattle market information system and the instant messaging service from Orange Niger significantly strengthened the skills of farmers in terms of selling and buying goods and the method of determining the prices for the different products.

In an area marked by a poverty rate of 59.6% nationally and 73.4% across the Maradi region (NIS, 2008), ICTs are an essential element for agricultural development and for the fight against poverty in general.

Information mechanisms initiated at the request of farmers' organisations have produced a more informed stakeholder who can resist the attempts of spoliation and depreciation of trade values which is often orchestrated by large traders with the help of intermediaries. The dissemination of the price of products on different markets is perceived by stakeholders as one of the effective strategies to fight against the vulnerability of rural households.

ICTs, favoured tool for the warning of catastrophes and food crises

In the fight against food insecurity, Niger has established a system for advance warning and prevention of droughts and food crises. Known as SCAP/RU (Early Warning and Emergency Response System), this participatory monitoring system of vulnerability in communities is based on relevant information regularly collected by local organisations. It uses the mobile phone to accelerate the communication of reliable and detailed information to a large audience in order to generate possible solutions.

Conclusion

This paper reveals the central role of the new ICTs in the fight against vulnerability in rural households in Niger. Some applications on the mobile phone constitute an effective tool for integration of small producers in the agricultural value chain. Unfortunately, one of the constraints that hinder the more widespread use of the information system *labarun kassuwa* by text messaging is the high level of illiteracy that characterises the rural population of Niger. It is therefore necessary to train farmers through farmers' organisations on the practical use of these simple and cost-effective applications.

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