

Chapter 16

Technological Innovations in Agriculture in Sub- Saharan Africa

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ABSTRACT

The purpose of this chapter is to review the literature on technological innovations in general and more specifically on the use of information and communication technologies in agriculture. Emphasis was placed on two main tools, namely the telephone and the internet. The opportunities created by these two tools have been highlighted on the basis of previous studies supported by scientific arguments. Some stylized facts have also made it possible to highlight the level of these ICTs in 20 countries of sub-Saharan Africa. Some countries like Kenya, Nigeria, South Africa, and Rwanda, and, to a lesser extent, Senegal are more advanced in this process of using ICT because they are relatively more economically stable. Finally, the constraints linked to the adoption of these ICTs as well as certain public policy recommendations were formulated.

INTRODUCTION

Agriculture remains the backbone of most economies in Africa, where it alone accounts for 60% of total employment (IFPRI, 2019). It is estimated that 45 percent of the territory is classified as arid, sub-arid or dry sub-humid zones: rainfall is between 300 mm and 800 mm per year. These regions are particularly affected by recent climate change accentuating constraints on agricultural production, making them very vulnerable to fluctuations in production, sources of serious food crises (Clavel, Barro, Belay, Lahmar, & Maraun, 2008). Exposure to risks, shocks and weak incentives for welfare are the main issues facing farm households in Africa (Osabohien, Onanuga, Baderounmu, Matthew & Osabuohien, 2020). According to the same authors, the same is true of market access difficulties (including the poor condition of roads, the failure of marketing infrastructure, lack of information on market opportunities, lack of control over negotiation techniques of the producers), the low technicality of the farmers but also the insufficiency of credits.

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In addition, according to the World Bank (2020), the continued increase in globalization and the integration of food markets has intensified competition and efficiency in the agricultural sector and created unique opportunities to include more smallholders in supply chains. Yet on a related note, agriculture faces a series of modern and serious challenges, particularly in developing countries exposed to price shocks, climate change and persistent infrastructure deficiencies in rural areas. Severe and unforeseen weather conditions reduce already limited yields and promote migration from rural areas and rural employment. It is in the context of the globalization of agriculture that the need for information becomes most pressing. Smallholders, who still provide a significant portion of the world's food, need information to advance their work just as much as industrial producers. It therefore becomes necessary to wonder about the question of new methods applicable to agriculture so that it is efficient, more profitable, less painful and more attractive than Information and Communication Technologies (ICT)

ICT can be seen as a tool to increase efficiency and save time. There are a dimension (sub-set) of technology (alongside electricity generation, transport, etc.), which can be considered as an essential indicator of the level of development achieved by an economy and given the trend Current globalization, ICT could be a tool to achieve this goal (Ejemeyovwi & Osabuohien, 2018). This definition generally applies to all sectors of activity including the agricultural sector.

Thus, ICTs, particularly the telephone and the internet, as we wish to address in this chapter, are now tools that farmers in several countries have integrated into their strategies for improving agricultural production, increasing yields and marketing this production. According to the existing literature on ICT in particular the telephone and the Internet, many opportunities are noted for their use such as the facilitation of money transfer to farmers, the marketing of agricultural products, information on weather conditions and market failures etc. Stylized facts on the rate of telephone and internet adoption, however, show low levels in Sub-Saharan Africa as shown in Figure 1 and 2, while they constitute the main tools for receiving meteorological information and coordinating between farmers themselves, but also between farmers and buyers of production and many other roles that will be developed in the body of the chapter.

The main objective of this chapter is to review the literature on information and communication technologies applied to the agricultural sector in Sub-Saharan Africa. This will specifically involve questioning the theoretical review of the literature on technological innovations in general and applied to agriculture in a particular way, a field in which the theme of our chapter fits, but also to highlight the role of two tools, namely the telephone and the Internet, in the facilitation of agricultural work and the flow of production, although access is not sufficient for all countries.

The main research question of this article is what are the opportunities that the information and communication technologies (telephone, Internet) generate for the benefit of the agricultural sector in Sub-Saharan Africa? To answer this question, we will use existing literature to identify the arguments that could be put forward as scientific evidence.

The work is structured in three main parts. The first deals with the theoretical review of the literature on innovations in general. The second concerns the review of the literature on technological innovations in agriculture. The last part deals with the opportunities of Information and Communication Technologies for the benefit of the agricultural sector. It also analyzes with stylized facts the evolution of the rate of subscription to the telephone and the rate of use of the Internet in the Sub-Saharan African countries targeted by the study. The conclusion finally highlights guidelines and recommendations for public policies.

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