Chapter 10
A Web–Based Platform for Crop–Specific Data Management and Exchange of Farmers' Experiences

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ABSTRACT

In this chapter, the research theme is focused on the relationship between small farmers and information and communication technologies (ICT). Although there are other previous works that have already analyzed this same relationship, the authors believe that access to information remains a major challenge for farmers. With the application of workshops on agricultural practices of maize, in communities of Oaxaca and Veracruz, they learned about the practices of farmers around the production cycle and applied a survey to find out their opinion regarding the use of ICT. In addition, they used a specialized database to complement the workshops objectives. Next, in collaboration between researchers in the areas of biology and computing, they developed a web platform for access and use of information related to the variables of interest to farmers. Among the main results, they highlight that the community prefers to use cell phones to access such information and that the older generations are looking to transmit experiences and knowledge to the young with the aim of conserving ancestral knowledge.

INTRODUCTION

Information and communication technologies (ICT) are having increasing impact on different domains and when it comes to agriculture,this is not an exception. The compiled and managed information could be of interest to a broad range of different actors, such as governmental audience, educational and research institutions, small associations, and certain producers.

In the case of precision agriculture (PA), the agronomic experience is one variable that can greatly influence the agricultural decision-making process, and even more, if technology transfer helps to take the right action in the right place at the right time, the benefits for any producer could be highly positive.

Broadly speaking, technology transfer includes the development of activities aimed at facilitating access to knowledge, products and technological services developed for the agricultural sector(Corpoica, 2015). The concept of technology transfer is evolving towards knowledge transfer, by understanding arguments from personal, social or cultural experience(González Sabater, 2017).

The processes involved in knowledge management are the creation, transmission or socialization, and use of knowledge(EcuRed, 2011), (Canals, 2003). Technology transfer strategies in the agricultural sector are aimed at getting producers to adoptand use the technologies. To the extent that a community makes use or appropriates knowledge or technology, we can speak of innovation; an action that contributes to the social and cultural transformation of a community. Knowledge management is facilitated by ICTs through virtual communities and communities of practice, among others, promoting collective learning through exchange(Badia & García, 2006), (García Yeste, Leena Lastikka, & Petreñas Caballero, 2013).

Information related to these factors is characterized by the analysis and/or control of the behavior (temporal and spatial) of agricultural and social environmental variables associated with the crop. It is therefore of interest to explore studies related to techniques linked to the experimental work of the farmers.

The objectives of this chapter are focused on two main situations that involve collaborative work and complement one another. Firstly, the exchange of information, experiences, culture and traditions of small farmers dedicated to the cultivation of native maize in the different regions ofMexico(Ali *et al*., 2019); Secondly, this research is based on the interdisciplinary work of experts in the area of biology, mainly in ethnobotany, ecology, sustainable development and agroecology, in combination with researchers from the ICT area, with regard tosoftware development for mobile and web applications.

Although there are some definitions of precision agriculture and several components are continuously added to its conceptual frame, the relevant aspect to consider in the present chapter is the need for information of the small farmers (Ali *et al*., 2019).

The expected impact of the objectives stated aboveaim to remark, from a research perspective, the conceptual and operational framework used to integrate and distribute the information and knowledge obtained from small maize farmers in specific regions of Mexico, as well as the supported technology. Both aspects can be used as a guide for economic studies within governments and world or local organizations programs.

The chapter begins with an analysis of representatives works from the state of the art and with the specification of the problems related with the understanding of the research context; then it continues with the acquisition of data, first using a maize database from CONABIO and alsofrom the application of a survey among small farmers of specific communities from Oaxaca and Veracruz. Next, there is a specificsection linked to the appropriate use of ICT for the proper visualization and interpretation of the maize crops information by the small farmers. Finally, it concludes and summarizes the main findings as well as a brief description of future work.

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