

Executive Summary

Impact of Information and Communication Technologies (ICTs) on Agricultural Development in Tunisia



ICT2Scale – “Access to E-learning and Cell Phone Based Services to Strengthen Extension Services for Smallholder Farmers in Tunisia ”

Boubaker Dhehibi⁽¹⁾, Mohamed Zied Dhraief⁽²⁾, Udo Ruediger⁽³⁾

- (1) Social, Economic, and Policy Research Team (SEPR) - International Center for Agricultural Research in the Dry Areas (ICARDA) – Tunis, Tunisia (E-mail: b.dhehibi@cgiar.org).
- (2) Department of Agricultural Economics (DAE) – National Research Agronomic Institute of Tunisia (INRAT) – University of Carthage - Tunis, Tunisia (E-mail: dhraief.mz@gmail.com).
- (3) Soil, Water, and Agronomy Team (SWA) - International Center for Agricultural Research in the Dry Areas (ICARDA) – Tunis, Tunisia (E-mail: u.ruediger@cgiar.org).

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1. Introduction

Information and extension services are one of the key elements in addressing development issues in the sector of agriculture in developing countries. These services support farmers by disseminating information and building the capacities. Unfortunately, in Tunisia extension service fail to reach smallholders, especially in remote areas due to a lack on financial, human and logistical resources. To face these challenges, **Information and Communication Technologies can act as a replacement to foster the access to innovation to farmers.**

The project “ICT2Scale – access to e-learning and cell-phone based services to strengthen extension services for smallholder farmers in Tunisia” used two information and communication technologies to improve both extension services and the incomes of smallholders. They are:

- Mobile phone messaging through which farmers receive relevant information via SMS to improve farming practices. A short number is used to provide information on the availability of inputs and their prices in local markets as well as the prices of agricultural products to farmers in order to improve their incomes.
- Distance learning (e-learning) for the benefit of trainers from agricultural vocational training centers and extension workers attached to the regional extension agencies (CTV) on topics including didactics and agricultural production in arid zones, etc.

2. Objective of the study and research question

The main objectives of the project are threefold:

- Using ICT to enable smallholders' farmers to access agricultural innovation systems.
- Assisting smallholders (women and men, with special emphasis to youth) to improve their farming technologies and farm management through the use of ICT-based agricultural extension services.
- Achieving a large-scale impact through ICT-based extension services.

The specific objectives of this study are to diagnose the general characteristics of the users of the SMS technology, radio spots and short number, analyze the factors affecting the use of the SMS (costs, comparative advantage, compatibility, simplicity, observability, social influence, etc.), analyze the impact of the use of the ICTs on smallholder agricultural activities (yield, cost of production, revenue, etc.), provide knowledge to trainers through e-learning and develop practical recommendations for the dissemination of extension services based on ICTs.

Several research questions emerge from this study:

- How to increase the adoption of ICT for the smallholder farmers?
- What is the contribution of the factors affecting the use of the SMS (costs, comparative advantage, compatibility, simplicity, observability, social influence, etc.), on the decision making of the adoption of ICT?
- What is the appreciation of farmers on the SMS, E-learning, radio spots and short number?
- How to better connect the trainers from agricultural vocational training centers and extension workers attached to the regional extension agencies (CTV) to sources of knowledge using e-learning technology?

3. Data collection

3.1. ICT survey

ICT2Scale project was implemented in three governorates: Zaghouan, Kairouan and Jendouba. The selection of the individual farmers was based on a random sample and conducted mainly online due to the COVID-19 pandemic. The survey was conducted from April 19th to June 8th 2021.

Messages were sent to 1000 farmers but only 421 HH were surveyed. The distribution of the sample was as follows (Figure 1): In Zaghouan governorate 14.5% were in Nadhour, 7.4% in Saouef, 7.1% in Zriba. In Kairouan, they were 26.8% in Sbikha and 15.7% in Oueslatia. In Jendouba, they were 28.5% of the sample from Fernana.

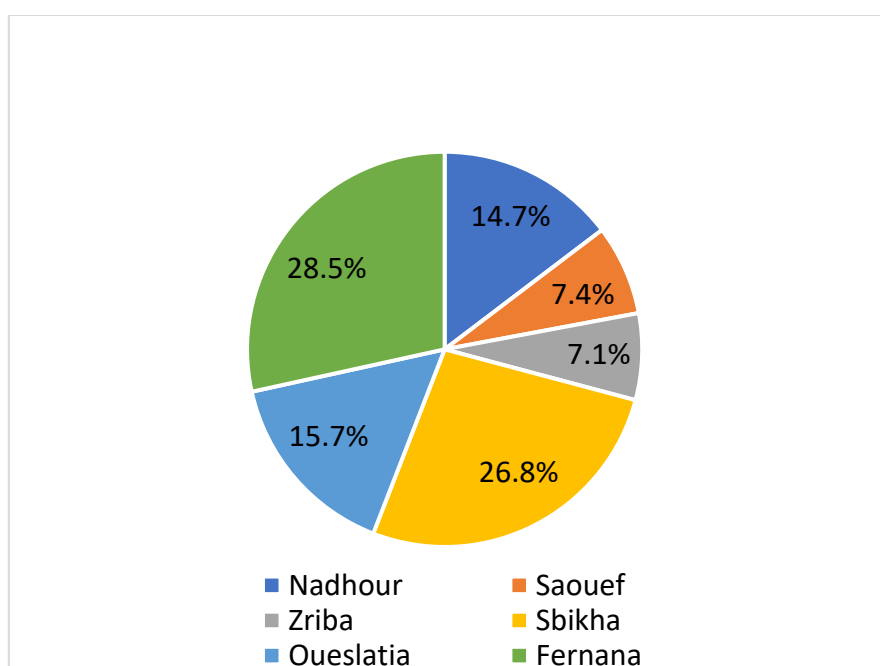


Figure 1. Sample distribution of ICT survey by delegation, %

The ICT questionnaire was divided into different modules presented as follow:

- Module 1: Identification of the interviewee
- Module 2 : SMS information
- Module 3 : Short number information
- Module 4: Radio spot information
- Module 5: Factors affecting the use of the SMS
- Module 6: ICT impact on agricultural activities

3.2. E-learning survey

The E-learning survey concerned 37 participants, among them, we counted trainer, government manager, agricultural extension officer, student, researcher, project coordinator, farmer and agricultural employee (Figure 2). The survey was conducted online through google forms questionnaires between May 12th and May 25th, 2021.

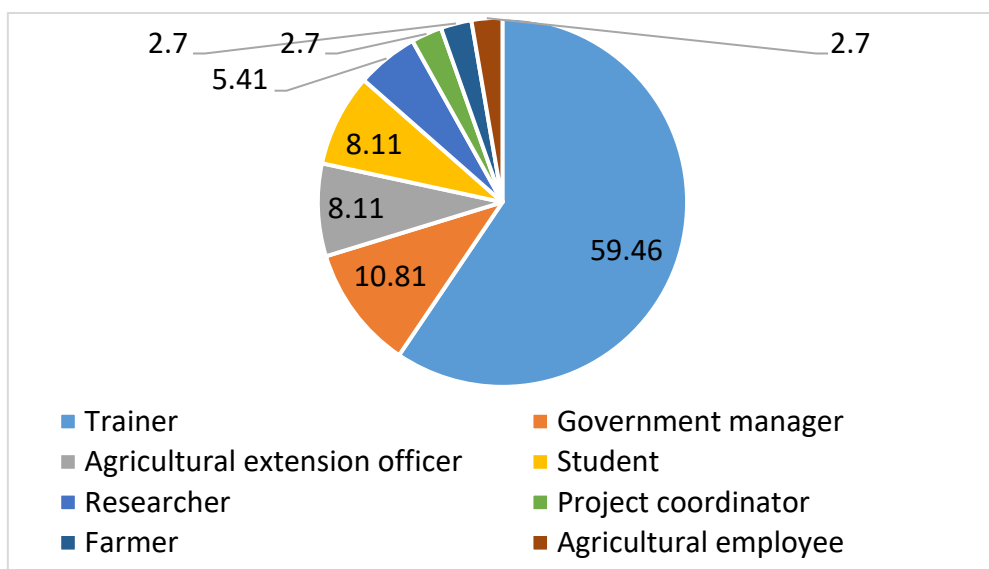


Figure 2. Sample distribution of e-learning survey by main occupation, %

The e-learning questionnaire was divided into different modules presented as follow:

- Module 1: Identification of the interviewee
- Module 2: Questions for the certified participants of the e-learning
- Module 3: Questions for the extension officers and the trainers whom did not participate to the e-learning modules.

4. Results and discussion

4.1. IC Technology: technical SMS as means of agricultural extension

Technical SMS are read by most farmers. Almost 70% of farmers read the messages regularly; at least once a week in three governorates (Figure 3). The highest percentage is found in Jendouba with 92.5% of the sample declaring reading the messages regularly while they were 79.33% in Kairouan and only 30.33% in Zaghouan. 36.07% of the sample in Zaghouan affirmed rarely reading the messages while they are 5.74% to never read them at all. For those who answered that they rarely or never read the messages, they were asked why they did so. The most common answer for both Zaghouan and Kairouan was that they lack of motivation (Half of them in Zaghouan and 64.29% in Kairouan). The second common reason was that they have no interest in reading the SMS (31.25% in Zaghouan and 14.29% in Kairouan). Almost 14 % in Kairouan stated that they were illiterate and 15 % that they have network problem.

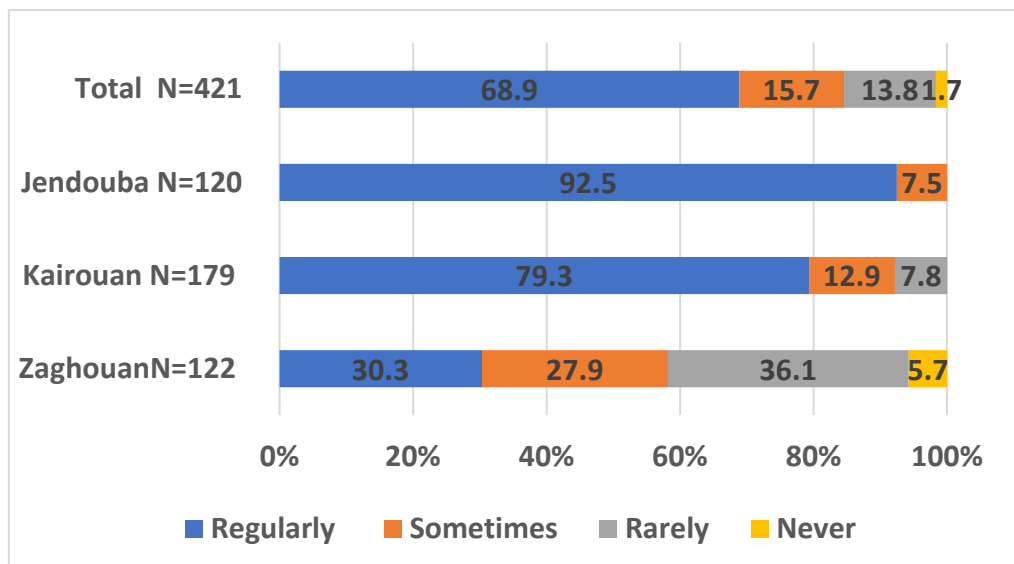


Figure 3. SMS reading frequencies by governorate, %

Technical messages are considered useful for farmers and farmers are applying the gained knowledge (Figure 4). There are strong regional differences. For Jendouba governorate, 71.67% of the sample declared that the messages were useful and only 3% were indifferent. For the other governorates, the answers were more scattered. In Zaghouan, 57% of the HH declared that the messages were not useful while they were 53 % in Kairouan. The percentage of indifferent HH towards the messages are also high with 31 % of the HH in Zaghouan and 28 % in Kairouan.

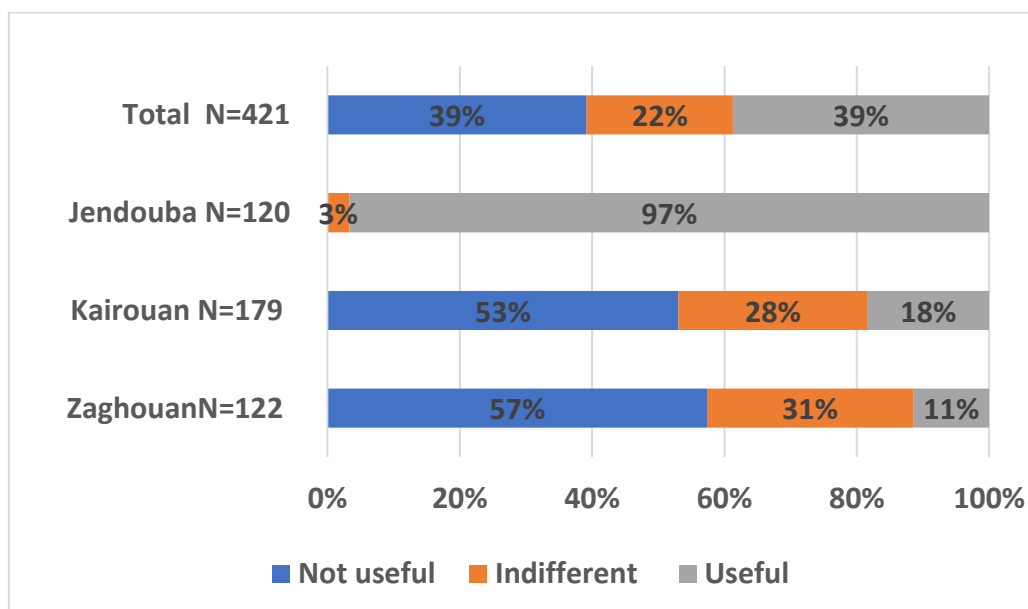


Figure 4. Farmer's appreciation for the SMS usefulness by governorate, %

Over half the farmers have learned new technologies and received new information (Figure 5). The percentages were stating that these messages didn't teach any new information for 57% of the HH in Zaghouan, 43% in Jendouba and 40% in Kairouan. The messages gave a lot of new information for 32% of the HH in Jendouba, 18% in Kairouan and only 6% in Zaghouan. Moderately new

information is given by these messages for 28% of the respondents in Kairouan, 12% in Zaghouan and in Jendouba.

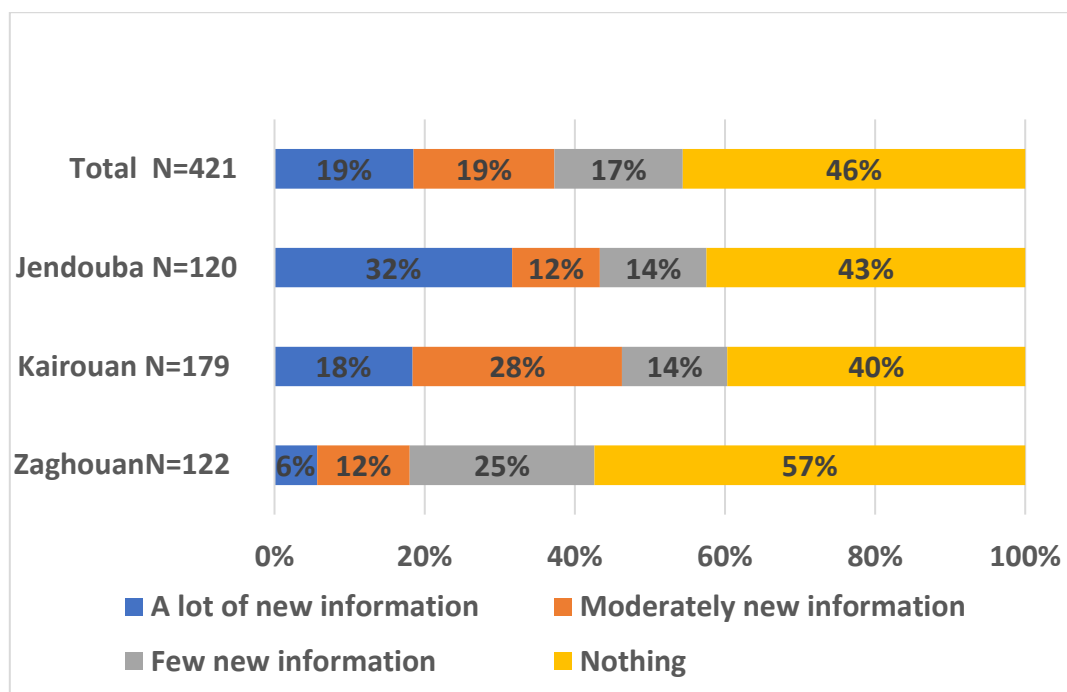


Figure 5. Acquired information from the SMS by governorate, %

The respect of the sending calendar is essential to satisfy the needs of the farmers receiving the SMS. Half the farmers stated that the messages came at the wrong time. They were 57% in Zaghouan to declare that they don't agree, while they were 53% in Jendouba and 37% in Kairouan. Half of the sample in Kairouan (46%) stated that they were indifferent about the timing, while they were 34% in Jendouba and 27% in Zaghouan. They were less than 16% of the whole sample to agree that the messages were sent at the right time.

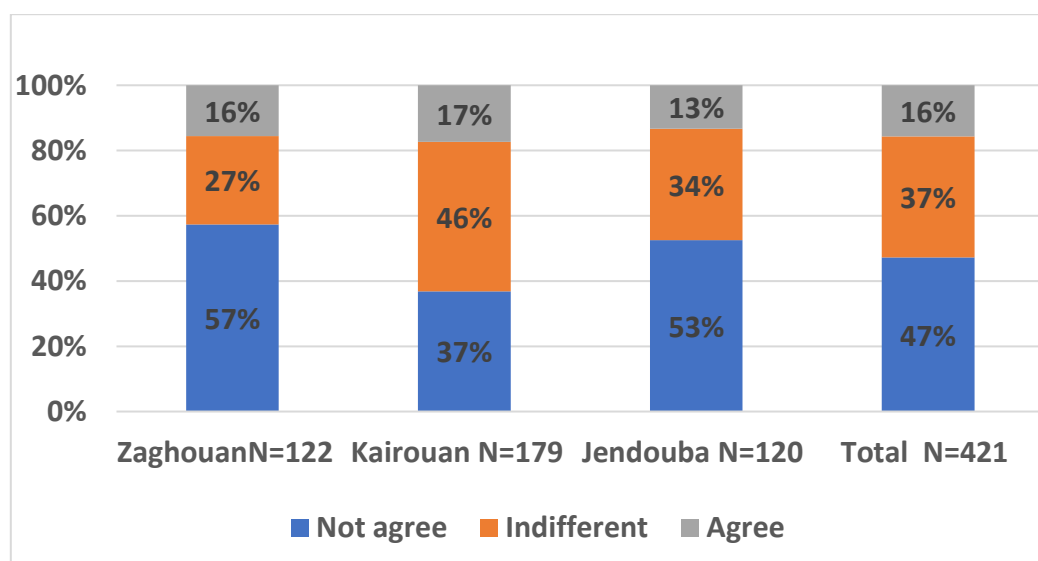


Figure 6. Calendar respect for sending SMS by governorate, %

Over 40% of farmers are willing to pay for receiving technical SMS (0,03 DT/ SMS). The answers are different from a governorate to another (Figure 7). In Zaghouan they are 82% to refuse to pay while they are 53% in Kairouan and 46.7% in Jendouba to be willing to pay in the future. For those who refused to pay once the project ends, the reasons behind this decision are mainly related to the content of the SMS (41 % of the sample) or they are not interested by this technology for 19% or also because the message is expensive for 17% of the sample.

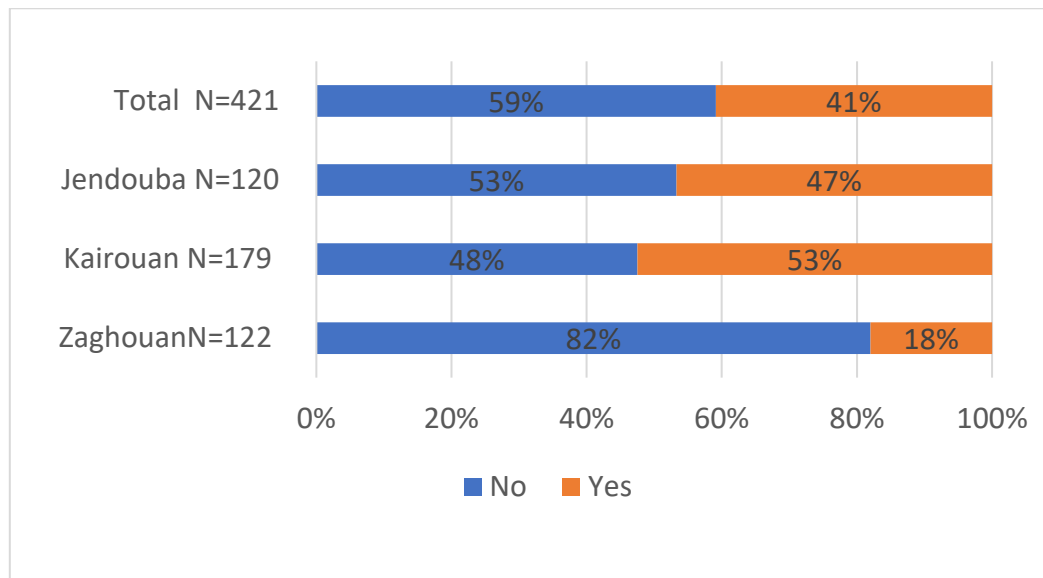
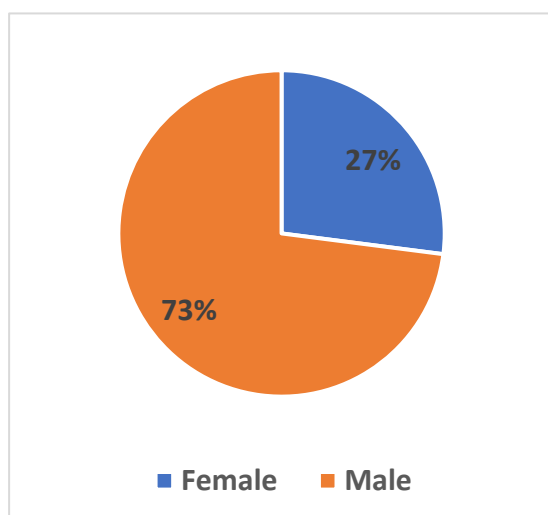


Figure 7. Farmer's willingness to pay for the SMS once the project ends

4.2. ICT technology: E-learning and radio spots

The E-learning technology is appreciated equally by men and women and suitable even for older people (Figure 8, Figure 9). Almost 27% of the certified participants were female and 2/3 over 40.



years old.

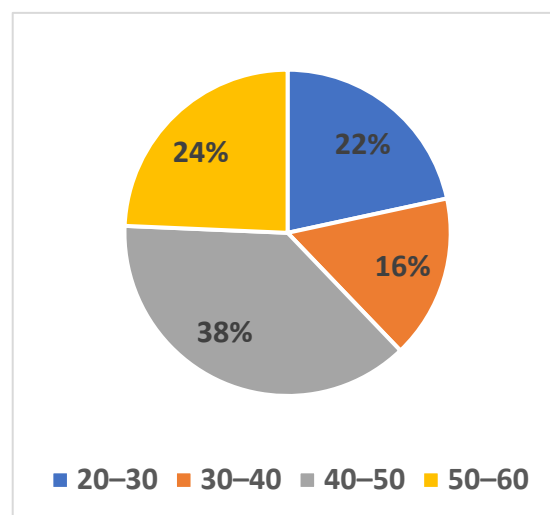


Figure 8. Gender of E-learning participants, % **Figure 9.** Age of E-learning participants, %

The E-learning modules are well evaluated by the participants (Figure10, Figure11). In this sense, 73% of the total sample agreed that the content of the trainings was interesting and useful. In addition, 70.3% of the interviewees agreed that the animation of the modules is very well done. The participants are especially motivated for the e-learning modules to have a certificate and to deepen their general knowledge. All the participants recommended these e-learning modules trainings for their colleagues and recommended improving the content of these modules.

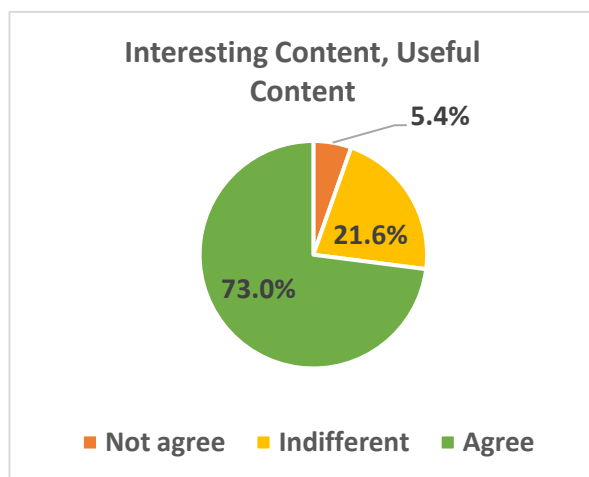


Figure 10. Farmer's appreciation of the SMS content, %

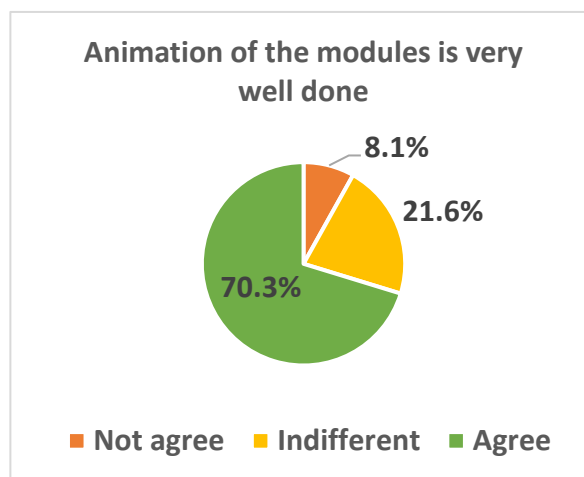


Figure 11. Farmer's appreciation of the modules animation, %

Almost 40% of farmers are interested in listening to agricultural radio spots (Figure 12). This technology is more appreciated in Kairouan (45%) and Zaghouan (60%) than in Jendouba (10%). Regarding the proposed thematic for this technology, almost 30% of the farmers in the total sample prefer to devote a radio broadcast on the olive, 15.68% on the incentive policies, 12.83% on the plan diseases, 5.46% on the horticulture, 3.33% on the cereal farming and 1.90% on the arboriculture.

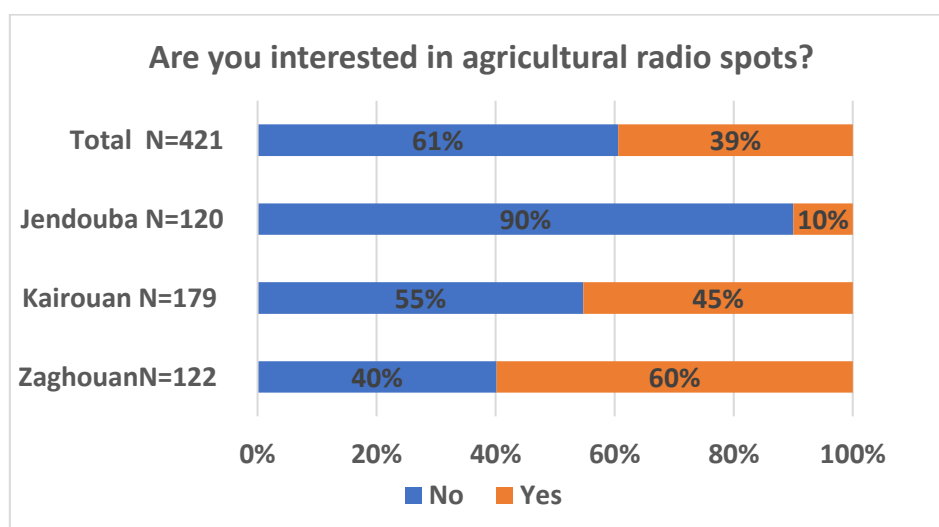


Figure 12. Farmer's appreciation for the agricultural radio spots by governorate, %

4.3. ICT technology: Market price information via mobile phone short number

Very few farmers (less than 5%) have used this market price information system. The majority of interviewed farmers declared that they did not know the short number (85270) dedicated to have access to the agricultural product prices (local markets). They claim that they were not aware of this new service. Additional efforts should be done by the government managers to promote these ICTs among the farmers via field days, awareness campaigns through flyers, workshop at the regional extension agencies, etc.

For the future use of this technology, farmers are not ready to pay to receive market price information; therefore, a smartphone price-application free of charge with a high variety of commodities is a promising alternative.

5. Strategic Recommendations

The strategic recommendations to the use of ICTs among farmers are provided as below:

- **Improve the access of SMS technology:** to encourage the dissemination of the SMS technology among small farmers, a revision of the legislation (budget headings) is essential to allow the CRDA or CTV to use part of their budget to purchase and sent SMS.
- **Improve the use of ICT by professional organizations:** it is essential to recommend to SMSA and GDA to use SMS as an ICT to coach and advise their members. This is essential to disseminate the ICT for the professional organizations in Tunisian agriculture.
- **Improve the partnership between private and public sector:** a better coordination between SMSA and CTV can improve the adoption of ICT among farmers and provide relevant information on agriculture extension.
- **Improve the quality of information:** It is essential to do periodic needs assessment by agriculture extension information providers in order for them to deliver timely and relevant information to small-scale farmers for improved production. The department of agriculture extension should put a ***mechanism of ensuring that agriculture extension information provided by any entity should be useful in the right format, time and language that can support farming productivity***. Information sources to farmers should explore multilingual sources to ensure all small scale farmers benefit from information provided (Lung'ahi, 2014),
- **Improve the adoption of the ICTs:** farmers should be offered learning trainings to facilitate acceptance and use of communication tools such as mobile phones, short number and radio spots. This will support adoption, replication and sustainability since farmers will be self-reliant,
- **Improve the social influence of the ICTs:** further research should be conducted to investigate why the social influence negatively affects the SMS technology in the studied governorates,
- **Assessment of the other sources of extension agriculture information:** further research should be conducted to investigate the role of other sources of extension agriculture information to find out the market share and the influence they have,

- ***Integrate the ICT approach into the national agriculture extension strategy:***The government should create a digital service in the regional extension agencies and dedicate a budget to finance the different costs of the ICTs approach.
- ***Introduce all the partners in the agriculture extension strategy*** to promote the ICTs such as public institutions, private sector, NGOs, SMSA, Farmers union, etc.
- ***Improve the communication about the importance of ICTs in agriculture:*** Implement a national communication strategy based on field days, workshop, flyers, radio show, programs TV...to promote the ICTs among farmers.
- ***Adapt the ICT tools to the local context:*** the cultures of farmers can differ according to the location.
- Supply CTV with necessary equipment (Tablet, Laptop) and infrastructure (access to ***internet***) to enable extension agents sending SMS. CTV should deploy more efforts in sending messages to their members as they did not receive them unlike members of the SMSA.
- Develop further e-learning modules and promote the modules (via social media and training centers)
- Create a national e-learning platform (e.g at AVFA)