

Equal and inclusive opportunity to access and use of ICT-based crop extension services for farm-level actors in Rwanda

A case study of the ICT4BXW project



Equal and inclusive opportunity to access and use of ICT-based crop extension services for farm-level actors in Rwanda

A case study of the ICT4BXW project

31-03-2020, Wageningen

Author:

Frenske Blom

951103075130

Frenske.blom@wur.nl

Wageningen University, MSc Development and Rural Innovation

MSc Thesis Knowledge, Technology and Innovation

Supervisors:

Cees Leeuwis

Chair and professor of Knowledge, Technology and Innovation group at Wageningen University

Cees.leeuwis@wur.nl

Mariette McCampbell

PhD student at Wageningen University, Knowledge, Technology and Innovation group

mariette.mccampbell@wur.nl

Preface

This thesis research 'Equal and inclusive opportunity to access and use of ICT-based crop extension services for farm-level actors in Rwanda' is executed by Frenske Blom as part of the Master Program Development and Rural Innovation of Wageningen University from August 2019 until March 2020. This thesis research is guided by Cees Leeuwis and Mariette Mc Campbell. Cees Leeuwis is professor of the Knowledge, Technology and Innovation group of Wageningen University. Mariette Mc Campbell is a PhD researcher of the Knowledge, Technology and Innovation group of Wageningen University and visiting researcher of IITA and the ICT4BXW project.

I would like to thank Cees Leeuwis for guiding the writing process of both the proposal as the thesis report. I would like to thank him for feedback, guidance, support and thinking along in order to improve the results of this thesis research. I would also like to thank Mariette McCampbell for both guiding the writing process of the proposal and thesis report as well as for the guidance in Rwanda. I would like to thank her for all the time and effort she has put in providing feedback, guidance and support.

The IITA team in Rwanda gave me the opportunity to research the ICT4BXW project from a close perspective by offering me an office and support in Rwanda. I would like to thank the IITA team for their support in my research and in particular Marc Schut, Julius Adewopo and Charles Mwizerwa for their guidance and thinking along in the process.

I would like to thank Lydie Tuyizere for the translating and support in the field. I would like to thank her for building trust with farmer promoters, thinking along in my research and helping me understand the Rwandan context even better.

I would also like to thank all project partners that participated in the semi-structured interviews for their effort and time of sharing their perspectives.

Lastly, I would like to thank all farmer promoters and sector agronomists who were all making time for me to interview or observe them in their practices. I would like to thank them for their openness and giving me an insight in their daily activities, struggles and opinions.

Abstract

All farmers around the world have a need for information. Information communication technology (ICT) could make access to information easier (Palumbo, 2013) (Aker & Mbiti, 2010) (van Winden, 2011). Others do however claim that the use of ICT excludes certain users from accessing information (Diga, Fortune, & Plantinga, 2013) (Njoki & Wabwoba, 2014) (Waugaman, 2016). Not only the use of ICT but also the design of the ICT platform could exclude users from access to information (Clarkson, Dong, & Keates, 2003). It is therefore important to understand the interaction between an ICT application, its design process, its use and the excluding or including aspects that affect access to information. This research aims to answer: 'how does the introduction of a crop extension app, developed according to Human centred Design (HCD) approach, influences access to and use of extension services for farm level actors?'. This research took the case of ICT4BXW which uses a crop extension app at village level to control and prevention Banana Xanthomonas disease (BXW) in Rwanda. This research is tackled through process tracing of the user representation in a design process and technography to understand the implications and process of introducing a crop extension app at village level.

Process tracing showed that the user representation, project assumptions and expectations changed over time. The results of process tracing show that the user's role for the ICT4BXW app changed from providing information to receiving information. The expectations of the project on smartphone capacity was adapted and creating impact in disease occurrence changed to focus on learning from the design process. These changes of user representation were coevolving based on what user representatives gave as input, changing perspectives of project partners and as a response to unforeseen challenges. Process tracing showed that almost all feedback provided in the period of participatory workshops, including feedback of user representatives was adopted and included in the design. The feedback that was provided after these workshops was not always adopted or took time to be implemented.

Introducing the ICT4BXW app meant for the farmer promoters that they had to visit all individual banana farmers in their village to register farmers, diagnose BXW and provide BXW information to farmers. Before introducing the ICT4BXW app, the farmer promoters would share this information in a collective village meeting. The farmer promoters experience that by introducing this app more time investment is required from them to provide extension services. The farmer promoters are additionally requested to visit the sector agronomist once a week to upload data. 8 out of 17 farmer promoters mention that the time investment and distance to visit the sector agronomist is a challenge. The project partners assume and expect that both farmer promoters and sector agronomists are willing and able to spend this extra time. By introducing this app, the farmer promoters also need to learn how to work with a smartphone, observations and interviews show this is sometimes challenging. On a positive note, after introduction of this app farmer promoters do experience more trust from farmers in the information they provide.

The results of this research show that there are different levels of involvement and power among project partners and user representatives in making design decisions. In the first stage of the project users were not represented yet and design decisions were based on the imagination of project partners. Some of these design decisions resulted in forms of exclusion. In the second stage, user representatives were included to influence design decisions through participatory design workshops. Final design decisions were however always made by project partners. Most design decisions on which user representatives had an influence created inclusion for the application. Farmers were not directly represented during the design process but represented through the imagination and experiences of farmer promoters. This representation or lack of representation is reflected in the design of the app in

which the farmer promoter plays a central role in order to access information on BXW for farmers. This does not create full exclusion for farmers to access information, but it creates dependency on the farmer promoter. Given the limited time/capacity of farmer promoters to visit farmers at home this is likely to result in less farmers having access to BXW information.

The results in the ICT4BXW case indicate that the HCD approach still includes politics in design since project partners chose when, how and how often users would be represented in the design phase. This thesis showed that the form of user representation is affecting if design decisions of a crop extension app result in more inclusive or exclusive access to BXW information. HCD should therefore not be seen as utopia, panacea or solution to solve political/power concerns, exclusion and assumptions in design. By analysing the practices of the farmer promoter, this thesis has shown that the introduction of this crop extension app affected roles, responsibilities and dynamics of farmer promoters, sector agronomists and farmers in the existing extension system. This research shows that use of ICT does not automatically guarantee greater access to information. Precautions must be taken in the design process of ICT to ensure equal and inclusive access to information.

Table of Content

1.	Introduction.....	1
2.	Theoretical Framework	3
2.1.	Ontology and Epistemology	3
2.2.	Theory of technological politics.....	3
2.3.	Technography as a practice theory	6
3.	Research Design	7
3.1.	Objective, research question and design	7
3.2.	The ICT4BXW project.....	7
3.3.	Methodology and methods of sub research question 1	8
3.4.	Methodology and methods of sub research question 2	9
3.5.	Methodology and Methods of sub research question 3	10
3.6.	Analyses of sub question 1, 2 and 3	10
4.	Results: Context.....	14
4.1.	The ICT4BXW project.....	14
4.2.	Project partners and their role in the project	15
4.3.	The extension system in Rwanda on paper.....	19
4.4.	The extension system in Rwanda in reality	19
4.5.	Analyses of the context	21
5.	Result: Process tracing of user representation and design choices	23
5.1.	Process tracing of user representation	23
5.2.	Who is the user according to the project?	38
5.3.	Analyses of process tracing of user representation	39
6.	The user's side	43
6.1.	ICT4BXW at field level	43
6.2.	Analyses of user's side.....	49
7.	Discussion and conclusion	51
7.1.	Summary of findings.....	51
8.	Linking results to the theoretical framework.....	53
8.1.	Implications and recommendations for the ICT4BXW project.....	54
8.2.	Implications and recommendations for projects or the ICT4Ag research community	55
8.3.	Reflection of methodology and methods.....	55
8.4.	Conclusion	57
9.	Literature	58
10.	Appendices	63

Appendix I: Semi-structured interview questions for implementors of the project/ developers of the ICT platform.....	63
Appendix II: Semi-structured interview questions for the sector agronomists	64
Appendix III: Semi-structured interview questions for farmer promoters	65
Appendix IV: Semi-structured interview questions for farmer promoters for second visit.	66
Appendix V: Semi-structured interview questions for farmers, second visit.....	67
Appendix VI: Date of fieldwork, location, who is visited and purpose of visit.....	68
Appendix VII: Process of feedback and adaption.....	71
Appendix VIII: Process of Communication	73
Appendix IX: Use of resources.....	74
Appendix X: Different perspectives of project aims, goals and direction	75
Appendix XI: Exclusion and inclusion analysis.....	76

Figures, Tables and Textboxes

Figure 1 Coding tree	12
Figure 2 A map of ICT4BXW focal villages	14
Figure 3 Chronological timeline including activities and stages.....	23
Figure 4 Interests and decisions in the inspiration stage	26
Figure 5 Interests and decisions in the ideation stage.....	32
Figure 6 Interests and decisions in the implementation stage	38
Figure 7 Picture of farmer promoter during registration of a farmer.....	45
Table 1 Analysed documents with their name, author and date of release	8
Table 2 Project partners that are interviews, their role and the date of the interview	9
Table 3 Project roles and activities in different phases	17
Table 4 Feedback matrix filled in by farmer promoters.....	48
Table 5 Changes in assumption(s) and expectation(s) about app use in all HCD stages	52
Textbox 1 User representation in the inspiration stage.....	25
Textbox 2 User representation in the ideation stage.....	31
Textbox 3 User representation in the implementation stage.....	37

Abbreviations

In the context of this research the following abbreviations are used:

APM: Annual Performance Meeting

BXW: Banana Xanthomonas Wilt

CMU: Complete Mat Uprooting

FP: Farmer Promoter

GPS: Global Positioning System

HCD: Human Centred Design

ICT: Information Communications Technology

ICT4BXW: ICT and Citizen Science for Control and Prevention of Xanthomonas Wilt of Banana Disease project

IITA: Institute of Tropical Agriculture

IAMO: The German Leibniz Institute of Agricultural Development in Transition Economies

MT: MangoTree

RAB: Rwanda Agricultural Board

SA: Sector Agronomist

SDSR: Single Diseased Stem Removal

SNA: Social Network Analyses

Glossary

In the context of this research the following definitions are used:

Extension services: the support for informed decision in effective strategies to manage banana production. This consists of the provision of information, knowledge and advice targeted to farmers and provided by farmer promoters.

ICT-based crop extension service: the provision of information, knowledge and advice of banana production with support of a smartphone application.

ICT intervention: The implementation and use of an ICT platform which shifts existing practices to new practices. In this research the intervening ICT platform is the BXW disease management smartphone application.

Farm-level actors: sector agronomists, farmer promoters and farmers who operate in village level farming practices.