Executive Summary

AP(P)ICULTURE: DIGITAL SOLUTIONS FOR REAL-WORLD PROBLEMS

A CASE OF APICULTURE IN RURAL UGANDA

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Executive summary

In Uganda, Apiculture is primarily practiced on a subsistence scale, with about 2.7% of total households reported to own beehives and an estimated annual honey production of about 2,600 tons (according to MAAIF/UBOS, 2010). It has a vast untapped potential, as the estimated yearly capacity is more than 500,000 tons of honey. This is changing, with many people considering the activity as a trusted commercial business, shown by the increased national production trends in all bee products. Nevertheless, the sector continues to employ a substantial number of people, attributed to the ease of operating the business and the fact that it requires less finance to start and run.

Several factors contribute to the challenges that this subsector faces. Previous studies report a need for knowledge and skills, modern harvesting techniques, sufficient financial and capacity-building support, and appropriate equipment (MAAIF annual reports, 2016/2017; 2017/2018). As a result, unevolved honey extraction methods, such as boiling honeycombs and sun heating or combed honey, are still primarily used. In addition, lack of access to affordable credit products for smallholders is a big issue. This is related to the lack of traceability, business quality assurance mechanisms and the difficulty to include beekeepers in Know Your Customer (KYC) requirements.

This study is based on one of the current projects funded by the CFYE[1] Trees x Bees. The system of digital applications introduced in the project aims to solve problems of access to finance, quality assurance, and traceability among smallholder farmers.

The study examines the usability of three digital applications that are part of a youth employment program in Uganda, focusing on coffee farmers and starting beekeepers in western Uganda. The research was carried out in partnership with TUNADO, the apex body for the apiculture sector in Uganda, and focused on three localities/communities where the project is running. The three applications used in

[1] The Challenge Fund for Youth Employment, managed by Palladium, financed by the Ministry of Foreign Affairs of the Netherlands: https://fundforyouthemployment.nl/

the program are Farmerlink, Sevi, and Kucheza, which are used for registration, accessing credit, and gamified learning, respectively. The study explored the usability of these applications in a developing country's context and gave several recommendations to improve digitization. The study paid attention to the individual characteristics of users, the technological factors, and the influence of the social environment and infrastructure. A total of 30 respondents participated and findings point to the need of proxy users for beekeepers to interact with the digital solutions effectively. It was also found that the quality and nature of the device used to operate the digital applications matter greatly, and offline modes are necessary in rural areas with low connectivity. The study's recommendations include training, device distribution, and better offline functionality for digital applications.

User-individual aspects of usability

The study identified the following individual aspects of usability:

1. Digital literacy: The beekeepers' level of digital literacy is a crucial factor in their ability to use digital solutions effectively. As most of them had a low digital literacy rate, the use of proxy users helped overcome this barrier to participation.
2. Device familiarity: Since most beekeepers needed to possess a smartphone to use digital solutions, their familiarity with the device was important. Understanding how the device works is essential for effective use.
3. Trust: The beekeepers needed to trust the intermediary users to use the digital solutions effectively. The fact that the apiary masters represented a trusted organization (TUNADO) helped build trust among the beekeepers.
4. Access to credit: The beekeepers' previous experiences with accessing credit from conventional sources, including mobile money, is also an important factor in their ability to use digital solutions. Understanding

the process of accessing credit digitally is crucial for them to benefit from digital solutions that provide credit.

Technological aspects of usability

Usability of digital applications is not only affected by their features and functionalities but also by the technological aspects that support them. There are several technological considerations that should be taken into account to ensure their effectiveness in remote and rural areas.

5. Device specifications: Devices used to operate the applications should have sufficient storage, memory, processing power, and battery longevity to support its operations. This is especially important in areas with limited access to electricity and internet connectivity, where the devices may need to last for extended periods without recharging.

6. Screen sizes: The size of the screen used to display the application is also important, as smaller screens may hinder the effectiveness of the training. In larger groups that train in the open air, this limitation can be further amplified.

7. Offline modes: The application should have an offline mode to work in rural areas with low connectivity and network issues. This allows users to store data and save gameplay offline, and synchronize it when there is sufficient connectivity.

8. Technical support: Upgrades and updates of software in the applications can cause interferences or disturb data storage and saving, so timely technical support is necessary, especially in areas where developers are not easily accessible.

9. Language accessibility and compatibility: Language barriers can pose problems in areas where literacy in English is limited. It is advisable to offer applications in indigenous languages in remote areas to ensure their effectiveness and accessibility.

Social environment

The social environment of beekeepers greatly impacts the use of digital applications. These applications not only assist beekeepers in their work but also facilitate communication and learning within their social circles. The major considerations identified are:

1. Mediation support: It's interesting to note that some beekeepers may require assistance in accessing and utilizing technology, highlighting the potential digital divide within the community. However, the willingness of their peers to mediate and share information suggests a strong sense of community and collaboration.

2. Knowledge sharing: The sharing of learning points and information about the applications also shows how social networks can be an important source of knowledge and support. Through these interactions, beekeepers can expand their understanding of the applications and how they can be applied to their businesses.

In conclusion, the role of intermediaries is crucial to adopting and using digital applications. This happens through one-on-one interactions with trusted intermediaries (in this case, the Apiary Masters) or in group sessions and proxy use of the applications. The above shows that there is more to digital applications and their capacity to solve real-world problems than what happens on the screen. There is a system of human interactions and networks that negotiate this process.