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Sustainability transitions of agriculture and the transformation of education and advisory services: convergence or divergence?

Pierre Labarthe

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ESEE  2023

26th European Seminar on Extension & Education

Sustainability transitions of agriculture and the
transformation of education and advisory services:
convergence or divergence?

Toulouse, 10-13 July 2023



BOOK OF ABSTRACTS

26th European Seminar on Extension & Education

“Sustainability transitions of agriculture and the transformation of education and advisory services: convergence or divergence?”

The conference was organised in Toulouse (France), 10-13 July 2023.

More information

<https://esee2023.colloque.inrae.fr/esee-2023>

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Authors

VV.AA

Editor

Pierre Labarthe

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Can SMS, IVR and apps enhance organic farming practices in Africa?

Selina Ulman, Benjamin Gräub, Faith Maiyo, Lise Dusabe, Dieudonne Sindikubwabo

Research Institute of Organic Agriculture (FiBL)

Short abstract

Over the last three years, the Research Institute of Organic Agriculture (FiBL), together with partners in Kenya, Rwanda, Mali and Senegal has accumulated a wide range of knowledge on how simple technologies can be used to improve access to organic farming knowledge by smallholder farmers. Over 4400 smallholder farmers in Kenya and Rwanda received SMS-based and app-based training on organic agriculture. This presentation showcases the experiences and derived recommendations for the use of digital technologies for capacity development of smallholder farmers in East Africa. Traditional farmer training and farmer field schools are hugely important in farmer education, but many farmers do not have access to them and its high costs limit their scaling. SMS-based or app-based training, as well as training via interactive voice response (IVR), can be a useful addition that are comparatively inexpensive and can more easily reach a large number of farmers. Raspberry Pi computers are found not suitable for farmer training. This work provides insights into the potential of phones, smartphones, tablets, (OTG) USB sticks and Raspberry Pi computers to improve farmer access to information and training on organic agriculture practices and to promote the growth of organic agriculture in East Africa and beyond. We will highlight the principal aspects when planning, developing and implementing digital trainings for farmers smallholder farmers in Africa.

Extended abstract

Purpose

This paper highlights the experiences and derived recommendations for the use of Information and Communication Technologies (ICTs), namely SMS, apps, IVR, Raspberry Pi computers and OTG USB sticks for knowledge transfer to smallholder farmers in Africa. Over the last few years, the Research Institute of Organic Agriculture (FiBL), together with partners in Kenya, Rwanda, Mali and Senegal has accumulated a wide range of knowledge on how simple technologies can be used to improve access to organic farming knowledge by smallholder farmers. Traditional farmer training and farmer field schools lead to positive outcomes for farmers such as empowerment, improved knowledge, increased yields, income and well-being (Friis-Hansen & Duveskog, 2012; Waddington et al., 2014), but many farmers do not have access to them and the high cost limits their scaling (Mapiye et al., 2021). The use of Information and Communication Technologies (ICTs) for farmer education can have positive impacts on farming practices and the farmers well-being in Africa (Hudson et al., 2017; Sennuga, 2020). SMS-based or app-based training, as well as training via interactive voice response (IVR), are expected to be a useful addition that is comparatively inexpensive and can easily reach a large number of farmers. This work provides valuable insights into the potential of digital technology to improve African smallholder farmers access to information and training on organic agriculture practices and to promote the growth of organic agriculture in East Africa and beyond. Additionally, we will highlight the principal aspects to consider when planning, developing and implementing digital trainings for farmers.

Design/Methodology/Approach

FiBL has tested various technologies in Kenya, Rwanda, Mali and Senegal as part of various projects^{1,2,3}. These projects were jointly implemented with the partners Biovision Africa Trust (BvAT) in Kenya and

Rwanda Organic Agriculture Movement (ROAM) in Rwanda, Association of Professional Farmer Organizations (AOPP) in Mali, Fédération Nationale pour l'Agriculture Biologique (FENAB) in Senegal, as well as the technology partners Arifu, Yelder/Fesy and Viamo. App-based and SMS-based trainings were developed in a participatory process. Four modules on introduction to organic farming, indigenous poultry, dairy goats and vegetables were developed, disseminated and evaluated. Raspberry Pi computers and Interactive Voice Response (IVR) were tested as additional technologies, including in West Africa (Mali, Senegal). The results of the projects over the period 2020-2023 are summarised and classified here.

1 Digital Training Materials Pilot Project (Phase 1) in Kenya and Rwanda (2020-2022) was financed by the Leopold Bachmann foundation.

2 Knowledge Centre for Organic Agriculture in Africa (KCOA) is a collaborative country-led partnership funded by the German Federal Ministry for Economic Cooperation and Development (BMZ) and implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and non-governmental organisations across Africa. The KCOA aims to scale up adoption of organic/ agroecological farming practices through a network of five Knowledge Hubs in Africa. The project runs from 2019 to 2026.

3 Scaling-Up Digital Training Materials (Phase 2) in Kenya and Rwanda (2022 – 2025) is financed by the Leopold Bachmann foundation.

Findings

SMS-based and app-based training tested in Kenya and Rwanda

In the Digital Training Materials Pilot Project in total, more than 4400 farmers were trained with app-based and SMS-based trainings. The app- and SMS-based training consists of four modules: an introductory course on organic agriculture, a module on indigenous poultry, one on vegetables and one on dairy goats.

The high engagement rate of the training (39 % of invited messages resulted in high engagement with at least one of the 4 modules) and the survey with 203 farmers Kenya who conducted the SMS training indicates that the SMS-training technology was very well received by Kenyan farmers; 94 % of the learners who engaged deeply with the content perceived the SMS training to be helpful for their farming. A majority also reported a significant improvement in their farming practices (89 % of respondents), yields (90 % of respondents), commercial farming income (69 % of respondents), and quality of life (76 % of respondents). (own data: Arifu, 2021)

In contrast to Kenya, the SMS-based training was not received well by farmers in Rwanda (3,7 % of invitations to the training resulted in high engagement). According to users' feedback, the low rate of engagement is mainly due to low literacy skills, poor eyesight and unaccustomedness to using SMS. This underlines that the context matters and that the attitude towards a digital channel may vary greatly between different cultures and people.

The following 11 key learnings were distilled for the use of app-based and SMS-based training materials for smallholder farmers in East Africa:

- 1. Content development: As the text length on SMS is very limited, concise formulations are necessary. Texts should come in a storytelling format to keep them attractive to read*
- 2. Content adaptation: If the training is used in other countries, it must be adjusted to the local circumstances and languages.*

3. *Visual elements bring value to training: Videos, graphs, illustrations and pictures photos can make a real difference in farmer training. Complex topics can be visualized, and through videos, the farmers can gain a personal impression of other farmers.*
4. *SMS & IVR for introductions: SMS training is primarily suitable for introductory content and should be followed or accompanied by further guidance such as in-person training, advisory work, online training, or other ways that allow deepening of specific topics.*
5. *Finding the right channel: Whether to use SMS, telephone, apps, or other channels should be based on the target group, the type of content, its complexity and the resources available. We learned e.g. that SMS does not work as well in Rwanda as it did in Kenya. It is also recommended to use different channels and link them together.*
6. *Costs: Compared to content development, dissemination is relatively low in cost, which makes it scalable to a high number of recipients.*
7. *Cooperation: Good cooperation between technology partners and local partners with strong networks with farmers as well as a profound knowledge base are essential.*
8. *Make clear what it costs: People might not use the training because they assume that additional costs will follow. It is essential to clarify from the beginning that it is for free or how much it costs.*
9. *Marketing: Proper promotion of the training material on placards, flyers, the radio and tv to help to make it public is necessary to reach out to a high number of farmers.*
10. *Reminder messages: More than one invitation message is needed. Farmers should be reminded several times to start or continue with the available training modules to achieve high engagement.*
11. *Different use of technical devices: Reaching women, older adults and people with illiteracy or bad eyesight is challenging. It is essential to know the social structures and the use of phones within families and communities in order to adapt marketing activities and the training itself. People who cannot read will not benefit from SMS-training if they do not have someone to read the content to them.*

IVR-based training tested in Mali

Based on the SMS-training on organic agriculture, dairy goats, vegetables and poultry, IVR-based training modules were developed for smallholder farmers in Mali. 197 farmers were selected in Mali and sent an invitation to the IVR training. The engagement rate of 100 % shows that the training was extremely positively received by the users. Two main reasons for this very high engagement rate are assumed: a pre-selection of potentially interested farmers was made (no mass invitations) and in advance, the users received a phone call from the organization they knew well, which informed them about the offer of the IVR training. The effects of the trainings are currently being examined in an evaluation, the results are still pending.

Raspberry Pi computers tested in Kenya, Rwanda and Senegal

Testing Raspberry Pi computers as alternatives to tablets in farmer training in Kenya, Rwanda and Senegal showed that if used in a set-up where their price is competitive to a tablet's price, they are more error-prone, less user-friendly and judged less useful by users. No clear use cases for Raspberry Pi computers in farmer training were identified.

Overview of the requirements of ICTs to be used in farmer training and their user-friendliness

Find in the following table an overview of the target group, minimum requirements and user-friendliness of the tested ICTs:

Technology	Target group	Minimum requirements for users	Do users need to be literate?	Costs for development and dissemination per user 1 = comparably cheap 5 = comparably expensive	User-friendliness/difficulty to use 1 = very easy to use 5 = not user-friendly
SMS-based training	Farmers	Phone, coverage	Yes	2	2 (literacy and knowledge on SMS required)
Interactive Voice Response (IVR)	Farmers	Phone, coverage	No	2	1 (only needs a phone)
App-based (in-person) trainings	Multipliers (farmer trainers)	Tablet or smartphone and intermittent internet connection	Yes	5	3 (literacy, internet, tablet)
(OTG) USB sticks	Multipliers (farmer trainers)	Tablet, laptop or computer	Yes	1	3 (needs a device)
Raspberry Pi and display	Multipliers (farmer trainers)	Raspberry Pi, access to electricity and intermittent internet access	Yes	4	5 (user-friendliness limited, needs a screen and access to electricity and intermittent internet access)

Practical Implications

Digital training for farmers and for farmer trainers can be a valuable complement to physical training. Farmers who otherwise do not have access to agricultural training can be reached and connected to existing extension workers or other training materials. As the dissemination of the materials is relatively cheap, they are easily scalable. SMS-based training and training via IVR are particularly suitable as an introduction to new topics. App-based training is also suitable for in-depth engagement, for preparing farmer trainings and as enrichment for physical farmer trainings. Always important is the orientation and adaptation of the training materials to local conditions, such as the prevalence of technologies (e.g. smartphones) among farmers and their attitudes towards them, the interests and previous knowledge on specific topics, the agricultural structures and production methods or the language. It can be concluded that the potential of digital tools is enormous and largely untapped for this purpose.

Theoretical Implications

Recommendations for or against the use of specific digital training materials in farmer training strongly depend on the local context and the resources available for their development and dissemination. Some factors such as literacy, depth of content, topic, field of application, type of training, available resources for development and dissemination, and distribution of smartphones are identified as variables with great influence on the use of SMS, apps and IVR in farmer training. A broad-based framework should be developed, based on these and additional factors, which allows giving targeted recommendations and guidance on the use of digital farmer trainings. The testing of ICT in farmer training should be expanded to

other African countries to gather information about the country-specific applicability of different ICTs and to further spread their use.

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