

Agroecological TRANSITIONS Programme



Field testing digital tools in sustainable rice production in the Mekong Delta, Vietnam

Barnard, J. J.

Vu, H.T.

Nguyen K. D.

Cuong O.Q.

Nelson, K.M.



Correct citation

Barnard, J., Cuong. O.Q., Nguyen K. D., Vu, H.T., Nelson, K.M., 2023. Field testing digital tools in sustainable rice production in the Mekong Delta, Vietnam. *Agroecological TRANSITIONS: Inclusive Digital Tools to Enable Climate-informed Agroecological Transitions* (ATDT). Cali, Colombia: Alliance of Bioversity & CIAT.

Project Donor Acknowledgement

The *Agroecological transitions for building resilient and inclusive agricultural and food systems* (TRANSITIONS) programme is funded by the European Union through its DeSIRA initiative and managed by the International Fund for Agricultural Development (IFAD). This publication was produced by the *Inclusive Digital Tools to Enable Climate-informed Agroecological Transitions* (ATDT) Project under the European Commission grant agreement No. 2000003773.

Disclaimer

The contents and opinions expressed in this publication are not peer reviewed and are the sole responsibility of the authors. They do not necessarily reflect the views of the European Union, IFAD or affiliated organizations.

Contact

Sadie Shelton [s.shelton@cgiar.org]
Communications Officer
University of Vermont, VT, USA
Alliance of Bioversity & CIAT



This report is licensed under a Creative Commons Attribution – NonCommercial 4.0 International License.

© 2023 Alliance of Bioversity International & CIAT

Photos

Cover photo: link & credit (same as below)
Back cover: [©2016 Neil Palmer \(CIAT\)](#)

Executive Summary

This report summarizes findings from the project “Agroecological transitions for building resilient and inclusive agricultural and food systems (TRANSITIONS)” which is funded by the European Commission through its Development of Smart Innovation through Research in Agriculture (DeSIRA) initiative and managed by the International Fund for Agricultural Development (IFAD). The Digital Tools regional work in Vietnam focused on research and engagement with digital tools for technical advice and performance assessment in sustainable rice production in the Mekong River Delta due to the high climate change impacts, climate change mitigation potentials and sustainability challenges.

This report focused on the learnings from the field testing of 2 digital tools designed for the rice value chain. Focus Group Discussions (FGDs) were held in September 2022 in Can Tho province in the Mekong Delta with 24 farmers and extension agents. In March 2023 FGDs were held with 5 extension agents and 20 farmers working with Sustainable Rice Platform (SRP) practices in the Dong Thap province of the Mekong Delta.

Keywords

Sustainable Rice; Digital tools; Inclusion; Mekong Delta

About the authors

Dr. Katherine Nelson (k.nelson@irri.org) is a Climate Change Scientist at the International Rice Research Institute in Hanoi, Vietnam

Jennifer Barnard (j.barnard@irri.org) is a Sustainable Finance Expert at the International Rice Research Institute in Hanoi, Vietnam

Dr. Ong Quoc Cuong (O.Cuong@irri.org), is a Senior Associate Climate Change Scientist at the International Rice Research Institute in Can Tho, Vietnam

Trang Vu (t.h.vu@irri.org) is an Associate Scientist at the International Rice Research Institute in Hanoi, Vietnam

Acknowledgements

This work was implemented with funding from the European Union through its DeSIRA initiative and managed by the International Fund for Agricultural Development (IFAD). The views expressed in this document cannot be taken to reflect the official opinions of these organisations. We thank all the representatives of Sub-department of Crop Production and Plant Protection, Dong Thap province and the Sub-department of Crop Production and Plant Protection, in Can Tho, Rikolto, IFC as well as the cooperatives and the farmers involved for their assistance and support in providing data. All omissions and errors are the first authors' responsibility.

Contents

Executive Summary	ii
Introduction.....	3
Background	3
Methodology.....	3
Results: Field testing of digital tool by Agritask	4
Farmers' agroecology practices and sources of technical advice/performance assessment	4
Testing of Agritask mobile application.....	5
Results: Field testing of digital tool by Agrig8	7
SRP management	7
Challenges faced by field agents while using digital tools	8
Testing of Crop Pal mobile application	8

Acronyms

DeSIRA	Development of Smart Innovation through Research in Agriculture
FGD	Focus Group Discussion
GHG	Greenhouse Gas
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
IRRI	International Rice Research Institute
SRP	Sustainable Rice Platform

Introduction

Background

This report summarizes findings from the project “Agroecological transitions for building resilient and inclusive agricultural and food systems (TRANSITIONS)” which is funded by the European Commission through its Development of Smart Innovation through Research in Agriculture (DeSIRA) initiative and managed by the International Fund for Agricultural Development (IFAD). The Digital Tools regional work in Vietnam focused on research and engagement with digital tools for technical advice and performance assessment in sustainable rice production in the Mekong River Delta due to the high climate change impacts, climate change mitigation potentials and sustainability challenges.

Methodology

This report focused on the learnings from 2 field studies. The first conducted in September 2022 in Can Tho province in the Mekong Delta with 24 farmers and extension agents. The digital tool tested was a prototype created by Agritask. The tool is designed to support data collection and technical advice for rice farmers. The second conducted in the Dong Thap province in the Mekong Delta on SRP farming practices and digital tool use. Data was collected in March 2023, through FGDs with 20 farmers and 5 field agents. The digital tool tested was a prototype created by AgriG8 called CropPal. The tool is designed to support SRP certification and the calculation of GHG emissions.

The purpose of the FGDs was to:

- Discuss the support that farmers receive in terms of sources of information/guidance and performance assessment in rice production.
- Discuss how farmers use digital tools to improve, monitor, and evaluate their SRP farming practices.

Results: Field testing of digital tool by Agritask

Farmers' agroecology practices and sources of technical advice/performance assessment

Non-contracted farmers cultivate rice in three cropping seasons thus, they do not cultivate other crops besides rice. They want to decrease to two rice cropping seasons since there is limited profit. It will require local government support to convert from three cropping seasons to two cropping seasons. Some contracted farmers diversify to other crops besides rice in order to increase their income. They cultivate fruit trees like durian, jackfruit, and longan in Thoi Lai and Co Do districts.

Farmers use a number of methods to improve input use efficiency. This includes the use of the Three Reductions, Three Gains (3R3G) approach and One Must Do, 5 Reductions (1M5R) which are both government programmes to decrease seed, fertilizer, and pesticide input use. Contracted farmers plant their rice based on the recommended schedule of the local government. They use sowing with drum seeders or mechanized transplanting, spraying is done by drone, and they use a combine harvester to harvest the crop. They also implement ecological engineering for pest management in rice crops such as planting nectar-rich flower plants on the bunds surrounding rice fields. They apply the alternate wetting and drying (AWD) technique for water management and monitor the water level using water tubes. The contracting companies require farmers to use high-quality certified seeds, reduce fertilizers and pesticides, refrain from pumping water into fields, and use pesticides 20 days before harvest. The application of new measures/technologies are done in agreement with the company and the company provides training for farmers. The contracted companies pay an additional 200 VND/kg for rice.

Contracted farmers access information through training courses, demonstration models, field visits from extension staff, television, communications via Zalo, Facebook (i.e. to inform each other in case of pests or diseases), Agricultural forecast bulletin (CIAT), MobiAgri application, and previous experiences.

Non-contracted farmers are beginning to use improved methodologies. They use a reduced seed rate with 10-15kg/1300m² (around 80-120kg/ha). They also use certified seeds, reduce chemical fertilisers and increase use of organic fertilizers. They are also reducing the number of seasonal pesticide sprayings from 5-6 times to 2-3 times as well as not using pesticides during the first 40 days after sowing. They are influenced by market requirements, application of new technologies by neighbouring farmers, concerns

Use of digital tools in sustainable rice production in the Mekong Delta, Vietnam

for environmental impacts, and their desire to reduce input costs. They receive most of the technical advice through demonstration models, training classes, television, and talking with other farmers.

In general, farmers find local agricultural field agents and company field agents the most reliable sources of information, followed by experienced fellow farmers and rice buyers. The preferred methods of advisory include regular field visits and face-to-face meetings where field agents are able to observe the field and provide accurate responses. Farmers and field agents usually use instant messaging methods such as Zalo for exchanging of information. Official weekly reports are made in written form.

Testing of Agritask mobile application

The digital tool tested during the first field testing in Can Tho City in the Mekong Delta was a prototype created by Agritask. The tool is designed to support data collection and technical advice for rice farmers. The system is designed for use by both men and women. It is expected to improve efficiency in the data collection process whilst simplifying the process for farmers and reducing errors. With time, it is hoped that the tool will be used for SRP certification. The current business model is designed on the mechanism of paying farmers to use, since rice farmers do not display a strong desire to use digital tools to facilitate the data collection process. Farmers expect that this process should be facilitated by field agents as such, it will be important for Agritask to think about whether there is scalability in this approach. A more scalable approach would be to target field agents as the end users and as such developing a tool suitable for their needs.

The farmers and field agents considered the Agritask application to be useful for the recording of farming practices and a more convenient approach than using pen and paper recording. The information is structured well and arranged logically. It is considered to have generally user-friendly interfaces. The pest and disease recommendations are useful and there are calculations of cost and profit, enabling comparison between seasons.

Suggestions for improvement

It was considered very important that farmers are able to extract and share the data that they have entered. There were a number of recommendations to reduce the rate of errors. It was recommended to allow farmers to edit data retrospectively in case of errors while recording. Allowing duplication of records where practices do not change over time can reduce errors for example, area or type and

Use of digital tools in sustainable rice production in the Mekong Delta, Vietnam

volume of pesticides. Duplication of some entry points can also save a significant amount of time. It was suggested that a reminder warning be included if a user forgets to input data (according to an established frequency such as daily or weekly or a few times per week) similarly pest/disease warning were considered to be useful. Award points could encourage farmers to use frequently.

Some more specific recommendations are:

- Use of digit separators (. ,)
- Charts of farming results (cost, yield, revenue, profit, etc.) to compare with the same season across different years.
- The app currently does not allow saving data for the current day. It only allows saving for dates up to the date before the current date. Sometimes farmers use lunar calendar for crop establishment, it would be good if the app can show both lunar and solar calendars.
- Machinery cost should be broken down to specific items such as land preparation, tillage/ploughing, sowing, etc.
- Allow users to add items not available in the pre-designed lists of fertilisers and pesticides (some common fertilisers such as urea, DAP, Kali NPK 16-16-8, NPK 20-20-15 are not in the list). Under pest management: mouse management is missing.
- Labour cost can be VND/day and can sometimes be a lump sum cost (not determined by labour day), so the app should allow to record labour cost by area (i.e. ha or season).
- The area unit varies between provinces. While farmers in one province are familiar with ha, those in other provinces are more familiar with “big cong” (equivalent to 1296m²).
- Farmers are confused among units of fertilizer (the way of inputting is not friendly to them) and the units for pesticide were too limiting. Some people would prefer litres, while others prefer bottles or other units.
- The app’s error alerts were confusing to farmers, sometimes the alerts were in English even though the device system language and the app language were both in Vietnamese.

Results: Field testing of digital tool by Agrig8

SRP management

Rikolto launched their SRP project in Dong Thap 2018 with implementation of the model commencing at the end of 2019. By 2020, the program had been scaled up to involve approximately 800 small holder farmers across eight cooperatives, covering a total of 2,000-3,000 hectares of land.

Scoring occurs once per crop season, typically at the end of the season. Agents visit farmers weekly to monitor progress, assess the current situation, and take notes for a summary report. The process to input farming data for SRP monitoring and scoring takes approximately two hours per SRP farmer. At the time of survey, SRP scoring was done by technicians in the local areas who had been trained in SRP in cooperation with the cooperatives; most farmers who joined this program reached 80% and above. There was a plan that Rikolto would hire an independent body to perform the scoring in 2023 with the expectation of selling rice at a higher price.

Agents maintain records of each SRP farmer's name, rice area, field address, and phone number on hard copy documents. The SRP project provides agents an Excel form for scoring. SRP farmers keep record of farming diaries using a notebook provided by the project. The rice management diary includes information on seed varieties, fertilizer usage, harvesting practices, labour costs, yields, prices, and productivity. At the end of the season, these diaries are collected by field agents to input into a digital format (normally Excel) for scoring.

It was reported that production cost reduced up to 30% per season. Currently, there is no contract farming scheme for SRP rice under this project. Farmers sell rice either to companies under the cooperatives' on-going contracts or to middlemen. SRP rice under this project is sold at prices that are 100-200 VND/kg higher than market prices for regular rice; the difference comes from negotiation based on improved quality (i.e., use of certified seeds and reduced chemical use). Some farmers indicated that after completing the pilot project, they would continue to implement the SRP techniques due to the financial benefits from saving input costs and health benefits for farmers. Some farmers shared that they would continue the model if the rice is certified and sold at considerably higher prices.

Use of digital tools in sustainable rice production in the Mekong Delta, Vietnam

In general, all farmers apply AWD. Even during the wet season (Autumn – Winter), sometimes water is pumped out of the field to prevent logging. Farms use certified pesticides and apply integrated pest management practices to control pesticide use. Straw is generally incorporated before wet seasons and collected and sold during dry seasons. Straw is sold for production of mushroom, ornamental plants and flowers or compost.

Table 1. Specific information of the SRP model in the surveyed cooperatives

	Thang Loi Cooperative	Binh Thanh Cooperative
Number of SRP farmers	178	84
SRP area (ha)	387	240
Rice season		
Winter – Spring	October – January	November – February
Summer – Autumn	February – May	March – July
Autumn – Winter	June - September	July – October
SRP score	All: 90% and above	All: 80% and above

Source: survey, 2023

Challenges faced by field agents while using digital tools

Data is collected by field agents in pen and paper form in the field. When the agents return to their office this data is transcribed on to Excel. The software does not have all the statistical functions needed, and agents must use additional software like SPSS for further analysis. Additionally, it takes time to enter information from the notebook to Excel while doing SRP scoring.

Communication tools such as Zalo are commonly used by field agents to communicate with farmers. Google maps is sometimes used by field agents however, it doesn't meet the resolution needs to meet the requirements of users/officers in monitoring rice growth stages and pest detection.

Field agents expressed an interest in using an app and transferring the notebook/diary to manage online by an application to save time, ensure consistency, and provide convenience. There was the suggestion of integrating the scoring function into the app so that farmers can enter data themselves under the support of field agents.

Testing of CropPal mobile application

The second field testing conducted in the Dong Thap province in the Mekong Delta tested a prototype created by AgriG8 called CropPal. The tool is designed to support SRP certification and the calculation of

Use of digital tools in sustainable rice production in the Mekong Delta, Vietnam

GHG emissions. They are still in the process of developing a sustainable business model. They are proposing the app be pay for use by farmers or supported by financial institutions. It will be important to develop a long term scalable business model. One approach could be to design the app for use by public sector and private sector field agents, who work directly with farmers for SRP certification.

Field agents considered CropPal to be generally convenient, accessible, and suitable for users/farmers. They liked the ability of CropPal to retain information. It was suggested that a reminder warning be included for incomplete information in each section and there be a function to review the history of entered information. It was requested that there be a function to export outputs to Excel. It was proposed the design of a season management section by year.

Interface

Farmers struggled to interpret the icons. It was suggested that changing the icons to text or photographic images that are familiar to farmers which would make the buttons more easily recognisable. Farmers also preferred to have each button in its own distinctive colour. Vietnamese needs to be used as the primary language throughout the app.

Field agents had a preference for use of kg unit instead of “bag” unit. Field agents suggested changing from drop down options to a blank space which allows flexibility of answer. List all fertilizer categories and leave the corresponding quantity blank for users. They suggested changing the way to log in to CropPal, using the user's phone number to get the number code automatically, which is only required the first time using the app. The app could then be managed by the field agents using farmer code.

Functions

It was recommended that the application include more statistical functions on varieties e.g. variety type, quantity/area of sowing). They would like additional functions for productivity and information about expenses for fertilizers, and labour costs. The definition of the duration of each rice variety should be adjusted as follows: Short-term rice (85-90 days), medium-term rice (95 days), long-term rice (>110 days). Pest detection time needs to be included (dd/mm)

Agroecological TRANSITIONS Programme

The Program on Agroecological Transitions for Building Resilient, Inclusive, Agricultural and Food Systems (TRANSITIONS) aims to enable climate-informed agroecological transitions by farmers in low- and middle-income countries through the development and adoption of holistic metrics for food and agricultural systems performance, inclusive digital tools, and transparent private sector engagement. The *Inclusive Digital Tools to Enable Climate-informed Agroecological Transitions* (ATDT) aims to scale agroecological practices by enabling smallholder farmers to participate in co-design of digital tools and farming practices. Learn more about ATDT [here](#).



It is led by:



TRANSITIONS is financed by:



And managed by:

