

INNOVATE FINAL REPORT

INNOVATION WALLET LEARNING PROJECT

Dodore Kenya Limited
University of Nairobi
COIN22

DECEMBER 2019



COIN22

Acknowledgments

Authors: Mburu J. (University of Nairobi), E. Mujuka (University of Nairobi), S. de Hoogh and V. Mingate (Dodore Kenya Limited)

Design: Queena Li

Photography: Mburu J. (University of Nairobi), E. Mujuka (University of Nairobi), S. de Hoogh and V. Mingate (Dodore Kenya Limited)

This work was carried out with the aid of a grant from the International Development Research Centre (IDRC), Ottawa, Canada. The views expressed herein do not necessarily represent those of MEDA, IDRC or their respective Board of Governors.

About Dodore Kenya Limited

Dodore Kenya Limited is a company with vast knowledge and experience in financial mobile solutions for the bottom of the pyramid. It has developed the Agri-wallet to support financial inclusion for smallholder farmers. The 30 staff are dedicated and experts at developing and implementing these solutions. Dodore Kenya has offices in Nairobi, Kenya, Kigali, Rwanda and in Amsterdam, The Netherlands.

Learn more: www.dodore.co.ke

About MEDA

Since 1953, MEDA has been implementing effective market-driven programs globally. MEDA combines innovative private sector solutions with a commitment to the advancement and empowerment of excluded, low-income and disadvantaged communities (including women and youth) with core expertise in market systems and value chains, climate-smart agriculture, financial services, and investment. MEDA partners with local private, public and civil society actors, strengthening individuals, institutions, communities and ecosystems, and thereby contributing to sustainable and inclusive systemic change.









About INNOVATE

INNOVATE – Adoption of Agricultural Innovations through Non-Traditional Financial Services, is a three-year initiative implemented by MEDA and funded by the International Development Research Centre (IDRC). MEDA and its partners are assessing the potential of non-traditional finance to enable large scale adoption of agricultural innovations among women and men smallholder farmers in South Asia, South America and East Africa. The research and learnings will contribute to developing policy and programming recommendations.

Learn more: www.meda.org/innovate



Contents

	EXECUTIVE SUMMARY	v
	1. BACKGROUND	1
	2. METHODOLOGY	4
	3. RESULTS	6
	4. KEY FINDINGS & DISCUSSION	11
	5. DISSEMINATION	15
	6. CONCLUSION	21
	7. REFERENCES	23

Acronyms

AFRACA – African Rural and Agricultural Credit Association)

AGRA – Alliance for a Green Revolution in Africa

ATI – Agricultural Technologies and Innovations

CBK – Central Bank of Kenya

GM – Gross Margin

IW – Innovation Wallet

KCSEED – Keringet Community Social Economic and Environmental Development

MEDA – Mennonite Economic Development Associates

NTAF – Non-traditional Agricultural Finance

EXECUTIVE SUMMARY

The Innovation-wallet learning project was funded through MEDA and jointly implemented by COIN22 and Dodore Kenya, in partnership with the University of Nairobi. Innovation-wallet is a non-traditional finance service which affords financially excluded smallholder farmers the convenience of saving and borrowing, all in a mobile account with restricted funds specifically earmarked for the purchase of inputs for increased productivity and income.

Innovation-wallet is a novel value chain financing option that links farmers, input suppliers, markets and the financial provider. The project was launched in May 2018 and lasted 15 months. The overall objective involved assessing farmers' willingness to save and borrow funds through the wallet for the purchase of agricultural innovations. The project targeted farmers producing tomatoes under the Kwakyai Irrigation Scheme in Makueni County and potato farmers in Nyeri, Nyandarua and Nakuru Counties.

Results revealed that farmers are willing to save and to borrow from innovation wallet for the purchase of agricultural inputs. Timely access of these inputs increased productivity and incomes. Mean differences of gross margins were positive for both value chains and statistically significant at 10% for potato production in Nyeri County. The innovation wallet enabled farmers acquire inputs in a timely fashion and secondly they were able to apply fertilizers and pesticides in the right quantities and of the right quality because of the innovation wallet that enabled financial access and discipline.

It can therefore be concluded that the project had a positive impact on enterprise productivity and incomes of smallholder farmers. If further scaled to other parts of the country and region, the innovation-wallet can contribute to agricultural development and improve livelihoods of local communities.



1. BACKGROUND

- Introduction
- Project Overview
- Project Hypotheses
- Project Objective

1.1 Introduction

In Kenya, the share of agricultural finance as a proportion of outstanding national credit remains below 5 percent and shows little signs of improvement (CBK, 2015). This notwithstanding, several commercial and microfinance institutions in Kenya have established agribusiness departments. Some of the key barriers to accessing agricultural finance include the high risk associated with agriculture (mainly production and price risks), lack of collateral and reliable data on smallholder farmers. The transaction costs incurred in reaching remote rural populations are also considerably high. Consequently, smallholder farmers in East Africa are cash-strapped and lack funds to buy innovations for enhancing productivity and produce very low agricultural yields. For instance, smallholder potato farmers in East Africa produce only 2.5 tons per acre compared to a global average of 10 tons per acre.

In most cases productivity is induced by technical innovations. For example, Dutch farmers, who utilize different innovations in agriculture, produce 20 tons per acre (Van Oort et al., 2012). Innovations such as drip irrigation, hybrid seeds and crop protection strategies are available in East Africa, but smallholder farmers often lack the funds or sometimes awareness to purchase them. It is a challenge for smallholder farmers

to save enough to invest in their farms to increase their agricultural production. When loans are accessible, these are often diverted to personal consumption instead of income generating farming activities. This gap hampers national efforts to ensure food security, improve livelihoods and spur the growth of the rural economy. To address this challenge, improved access to rural financial services has been proposed (AGRA, 2015). Digital innovation for building liquidity for agricultural payments looks promising.

1.2 Project Overview

It is against this background that Dodore Kenya in partnership with COIN22 and University of Nairobi tested a non-traditional finance service (innovation-wallet) to encourage smallholder farmers to take up agricultural innovations. The innovation wallet is a novel value chain financing option that links farmers, input supplier, markets and the financial provider. It uses technological innovations like blockchain and business process innovations like micro-transactions and lean production to reduce complexity and process costs. It contains virtual currency (or 'coins') which are restricted and can only be used by the farmer to purchase innovation to increase agricultural production.

The funds in the Innovation-wallet cannot be diverted for personal consumption. This product has the potential to transform the rural financial landscape as it fundamentally changes how smallholders save and borrow for innovation, pertinent for their farming activities. The Innovation-wallet account is easy to use and the basic features are free. It works on every mobile phone, making it possible to scale. As an e-wallet platform, the wallet facilitates timely and efficient transactions.

It targets the unbanked smallholder farmers in contract farming. The buyer or off-taker pays the farmer through the wallet and the farmer saves money restricted for the purchase of agricultural innovations. Input suppliers are also paid through the system and if need be, farmers access overdraft for the purchase of agricultural inputs. This strategic financial system makes credit more available for the smallholder farmer.

1.3 Project Hypotheses

The hypothesis of this study was that smallholder farmers would be more willing to buy more innovation and increase their production and income when they adopt the Innovation-wallet, making it very easy to save and borrow funds specifically earmarked for agriculture. For this to be true, the set success criteria were that 60% of the farmers would

save funds in the wallet, 30% would borrow from the wallet, and that 50% would actually take up innovation resulting in increased farm productivity and income.

1.4 Project Objective

The overall objective of the project was to assess farmers' willingness to save and borrow funds through innovation-wallet. The specific activities of the project included:

- Conduct a needs assessment among tomato and potato farmers;
- Test and monitor the digital purchasing transactions in the Innovation-wallet;
- Analyze the proportion of farmers who purchase innovations with funds in their Innovation-wallet;
- Assess the effect of the innovation on agricultural productivity and farmers' income; and
- Learn the effect of gender-based differences and gender issues on farm productivity and incomes

2. METHODOLOGY

- Study Area
- Approach

2.1 Study Area

The project targeted 103 farmers producing both tomatoes and potatoes. Under the Kwakayai Irrigation Scheme in Makueni County the project targeted 20 (14 men, 6 women) farmers. Targeted potato farmers from Nyeri, Nyandarua and Nakuru Counties were 83. The potato farmers were specifically located in Naromoru, Olkalau and Keringet, respectively. In the latter, the potato farmers market their produce through the Keringet Community Social Economic and Environmental Development (KCSEED) Programme that links them to reliable markets. The tomato farmers have a formal contract with the Ketchup project to supply tomatoes for further processing. This initiative is in a bid to reduce the tomato postharvest losses in Kenya which are estimated at 40%.

2.2 Approach

A baseline survey was carried out before implementation started in order to prepare a pre-project information database on relevant indicators. This aided the assessment of performance and impact of the business in the future as specified in the project proposal. The baseline survey laid the foundation for attribution of results to the project interventions.

Selected key results of the survey are compared and discussed with respect to the end term data of the project. The end-term evaluation was undertaken to assess project outcomes, achievements and issues encountered during the life time of the project while showcasing the process and results of the evaluation. Specifically, the end-term survey sought to assess the current status of saving, borrowing and uptake of innovation (Project Hypothesis) and to disaggregate the current status of saving, borrowing and uptake of innovation by gender (Project KPIs). The end-term evaluation employed both quantitative and qualitative research methods, incorporating purposively selected samples (tomato and potato farmers registered in innovation wallet). The end-term data was collected among 105 farmers, comprising of 22, 32, 31 potato farmers from Keringet, Naromoru and Ol kalau of Nakuru, Nyeri and Nyandarua Counties, respectively, and 20 tomato farmers from Kwakayai, Kibwezi County. For brevity, only end-term data related to hypotheses is discussed and compared with the baseline.

3. RESULTS

- Assessing the Status of Saving, Borrowing and Uptake of Innovation
- Gender Disaggregation of Tomato Farmers and Potato Farmers

3.1 Assessing the Status of Saving, Borrowing and Uptake of Innovation

Tomato Farmers in Kwakyai

All farmers in Kwakyai who saved in the Innovation wallet borrowed an average of **Kshs. 27,789** (USD 278) for the purchase of certified seed. Yield and income increased by **15%** and **92%**, respectively. Thus, adopting the innovation has a positive impact on agriculture and farmers' income.

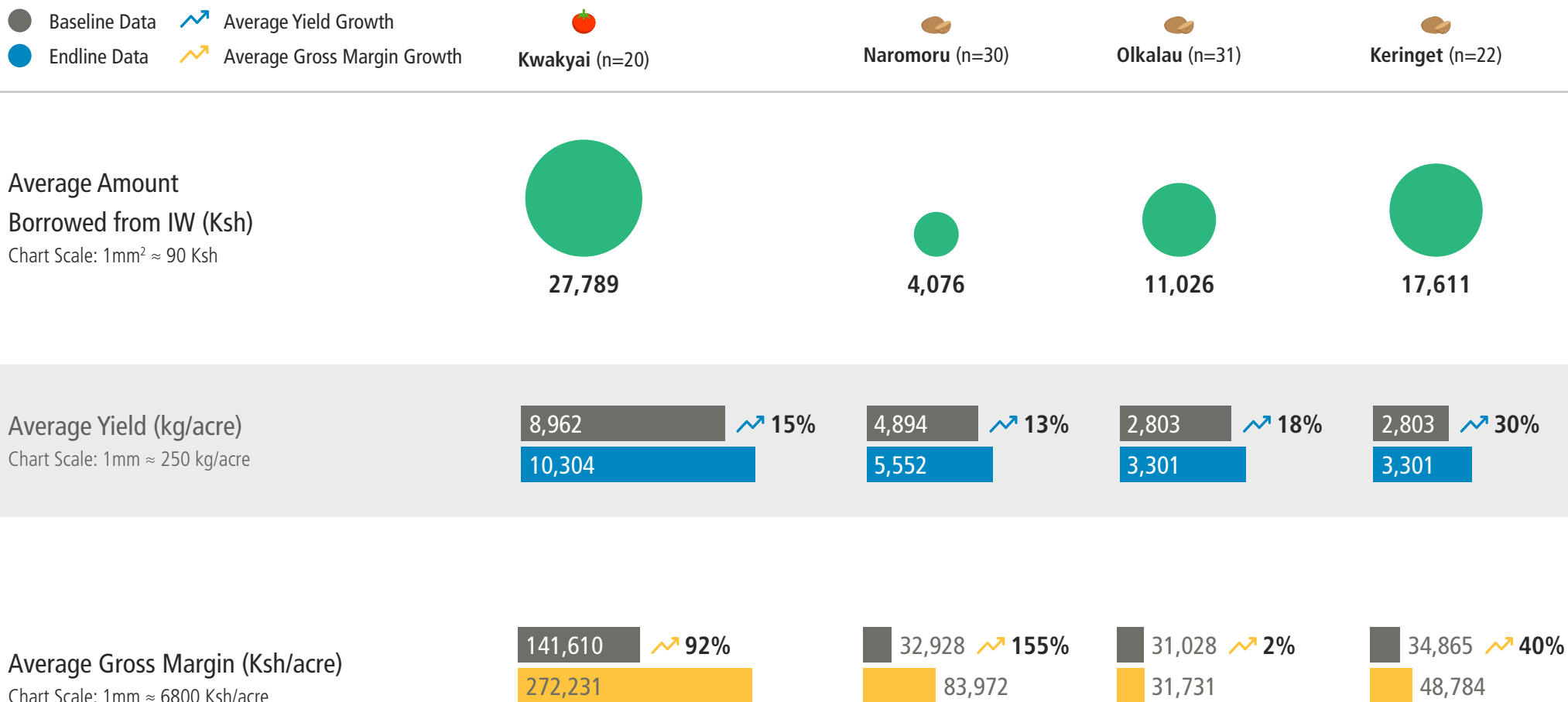


Potato Farmers in Naromoru, Olkalau and Keringet

With the lack of a baseline study in Naromoru, the end-term evaluation relied on recall data to measure the impact of adopting the innovation. Farmers who saved in the wallet borrowed an average of **Kshs. 4,076** (USD 41). With the uptake of the innovation, yields and income increased by **13%** and **155%**. With the lack of a baseline study in Olkalau, the end-term evaluation relied on recall data to measure the impact of adopting the innovation (Figure 1). Farmers who saved in the innovation wallet borrowed an average of **Kshs. 11,026** (USD 110). It was found that with the uptake of the innovation, the yields and income increased by **18%** and **2%** respectively. Both the yield and income recorded for the Olkalau farmers was lower compared to other regions because of weather extremities in that region during flowering. A lot of rain caused flooding and at onset of crop maturity rains failed leading to modest increase in both yield and income compared to the other areas. All farmers in Keringet who saved in the wallet borrowed an average of **Kshs. 17,611** (USD 176) for the purchase of certified seed and fertilizers. The yield and income increased by **30%** and **40%**, respectively (Figure 1).

RESULTS

FIGURE 1. Current Status of Saving, Borrowing and Uptake of Innovation (Project Hypothesis)



3.2 Gender Disaggregation of Tomato Farmers and Potato Farmers

Figure 2 shows gender disaggregation in the tomato treatment and potato treatment sub-samples.

Tomato Farmers in Kwakyai

Unfortunately, the sample sizes are extremely low and thus the data has to be interpreted cautiously. Female headed households were 30% of the sample with an average age of **50 years** which was slightly older than their male counterparts that had an average of **44 years**. Male headed households had higher land sizes of **0.59 acres** against female land holding of **0.23 acres**. Both male and female farmers were well educated, having attained secondary education. Male farmers had more knowledge on agricultural technologies and innovations. This explains why their yield and income were higher by **21%** and **27%** respectively.

Potato Farmers in Naromoru, Olkalau and Keringet

In Naromoru, female headed households were 17% of the sample with an average age of **47 years**, which was slightly younger than their male counterparts that had an average of **53 years**. Male headed households had higher land sizes of **0.8 acres** against female land holding of **0.5**

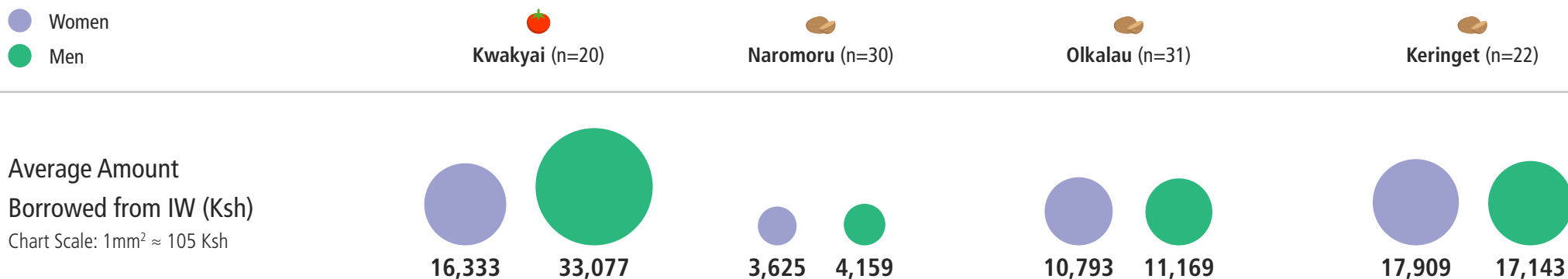
acres. Female farmers were better educated and had higher usage of agricultural technologies and innovations. Consequently, their yield and income were higher by **75%** and **125%**, respectively.

In Olkalau, female headed households were 58% of the sample with an average age of **44 years** which was slightly younger than their male counterparts that had an average of **55 years**. Female headed households had higher land sizes of **1.22 acres** against male land holding of **0.92 acres**. Female farmers were better educated and had higher usage of agricultural technologies and innovations. Consequently, their yield and income were higher by **10%** and **7%**, respectively.

In Keringet, female headed households were 59% of the sample with an average age of **52 years** which was slightly older than their male counterparts that had an average of **39 years**. Female headed households had higher land sizes of **0.73 acres** against male land holding of **0.44 acres**. Male farmers were better educated and used financial support to access agricultural technologies and innovations. Consequently, their yield and income were higher by **66%** and **103%**, respectively.

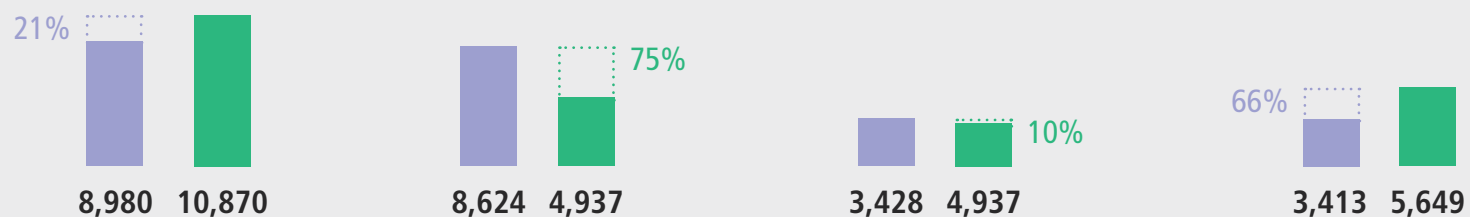
FIGURE 2. Gender Disaggregation of Tomato Farmers and Potato Farmers

● Women
● Men



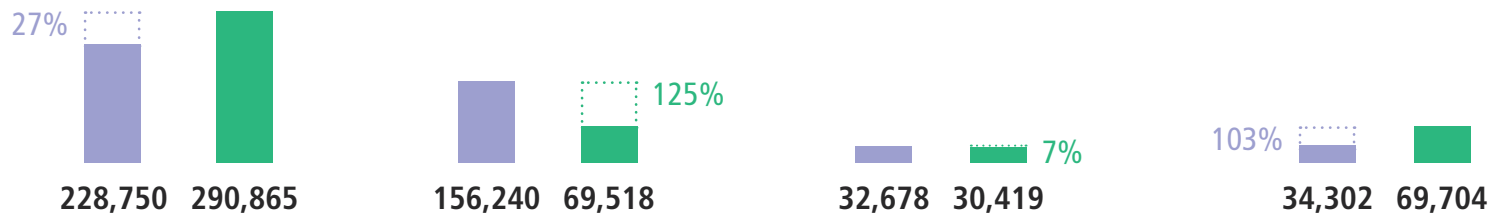
Endline Average Yield (kg/acre)

Chart Scale: 1mm ≈ 550 kg/acre



Endline Average Gross Margin (Ksh/acre)

Chart Scale: 1mm ≈ 14,500 Ksh/acre



4. KEY FINDINGS & DISCUSSION

- Innovation wallet enhanced savings and credit access for agricultural inputs
- Demand for saving and borrowing among smallholder farmers is unmet
- ICT based innovations are gaining popularity among smallholder farmers
- Need for continuous capacity building of farmers
- Need for customer segmentation
- Development of agricultural innovations takes time
- Need for farmer centricity
- Investment in sound business models
- A value chain broad approach
- Need for reliable database

Yield and income increased with literacy levels, knowledge, access and usage of ATIs and financial support, irrespective of gender. Women were better educated in Naromoru and Olkalau. They realized higher yields and income. The increased incomes are attributable to the linkage with off takers that engaged the farmers in contract farming. Other findings include:

Finding 1 – Innovation Wallet Enhanced Savings and Credit Access for Agricultural Inputs

Results revealed that the innovation wallet enhances convenience for saving and timely access to credit for users. This increased uptake of agricultural innovations for increased productivity and income. The wallet enabled this in part as a portion of their proceeds were earmarked for the purchase of inputs and couldn't be released to the farmers under whatever circumstances but was transferred to input suppliers where they made their purchases. It was found that the innovation wallet savings contributed to yield increases of up to 18% and 15% in potato and tomato value chains respectively. Incomes increased by up to 155% and 92% in potato and tomato value chains, respectively.

Finding 2 – Demand for Saving and Borrowing Among Smallholder Farmers is Unmet

The willingness to save and to borrow from the wallet among both tomato and potato farmers maintained an upward trend, corroborating the growing body of literature that affirm that Kenyan farmers are credit constrained. In fact, in most cases in potato farming, farmers depend on credit to procure certified seed. Thus, without credit they would not be able to plant certified seed and therefore their yields would remain low.

Finding 3 – ICT Based Innovations are Gaining Popularity Among Smallholder farmers

Farmer are increasingly interested in using ICT solutions and innovations to meet their farming needs. The project experienced no difficulties or complains about the use of mobile-based saving and borrowing. Thus up-scaling of innovation wallet technology is tenable since Kenya is a frontrunner in the uptake of mobile technology in Africa. The wallet proved adaptable due to its simplicity and affordability as farmers only required a feature phone that is within reach for many smallholder farmers.

Finding 4 – Need for Continuous Capacity Building of Farmers

Access to finance in itself coupled with traditional means of closing yield gaps is not sufficient in increasing productivity and incomes. Continuous capacity building of farmers on proper agronomical practices, high quality inputs and market access are also necessary in the wake of climate change, changing pest and disease patterns and changing demographics.

Finding 5 – The Need for Customer Segmentation

The simple differentiation between large scale farmers and smallholder farmers proved deficient as within the groups of smallholder farmers there were large differences. For instance, the young and more business-oriented farmers were eager to try the innovation while the more elderly subsistence farmers took longer to see the opportunities that innovation wallet affords.

Finding 6 – Development of Agricultural Innovations Takes Time

Developing innovation wallet required time, resources and to a certain extent the space to fail. Profound knowledge about the crop and the possibilities to measure changes in crop growth due to use of innovations was necessary. Validation of the resultant information required farmer feedback and will be necessary for at least 2 or 3 growing seasons. Ample time should be availed for trials and lessons drawn from the successes and failures to avoid dissemination of an innovation that would be abandoned shortly after.

Finding 7 – The Need for Farmer Centricity

The study revealed that the involvement of farmers in the development of innovation wallet through continuous feedback is crucial. The strategy of working with groups of farmers and with key-farmers proved worthwhile. These farmers accepted to test the innovation, freely gave their feedback and were more willing to adopt the innovation.

Finding 8 – Investment in Sound Business Models

Dodore Kenya invested in an exclusive business model that ensured that customers were linked to markets and input suppliers. This enhanced trust between the company and its customers since the farmers were assured of a market for the expected increase in yield and were thereby more willing to test a yield-enhancing innovation. The linkage between farmers and input suppliers also ensured timely supply of quality inputs further cementing the relationship between the company and the farmers. This business model proved to be realistic and attractive to a good number of smallholder farmers allowing the company to enjoy 'economies-of-scale'.

Finding 9 – A Value Chain Broad Approach

A value chain broad approach demonstrated the feasibility of increased productivity and incomes. The involvement of the credit provider, input supplier, off-takers who also doubled up as food processors, agronomists and other stakeholders in the value chain made the entire value chain stronger, more efficient and were key in increasing productivity and incomes. Having a guaranteed buyer is critical, enabling the farmer to know he or she can sell their product

to someone. The ecosystem of businesses in which the innovation wallet is successful for all parties involved:

Supplier – farmer can access certified seed

Credit – farmer can purchase certified seed

Buyer – access to market => secured revenue for buyer and seller

Wallet – store of value -> farmers can save for certified seed and other agricultural innovations next time

Finding 10 – Need for Reliable Database

Attribution was largely dependent on the availability, quality and existence of relevant data. Frequent follow ups ensured up to date data from the farmers was available. Capacity building of farmers on record-keeping paid off.

5. DISSEMINATION

- Dissemination Objectives
- Target Groups for the Dissemination Activities
- Dissemination Channels / Tools
- Dissemination Workshops

5.1 Dissemination Objectives

The overall objective of the dissemination exercise was to communicate the project goal, activities and results in order to reach out to the widest possible range of stakeholders and to promote further exploitation of the project results. The project success will be guaranteed if stakeholders are not only aware of the project but are also included and incited to be actively involved in adopting the innovation wallet.

The overall objective of the dissemination exercise was to communicate the project goal, activities and results in order to reach out to the widest possible range of stakeholders and to promote further exploitation of the project results. The project success will be guaranteed if stakeholders are not only aware of the project but are also included and incited to be actively involved in adopting the innovation wallet.

The **specific objectives** were:

- **Raise awareness** on project outcomes among existing and potential stakeholders
- **Promote consensus** among stakeholders on viability of innovation wallet
- **Motivate stakeholders' engagement**, motivation and interaction
- **Popularize and gain visibility of project outcomes** to the wider public
- **Obtain critical feedback** from stakeholders

5.2 Target Groups for the Dissemination Activities

Key to successful dissemination is the identification of the right target groups and to tailor messages based on specific needs and characteristics. Both primary and secondary audiences were targeted. Primary audiences are those who need to make decisions or change, such as project beneficiaries and the general public. Secondary audiences are those in a position to influence the decisions or actions of the primary audience. They include policy makers and public administration.

5.2 Dissemination Channels/Tools

Dissemination tools are the communication channels through which messages from the project are conveyed to stakeholders and to the general public. In the case of innovation wallet, the following tools were used:

1. Interpersonal communication with off takers and input suppliers

Feedback from the off takers:

- Local and export market for potato and tomato is considerably good and side selling should be discouraged
- Quality should be maintained for sustainability of the project

2. Policy brief

Scientific findings translated into policy recommendations and guidelines. There were circulated to policy makers, scientific community and other interested parties. Feedbacks from the target stakeholders had not been received by the time of compiling this report.

3. Conference presentation (MEDA Side Event – AFRACA conference, 30th September, 2019, Nairobi, Kenya)

Feedback from the off takers:

- Ease of accessibility was lauded
- Ensure affordable interest rates and dignity in loan recovery
- Consider modifying innovation wallet for countries struggling with inflation and currency devaluation such as Sudan

4. Technical report

5. Stakeholder dissemination workshops (region based)

5.2 Dissemination Workshops

This section will focus on dissemination workshops held in each of the study areas.

Kwakyai (Tomato Farmers)

The dissemination exercise at Kwakyai was conducted on 26th September, 2019. Both customers involved in the pilot and those who were not (32%) were present. Participants were taken through rationale and objective of the project and the method used to arrive at the results. Participating customers confirmed their willingness to save, borrow and to purchase agricultural innovations as shown by the results that had surpassed the success criteria. They also confirmed that yield and income had increased. This was established from analyzing the data and interacting with the farmers during workshops with a view to validating the results. Results estimated average yield and income increases at 15% and 92%, respectively. These farmers have access to water for irrigation and can farm all year round and keep diseases and pests at a minimum.

Feedback

- Ease of registration for innovation wallet was commended by potential entrants.
- New farmers expressed interest in registering for the innovation wallet and the process was explained by the relevant staff.
- There were isolated cases of side selling and emphasis was placed on the group model in order to meet the needs of the buyer.
- There was concern that the level of credit was pegged on savings, but farmers were interested in capital investments such as water pumps and water tanks.

Olkalau (Potato Farmers)

The dissemination exercise at Olkalau was conducted on 2nd October, 2019. Both customers involved in the pilot and those who were not (30%) were present. Participants were sensitized on the problem that occasioned the need for innovation wallet, project objective and the method that was used to arrive at the results. Customers confirmed their willingness to save, borrow and to purchase agricultural innovations as shown by the results that had surpassed the success criteria. They also confirmed that yield and income had increased. Despite drought during the season, average yield and income increased by 17.7% and 3.3% respectively.

Feedback

- There was demand for contract that spanned more than a year.
- There was demand for overdraft to cultivate an acre or more, as a shift from the current quarter an acre.
- There was a request to have an official on the ground and training on entrepreneurship.
- Demand to join the innovation wallet was very high.
- There was need for another seed variety.

Naromoru (Potato farmers)

The dissemination exercise at Naromoru was conducted on 3rd October, 2019. Both beneficiaries and non-beneficiaries (43%) were present. Participants were taken through rationale and objective of the project and the method that was used to arrive at the results. Customers confirmed their willingness to save, borrow and to purchase agricultural innovations as shown by the results that had surpassed the success criteria. They also confirmed that yield and income had increased. Average yield and income increased by 13.4% and 155%, respectively.

Feedback

- Farmers were interested in crop insurance
- There was demand to join innovation wallet mainly by the youth
- The credit offered was for the purchase of seed. There was demand for credit for other inputs such as fertilizers
- Digifarm was cited as the competitor on the ground and there was need for clarification on the edge innovation wallet has over it.

Keringet (Potato farmers)

The dissemination exercise at Keringet was conducted on 1st October, 2019. Both customers involved in the pilot and those who were not (20%) were present. Participants were sensitized on the problem that occasioned the need for innovation wallet, project objective and the method that was used to arrive at the results. Customers confirmed their willingness to save, borrow and to purchase agricultural innovations as shown by the results that had surpassed the success criteria. They also confirmed that yield and income had increased. Results estimated average yield and income decreased by 64.6% and 73.8%, respectively. This was due to lack of rains in the study area. Some farmers recorded total crop failure.

Feedback

- There was need for overdrafts for the purchase of inputs for two seasons
- There was need for crop insurance from planting to harvesting
- Increase overdraft limit
- Finance other value chains
- Link farmers with market for other value chains e.g carrots, peas and cabbage

6. CONCLUSION

Demand exists for digitized payment ecosystem that allows savings and credit restricted for purchase of agricultural innovations. In order to replace cash transactions, digital payments must offer a greater value proposition beyond payment receipt. The value proposition of the innovation wallet is that it incorporates merchants, off takers and financial providers within the same ecosystem.

Digitizing payments from off-takers to their smallholder suppliers is a strong entry point for integrating digital financial services into agriculture value chains. Otherwise, smallholder farmers are likely to continue depending on cash which is costly to collect, to send and which can be stolen or misappropriated. Digital payments reduce frequency of transactions improving transparency through quicker, traceable payments. The high volume of transactions in agricultural value chains creates a multiplier for any inefficiencies, such as cash payments. Digital payments facilitate access to financial services for smallholder farmers by lowering transaction costs, providing flexibility, and improving the customer experience as reflected in higher gains in yield and income. Digitized value chains also create more efficient markets.

The dissemination exercise created awareness on project goal, activities and results in order to reach out to the widest possible range of stakeholders and to promote further exploitation of the project results. Efforts to reach a wider audience were achieved through the wide array of dissemination tools. The exercise spurred interest from both the existing and potential entrants. Farmers expressed willingness to save, borrow and to purchase agricultural innovations for larger land parcels. Farmers appreciated that all factors held constant, innovation wallet has potential to increase productivity and income.

Key Policy Recommendations

- **Results showed that farmers' willingness to save and to borrow from innovation wallet for the purchase of agricultural innovations led to yield and income increases in both value chains.** It would be interesting to do further research into the types of innovations that were of more interest to farmers whether they are capital expenditure or working capital or they are inputs for production or those that address post harvest.
- **Financing smallholder farmers should be approached wholistically from the value chain financing angle and that way all actors in the value chain are incentivised to support smallholder farmers.** Increase in farmers income cannot wholly be tied to access to finance as such increase is a factor of market prices.

7. REFERENCES

REFERENCES

AGRA (2015). Assessment of financial services landscape for smallholder farmers in Ghana, Kenya, and Tanzania. AGRA, Nairobi, Kenya.

Central Bank of Kenya (2015). Annual Bank Supervision Report. CBK, Nairobi, Kenya.

Van Oort, P. A. J., Timmermans B.G.H., Meinke H., and van Ittersum, M.K.,(2012). Key weather extremes affecting potato production in The Netherlands. European Journal of Agronomy 37(1): 11-22

World Bank (2015). Kenya agricultural sector risk assessment. Agriculture global practice technical assistance paper. World Bank, Washington, DC.

COIN22



DODORE

