

Mobile Money and PAYG Innovation to Scale AgTech Adoption in Smallholder Value Chains



ABOUT THIS BRIEF

MEDA's **INNOVATE** project is a three-year initiative assessing the potential of non-traditional finance to stimulate agricultural innovation adoption among smallholder farmers in South Asia, South America and East Africa.

MEDA's partners across these regions have tested products or services targeted towards smallholder farmers or produced case studies documenting learning from ongoing or completed non-traditional finance projects and initiatives.

Through **INNOVATE**, MEDA engaged **I-DEV International** to implement the project, "**Mobile Money & Pay-As-You-Go (PAYG) Innovation to Scale: AgTech Adoption in the Smallholder Value Chain**".

PROJECT CONTEXT AND JUSTIFICATION FOR INTERVENTION

This project was designed to pilot a model that would offer rural, low-income smallholder farmers in the Northern Andean region of Peru access to a) consistent, higher volumes of water through new drip irrigation systems, b) increased tara crop yields and thus c) increased household income. The pilot targeted farmer members of APTN (*Asociación de Productores de Tara-Norte*) located in San Marcos, Cajamarca, Peru. Specifically, I-DEV's pilot set out to introduce drip irrigation; offer best-in-class clean energy systems for irrigation; and integrate the use of Peru's national mobile money platform BIM for loan repayments. This summary builds on the report produced by I-DEV in November 2019 titled: **Mobile Money & PAYG Innovation to Scale Agtech Adoption in Smallholder Value Chains**. Ultimately, I-DEV adjusted its original pilot design, which intended to introduce multiple new elements to APTN farmers at the same time. Instead, I-DEV opted for a single new element (drip irrigation) delivered at the lowest possible cost, drawing on locally available solutions, and focused on the primary objective: to strengthen farming income and resilience in the face of shifting climate patterns and less reliable public sources of water.

OVERALL LESSONS LEARNED

Designing a New Financing Mechanism

Consider a "graduation model" for any lending facility that introduces new agtech solutions. Many farmers already rely on loans that are more clearly tied to household income generation (i.e. buying cows or cuy for sale). I-DEV's experience suggests that financing schemes for drip irrigation offered through a cooperative model should be designed as a revolving loan facility for quality members that are also "top performing" borrowers with a strong production track record.



Designing for Solar Irrigation Systems

Introduce solar irrigation as a ‘step up’ after diesel-powered systems. I-DEV’s experience suggests that farmers should qualify to borrow for a solar system after they have adopted diesel-powered irrigation and increased crop yields. Solar-based systems can then be marketed and positioned as a “step up” for farmers that have already demonstrated the technical ability to manage new irrigation techniques and the financial obligations that come with borrowing to acquire them.

Designing for the Use of Mobile Money

Look for areas or farmer groups with higher internet and smartphone use. The penetration rates of mobile devices and internet are relevant indicators to identify and measure during the design phase of any project seeking to introduce the use of mobile money as a mechanism to receive, use, or repay loans. They can inform how best to approach issues of behavior change and capacity building among smallholder farmers to adopt new ways to conduct financial transactions, especially loan repayment. Such an assessment can also support budgeting and planning activities related to how much, and what type of, training will be necessary to provide.

RELEVANCE TO INNOVATE’S LEARNING THEMES

The I-DEV pilot and experience contributes to three of INNOVATE’s learning themes:

1. **Smallholder household norms**
2. **Smallholder farmer products and services; and**
3. **Payments**

Smallholder Household Norms

Applying human-centered design (HCD) principles can surface opportunities and barriers to unlock new technology adoption: The commissioning of engineering studies created opportunities for farmers to be active participants and project design contributors during the process of validating and prioritizing key elements of a new drip irrigation solution. These studies brought together I-DEV staff, outside engineers, and farmers to discuss farming practices, land management, weather patterns, and water needs. I-DEV observed that these interactive exchanges helped engineers better tailor irrigation system designs to local requirements and capacity. It also allowed farmers to see and hear from engineers what the proposed irrigation system would involve, which gave them time to consider potential impacts to how they farm before these systems were actually deployed.

Low cost-low value crop vs. high cost of drip irrigation — Tara grows indigenously on trees in Cajamarca and has a low cost of production and harvesting. While it makes up 30% or more of farmer income, tara is viewed as a less valuable crop compared to cuy, milk, meat and other produce. Therefore, the notion of taking out a large loan to pay for drip irrigation to increase tara yields seemed strange and uncomfortable for APTN farmers. They instead found the possibility of diversifying crop production with more regular yields much more appealing.

Despite favorable bias among implementers for agtech, low perceived value or excitement among farmers to adopt — Because APTN farmers do not regularly interact with technology — phones, internet, other tech solutions — and many homes lack electricity, agtech and mobile money solutions were largely unfamiliar. As a result, there is very little awareness or thought given to potential benefits and upsides of such technology adoption and investment. Through engineering walk-throughs on-site, farmers could build awareness and confidence regarding new agtech solutions and allow farmers to ask questions and visualize the potential impact on crop production, land management, and water access.



Smallholder Farmer Products and Services: Required Features

Solar irrigation comprehension, availability and product distribution: Solar irrigation was deemed too complex and costly for a majority of APTN farmers to operate independently given their current irrigation practices and financial capacity. Current systems are also more expensive than diesel models on a power/capacity comparison. Further, these systems are also in short supply due to limited regional distribution, which is a function of low demand and ability to pay. Implementers must carefully consider whether market demand has reached a level whereby service providers will properly invest in marketing, sales, distribution, and after-sales support activities in a new or more rural market segment. Absent this commitment and activity, new financing schemes for agtech solutions may encourage borrowing practices and consumption patterns that cannot be sustained by farmers or market actors.

Emphasize and focus on cost savings and additional benefits of quality agtech brands: While solar irrigation systems are more expensive than traditional diesel systems, savings are achieved by eliminating fuel costs and through lower maintenance and repair costs where warranty-backed, quality systems exist on the market. In many Latin American countries, low quality Chinese solar-powered drip irrigation systems have flooded the market, giving solar-based systems a bad name and lowering willingness to experiment. Projects seeking to introduce new agtech solutions, especially best-in-class offerings, will need to account for these market realities and dynamics to ensure that farming communities understand in practical terms—from system cost to system quality, performance, and maintenance/repair—how the proposed systems are different from other systems they may be more familiar with or have heard about (in an negative way) and why quality brands are ultimately more beneficial than cheaper alternatives.

Non-traditional financing: A non-collateralized loan product for new agricultural equipment has limitations when the financing cost exceeds a certain level relative to a farmers' income earning capacity. A better understanding of cropping cycles, climate, and

cash flows are key to designing new financing schemes to support agtech adoption. In addition, relying on PAYGO as the only repayment method may not be suitable for smallholder farmers with weak digital or mobile technology literacy. Added to this is that fact that in most PAYG models, repayments are required on a weekly or monthly basis. This timing is not well aligned with the income and crop cycles of farmers with one or two large income events per year. Further, a financing scheme predicated on a PAYG model typically functions best when the system can be temporarily deactivated in the event of customer non-payment. None of the solar irrigation system providers in this region of Peru had such a "remote shut-off" feature. I-DEV's experience, therefore, led it to the view that a more traditional loan mechanism that does not require mobile or digital technology for repayments, but rather mimics familiar features of a Kiva loan, would be more easily understood and utilized by smallholder farmers.

Payments

Current mobile money sector exhibits limitations that restrict use in a rural/agri-context: Mobile money in Peru is in a nascent stage of development and BIM has not penetrated beyond major urban centers. In rural areas, cash remains the dominant, and most preferred, payment method. Platform integration with BIM is also expensive for service providers that want to offer PAYG services through the mobile money channel. On this project, I-DEV's solar vendor partners resisted absorbing the costs of BIM installation.

Target farmers with value chain linkages to actors that pay, or are willing to pay, with mobile money: Where an existing payment relationship exists, and where this transaction has become—or may become—digitized, the relationship may be leveraged to help reduce the learning curve associated with mobile money adoption. I-DEV cited the potential of engaging a large agribusiness/exporter (i.e. Green Mountain Coffee or Nestle) to digitally pay their farmers with mobile money as one way to sensitize and encourage the use of this new digital transaction channel that would then also make it easier to encourage other financial activities (e.g. borrowing).



CONCLUSION

During planning phase, be sensitive to complex pilot designs with several new factors: Introducing a new technology (solar drip irrigation) with a new financing mechanism (PAYGO) and a new payment method (mobile money) requires considerable behavior change and is challenging to test over an eighteen-month pilot period. Rural household norms regarding irrigation practices, financial literacy, and mobile literacy can create a range of challenges that may require a longer project cycle and considerably larger investments in training, awareness raising and incentive structures to shift behavior and test willingness to pay and adopt new payment methods, mechanisms and agtechnologies. During implementation, I-DEV adjusted the scope of its pilot to focus only on the introduction of drip irrigation to augment production and did not pursue the PAYG or mobile money elements.

Anticipate indirect costs related to technology installation and training: The cost of installation and training can represent a large part of the total cost of a new agtech system, with specialized technical knowledge often needed, and few suppliers willing to cover this cost for a pilot without a clear market demand and lucrative sales opportunity. Collecting detailed topographic, engineering and technical data in the design phase will allow implementers to better anticipate these costs and save time during discussions with prospective providers.

About MEDA

Since 1953, Mennonite Economic Development Associates (MEDA) has been implementing effective market-driven programs which have enabled millions of people around the world to realize their economic and social aspirations. MEDA combines innovative private sector solutions with a commitment to the advancement of excluded, low-income and disadvantaged communities. As a dynamic technical innovator, MEDA has expertise in market systems and value chains, climate-smart agriculture, inclusive and green finance, impact investing, women's empowerment, and youth workforce development. 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.



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