



**GLOBAL
RESILIENCE
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BUILDING RESILIENCE OF COCONUT SMALLHOLDER FARMERS IN THE PHILIPPINES:

The Case of Grameen Foundation's FarmerLink Program

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OVERVIEW

Grameen Foundation (GF) is a global nonprofit organization that brings innovative and sustainable solutions to address poverty and hunger. Utilizing digital innovations and building strategic partnerships in various countries in Asia, Latin America, and Africa, GF aims to reach 25 million poor people by 2025 with solutions that measurably improve their lives. With its agriculture programs, GF has enabled more than 470,000 poor farmers to improve their productivity and income.

In December of 2015, GF, in collaboration with its implementing partners the Philippine Coconut Authority (PCA), Franklin Baker Company of the Philippines (FBCoP), and People's Bank of Caraga (PBC), launched the pilot for the FarmerLink Program. FarmerLink's vision is to increase coconut farming households' incomes and resilience by improving their productivity, providing them access to appropriate financial products and services, linking them directly to markets, and reducing their losses to pests, diseases and weather calamities. The pilot introduced a suite of digital interventions directed at reinforcing farmers' adoption of Good Agricultural Practices (GAP), and leveraged existing field officer networks in deploying the mobile tools and offering one-to-one extension services to farmers. An early warning system was also developed to directly send weather, pest, and diseases advisories to farmers' mobile phones, along with practical mitigation advice to minimize losses from calamities and infestations. Moreover, opportunities were explored in areas where other partners (i.e. coconut buyers, financial service providers, government agencies) could gain efficiencies via operational transformations enabled by the tools.

The program produced promising results within the 18-month implementation period. The farmers who received the mobile-enabled extension services showed full adoption of 6 out of 9 GAPs as prescribed by PCA, while their counterparts who didn't receive any intervention from the program reported full adoption of only 3 out of 9 practices. 70% of the farmers also found the SMS-based extension that they received to be very influential to their farm practices. The efficacy of the interventions to motivate behavior change in farmer practices, by and large, points to a constructive starting point in achieving longer term outcomes such as increased income and production. Reception of the FarmerLink intervention is likewise encouraging as 93% of the farmers perceive that they would develop more skills if the project is continued beyond the pilot period. Moreover, the knowledge content that farmers received on financial management proved to be valuable. 65% reported that SMS containing household financial management tips have been extremely influential in their current way of handling household finances.

Partners also saw favorable outcomes in operational efficiency with the introduction of digital tools in the farm inspection processes for certification. A 62% time reduction was gained in the process which meant field inspectors can double farmer visits with the mobile tools compared to current operations. The time savings gained from the automation potentially translates to an estimated annual operational cost reduction amounting to Php 183,800 (\$3,600) per inspector.

I. BACKGROUND: Smallholder Farmers and Digital Agriculture

I.1 Problem we're trying to solve Coconut smallholder farmers (SHF) are among the poorest households in the Philippines with 60 percent living at or below the national poverty line of Php20,000 (US \$444) per year. Although smallholder farmers play a crucial role in their communities and in the region as a whole, they remain to be among the least resilient in the face of natural calamities, market volatility, and crop failure. Their ability to build assets and mitigate risks is constrained by the following four barriers:

1 LOW FARM PRODUCTIVITY

Inefficient agricultural practices, outdated agronomic knowledge and techniques, and vulnerability to natural calamities are the prominent inhibiting factors of increasing farmers' product yield. Despite continuing innovation on agronomic knowledge and inputs, farmers experience knowledge stagnation because dissemination of these information do not penetrate deeply at the grass roots. Majority of SHF cultivation experience and knowledge have been inherited from generations of family members with about 97% of the farmers included in the study reported to have never received any extension services.

2 UNPREDICTABLE WEATHER EXTREMES AND PESTS AND DISEASES OUTBREAKS

With the negative impacts of climate change and pests and diseases to coconut production, farmers' losses are further exacerbated by the lack of understanding and resources required to apply appropriate mitigation practices. These calamities have, by nature, a short time period within which it is necessary to respond accordingly to cope with its devastating effects. However, action is impeded by the rarely-received (if any at all) timely and accurate information on such phenomena, posing greater risks to farmers' livelihood.

3 LIMITED ACCESS TO APPROPRIATE FINANCIAL SERVICES

The lack of formal financial products and services tailored to farmers' liquidity structure leave them without the financial safety net critical in the face of environmental and economic uncertainties. 66% of the SHF turn to informal sources (family and friends) for their monetary needs and only 11% reported to have savings. Without secure, affordable and accessible financial coping mechanisms (i.e. loans, savings, insurance) farmers struggle to build assets, invest and diversify operations.

4 LACK OF DIRECT MARKET ACCESS

Disjointed channels to directly interact with potential buyers expose farmers to disadvantageous market conditions that place household food and financial security at risk. While 62% of the coconut SHF had dealings with one or two buyers on a regular basis, more than half (56%) said their transactions were mediated by middlemen buying at relatively lower prices. This, consequently, diminishes farming returns. The reliance on middlemen is necessitated by farmers' lack of alternative source of market information (prices, quantities demanded, buyer location), and traders'/buyers' limited capacity to source produce especially those in remote areas and accordingly assess yield quantity and quality.

Collectively, these challenges portray the coconut farmers' experience of vulnerability at various stages in the cropping cycle, from production to marketing, because of natural perils and entrenched unfavorable systems. Resilience-building is further inhibited by operating in a value chain with an uncondusive information environment where information flow is not only marginal but the means by which knowledge exchange is facilitated is also not well-established. As a result, opportunities for improved performance and output are foregone as well as potential for streamlining and efficiency savings remain untapped for various players in the supply chain.

I.2 Vision to build farmer resilience

Coconut farming needs to become a viable income-generating activity capable of supporting farmers' needs and meeting market demands. FarmerLink was conceived with the goal of increasing SHF incomes and resilience by improving productivity, providing access to appropriate financial services, linking farmers directly to markets, and reducing their losses to pests, diseases and weather calamities.



Improved Productivity

Providing farmers with updated good agricultural practices



Increased access to appropriate financial services

Linking farmers to existing agricultural financial products and services provided by rural banks



Direct access to markets

Connecting farmers directly to buyers and exporters with high demand



Early warning system to detect pest and disease

Combining field observations, weather information and pest models to deliver alerts directly to farmers via SMS

I.3 Strategy to reach the goal

Drawing on Grameen's experience in digital agriculture, the FarmerLink strategy is designed to focus on the formation of strategic alliances that leverage digital solutions delivered to farmers through field officers or agents. This strategy incorporates the three key elements of an effective digital intervention to agriculture:

1 TECHNOLOGY AND TOOLS

Digital solutions have the potential to overcome the lack of interactivity between value chain (VC) actors through democratizing information access, and facilitating goods and services exchange. Mobile technology such as cell phones, television sets, and radios are potential vehicles in the timely and widespread dissemination of knowledge and collection of data useful in agronomic learning, operations monitoring, transaction facilitation, market intelligence and decision-making. To date, mobile applications have been developed and deployed in various areas of the supply chain with SMS extension services, geospatial mapping of calamities, and mobile financial services as some of the prominent use cases in the agricultural scene.

2 FIELD AGENT NETWORK

An extensive field agent network aids in the delivery of scientific research and techniques from lab to field, educating farmers on sustainable agricultural practices and imparting localized insight on farm management right at their doorsteps. Field agents also support the adoption of mobile technology usage in farming communities that are often unacquainted with the benefits of digital tools to operations streamlining and yield maximization. On-the ground agent network is especially important in the remotest of areas where technological interventions remain unsupported by existing communication systems or the level of technology usage by farmers is limited. As the last-mile agents able to interact directly with farmers, they become trusted partners in influencing farmer behavior and in connecting them to resources and opportunities offered by other VC players. GF has worked with different types of field agent networks, from farmer leaders to cooperative members to government extension officers.

3 VALUE CHAIN STRATEGIC ALLIANCE

Establishing synergies between various value chain actors can create pathways for farmers to access affordable resources and better market prospects that potentially translate to improved productivity, income and resilience. Alignment of interests and buy-in of partners is vital in the long-run sustainability of digital interventions as a singular player alone can be constrained by challenges that are beyond their mandate and capability to address. Each actor has a stake in creating an inclusive value chain ecosystem with strong linkages and economical mobility of resources (manpower, capital, information, goods and services) because of operational efficiencies, cost reduction, and innovations they stand to gain in the process.

II. FARMERLINK PROGRAM DETAILS

I.1 Pilot Details The FarmerLink program is a multi-sectoral collaboration of Grameen Foundation and its implementing partners, the Philippine Coconut Authority (government agency), Franklin Baker Company of the Philippines (coconut buyer), and People's Bank of Caraga (financial services provider). The pilot program utilized the existing field officer networks of the implementing partners and equipped them with a suite of mobile agricultural extension tools to help farmers improve productivity through good agricultural practices (GAPs) adoption, operations planning and monitoring, and resources linking.

DURATION

18-months

from Program
Conceptualization and
Design (December 2015) to
Pilot Evaluation
(June 2017)

LOCATION

**5 provinces in the
Davao Region:**

Compostela Valley, Davao
del Norte, Davao del Sur,
Davao Oriental and
Davao Occidental

PROGRAM PARTICIPANTS

- 26,732 Smallholder coconut farmers as of June 30, 2017
- Avg. coconut land area: 2ha
- Avg. Annual Yield: 20 nuts/tree (approx. 1kg/nut)
- PCA's Ideal Annual Yield: 60-90 nuts/tree
- Avg. Annual Income: Php 38,719.64 (USD 754)
- Gender Ratio: male 49%, female 51%

IMPLEMENTING PARTNERS

61 field extension officers

from existing agent networks of
Philippine Coconut Authority,
Franklin Baker Company, and
People's Bank of Caraga are
equipped with Grameen's
agricultural mobile
tools

TECHNOLOGY PROVIDERS

aWhere,
Palantir,
engageSpark

TOOLS

Hand-held devices (mobile phones and tablets) are used to disseminate and collect information. Online database with dashboards and analytics are accessible to partners.

II.2 Implementation Overview Grameen Foundation's existing mobile applications are complemented by digital services from technology providers, aWhere, Palantir, and engageSpark, to create FarmerLink's suite of services. Three integrated components comprise the digital intervention, with each component intended for the specific usage of different value chain actors.

For Farmers: SMS-based agriculture extension services, financial literacy and Early Warning System (EWS) alerts. The farmers develop a sense of empowerment through their exposure to new knowledge, skills and technologies that provides them the opportunity to become less passively vulnerable against uncertainties and more proactively engaged in the betterment of their farm operations. Through FarmerLink, farmers are given the opportunity to improve their agronomic knowledge and skills via mobile extension services. They received bi-monthly visits from extension agents equipped with mobile tools that utilize various media (videos, images, research, testimonials, etc.) to impart a deeper understanding of GAPs that were applicable to the farmer's specific circumstances. Farmers were assisted in setting farming goals and creating their own farm management plan which was applied and monitored along the course

of the program. They were also given calendars and were taught to keep a record of their farm activities so that their progress could be measured. To ensure the continuity of learning and reinforce adoption of new skills, short message service (SMS) is sent bi-weekly directly to farmers' phones containing timely and localized reminders on GAPs, pest and disease management, and financial literacy. It is useful for farmers to receive regular reminders because it is challenging to absorb and remember the things they were taught after just one discussion or training session. Having a digital log of all the reminders they received in their phones, allows them to revisit and reread the messages when appropriate circumstances to apply specific advice arise. Moreover, to help farmers cope with extreme weather, pests and diseases, an early warning system was developed. The EWS works by sending SMS alerts straight to farmers' phones when unfavourable weather conditions and potential pest and disease outbreak are on the radar. The advisory is sent along with the practical recommendations on how to mitigate damage to their farm.

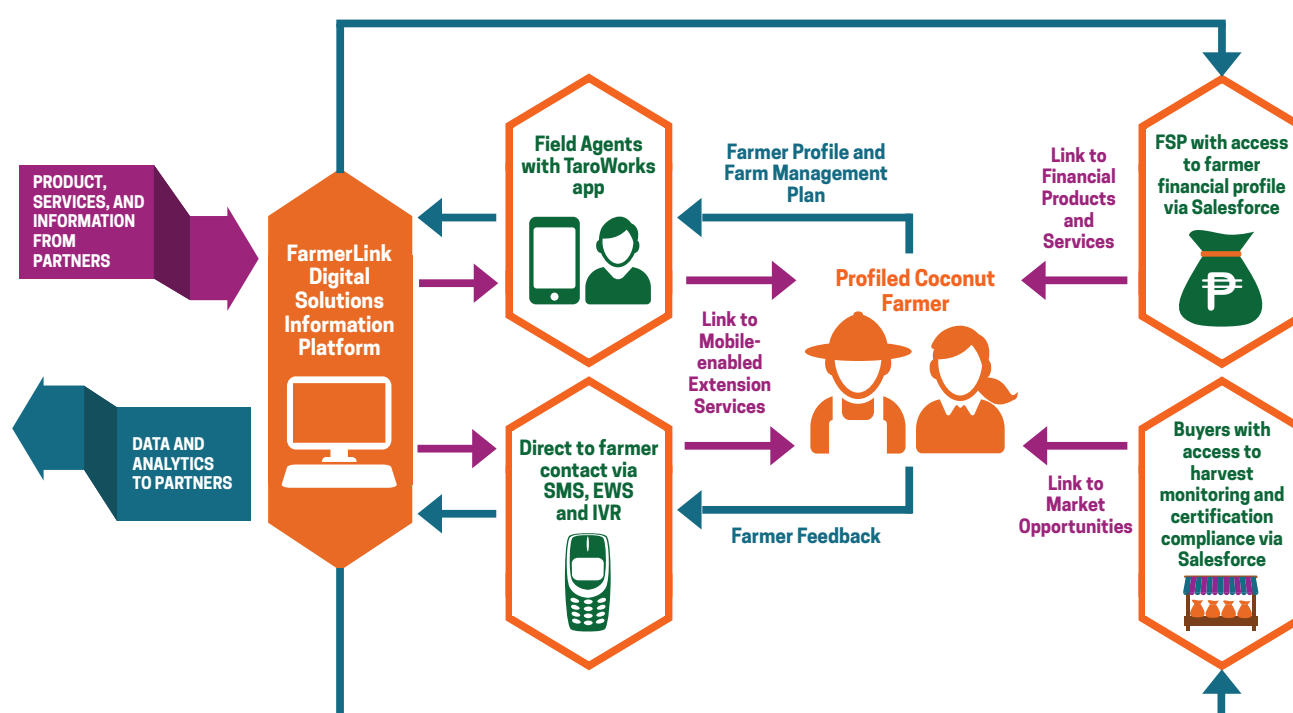
For Field Agents: Mobile-based extension services. The mobile tools powered by TaroWorks, a mobile CRM that manages field operations, provide a valuable service to extension agents in streamlining their work as well as bridging information gap. Extension agents benefit in the automation of farmer registration and data collection processes via the mobile tools. Not only do they save time and effort with the ease of performing the task but doing away with the paper and pen method also meant that the information is instantly recorded securely into their devices. The risk of misplaced files as well as the immense time delay caused by physical file transfers and encoding is eradicated. As is the case with the farmers, agents similarly partake in the knowledge building as they are equipped with the Community Knowledge Worker (CKW) Search tool, a repository of constantly-updated agronomic and financial content that help in the facilitation of a more targeted coaching session tailored to the farmers' needs. The Farm Management Plan (FMP) and the Harvest Monitoring tool allow agents to interact with farmers not only as instructors but as partners in accurately supervising daily farm operations and assessing their productivity. This consequently gives them an opportunity to become trustworthy collaborators to the farmers, which is imperative in performing their role as intermediaries between farmers and partners. With the deployment of the digital tools in technical and process-related support to certifications (Organic Certification tool) and financial services applications, extensions' capacities and functions transform from merely driving information to linking farmers to value chain players, products and services.

For Public and Private Sector Partners: Dashboards and data analytics. Partners are given access to the back-end analyses and array of statistics presented in a dashboard that is easily and promptly refreshed with up-to-date information by syncing field gathered content into Salesforce, a web-based CRM software providing data management and analytics. Partners' access to the rich data from the field as well as the feedback from the farmers puts them at a better position in making informed decisions, programs and strategies for their organization and for the farmers. Additionally, the dashboard aids in the management of their field force as it provides monitoring of employee operations and accomplishments, and in resource management as it allows tracking of products and services. Each group or institution experienced varying degrees of efficiencies in specific areas of their respective operations. With process automation came time savings that translate to partner organizations' bottom line as information is recorded at near real-time speed. Data integrity is preserved with the removal of manual transcription, and report generation becomes more convenient with the data dashboard presented in Salesforce.

II.3 Interplay of Solutions on the Ground By combining the power of digital interventions and trusted human intermediaries the FarmerLink platform creates a conducive ecosystem that not only augments the ease of information flow but also facilitates transactions between farmers and value chain players. The digital tools create an efficient structure for knowledge building and information sharing that is crucial in strengthening the linkages within the value chain. With increased visibility of goods (farmer produce stats), services (financing, certification), and opportunities (market access) made possible by the information exchange, the various VC actors gain confidence in dealing with each other as there is less obscurity in the nature of the transactions and risks they are undertaking. Farmers are linked to valuable

resources (financial products and services, farm inputs and implements, knowledge and skills, extension services) through the mediation of mobile-enabled extension agents, and performing technical documentation and processes becomes more manageable.

Transformations in farm and business procedures also occur as the digital solutions enable automation and process streamlining at different levels of operations. Farmers are introduced to proper GAP adoption practices that measurably improve output quality and quantity. Extension agents save time in performing their field tasks and institutional partners such as buyers, FSPs and government agencies instantly get reliable and up-to-date data analytics accessible via reports and dashboards. Traceability and monitoring of human and capital resources is enhanced by the platform as extensions' accomplishments in the field are reflected in the information that feeds into the database.



A two-way interaction simultaneously occurs between the various value chain actors through each of the technology components deployed in the pilot: the mobile extension services including SMS and EWS, and the data dashboard. There is constant gathering of feedback from farmers and other stakeholders that is utilized in the enhancement of content and interface of the tools. The exchange of information and services provides various stakeholders the necessary tools to improve their decision making on their operations, products and programs. The interaction that the digital platform facilitates allows a better understanding of the situation of the supply chain and its players, which has the potential to stimulate strategic alliances for inclusive growth.

III. PILOT KEY RESULTS

Result 1: Technology-based extension models can enable behavior change and effective adoption of good agricultural practices. Results show that the Treatment group (farmers who received mobile-enabled extension services) outperformed the Control group (farmers who did not receive any intervention) in the (1) full adoption rates for 6 of 9 practices (67% of GAPs) and (2) partial adoption rates for 7 of 9 practices (78% of GAPs). Results also show that the two GAPs that contribute 93% of overall coconut productivity (salt fertilizer application and mulching) saw the highest increases in adoption among the Treatment group.

Result 2: GAP awareness and access to financial services appear to be drivers of GAP adoption, while the gender of the farmer interviewed is not. Data shows that once farmers were introduced to good agricultural practices there is high likelihood of adoption. There is also some correlation between access to financial services and adoption since participants who reportedly have bank accounts adopted 5 of 9 (about 56%) of GAPs promoted in the program. Gender did not appear to have a significant impact on the motivation to adopt these practices.

Result 3: SMS alone can be powerful in driving action as seen in the deployment of the Early Warning System for weather and pests. As of June 30, a total of 3,291 farmers received SMS alerts on extreme weather conditions via the Early Warning System. 128 farmers participated in a feedback survey and results show that (1) 85% of farmers confirmed that the alerts reflected the reality around them, (2) 86% said they learned how they could take appropriate actions to mitigate the risk of drought and pests, and (3) 58% reported putting into practice the recommended actions promoted by the advisories. Farmers were more responsive when dealing with pest infestations. In September 29, 10,741 received alerts on potential pests (coconut scale insect and brontispa) with about 65% reported taking suggested countermeasures to prevent infestation.

Result 4: Farmers were very satisfied with the program and agreed that they will gain new skills if FarmerLink is sustained. 93% of the farmers in the treatment groups responded that they either agree or strongly agree that they will gain skills if FarmerLink is continued. 80% of the farmers reported that they are satisfied with the project. The reaction to the interventions was overall positive and suggestive of both willingness and interest in using mobile technology to receive agronomic information.

Result 5: Partners saved money and increased efficiencies using digital solutions. An activity-based costing methodology was utilized to measure potential efficiency gains from employing the FarmerLink mobile tools to a partner buyer's farm organic inspection processes. The results showed (1) a 62% time saving in the digital farm inspection process compared to manual processes, (2) that field officers doubled their farmer outreach for farm inspection with the help of the tools, and (3) that the monetized value of the efficiency gain is \$3,676 per field officer per year or \$47,788 per year if the tools are used by all current field officers.

IV. PROGRAM INSIGHTS

Insight 1: A consortium approach is powerful in building resilient systems. The problems within the agriculture value chain are complex and often the long-term solutions need to go beyond specific areas in the supply chain landscape. To address this, the FarmerLink program built a consortium of partners that included the government, private sector buyers, financial service providers and technology players. The consortium initiated the building of a robust ecosystem that improves farm and business operations management, information flow and exchange of goods and services within the coconut value chain. Through the participation of the different value chain players, the program was able to evaluate multiple prospects to reconnect farmers to products, services (extension and financial services) and opportunities (market access, knowledge building) that are crucial in enhancing their resilience amid uncertainties. Moreover, the consortium also paved the way for the exploration of partner opportunities, with focus on spotting areas where digital innovations prove to be functional in improving operation efficiency and increasing gains. To ensure that the reinforcing effects of the FarmerLink program to the value chain linkages becomes embedded into the system, a lot of partner handholding was necessary especially in the first six months of implementation to ensure partners are given the chance to align the outputs (data, technologies, processes, agreements) generated by the program to their operations, promoting buy-in at various levels of their organization.

Insight 2: Inclusive decision-making processes should be consistently embedded in program execution to meet farmers where they are. With the complex web of challenges faced by farmers on a daily basis, it becomes increasingly important to include them early on in any type of program intervention and provide them an opportunity to shape the program's design and execution. Involving farmers, especially those who already have leadership positions, provide rich insight into their concerns, perceptions, and capacities. This allows the nuance of their experiences to be captured and incorporated into the program design for better suitability and adaptability on the ground. FarmerLink integrates farmer decision-making in the creation of individual Farm Management Plans. The tool takes into account what the farmer wants for his or her farm (i.e. is the goal to maintain, grow or diversify the farm?) and the succeeding steps in the plan are then based on the farmer's choices. Every time content is created, feedback by farmers and agronomic experts is used in iterating it to ensure that the language is understandable, the information is beneficial, and the proposed action is applicable. One example was when the data showed very low adoption rates on salt fertilizer application, the succeeding SMS on the agriculture extension focused on specific details on salt fertilizer application including the dosage and appropriate frequency. Similarly, partners were largely engaged in the conceptualization and deployment of the data interface and digital tools that would be applied to their operations. Shaping the content and services delivered to the different value chain players and tailoring it to their specific needs not only augments the efficacy of the program but also improves ownership by the stakeholders.

Insight 3: Different channels have varying degrees of impact on behavior change and GAP adoption. FarmerLink experimented with different channels like SMS, voice messages, videos and EWS alerts to complement the field agent's interactions with the farmers. The results showed that SMS alone can be powerful for situations that have a sense of urgency as is the case with high-impact, difficult-to-predict extreme weather conditions, and pest and disease outbreaks. In the scenario of such occurrences, farmers proved to be increasingly reactive, as loss aversion is their primary concern, and are alacritous to performing concrete mitigating actions. In contrast, practices (or lack thereof) that have latent undesirable effects to production are more challenging to spur to change as it necessitates comprehension of

methods, benefits and consequences. Field agent interaction proved to be key in reinforcing activities that relate to GAPs adoption, especially when they are equipped with mobile tools that help enrich the coaching experience with farmers. While SMS is helpful in information push and knowledge-building, monitoring of skills application and evaluation of actual results requires the interaction with trusted human intermediaries. These channels should be designed to reinforce each other in order to manifest maximum aftereffects, but there is no denying the power of each of these components in targeting specific use-cases that contribute to the achievement of an overall desired behavior change.

Insight 4: Deep understanding of the strategic context and ecosystem is required to identify the program's appropriate long-term owner which may not be obvious at onset of project.

Moving from pilot to scale requires identifying a long-term owner of the program and PCA emerged to be the best candidate to lead the consortium because it has existing organizational structures, policies, faculties, and resources capable to support scaling and replication of the program. There is buy-in of the program across different levels of their organization as the increased visibility and efficiency of monitoring and evaluation activities resulting from the adoption of FarmerLink tools directly addresses PCA's most pressing operational challenges. The rich data resulting from the intervention can pave the way towards more strategic decisions of their senior management. PCA found great value in having real-time field data not only in measuring their field performance but also in determining the most appropriate programs and services for farmers. More importantly, PCA's mandate to address specifically the needs of coconut smallholder farmers and to oversee the whole coconut industry parallels the FarmerLink vision and the readiness of their executive management to co-operate in the incubation of the program pointed to their suitability as the prospective owner and implementer.

Insight 5: The nature of innovation projects requires a healthy tension between outreach and impact; while crop and project timelines limited the ability to capture impact, we identified early markers of change that if sustained over time provide meaningful indicators.

The 18-month pilot implementation period permitted the measurement of short-term output variables (GAPs adoption, perceptions, and efficiency gains) and results show the potential of the project to catalyze behavior change in the farmers and to spur a shift in operations to more efficient processes in partner operations. The greater measurable outcomes, productivity, crop quality, and price realization, by nature require a longer time horizon to manifest and are yet to produce any real change during the pilot conclusion. Nonetheless, the key findings reveal a positive prospect to the digital innovations introduced by Farmerlink as the increased adoption and efficiency savings at the end of the program pilot are early indicators pointing to the direction of the favorable outcomes if sustained for a longer time frame.

Insight 6: There is considerable opportunity for deeper integration of financial services.

The pilot program was not designed to evaluate financial service providers' operational footprint and support provided to farmers. Financial information such as investment amount required to adopt GAPs, trade-offs faced to finance adoption, as well as household cash-flow, were not captured in the assessment. The relationship found between GAP adoption and account ownership suggests that deeper integration between financial service providers and agricultural extension could strengthen the ability of a farmer to plan for investments and to utilize new or existing financial services for GAP adoption. Parallel to FarmerLink, Grameen has worked with its agricultural extension partners in Ghana and Colombia to develop Farmer Investment Plans (similar to the Farm Development Plan used to assist farmers in adopting GAPs). This component was not part of FarmerLink and while data on how Farm Investment Plans influence GAP adoption is still forthcoming, research has shown that financing and financial planning both influence smallholder farmer productivity.

V. PILOT CONCLUSION

The FarmerLink program set out to demonstrate that by leveraging the strengths of different organizations representing the private sector, the public sector, and civil society, coconut smallholder households could benefit from an integrated agricultural extension support ecosystem backed by technology. The field outcomes that emerged proved that the farmer participants made noticeable progress in terms of GAP adoption with the personal assistance received from the agricultural field officers as well as with the introduction of various technology-based channels (SMS, EWS) that enhance the farmer-agent interaction. These early developments are expected to result in the longer-term improvement of farmer coconut productivity and income.

Alongside the initial wins achieved in farmers' behavior, partners saw efficiencies gained through the digital transformation of its agricultural extension processes. This sets the stage for the demonstration of a business-case for the FarmerLink infrastructure to other private sector players in the coconut industry. The pilot further underscored the role that digital innovations play in streamlining operations processes and automating information flow that translate to gains in an institution's bottom line. Overall, the pilot program achieved the results it sought out to investigate and the prospects for the sustainability of the program is demonstrated by the promising feedback from the participating value chain players involved.

