



e-Granary: a virtual market place

a digital solution from Kenya



About the Mastercard Foundation

The Mastercard Foundation seeks a world where everyone has the opportunity to learn and prosper. The Foundation's work is guided by its mission to advance learning and promote financial inclusion for people living in poverty. One of the largest foundations in the world, it works almost exclusively in Africa. It was created in 2006 by Mastercard International and operates independently under the governance of its own Board of Directors. The Foundation is based in Toronto, Canada.

For more information and to sign up for the Foundation's newsletter, please visit www.mastercardfdn.org. Follow the Foundation at @MastercardFdn on Twitter



About AGRA

Alliance for a Green Revolution in Africa (AGRA) is a partnership-driven institution that is African-led and farmer centered. Established in 2006, AGRA places smallholder farmers at the center of the continent's growing economy by transforming their farming beyond the solitary struggle for survival, into thriving businesses. Our partners include African governments, researchers, development partners, the private sector and civil society working primarily with smallholder farmers - men and women who typically cultivate staple crops on two hectares of land or less. Our five-year strategy (2017 – 2021), aims to catalyze and sustain an inclusive agricultural transformation through integrated, country-based investment plans in 11 countries with a high potential for success. The focus is on increasing incomes and improving food security for 30 million farm households with support that strengthens the capacities of governments and private sector through policies, programs, and partnerships that increase productivity and access to markets and finance.

For more information, visit: www.agra.org

Foreword

This learning brief describes the journey undertaken by the Eastern Africa Farmers Federation (EAFF) in the deployment of its integrated digital farmer services platform, e-Granary and captures the key lessons learnt from the project. E-Granary was initiated by EAFF in partnership with AGRA's Financial Inclusion for Smallholder Farmers in Africa (FISFAP) program.

Any rural digital initiative encounters significant challenges when it starts and our objective in capturing the experiences of the project is to help inform practitioners, researchers and funders about the kinds of issues encountered in such projects as also approaches to addressing them. One key lesson highlighted in this paper is that the careful selection of the platform partners is important. Thus, for the roll-out of similar or near similar technology-driven service platforms for farmers, the interests of the participating partners must be well aligned and defined from the beginning. Other fundamental lessons are that a simple integrated model at inception is essential, and that collecting accurate data is often the biggest requirement and challenge in financial product design. Most importantly, farmers should see real value in the initiative right from inception, which is critical in fact for driving active use and getting the right commercial partners to the platform.

We hope this paper stimulates new approaches to serving smallholder farmers as also further deep-dive studies into the efficiencies and effectiveness of digital platform investments.

Enjoy the read and please do share your comments!





Acknowledgement

AGRA's mission is to improve yields and incomes by 2021 for at least 30 million farming households through a series of integrated, country-based programs in partnership with a wide range of private and public sector actors. In order to achieve this mission, a key component is improved access to affordable financial and non-financial services for smallholder farmers seeking to intensify and improve their farm practice.

The emerging digital highways have enabled farmers across Africa to interact with input suppliers and commodity markets more efficiently and more intelligently than ever before. Growth in mobile money usage in Ghana, Kenya and Tanzania make the delivery of financial services to farmers much cheaper and less risky. With less physical infrastructure required to reach farmers, and as more data on smallholder farmers becomes available for analysis, certification and rating purposes, the transactional risks are reduced.

AGRA, in partnership with Mastercard Foundation has provided matching grants and technical expertise to 22 partners to accelerate their innovative business models for (financial) service delivery to small scale staple crop farmers in Ghana, Kenya and Tanzania. The grant and technical assistance support our partners in probing, piloting and scaling the (digital) financial and non-financial solutions that present a business case for all partners and an end-to-end solution for smallholder farmers.

Since the start of the partnership in 2015, we have learned a lot of lessons from farmers, service providers, value chain actors and colleagues who are also operating in the digital finance and ICT4Ag space. This first series of three case studies documents some of the lessons in the following areas:

- Digital payments as a key enabler for rural financial inclusion in Northern Ghana
- Supply chain finance and digital payments for staple crop farmers in Kenya
- The role of digital platforms in structuring markets in Kenya

We would like to thank our implementing partners Tanager, Umati Capital and Eastern Africa Farmers Federation as well as our learning consultant, Rewa Misra, for the documentation of the lessons in the series and the AGRA team—Hedwig Siewertsen, Lilian Mwamdanga, Paa Kwesi Awuku-Darko and Reuben Gicheha.

Glossary

Smallholder farmers	Farmers in non-competitive value chains with land holdings less than 15 acres.
Financial inclusion	Access, use and sustained use of financial services and complementary non- financial services.
Account access	The number of adults reporting owning an account in any formal financial institution.
Mobile account access	The number of adults reporting owning a mobile payment account.
Account in use:	An account (whether held in a financial institution or mobile money) that has been operated at least once in the last 12 months.
Range of outreach	The range of financial and non-financial products and services that a household can access at one point of sale.
Scale	Market penetration (the ratio of customers reached to market potential) and/or market expansion (the inclusion of new segments at the market level) as an indication of scale.
Sustainability	While detailed financial analysis will be beyond the scope of these briefs, we will estimate high level measures that allow us to assess if market expansion contributes to significant growth in revenues in relation to costs.
Client value	Product range and timeliness (opportunity cost) and qualitative factors such as trust or social value.





Background

The Eastern Africa Farmers Federation (EAFF) was founded in 2001 as a regional farmers' organization with a mission to represent and advocate for farmers' interests and build their capacities. It is registered under the societies act in Kenya. EAFF membership comprises 23 co-operatives and commodity associations in 10 countries in Eastern Africa; i.e. Burundi, Djibouti, DR Congo, Eritrea, Ethiopia, Kenya, Rwanda, South Sudan, Tanzania and Uganda. EAFF currently has more than 22 million members (small and medium scale farmers with farm sizes ranging from one to 20 acres).

e-Granary was introduced by EAFF in July 2016 and is currently a database of farmers, input suppliers and output buyers with functionalities for payments, credit and extension services. In its own project documents, EAFF highlights a number of pain points along the journey to well-integrated markets and smallholders' financial access including lack of market linkages, lack of accurate data on farmers and gaps in access to payments and financial services.

EAFF views e-Granary as a disruptive intervention to sustainably address these challenges. e-Granary's vision is to transform farmers' livelihoods by improving their income and living standards.

The project goal of e-Granary is to improve the living standards of smallholder farmers in Kenya through increased incomes and financial inclusion. The key objectives of the project include:

- increased market access by farmers
- increased access to financial services/ credit
- enhanced capacity of farmers on structured trade and financial literacy
- increased awareness of the e-Granary platform by farmers

This learning brief captures the potential role of e-Granary in digital financial services, its key products, services and the value proposition for smallholders and providers.

EAFF and e-Granary in the Rural and Digital Finance Ecosystem

EAFF is a member-based market facilitator offering a core service of information on smallholders in the maize and soybean sub-sectors. EAFF links its members to markets - facilitating access to agriculture inputs and enabling access to buyers for outputs. It also provides other support services such as finance, extension services and training. EAFF's members are typically farmers' associations – the associations sign partnership agreements with EAFF for e-Granary and support services.


EAFF is an important platform to address fundamental challenges in Kenyan agriculture. Large agribusinesses are reluctant to link directly with smallholders or to offer optimal output markets and prices due to the lack of data on farmers, the cost of monitoring and supervision of assets (crop, inputs, equipment etc.), as well as the cost of cash handling and disbursements. At the farmer level, productivity is impeded by lack of finance and information. Reasons behind this could include the lack of formal identification, credit histories and collateral or the lack of awareness on appropriate agriculture practices. Additional issues are that financiers often have a heightened risk perception of agriculture and low visibility into yields and productivity. EAFF has also identified exogenous factors such as weather variability, particularly drought, low landholding size and price fluctuations, that affect the productivity, incomes and competitiveness of Kenyan farmers.

Critically, smallholder farmers that want to participate in markets face high transaction costs due to unpredictable market prices coupled with high transportation costs and weak market information. While structured commodity markets or exchanges have been established in a few countries in the region there is a distance to go before these issues are adequately addressed. There is significant scope therefore for digital tools to play a role in facilitating assured markets, contracts, extension, information, price transparency and facilitating access to finance.

To address these issues EAFF works with some of the largest farmers associations across East Africa, enabling input aggregation (procuring and supplying inputs at lower than market cost) and credit facilitation (internally through member funds). Providing information to external market actors facilitates supply chain visibility for leading commodity traders such as the Export Trading Group (ETG) and input suppliers, among them, equipment leasing firms. It also offers granular customer level data for financial service providers such as banks and insurance companies. EAFF partners with Safaricom to facilitate digital payments, and is in the process of developing partnerships with varied financial institutions to roll out credit and insurance services.

The front end of e-Granary is essentially a portal which includes a basic database on farmers and fee-based services such as advanced data and analytics. Data capture is done by farmers through their mobile phones using USSD short codes, while EAFF's





field team supports farmer registration. Besides the farmers' names and mobile phone numbers, the data includes their national ID, location, details of farming e.g. crops grown and yield for each of them. Farmers can access the application from any phone by dialing *492#. As farmers register, EAFF verifies their identity through their mobile number. Farmers are then able to provide the size of the farm, type of crop, production data, amount of seed used and amount of fertiliser used. Additionally, at harvest time, farmers log the quantities harvested.

This basic supply chain information allows EAFF to estimate the volume of inputs required, and the expected output. It also assists EAFF to negotiate with input providers and off-takers such as ETG. This company provides quality inputs such as fertilizer and seeds and offers a purchase guarantee (at a floor price on delivery) for farm produce and an assured best price after sorting and grading (i.e. if after grading the floor price is low compared to other buyers, ETG will purchase at the best price). It also absorbs a significant proportion of the transport cost of the crop - 70% of the cost from warehouse to market is covered by ETG and the remainder by the farmer. Farmer organizations extend credit on the basis of this contract. Assured price contracts, are critical for staples such as maize that see significant price fluctuations and could be an important incentive for farmers to share data.

Extension and training is offered by EAFF throughout the planting season on good agronomic practices, financial literacy and structured trade. After planting, EAFF signs a supply contract with farmer organizations. The number of farmers registered on the database increased from 1,200 during the October 2016 pilot to close to 300,000 by the end of July 2019. The first two quarters of 2018 witnessed a significant growth, recording 2,500 smallholders on supply contracts. An additional 2,500 farmers on contract were anticipated for next season. The partnership with ETG is crowding-in additional agribusinesses such as Yash Commodities and all registered farmers are currently using the service to post data, however, since the growth has been relatively recent, data on repeat users will only be available after 2 seasons.

Digital services offering a variety of market information are not uncommon. Within Kenya alone companies like Mfarm, iCow and Digifarm offer similar services complemented





by notifications about market prices and extension. The Government of Kenya is also interested in launching a related initiative to provide farmer data. The critical issue remains the incentives for farmers to share data accurately and agribusinesses to provide market linkages. As it scales the number of registered farmers and expands the number of farmers under supply contracts, it remains to be seen if e-Granary can differentiate itself by enabling well-aligned incentives for information sharing, supply contracts and finance.

Although it is essential, linking farmers to markets is not the only potential use of the e-Granary database. However, moving towards financial linkages in particular has been challenging. Strong backward and forward linkages, the availability of farmer produce and payments data are expected to expand access to credit and savings services. Although EAFF has piloted input supply on credit with cooperatives, an initial partnership for individual credit in this context with a company called MO-DE was not successful (see section on products and services).

e-Granary also tested a weather index insurance product with ACRE Africa and an insurer that utilized farmer data to screen farmers for insurance. For an insurer, access to farm data is utilized to vet farmers and decrease moral hazard. By analyzing repeat data on yields, insurers are also able to estimate whether or not the insurance is changing the production behavior of farmers (for example reducing productivity in expectation of payouts). However, the scheme was put on hold as the insurance partnership fell through following the drought in 2017 and an increase in basis risk. ACRE Africa and e-Granary continue to be in dialogue on new approaches to enroll farmers and distribute insurance.







The Evolution of e-Granary


Early Lessons


A substantial reorganization of the e-Granary model has been undertaken since an earlier iteration of its strategy that focused on digital credit. In the first phase, farmers were to obtain payments on delivery in the form of credit against warehouse receipts. Farmers would gradually be able to leverage increasing amounts of credit based on crop supplies and credit scores. Two critical partnerships in this context were to be a commodity exchange and MO-DE – a financial technology company that was to extend credit to farmers. However, MO-DE was unable to develop a robust credit scoring model as the initial data available through e-Granary was not of consistent quality. Additionally, MO-DE's prototype product offerings were not consistent with the specifics of financing agriculture for short tenure loans, and loans requiring regular repayments were unsuited to low income farm households. MO-DE was unfamiliar with appropriately managing risk on agriculture loans given that they did not have any links with output buyers and other risk sharing arrangements. The commodity exchange closed down and the partnership with MO-DE ended.

Initial Offering

-
- 

Farmer registers with their phone number that is also their mobile wallet.
 - 

Farmer receives a payment on delivery of crops to warehouses (on credit) for 100% (assuming a low grade). The grain is graded and the batch is tagged for traceability. The revised grade is communicated to the farmer.
 - 

Prices increase in the period after the harvest. Credit is based on this anticipated price increase, the new grade and credit score.
 - 

e-Granary sells the grain to the output trader and pays the farmer (net of loans, interest charges and warehouse fee.)
-

A rethink was necessary of both the customer journey and its core offerings in order for e-Granary to offer multiple functionalities in a phased manner. With the focus on improved quality of data collection, the registration process is now supported on the ground by field staff.

In the second phase, EAFF evolved a more specialized set of partnerships that pre-empted the need for market access for a successful credit risk management model. ETG, a large agribusiness, and microfinance partner Vision Fund, were more familiar with rural segments, allowing EAFF to refine a model where farmers have access to assured crop markets, thus reducing credit risk and optimizing the use of credit for improving incomes for the farmer.

ETG is one of very few agribusinesses with a dense last-mile infrastructure for input delivery, off-take as well as significant market linkages across the region. In this second phase, ETG was the only service provider to farmers. In the third phase, since EAFF already has a template for its partnerships model, it has started to expand its agribusiness and finance collaborations. In agribusiness, it has initiated partnerships with Yash Commodities and Soyafric, while the new finance partner is ECLOF.



The Emerging Business Model

Direct and efficient access to markets

e-Granary secures supply contracts, giving farmers a predictable and consistent market. The platform connects smallholder farmers clustered in viable economic producer groups at one end, and large off-takers at the other end. This ensures farmers are paid fair prices for their commodities and enabled to sell in bulk since partner off-takers have the capacity to purchase large quantities.

Farmer groups for marketing

It is very expensive to serve individual smallholder farmers. Thus, EAFF aggregates farmers into viable economic groups to enable them to access their network of service providers. Likewise, the aggregation of smallholder farmers into groups links producers with off-takers and achieves economies of scale along the value chain. Aggregation also enables smallholder farmers to meet the standards and requirements of modern markets and compete at scale, while supporting them to improve their productivity with increased access to services and markets.

Pooled purchasing

Grouping farmers aggregates the demand for advantageous rates/bulk purchase discounts and ease of access for certified inputs, small loans and crop insurance.

Digital financial services

Farmers now receive payments via mobile money. They are able to pay for inputs and rent tractors through their mobile phones, and access to credit is envisaged through the mobile digital platform.



The planned customer journey, status of supporting features in the app and potential commercial case are provided below.

Farmer's progressive use of the app	App Functionality and Status	Potential Commercial Case for EAFF
Farmers register and provide data to access out-grower contracts and quality inputs.	Farmer registration tested and deployed. The database provides the farmers name, group, location, national ID, crop data, supplier and agro- dealer directories.	Fee from agribusinesses for advanced data and farmer analytics. EAFF helps obtain quality inputs at a discount and charges a mark-up on input prices.
Business to person payments, enabling farmers to receive payments from harvest sales at the time of warehouse delivery.	Safaricom pay-bill integration completed and tested. MPESA bulk payment module integrated. GPS mapping of collection centers and warehouses tested and deployed.	
Payments from mobile wallet for farm services such as equipment leasing, inputs and bills.		
Coordination of farmer groups	Communication module to organize farmers into groups has been developed and deployed.	
Input loans through farmer associations	No group credit management function.	
Input loans direct to farmers	Loan module completed and is to be tested.	Processing fee.
Pull on demand information on farming through IVR combined with push SMS notifications for crop husbandry.	Call center deployed. Willingness to pay survey underway for SMS and IVR services.	Subscriptions and in-app advertising.
Other services like savings and insurance.	Detailed farmer KYC, transaction data and crop data.	Processing fee, insurance policy commissions.



Customer value

e-Granary's key contribution to farmers is in the facilitation of assured markets. At the close of 2017, the e-Granary farmers sold their maize at Ksh. 3,400 per bag compared to Ksh. 1,950 per bag as per the minimum guaranteed floor price. This is significantly higher at 77%. Overall the arrangement offers higher prices than typical market prices offered by traders. In the season end March/April 2018, farmers were receiving Ksh. 2,400 per bag.

Farmers' produce is collected from the aggregation center, with the buyer absorbing 70% of the cost of transportation per bag collected. This price is not deducted from the final dues of the farmer. In the absence of this support, typically farmers would organize their own transport and deliver to the buyer or sell to the middle-man who would deduct the transport costs from the buying price.

Farmers have been trained on quality assurance and grading. The buyer collects both grades and currently is offering the same price for the top two grades. Normally larger buyers and certified warehouses would collect only Grade 1, rejecting all other grades, while the broker would collect all residual grades and offer a significantly lower price for that grade.

Inputs are delivered to farmers through their farmer organization offices. The seeds and fertilizer are offered at a better price as a result of quantity discounts and have been screened for quality by EAFF.

Progress to date

So far close to 300,000 farmers have been recruited on e-Granary, enabling access to inputs and crop markets, while 50,000 farmers are accessing extension messages. Relatively low numbers of farmers have so far accessed credit due to the initial lag with the MO-DE partnership. However, a new financial services partner, the Vision Fund, has recently been brought on board and their influence is expected to expand in the subsequent growing seasons.

	Pilot 1	Pilot 2	pilot 3 (1st Cohort)	pilot 3 (2nd cohort)
Recruitment				
Farmer recruitment onto eGRANARY platform	5,000	39,000	103,000	115,000
Farmers reached with extension messages	-	1,000	20,000	50,000
Main				
Value chain focus	Maize	Maize, soyabean	Maize	Maize, Soyabean, beans
Farmers qualified for input loan	1,200	2,137	290	2,800
Loan issued/planned (Kes) Insurance inclusive	4,729,500.00	6,916,000.00	4,023,890.00	40,000,000.00
Loan issued/planned (US\$) Insurance inclusive	46,367.65	67,803.92	40,238.90	400,000.00
Loan amount per farmer	38.64	31.73	138.75	142.86
Challenges				
Notes	There was a nationwide drought which was declared a national disaster in Kenya, farmers lost over 90% of the crop to drought. Insurance claim was paid and the cost of input loan was covered	Loan Repayment rate was at 70%. Company needed to reevaluate the process of eligibility to reduce risk since 30% bad book is unsustainable	Loan amount per farmer increased due to an enhanced input package per farmer. Better Group profiling has reduced the pilot group for the short season which is not the main season. Scale up next season. Numbers low due to this pilot falling on the short rain season	The production is planned for the main season
Partnerships				
Source of portfolio funds	Internal	Internal	Partner financial institution (Vision fund)	Partner financial institution (Vision fund, ECLDF)
Market access partners	ETG	ETG	ETG	ETG, Yash Commodities, Soyafric

Mary's Journey with e-Granary

Mary Nkatha is a smallholder farmer in Meru region in Kenya. Together with her farmer group, she registered on the e-Granary platform using her feature phone. She was able to create a profile on the platform, and access certified inputs on credit terms tied to the crop production cycle. The input loan was bundled together with credit, life and crop insurance. Throughout the production cycle Mary and her friends receive key tips on how to manage their production. The group has an aggregation centre where all the harvested produce is stored after drying and measuring the moisture content, weighing and tagging. Since EAFF has already secured a supply contract with a large buyer, the floor price is guaranteed. Her produce and that of the rest of the group is picked by the buyer at no cost to them and within three days payments are made net of the loan amounts. Mary experiences no financial burdens associated with monthly repayments, her production is higher at 20 bags per acre instead of the average 15 bags, and repayments are prompt. She is now able to cater for her daily needs, pay school fees and is planning to lease a large farm to increase her production. Her farmer group is more cohesive and has certainty in their incomes to grow their savings.

Sustainability

Sustainability here is understood in terms of a win-win value proposition for farmers and key business partners which also allows EAFF to meet operating costs over time. While the model is still at an early stage of sustainability, the key gains for diverse participants in the program are provided below.

Gains for key agri-business partners: The supply chain information offered by e-Granary has allowed large agribusinesses like ETG to work with smallholders in a systematic manner. For example, e-Granary supplements ETGs internal management information system for supply chain logistics as the platform has more data than a typical agribusiness is able to gather on its own.

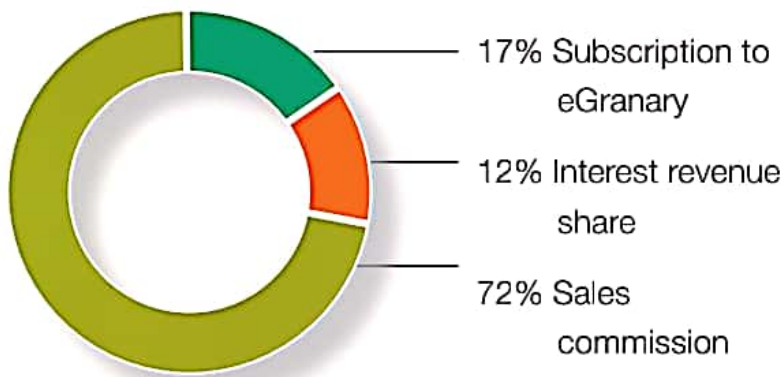
e-Granary is able to aggregate and profile the farmer cooperatives and groups thereby reducing transaction costs for farmer mobilization. e-Granary also employs staff in the field who constantly monitor the loans taken, including repayment, thereby reducing the risks of exposure. Going forward, this arrangement offers a bankable and de-risked farmer to potential financial service providers.

Buyers are assured of a traceable product in both quality and quantity. The collection areas are marked and identified through a map and by GPS location.



Revenue sources for EAFF and related benefits for farmers:

Priority	Revenue stream details	Benefits to farmers
Primary	<ul style="list-style-type: none"> • Sales commission – up to 5% (e-Granary and agents earn a commission linked to the price farmers are paid for produce. This provides an incentive to maximize farmer income.) • Revenue share with service providers – e.g. financial institutions 70-20 in favor of financial institutions • Basic subscription model for farmers who have been with the platform for more than a year. USD 1 per month per farmer • Bulk purchase discounts and markup on wholesale prices – EAFF first negotiates a discount of 10%, and then marks the wholesale price up by 20% for sale to farmers. This ensures lower price for farmers and margins for EAFF. 	<ul style="list-style-type: none"> • Access to reliable and predictable market • Access to certified affordable inputs • Access to reliable information on agronomy
Secondary	<ul style="list-style-type: none"> • Advertising • Monetization of market intelligence and data • Sponsorship of Learning Groups available to relevant companies (agri-inputs, etc). 	Every farmer gets to have a record of their income over a period of time which can be used to access financial services



Total Revenue:
USD 505, 940

Total Costs:
USD 1,309,268

Profit Before Tax:
USD (941,877)

Operational Self Sufficiency:
~40%





Conclusion

The e-Granary platform ultimately aims to work with 150,000 smallholder farmers in partnership with AGRA, of which 25,000 use credit services facilitated through the digital platform. While it has made recent progress in terms of numbers, every stage has been marked by challenges. Early setbacks with the MO-DE partnership means more is to be done to strengthen linkages with financial institutions and enable access to credit. Additionally, there are a number of risks that could unfold as the project gains scale and traction. For example, farmers are more likely to repay their loans if their productivity is significantly increased. To mitigate production and price risks, EAFF has a plan to provide agriculture trainings and price support to enable farmers maximize yields. Further, EAFF ensured the partnership with ETG group involved the provision of certified inputs to farmers to ensure quality and good production. However, side-selling is a big concern for both the off-taker and financiers. For the latter, it has the potential to negatively affect repayments since farmers' income is derived from a source that EAFF has no control of and the off-taker's trust in the program will be reduced. To mitigate this, EAFF only works with farmers that are in a farmer group with demonstrated cohesiveness over time. e-Granary's learning journey therefore, is far from complete.

Epilogue

As the model evolves and improves both from the perspective of its digital enablement and market linkages, it offers the potential to understand how the uptake and use of digital services could enable structured agricultural commodity markets – where both farmers and agribusinesses are well integrated and supported with appropriate levels of information, price transparency and assured sales. Given the absence of well-developed commodity exchanges in the region this may perhaps be an alternative approach for organizing the enhanced growth, productivity and incomes of smallholders in rural Kenya. e-Granary continues to explore sustainable and effective ways of crowding-in more last mile partners. The journey for them continues to evolve and every cropping season comes with its own unique opportunities, insights and challenges.

FISFAP Partners



The Alliance for a Green Revolution in Africa
West End Towers, 4th Floor
Kanjata Road, Muthangari Drive, Waiyaki Way
P.O. Box 66773, Westlands 00800, Nairobi, Kenya

Tel: +254 (20) 3675 000 | Email: info@agra.org