Cashless Chronicles

Insights on digital financial services in East Africa

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gui2de

Glossary

Agro-dealer – An individual or group (e.g., cooperative) that typically sells agricultural products to farmers. Agro-dealers can be trained in business skills, have knowledge of agricultural inputs (e.g., fertilizers, pesticides, seeds, etc.), and know how to safely handle products and use modern agricultural technology. An agro-dealer can be a wholesaler or retailer.

Basis risk – Basis risk arises when an insured individual's estimated losses (e.g., based on index measurements) do not match actual losses.

Claims Ratio – The percentage of claims costs incurred to premiums collected.

Double trigger – In area yield insurance, a payout is triggered if both plot yields and area yields are below a certain threshold of their respective predictions.

Freemium models – Mobile phone subscribers are awarded free life insurance coverage in proportion to the amount of airtime they use as a loyalty benefit.

Indemnity – Protection against actual loss or damage of a specific asset.

Insurance agent – Independent individual that represents an insurance company and is paid either for a fixed fee or based on commission. Agents typically own and control their accounts, policy records and renewals. They also provide advisory services to clients on which insurance to select.

Insurance surveyor – Service provider to an insurance company that conducts claim surveys and estimate the quantum of loss. Surveyor may also help with product design.

Insurtech – Refers to the use of technology to improve the efficiency of insurance models. This could range from front-end online tools, SMS-based and smartphone apps for claim filing, customer feedback, policy enrollment and back-end platforms for risk analytics and claims processing.

Strike rate – This is a loss assessment threshold. There are different ways in which this can be determined. For example, in weather index insurance the strike value could be a predetermined percentage below the mean of the rainfall index as observed over multiple years. If the value of the index falls below this certain percentage a payout is triggered.

The Rise of InsurTech in Agriculture:

Promising Products and an Emerging Research Agenda

By: Rewa Misra

Background

Farmers who live at or near subsistence levels are particularly vulnerable to weather risks in the absence of financial services (e.g., credit, deposit facilities, and insurance). Enter **Insurtech**. Insurtech refers to the use of technology to improve the efficiency of insurance models. Insurtech is enabling product diversity and new distribution models for Africa, as reflected in innovations in **freemium** life insurance, health and agriculture risk financing. This briefing note discusses three agriculture and digital insurance products across Kenya, Nigeria and Ethiopia to provide an overview of new trends in risk assessment and product distribution. The three innovations are: an area yield index-based product being offered by Pula Advisors[1] in Nigeria, Kenya, Malawi and Zambia; a vegetation index-based product in Ethiopia being offered by Kifiya Financial Technology; and Agriculture Climate Risk Enterprise (ACRE's) replanting guarantee scheme in Kenya.

Insurance companies see digital channels as a way of deepening distribution and lowering costs of enrollment and claims processing. And from a customer standpoint, insurtech is allowing the delivery of new kinds of products to smallholder farmers that introduce flexibility in premium payments, claims processing and payout structures.

Digital agricultural insurance makes existent data collection more efficient and accurate, and also allows the use of new types of data for innovations in risk modelling to reduce moral hazard and **basis risk**. In terms of making existent models efficient, first generation weather index models using weather station data (while an improvement on expensive conventional area yield models) were particularly vulnerable to basis risk. These are quickly being supplemented by satellite data-based indices which are improving the accuracy of weather indices. New risk models are also developing rapidly such as new kinds of area yield and vegetation indices, which are improving the accuracy of loss prediction. The use of these indices also means claims are triggered automatically as and when the data reflects an adverse event rather than clients having to file claims as in the case of conventional insurance models.

Engaging with the customer via digital channels is allowing companies access to a rich stream of customer data, which can be used to further customize both financial and content offerings. Overall, however, demand remains a key issue as customers struggle both to understand insurance as a product and to deal with trust issues in a digital environment.

[1]Pula Advisors is also expanding operations into Uganda and India.

ACRE REPLANTING GUARANTEE (RPG):

About the Company - Agriculture and Climate Risk Enterprise Ltd. (ACRE) is a registered **insurance surveyor** in Kenya and an **insurance agent** in Rwanda and Tanzania. The for-profit company [2]was established in 2009 with support from the Syngenta Foundation and the Global Index Insurance Facility (GIIF). ACRE works in close partnership with local insurers and other stakeholders in the agricultural value chain such as **agro-dealers**, large agribusinesses, cooperatives, non-profits, etc. It has cumulatively covered over one million farmers in Kenya, Tanzania and Rwanda.

The Product - Unlike conventional area yield **indemnity**-based agriculture insurance, weather index-based products link payouts not to actual crop losses but to a predetermined index. In the case of ACRE's replanting guarantee scheme, this is based on measured rainfall as a proxy for yield shortfalls during adverse weather. This approach requires modeling the distribution of historical index outcomes wherein payouts are linked to a location specific threshold in rainfall. Historical data in ACRE's case comes from both the Kenyan Statistical Agency and is also supplemented by satellite data from the ARC2[3] dataset. ACRE identified that the first 21 days of the crop cycle (germination) were highly vulnerable to low or excess rainfall and designed their insurance cover initially against maize seed germination failure. An insurance payment is triggered through MPESA if the satellite data in the first 21 days indicates the occurrence of too many or too few wet days in the germination phase. Automatic and immediate claim settlement via mobile money allows the customer to purchase another bag of inputs so as not to miss the entire planting season. The product is also being adapted to cover other stages of the plant cycle.

The Role of Digital in ACRE RPG - RPG is enabled by digital distribution and claims processing. RPG is bundled with inputs (bags of seed and fertilizer) that contain a scratch card with an activation code. The farmer is supposed to go to their field or in close vicinity of their field and activate the code from their mobile phone which allows ACRE to track their location and activate the policy. As no additional assessment is needed, the claims process is quick and completed using mobile money.

Accurate location data is critical as it allows ACRE to decrease the basis risk in their insurance model. Safaricom is an important partner here as they can access and triangulate specific location data from two base stations closest to the farmer using location-based software (LBS) and pass it on to ACRE. However, this has not eliminated inherent risks in the model – ex-post estimations for weather indices, highly localized micro-climates and the variable density of weather stations still contribute to basis risk in weather index models.

[2] Before becoming a for-profit company, services were operated under a non-profit project called Kilimo Salama.
[3] The Africa Rainfall Climatology version 2 (ARC2) is a revision of the first version of the ARC and uses inputs from two sources: 1) 3-hourly geostationary infrared (IR) data centered over Africa from the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT) and 2) quality controlled Global Telecommunication System (GTS) gauge observations reporting 24-hour rainfall accumulations over Africa. ARC2 satellite allows daily gridded 30-year precipitation estimations centered over Africa at 0.1% spatial resolution.

COMPANY	PRODUCT TYPE	PREMIUM AS % OF SUM INSURED	PAYOUT, CLAIMS RATIO & STRIKE RATES	APPROXIMATE OUTREACH	LINKED TO CONTENT SERVICES
ACRE	Weather index - input insurance	Premium is currently being paid by seed companies and is 8%	Payout in mobile wallet or as discount for next input purchase. Claims ratio unknown. Approximate strike rate rain< .441mm or >38 mm.	~129,000 registered. (This is specific to the RPG)	Yes – extension services for input use.
PULA	Area yield index - input insurance	4.5-6% for high productivity areas; 18-19% for low productivity areas.	Payout is in the form of inputs. Double trigger. Claims ratio ~55%. Strike rates vary by zone – 80-50% of yield loss.	~600,000 farmers	Yes – advice on agriculture practices and input use.
KIFIYA	Vegetation index – cooperative linked crop insurance	12-15% depending on the insurer.	High claims ratio of 241% as the product is in pilot stage and concentrated in one area. Strike rate NA.	6900	No

PULA AREA YIELD INSURANCE:

About the Company: Pula Advisors works in eight countries across Africa and Asia and, in 2016 alone, facilitated crop and livestock insurance coverage to 600,000 farmers in Kenya, Rwanda, Uganda, Nigeria, Ethiopia and Malawi. Pula works in an advisory capacity with Fortune 500 companies, global NGO's, microfinance institutions, research institutions and governments to help provide smallholders the protection they need in an increasingly unpredictable climate.

Area Yield Insurance – Traditionally area yield based products involve taking 25-75 crop cuts from an administratively delineated area for estimating losses. By instead delineating insurable areas by agro-climatic conditions (based on satellite data), Pula's risk model ensures greater correlation among variables affecting crop yield and improves yield predictability within a zone. This significantly reduces the required number of crop cuts required. These crop cuts are carefully marked and weighted for yield estimations. Area yield indices are easy to implement and generally exhibit lower levels of basis risk than stand-alone weather-index based approaches.

The Role of Digital in Pula's Area Yield Model – This product benefits from digital distribution and customer analytics: The insurance policy is bundled with inputs. Farmers receive scratch cards similar to airtime cards when they buy a bag of fertilizer or seeds and can activate these on cellphones. Farmers are assisted through the sales process and across the growing season through IVR services. The payouts are in the form of inputs (fertilizers or seed) as Pula believes that this

enables farmers to focus on improving yields. Pula's partners in this product have included among others CGAP, One Acre Fund, the Agriculture Ministry of Nigeria and the World Food Program.

The timing of agriculture activities is critical for improving yields. Pula is particularly focused on using mobile data as a means to providing tailor made advisory services. Small timely messages include reminders on when to apply top dressing or how best to plant a crop so as to obtain increased yields. For example, the right conditions (water, fertilizers etc.) can nearly double the kernel rows on a maize ear provided they are applied at the right time in the crop cycle. The advantage of engaging with farmers is that this improves the overall value proposition of the insurance service, facilitates demand and potentially may over time shift the ability of the smallholder farmer to increase incomes.

KIFIYA VEGETATION INDEX INSURANCE:

About the Company **-** Kifiya Financial Technology Plc. (Kifiya) was established in February 2010 and leverages innovative technology and distribution channels to make financial and non-financial services simple, affordable and within reach in Ethiopia. Kifiya has a dedicated microinsurance unit responsible for microinsurance product development and distribution innovations. Their microinsurance offerings are supported by a cloud platform that enables multiple insurance companies to access Kifiya's products, underwrite, sell and manage policy, and manage payout claims digitally. Their digital payment platform through their agent network enables enrollment and premium collection. Aside from agriculture and index-based livestock insurance products, Kifiya are also looking into new emerging markets with hospital cash, bereavement products (Funeral insurance) and Livestock insurance for highland smallholder farmers products.

Kifiya vegetation index – Kifiya's agriculture insurance product uses an NDV Index (Normalized Distribution Vegetation Index) and is currently in a pilot stage. This product was developed in partnership with the Twente University. Most vegetation indices are based on the NDVI. NDVI is calculated from the visible and near-infrared light reflected by vegetation. Healthy vegetation absorbs most of the visible light that hits it and reflects a large portion of the near-infrared light. Unhealthy or sparse vegetation reflects more visible light and less near-infrared light. A graphical indicator is then used to analyze measurements and assess whether the target being observed contains live green vegetation or not. The index employs a difference formula[4] to quantify the density of plant growth, the result of which is called the Normalized Difference Vegetation Index (NDVI). Weather impact on NDVI by pixel translates into a payout.

The Role of Digital in Kifiya's Model: Kifiya provides the infrastructure critical to enabling digital distribution including a cloud-based platform which enables insurers to manage products and process claims. Kifiya also provides smartphones at the point of sale (usually a small agribusiness or agro-dealer) which can be used by the dealer or farmer to purchase a policy and a payments platform to support premium collection and payouts. Most of the farmers in the area are associated with cooperatives and this becomes an important support structure both around building awareness on the product and facilitating demand.

[4] Near-infrared radiation minus visible radiation divided by near-infrared radiation plus visible radiation.

Emerging research agenda

How can insurtech enable demand for insurance? The vast majority of studies in this field have focused on demand for insurance per se. More can be done to test and learn how digital can shift purchasing behaviors in insurance through either simplifying the decision to buy or demonstrating the ease of processing claims. Innovations include bundling with inputs (default options), the use of apps with customer friendly interfaces at the point of sale (understanding the value proposition), and real time claims processing. There is a need for a systematic study of behavioral factors in the decision to buy/not buy and testing diverse digital product design features to support demand.

Non-financial services - Where bundling is important for selling insurance, it may be helpful to understand how the decision to buy and use inputs is affected by digital insurance. This might be by motivating farmers to buy inputs or improving the choice of quality inputs (as inputs, particularly seed, quality can be a significant issue). It could also be due to reinforcement messages through SMS of good agricultural practices enabled by digital insurance channels or simply weather data.

Designing incentives within the agri-value chain. A key factor for the successful delivery of many insurance models is that the agro-dealer is the main point of sale and training resource for smallholder farmers. However, there are information asymmetries between the insurance agency, the agribusiness (which may be a seed company) and a smaller entity like an agro-dealer. More can be done to learn how incentives can best be designed and framed to ensure agro-dealers play their expected role in the insurtech ecosystem.

Data use to improve customer value and measurement. Companies like Pula and Kifiya are recognizing that the rich data collected on customers is a mine of insights on customers' financial and agricultural behaviors, risk assessment, and product management and development. Better understanding and demonstrating these uses is an important area for strategic learning and impact measurement.

For General Information

About ACRE: www.acreafrica.com

About Pula: www.pula-advisors.com

About Kifiya Financial Technology: www.kifiya.com

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www.gui2de.org