A Data Driven approach to Integrated Risk Management in Agriculture Food Shock Modelling

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Micro-insurance product designer linking stakeholders to agricultural insurance through localized solutions to reduce climate risks

Licensed insurance intermediary, supporting local insurers to offer smallholder-focused insurance across value chains

Offices present in Kenya, Rwanda and Tanzania, projects in Uganda, Malawi, Nigeria, Senegal, Mali & South Sudan.

20 professional staff with expertise in Insurance, Agriculture and Veterinary Sciences, Actuarial and Data Science, Marketing, Strategy and Finance

Over the years we have been in the industry we have insured more than 1.5 million farmers
What Is agricultural Insurance?

• **Agricultural Insurance**: Insurance applied to crops, livestock, aquaculture, and forestry.

• **Advantages**

Advantages of Agriculture Insurance: Agriculture Insurance reduces the impact of risks in Agriculture, increase farmers’ access to credit, and inputs, improve agricultural productivity, transition from subsistence to commercial farming, provide social protection to the poor, build resilience of vulnerable communities and reduce food aid and ad-hoc expenditures during hazard periods.

**Insurance Products options**

- **AYII** – Area Yield Index insurance
- **WII** – Weather Index Insurance
- **IBLI** – Index based Index Insurance
- **MPCI** – Multi-Peril Crop Insurance
- **NPCI** – Named Peril Crop Insurance
- **Livestock mortality**
WHAT IS AN INDEX

Index:- A statistical/mathematical formula that measures deviations from the normal level of a parameter. It is an indicator.

Crop Weather Index Insurance:- Insurance based on an index whose parameter is weather related (eg rainfall level, temperature) with which deviations are expected to cause crop losses

How Is The Loss Measured? (RPG, Bima Pima)

• Satellite
• AWS
• Rain gauges

Weather Data + Agronomic Model
ACRE Strategy on Integrated Risk Management

IRM Strategy

Mitigation
- Offtaker
  - Partnerships (Digifarm, Apollo, Tulaa etc)
- Finance
  - Collaterisation of credit using insurance
  - Digital Credit access (Agri-scoring)
- Agronomy
  - Inputs
  - Digital Advisories
  - Post Harvest
- Basis Risk
  - PBI
  - SMI
  - Other satellite datasets
  - Increase products

Insurance
- Price
  - Volume=Portfolio Pricing
- Distribution
  - Partnerships
  - Digital Tools
  - Aggregation
  - PESPS
Role of Data in Integrated Risk Management Approach

- **Some Examples of tools that are key in providing smallholder farmers.**
  - Digital credit scoring to advance affordable financing to disaggregated smallholder farmers.
  - Digital Advisory to provide effective and affordable information on forgotten value chains and disaggregated farmers.
  - Digital micro-insurance solutions for smallholder farmers. Affordability and easy access.
Reducing Basis Risk: Picture Based Insurance and Advisory

New product that uses farmers smartphone photos, satellite imagery, weather station data, agronomic records and online data archives to provide a robust insurance and advisory product.

The project is a partnership between ACRE Africa, KALRO, IFPRI and Wageningen University.

Key data science aspects of AI, ML and DL are put in practice in this project.

Target Number of Farmers 45,000. Baseline and endline study to be conducted on 6000 farmers.
Soil Moisture Index for Insurance and Advisory

Uses soil moisture and combines soil health data to provide advisory to farmers

Soil moisture Data is provided at a 100m pixel scale (compared to 10KM of ARC 2). On farm monitoring possible.

Dutch Partner VanderSat

Phase one 2018 June to 2018 Dec targeting Meru and Embu

Second Phase started on April 1st Targeting Machakos and Bungoma County
Tool for Agricultural Risk Advisory (TARA)

A multidisciplinary approach towards derisking agricultural production, ACRE, Vandersat and Tulaa

Access to finance is key for distributing agricultural insurance. Bundling insurance with finance is key in ensuring that this is possible.

New Datasets improve the monitoring of both insurance and finance. Soil moisture is an interesting datasets in this regard.

Using AI algorithms and ML, this is combined with data from agronomic surveys to provide a robust risk score that allows more farmers to access loans.
Proposals on New Innovations

INDEXplorer: (ASSIMILA Ltd and ACRE Africa, Copernicus proposal to access ECMWF 40 different datasets to be used to create a database of historical datasets for risk profiling, insurance, advisory and credit access)

REFLEX (Real-time Examination of Flood Extremes): Partners include (Vandersat, Flood Tags, 510 Red Cross Netherlands, Kenya Red Cross and ACRE). Provide a new comprehensive flood insurance based on high resolution satellite data from Vandersat and Flood tags in disaster risk prone areas under the Red Cross.

Digital Extension Tool for Climate Smart Agriculture: SIDA and SMHI Supported research on creating a digital tool to provide extension farmers with data on DSS in relation to climate change, Gender embedding and orphan crop value chains

FoReSee (Forecast-based financing and Re-insurance through Satellite-integrated disaster modelling): Partners include Vandersat, Deltares, 510 The Netherlands Red Cross, Cordaid and ACRE. The product proposes to merge high resolution satellite data with an open source model to provide forecast information on drought and floods to create a predictive based insurance products.

Remote Sensing Based Yield Insurance: Providing a yield index that can replace the problems of the existing area yield product by harnessing high spatial resolution data from Postdam Institute of Climate Impact Research (PIK)