GIACIS
Geodata for Innovative Agricultural Credit Insurance Schemes
- Risks and Micro-Insurance for Food Security in Ethiopia

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Theme: Rainfed agriculture in sub-Saharan Africa - A risky business
By: Studiekring Ontwikkelingsvraagstukken (SKOV)
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UNIVERSITY OF TWENTE.

Intro
The Index
The Project

A systematic and synergistic approach for financial inclusion, promotion of investment in agriculture, broker sustainable production methods and risk transfer tools.

Geodata for Innovative Agricultural Credit Insurance Schemes (GIACIS)
Lilianne Ploumen: In Ethiopia a consortium made up of financial institutions, the University of Twente and the Ethiopian national meteorological agency is providing insurance against climate risks, such as unexpected drought, for millions of smallholders. Better data allow more accurate risk estimates to be made, keeping premiums affordable. According to Ms. Ploumen, ‘The program will support at least 3 million smaller food producers over the coming years, and probably more, as technology becomes more sophisticated and more affordable.’

The minister explained that the collaboration in the G4AW program is a fine example of the role business can play in tackling climate change.

For ITC the project counts as valorization of longer-term research efforts.

Lilianne Ploumen naar Marrakesh voor VN Klimaatconferentie
2008: PM Meles Zenawi states there can be NO more famine ever in Ethiopia

Intro: Droughts in Ethiopia

Ethiopia hit by worst drought in decades
The UN says about 8.2m people need emergency food aid in Ethiopia, nearly double the number six months ago.

25 Jan 2016
Foreign financial assistance is already arriving and, combined with money committed by the Ethiopian government, totals about $360m to confront the drought's aftermath. But the overall emergency response could cost $1.4bn.

18 March 2016: Ethiopia’s prime minister has urged the international community to increase its support towards the ‘Horn of Africa’ state as 10 million people face going hungry.
Twente helpt Ethiopiërs aan verzekering

**GEODATA** Universiteit Twente helpt boeren in Afrika om zich te verzekeren tegen een mislukte oogst. Verzekeraars gebruiken Europese satellietfoto's om te beoordelen hoe droog een regio is.

The credit amount is insured, based on NDVI-performance during the growing season

Is very area specific

Is crop a-specific

ITC basically does the 'actuary' work
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A systematic and synergetic approach for financial inclusion, promotion of investment in agriculture, broker sustainable production methods and risk transfer tools

Geodata for Innovative Agricultural Credit Insurance Schemes (GIACIS)
The annual frequency distributions of yields can be compared to ‘stages’ of the Learning and Technology Adoption trends of development.
CPA studies address:
- growth limiting
- yield reducing
- land modifying aspects of LUS’s.

It relates differences in land and management aspects to differences in system performances.

CPA uses survey data from many plots (farmers’ fields) located in a specific map-unit to generate a production function.
The index: must capture variability in crop performance

Selected Index: NDVI
The index: Lagged-P highly correlated with NDVI … provided that …

... the data are generalized:
- For many gridcells in a CPS-zone
- For many years (seasons)

Insurance however does not deal with generalities, but with left-tailed anomalies by pixel and season.
The index: CPS-Zones $\approx$ Recommendation Domains

This “movie” represents CLIMATOLOGY (used as reference to assess anomalies)

Crop Production System Zones $\approx$ Recommendation Domains → Relatively homogeneous in Climate, Terrain, Soil, Land Cover, Land Use, Farming System, etc.
Different zones relate to differences in growing seasons, crops grown, crop calendars, etc.
The index: CPS-Zones capture growing seasons

a) An early long season
b) An early (first) short season
c) A late (second) short season

Early:
starts in dekade 8-14 (mid-Mar – mid-May)

Late:
starts in dekade 18-32 (end Jun – mid-Nov)

Long:
15-25 dekades

Short:
3-15 dekades
The index: what is dry and what is drought?

Each farmer must indicate which dekades (10-day periods) to insure; each has its own trigger-exit thresholds.
A farmer is supposed to insure only the relevant part of a growing season.

Note:

... with full drought assessment by 1km gridcell by season: 2015 (late)

2nd drought in ONE year!!

See 2015 Late+Long
A farmer is supposed to insure only the relevant part of a growing season. Note: This drought caused lots of livestock movements!
Identify the grid code

The insured field(s) must be linked to a 1km gridcell

The insured dekades must be specified

The index: CPS-Zone → 1km grid → Field (Policy)
Frequency counts of pay-outs (%) versus farmer claimed yield-losses (%) [n=190; N.Wollo zone]

Only 3+1 = 4% of the farmers deviated between 20-40% from our pay-out estimates. Most remain happy (some got money, while not needed), and for the remaining 1% a payout was expected (but not received).

The acceptable accuracy (< 20% deviation) is thus 96% for the surveyed area and farmers.

Modified from: Fetene Zerihun Minale, 2017
• Offers a GeoData-driven DROUGHT risk-mitigation (insurance) product

• Index-based (NOT Indemnity-based, NOT Crop-based, NOT Impact-based, but Exposure-based)

• Remotely Sensed Index: Hyper-Temporal NDVI-data (Spot-VGT & Proba-V)

• Underpinned by FOUR business models (extreme low-costs solutions)
  • Farmers
  • Insurance Companies
  • Credit suppliers
  • Digital financial technology company

• 100% Scalable and Flexible

• Solid statistics:
  • Threshold NOT derived from 16 year pixel-based repeats only
  • Full use of country-level stratification defining Crop Production System zones
  • NOT Sample statistics, but Population statistics (use of percentiles)
  • Full alignment to local growing seasons and terrain variability

• Data capturing (GeoNetcast), pre-processing (Ilwis), and interpretations, all fully carried out by Eth.partners
• **A PPP with few partners based on maximizing complementarity** *(systematic synergetic approach)*
  - Provides financial inclusion
  - Promotes agricultural investment
  - Brokers sustainable production methods
  - Provides risk transfer tools
  - Uses branchless banking technology

• **Upgraded from a Project to a Program:**
  - Managed now by an all Ethiopian PPP
  - No longer managed as a Pilot scheme
  - Part of the 5-years Growth and Transformation Plan (GTP-II)
  - First state approved Micro-Insurance product in Ethiopia

• **Targets smallholder farmers (80% < 0.5ha) with an aim of 15m HH insured in 2025**

• **Aims to boost purchase of agricultural inputs** *(through change in risk avoidance behavior)*

• **Makes an insured credit package (bundled) locally available**