SCOR
The Art & Science of Risk

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New technology applied to enhance product offering and insurance services to agriculture: concrete examples

Michael RÜEGGER, Deputy CUO Agriculture and

Fanny ROSSET, Senior Underwriter Agriculture, SCOR Global P&C

Agriculture Production - some specifics

Agriculture is a "moving" business…

Historical performance analysis

Field analysis
Soil Type,
Intra-field variabilities
Crop rotation

Season planning

Sub-soil moisture
Season weather Forecast
Crop prices

Cropping plan

In Season decision

Best planting dates
Agronomic prescription
Seeding rates

…and a mix between tradition and innovation

- ✓ Crop production is becoming more and more a data driven decision
- ✓ Producers are making use of extensive sets of technology driven tools
- ✓ Goal to become more efficient, increase output and ultimately profitability

Insurance products need to adjust to these evolutions and take advantage of technology available and evolving

Agriculture Insurance - some specifics

Farmers perspective
(widely spread position toward agriculture insurance)

Too expensive

Don't know about it

Does not cover enough

Don't need it

Don't have access to

Too cumbersome

Government will step in if needed..

I may take it…if it pays-out regularly

Re/Insurers perspective/ concerns

Heavy infrastructure costs

Difficult insurance penetration

Slow portfolio development

Volatility (results and income)

Portfolio Diversification

Moral Hazard

Anti-selection

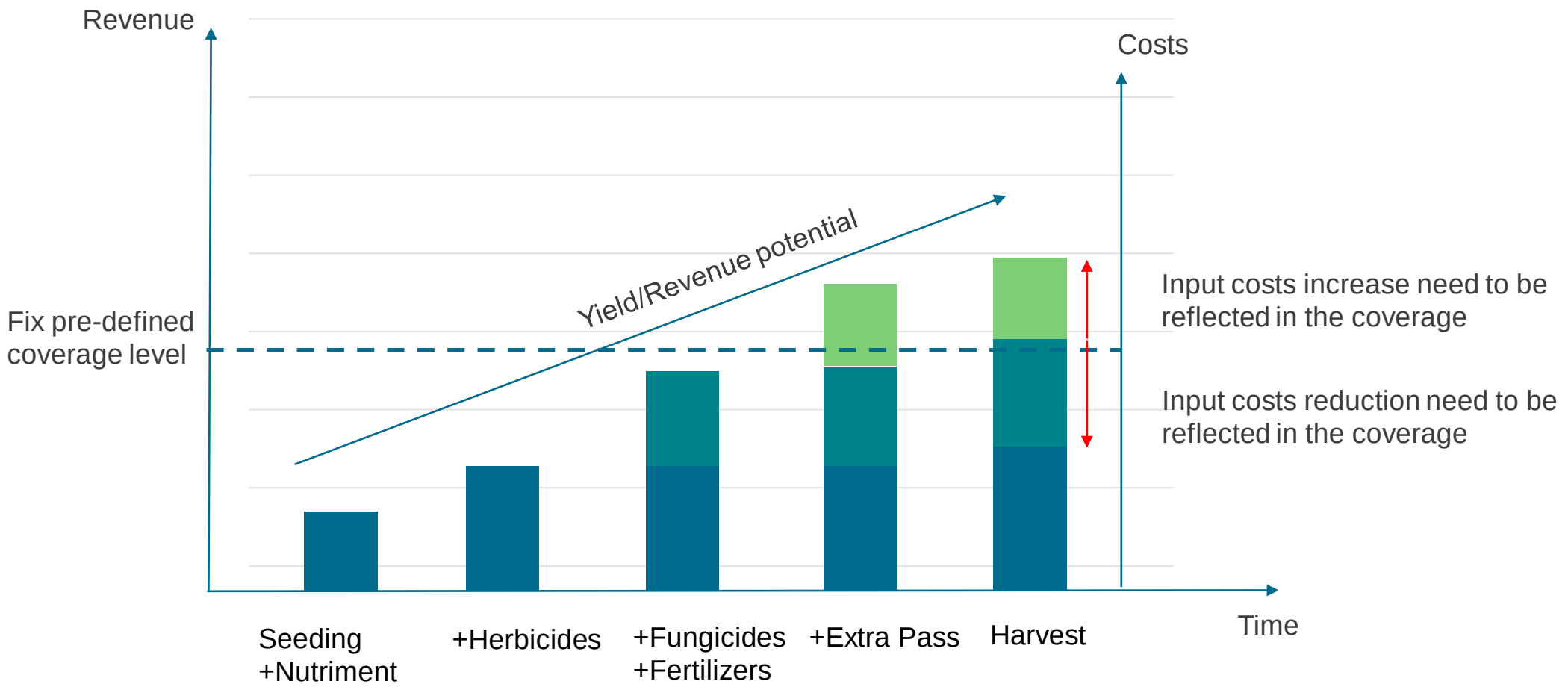
Asymmetry of information

Won't do it without government support ?

Goal: Change of paradigm to make insurance a tool fully integrated in the production risk management

Need for dynamic cover

Australia case



Scenario 1 - no cover upgrade

Australia case

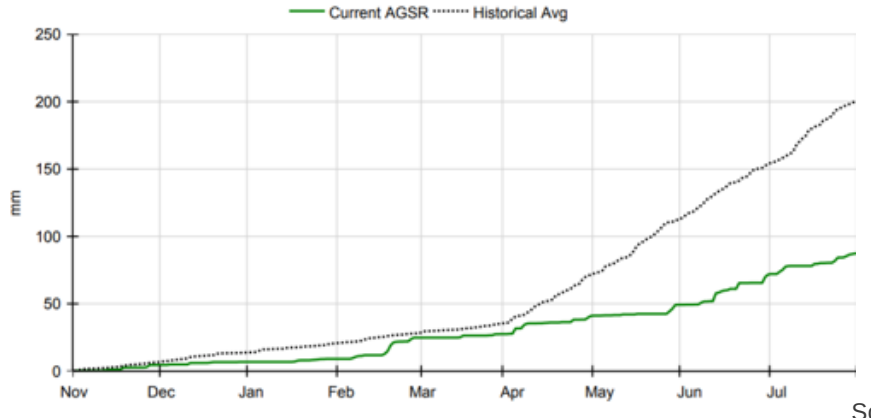
New approach: cover staging

Initial cover:
Seeding and herbicides costs

Seasonal conditions and yield forecast do not justify further treatments (cost/benefit)

Cover remains at the minimum level in line with producers' production costs of the season

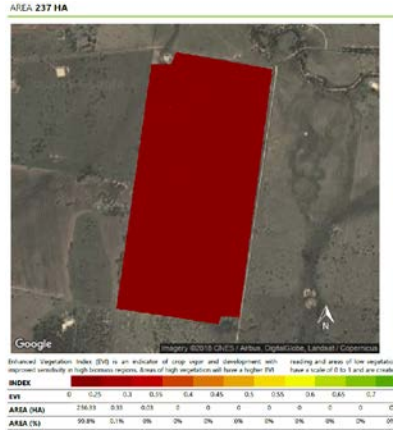
1- Moisture resources: Aggregated precipitation and subsoil moisture analysis

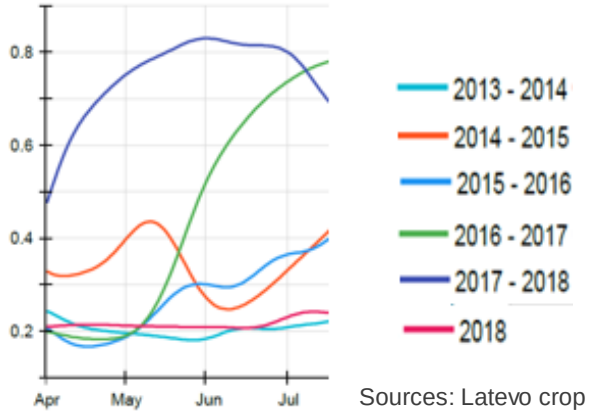


x Significant lack of available moisture

Sources: Latevo crop monitor/Geosys

2 - Crop emergency : NDVI/ EVI field analysis





x No / very poor vegetation

Sources: Latevo crop monitor/Geosys

Scenario 2 - validation of cover upgrade by using technology

Australia case

New approach: cover staging

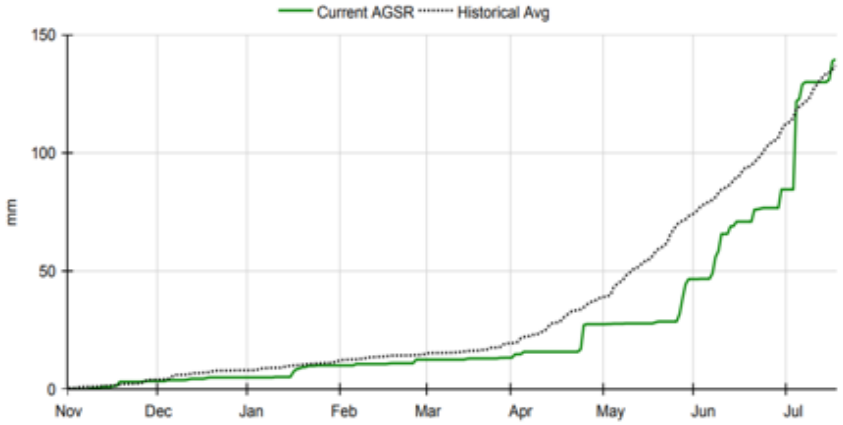
Upgrade cover:
+ Fungicides and fertilizers costs

Initial cover:
Seeding and herbicides costs

Seasonal conditions and yield forecast justify further treatments (cost/benefit)

Cover increase to reflect producers' production costs of the season

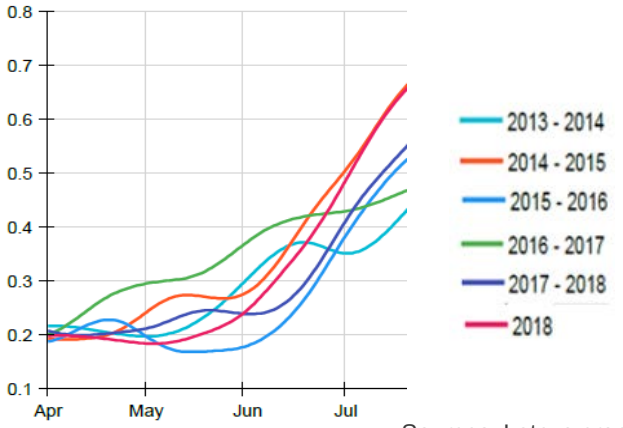
1- Moisture resources: Aggregated precipitation and subsoil moisture analysis



✓ **Adequate level of available moisture**

Sources: Latevo crop monitor/Geosys

2 - Crop emergency : NDVI/ EVI field analysis



✓ **Proof of crop emergence and vegetation**

Sources: Latevo crop monitor/Geosys

Scenario 3 - technology combined with traditional approach

Australia case

New approach: cover staging

Upgrade cover:
+Extra - pass

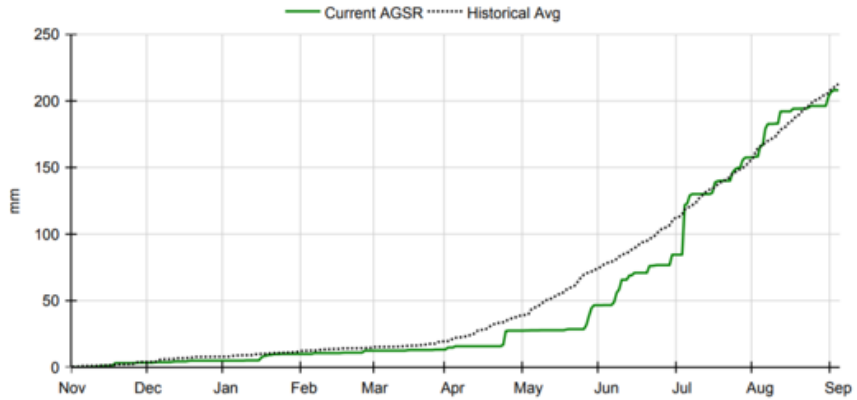
Upgrade cover:
+ Fungicides and fertilizers costs

Initial cover:
Seeding and herbicides costs

Full on farm review confirm yield potential and Farm management

Cover increase to reflect producers' production costs of the season

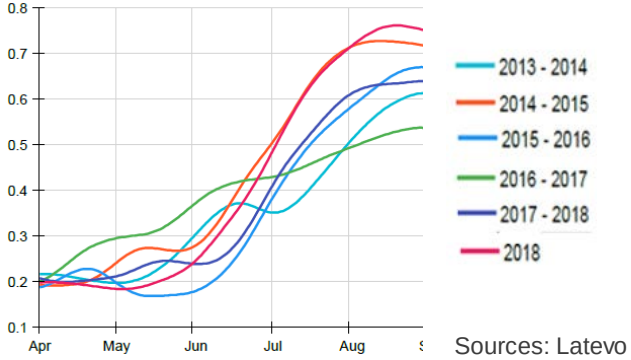
1- Moisture resources: Aggregated precipitation and subsoil moisture analysis



✓ **Adequate level of available moisture**

Sources: Latevo crop monitor/Geosys

2 - Crop emergency : NDVI/ EVI field analysis



✓ **Full on farm field inspection**

Sources: Latevo crop monitor/Geosys

Mutual benefit of a dynamic cover

Interests of Producer and Insurer are aligned

- Insurance cover increases in response to producers investment in the crop
- Most advanced producers (in terms of best practice) access higher level of cover
- Dynamic level of cover enables a reasonable cost for the product

Enhanced services to producers

- Platform used for UW analysis available to the insured for fields monitoring
- Transparency in insurance decision
- Common agronomic information serves as basis for joint decisions
- Increase client retention though multiple points of contact during the season

Give farmers the piece of mind to farm each season to its full potential

- **We want farmers to buy an insurance product not for the year of loss but for all the others**

New technology reaching out for remote areas

Mongolia case

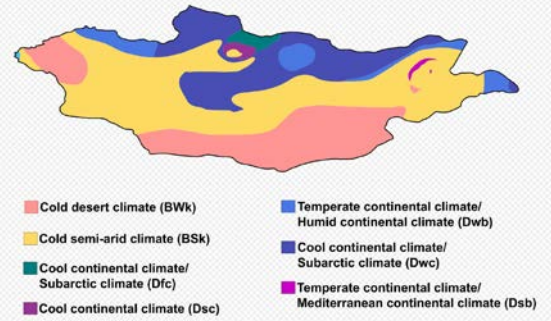
Situation today:

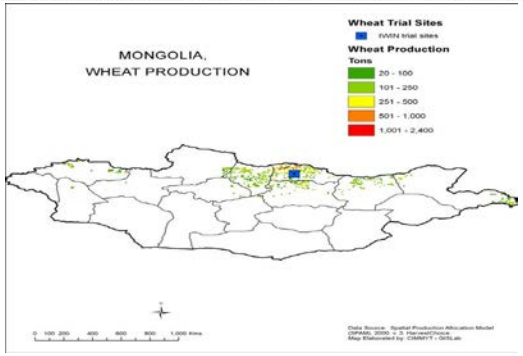
- Long lasting relationship SCOR ⇔ Mongolian Government through livestock cat cover
- Mongolian Government wants to push Agriculture production
- Part of this strategy is Agriculture insurance
- Pilot for traditional MPCI cover in place since 2 years (Backed by SCOR)
- Extreme weather dominating (continental climate), but topographically “easy”
- Comparatively big farms and fields
- Few and unreliable data of the past
- Take up low & infrastructure costs high (scarcely populated remote areas)

Approach to the future:

- Calibration of plant model for wheat on Mongolian circumstances
- Based on weather data “artificially” generate yields of the past 10 years (5x5 km pixels)
- Aggregation of yield outputs on logical geographical units (in terms of Agroecology, correlations, administration and sales)
- Farmer buys according to his location the insurance policy
- Based on actual weather conditions and the calibrated model (according to seed variety and planting date), pay-out is triggered (or not)

Mongolia map of Köppen climate classification





Creating history in untapped cropping areas

Mongolia case

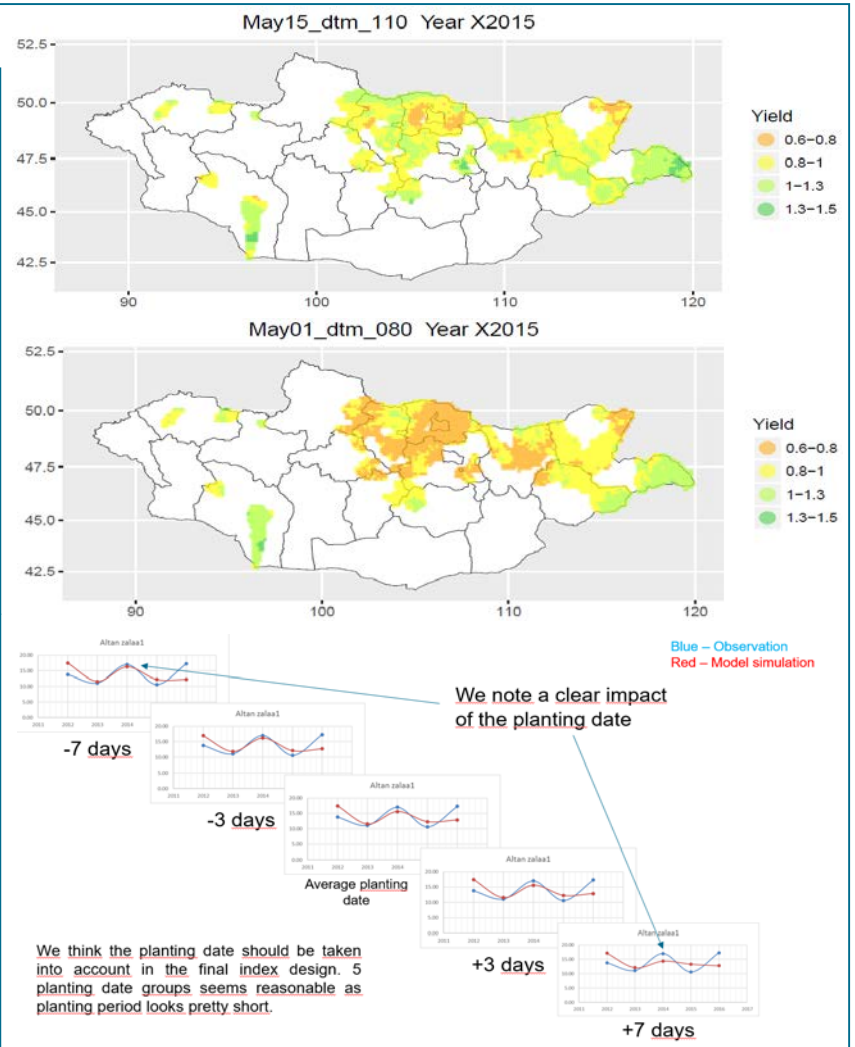
Ingredients and steps:

- Soil maps
- Weather data (precipitation, wind, temperature)
- Plant model (in this case ZedX)
- Sowing dates
- Varieties (between 80 and 110 days to maturity)
- Each 5 x 5 km grid gets an expected yield & a 10 years history
- Based on aggregated zones cover and rates are determined
- Field experience (detrended yield history) and artificial history are compared and discussed with farming community
- 1-2 years test phase is minimum before commercial roll out

Challenges:

- Different grid lengths of data
- Detrending of yields (How would it look like at today's technology?)
- Geographical aggregation (Wide enough to be abstract, small enough to match index with field reality)

- ***Calibration of the model: insurance is about outliers – is the model able to match the pay-out cases?***



Conclusions

Agriculture is about living things, seasonal dynamics and resilience

- Data quantity and availability as such does not mirror biological reality. Only new methods and interlinks (models) between data may approach agriculture reality on the fields
- Huge part of product roll out is driven by testing & discussing results with clients

New technology are tools – but tools need to go with corresponding methods and proper use

- A new tool does not change reality
- Understanding of socio-economic farming environment are key
- Insurance needs to be in line with new trends in farming and adjust accordingly product design and offering
- Data collection and storage is not a hurdle anymore (from satellite via drones to weather stations), nor is computing power – the application makes the difference
- Data cleansing and validation however is cumbersome (outliers must be the focus!)

New technology may not replace traditional methods but enhance them

- Role of Agriculture insurance will evolve from a pure loss compensation to a more advisory and discussion partner to the producer
- “Boots on the ground” will remain a relevant part of agriculture insurance

Thank you
for your attention