PARAMETRIC INSURANCE & I ITS APPLICATION TO AGRICULTURE

March 2017





In 2014, a department dedicated to parametric insurance was launched at AXA. Today, we are **AXA Global Parametrics**.



- AXA Global Parametrics: the AXA Group's parametric insurance center of expertise
- Ambitious goal to come-up with innovative solutions to mitigate the consequences of climate change
- Clients include corporations but also governments, international institutions, SMEs or individuals
- Global scope already active on 5 continents and 28 countries
- Many indexes possible including rainfall, temperature, crop yield, wind speed, wave height, and more
- The indexes are based on the newest technology including satellite imagery



What is parametric insurance?







We build tailor-made covers for all types of weather risks in three steps:

COVER Construction of an insurance cover adapted to your needs:

Which location?

What amounts of indemnity?



ANALYSIS of your activity's sensitivity to weather anomalies.

What consequences do different anomalies (heat, rain, cold, drought...) have on your yield, revenues or cost structure? **PAYMENT** triggered depending on certified weather data within a few days.

- ✓ Range of tailor-made products
- ✓ Quick compensation process
- ✓ Smoothing of financial results



- ✓ Balance sheet protection
- ✓ Risk transfer
- ✓ Global coverage

What data do we usually use in our contracts?

Weather stations, satellite imagery, and many others





- Reliable weather stations can be used for parametric insurance contracts
 - → Rainfall
 - → Temperature
- If weather stations are not reliable enough (low density, no historical data..), it is possible to use satellite
 - → Between 15 and 30 years of data
 - \rightarrow Resolution up to 250m.
- Satellites can measure weather parameters ...
 - → RFE (Rain Fall Estimate)
- ... and plenty of other parameters
 - → Drought index (evapotranspiration)
 - → Vegetation index (NDVI)
 - → And many others!



Example of weather sensitivity per sector



AGRICULTURE Decrease in yields or lower quality crop production due to drought, frost, or excess rainfall



RENEWABLE ENERGY Decrease in renewable energy production due to adverse weather



FOOD & DRINK Lower sales of fresh drinks during a cold, rainy summer



GAS & ELECTRICITY

Low energy demand when temperatures are mild during the winter



CONSTRUCTION Work interruption when temperatures are too cold



TOURISM & LEISURE

Decrease in visitors and beverage consumptions in theme parks due to cool and rainy temperatures



DISTRIBUTION

Decrease in seasonal clothing sales (winter coats, bathing suits), due to adverse weather



TRANSPORTATION

Increased costs for airline companies in case of cold temperatures and snow, e.g.: aircraft de-icing



Crop production largely depends on weather: quality as well as yield can be impacted

PRODUCTION YIELD

Weather events such as drought, floods or excess heat can impact production quantity





PRODUCTION QUALITY

Some weather events such as rainfall, temperatures, or frost can damage crop quality





AXA CS develops various insurance solutions for agricultural risks

VEGETATION INDEXES through satellite imagery

 Protection against various weather risk through vegetation indexes using satellite indices (NDVI, TCI, VHI...)

WEATHER INDEXES through weather stations or satellite imagery

 Protection against weather risks that may lead to a decrease in yield or quality, e.g. excess of rain, drought, temperature, etc...

AREA-YIELD through official statistical bodies

 Cover against a decrease in production due to adverse weather conditions using official area yields

These insurance solutions have many advantages including:

- ✓ Rapid and simple payment
- ✓ Tailor-made
- Global coverage





Example of a vegetation index through satellite imagery

Sample farm location



NDVI index



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Example of a weather index through a weather station

Sample farm location



Near Lódź, Poland

Source: Google Earth



Sample cover structure				
Main risk	e.g. Frost			
Index	e.g. Daily temperature			
Data provider	Certified data provider (e.g. Speedwell)			
Location	e.g. farm near Lodz, Poland			
Risk period	e.g. per crop season			
Trigger	e.g. temperature below X degrees during period			
Deductible	e.g. X degrees below average			
Payout	e.g. percentage of crop value by degree			
Limit	e.g. 30-50% of crop yield			



Example of an area-yield cover through official statistical body

Elements to communicate to the insurer:

- → Planted surfaces
- → Expected yield
- Insured margin per ton or price per ton
- → Choice of reference yield (e.g.: average of the last 5 years)
- → Desired deductibles and limit

	Crop	: Winter Wheat	
2015 Campaign	Surface (ha)	20 000	
	Yield forecast (t/ha)	4.0	
	Insured margin (€/t)	20	
	Capital insured (€)	1 600 000	0
	Limit (%)	30%	
	Deductible (%)	10%	
	Official yield reference	e 4.5	

Claims settlement

- Calculation of net indemnity following the publication of results¹
- → Claims settlement
 - Possibility of down payment after semidefinitive results

		Crop : Winter	Wheat
June 2016 settlement	Official yield 20 ⁴	15	3.9
	Yield difference	(%)	-13.3%
	Indemnity (€)		52 800





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