On behalf of:

Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety

of the Federal Republic of Germany

SATELLITE TECHNOLOGY

How to improve competitiveness and reduce uncertainty in the agricultural sector

PERU Ministerio de Agricultura y Riego

Munich RE

CAT

Climate, Agriculture and Risk Transfer

The agricultural sector, because of its intrinsic relationship with the environment, is highly vulnerable to extreme weather events, which will grow in frequency and intensity as a result of climate change.

The project 'Integrated financial management of climate risks in the agricultural sector' (Climate, Agriculture and RiskTransfer – CAT) is an initiative undertaken by Peru's Ministry of Agriculture and Irrigation with support from the German development cooperation implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, commissioned by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, with funds provided by the International Climate Initiative (IKI). The reinsurance company Munich Re is a strategic ally.

The goal of the CAT Project is to put in place a Sustainable Risk Transfer System (SRTS) in the agricultural sector. This involves creating an enabling environment that will build the sector's capacity to reduce the risk of losses due to extreme weather events.

The SRTS is intended to contribute to climate change adaptation of the agricultural sector by developing and financing insurances with state and private-sector participation.

Agricultural insurances are a financial instrument that:

- Allows the sustainability of farmers' work by transferring the risk of losses to specialised insurers;
- Stabilises incomes in the face of production losses and ensures business continuity;
- Facilitates farmers' access to credit through formalisation and inclusion in the financial sector.

The implementation of an SRTS with agricultural insurances requires:

1. Regulations
2. A budget
3. Processes
4. Insurance policies
5. Information systems

Regarding the last requirement – information systems – the CAT Project has come up with an innovative solution for obtaining high-quality information: Cropland Masks (CLM).

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PERU

The current situation in the agricultural sector

The diversity of Peru's agricultural sector is demonstrated by:

A wide variety of over 150 crops

Farmers with less than 1 to over 100 hectares in 11 ecoregions

Over 10 weather-related risks, including frosts, droughts and floods

In this context, farmers and their associations, the public sector (governments and public institutions) and the private sector (financial institutions, insurance companies and other entities) need timely, accurate and accessible information to make decisions. Thereby, the sector's resilience to climate change will increase.

With the SRTS and agricultural insurances in place, the availability of reliable information will promote the development of insurances suited to the producers' needs.

The information system currently in use does not, however, provide the sector with good enough information.

Factors limiting information quality

The system is not integrated

Only some entities provide the system with data.

The methodology is outdated

The methods used to collect information are not synchronised, updated or sufficiently detailed.

The system is not cost-effective

Collecting information using an out-of-date and complex method results in high costs.

SATELLITES

Using satellite technology for risk management

Since 2015, Peru's Ministry of Agriculture and Irrigation has sought to improve agricultural information in order to implement the SRTS. In this context, the opportunity to introduce new technologies such as satellite images for the generation and interpretation of information was identified. The CAT Project, together with a company specialised in the application of satellite images to generate agricultural statistics, developed the Cropland Masks (CLM) method.

CLM are a reliable and efficient technological method based on satellite images that are automatically or manually processed in a programme for the visualisation of geographic information. CLM identify cropland, down to individual parcels of land, and classify it according to four categories (see below). Using high-definition or infrared images, even different crops can be distinguished and the yield can be estimated.

The information obtained is of great importance to actors in the sector such as local associations, water users' associations, local and regional governments, and other organisations interested. The availability of quality information improves decision-making capacity at all levels.

Chongoyape, Lambayeque

Before implementing CLM as a replicable method nationwide, a place already benefiting from high-quality information had to be found in order to validate the method and the results it produces.

The Ministry of Agriculture and Irrigation together with key players prioritised the Chongoyape district on Peru's north coast, in the department of Lambayeque, as the first place in where to apply the CLM method.

Peru's coast is a desert traversed by narrow productive valleys of extensive farms and smallholders producing crops for exportation, the local and national market.

In Chongoyape, the farmers are organized into an irrigators' committee that has exemplary administrative records of the cropland.

- Annual crops (rice, potatoes, maize)
- Permanent crops (sugar cane, grapevines, coffee)
- Annual and permanent crops
- Forage crops (pastureland) – not identified in the area
- Non-cropland

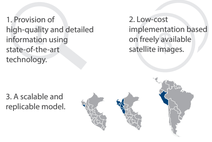
CLM can provide information which guides:

1. The establishment of more sophisticated information systems, such as administrative records.

2. The sampling of national surveys which provide insurance companies with information supplementary to that of satellite images, such as the technical level, production cost and climatic impacts.

Therefore, CLM are the first step in generating an information system for the SRTS and its agricultural insurances, and in the creation of an integrated agricultural information system, as the results can be complemented with data from the cadastre, administrative records, agricultural censuses and other sources.

Benefits

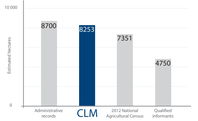


Results

When comparing the cropland area estimates, that obtained by the CLM method was close to that of the 2012 National Agricultural Census and that of the irrigators' committee's administrative records. This underlines the high quality of the information this new method provides and demonstrates the insufficiency of the method currently in use based on local qualified informants. The cropland area is one of the most important pieces of information for the implementation of agricultural insurances.

Implementating CLM as a method to generate high-quality information throughout the territory will benefit the sector by enhancing the flow of information, especially in regions without committees that keep quality administrative records, and by improving decision-making for climate change adaptation.

Estimated cropland by source of information in Chongoyape, Lambayeque



APPLICATIONS

Using satellite technology in other sectors

The good practice of using satellite images can be replicated in other sectors, improving response times, decision-making, planning and management at individual, sector and national levels. For example, satellite technology can be applied in:

SECTOR	DETECT AND MONITOR
Transport	Pollution caused by urban traffic Marine currents for transport by sea
Tourism	Water quality, spread of algae and jellyfish
Housing	Ground movements affecting housing and infrastructure
Health	Conditions that favour the spread of disease
Fishing	Temperature, water salinity and currents Fish stocks
Emergency response	Oil spills Floods and fires
Spatial management and planning	Urban growth Unofficial dumps
Environment	Deforestation and land use Conservation of habitats, biodiversity, ecosystems and protected areas Greenhouse gases, ozone, aerosols and UV radiation

MEASURE Nationally Determined Contributions (NDC)