Satellite Data for Climate, Crisis and Disaster Risk Finance

Supported by

Implemented and Managed by
A technical partnership on Satellite Data and Risk Financing

Context

- **Problem Statement**: Need for new and robust information on a broad range of financial risks
- **Development Objective**: Improved financial resilience through comprehensive, timely, global information on climate, crisis and disaster risks

Key Features

- Timeline: 2021-2023
- World Bank FCI/CDRF-led
- 3 Components; 5+ partner Global Practices
- 10+ core Projects
- 30+ key stakeholders and technical partners
- Target Impact: 100 million beneficiaries

Planned Activities

Technical Assistance in support to operational engagements:

- Financial exposure mapping
- Climate risk monitoring
- Forecast and near real-time risk information
- Models and triggers for “new” risks
- Improved parametric insurance products
- Capacity Building on use of EO/Big Data, AI/ML

- Focus on integrating value-add risk information into WBG operations and products, across World Bank teams, with key stakeholders and partners
3 Highlights:
• Next Generation Drought Index Insurance
• Climate-related financial risks
• Financial resilience in MENA
Next-Generation Drought Index: Leveraging satellite data for drought insurance in Senegal

**Input Data Selection**
- Rainfall
- Water Balance
- Evapo-Transpiration
- Soil Moisture
- Temperature
- Vegetation Greenness
- Any other dataset or model

**Parametrization**
- What is the plant growth cycle and seasonality?
- How to combine indicators into single index?
- Any geographic pattern of drought? (grouping agricultural areas together)
- How vulnerable is the target population to drought?
- What are the reference/historical performance values to be considered?

Pre-processed drought datasets made available under single interface

Step-by-step parametrization and data integration to guide users through design process

**Transparent design process**: users are empowered to generate and visualize drought risk indices that best meet their expectations

Satellite-based soil moisture data provides unique insight into drought risk and through continuous, global and free coverage with the Copernicus constellation.
Source: ESA/SMAP
Next-Generation Drought Index:
Understanding Crop Exposure & Value-at-Risk globally

Leveraging state-of-the-art satellite technology for high-resolution crop mapping

Source: ESA/Copernicus
Next-Generation Drought Index: Translating satellite data into relevant risk information for financial risk management

**GATHERING DATA & INFORMATION**
- Gather data and information from a variety of sources including ground data (the season, the region, the types of crops grown, hazards), identify existing gaps

**SPATIAL ANALYSIS**
- Recognize the spatial scope of the program
- Utilize data and information from step 1 for analysis

**RISK MODELING**
- Design your program by utilizing the components in step 1 & 2 and weighting various indicators
- Identify/evaluate high impact indicators
- Evaluate sensitivity or nonsensitivity of program

**MONITORING & FEEDBACK**
Obtain program feedback from the ground and users after implementation of program

**OPERATIONALIZATION**
- Detail operational plan such as distribution of payout
- Use feedback from users for an effective service plan
Tracking climate-related financial risks: Leveraging global coverage of critical climate indicators to inform on environmental impact of investments

Essential Climate Variables
Source: Global Climate Observing System
Tracking climate-related financial risks: Understanding financial sector’s exposure to climate

Source: IceEye
Mapping Financial Exposure in MENA

Leveraging high-resolution satellite data and AI/ML

EO derived urban blocks manual mapping over Rabat/Sale, Morocco
Source: Pléiades © CNES 2019, distribution Airbus DS

Total economic value of properties per EO based building footprint
Source: SERTIT/WBG
Supporting rapid financial response in Morocco

Supporting fully integrated response through disaster risk management and financial response
Key messages

• **Gap between resilience agenda/demand and technology/supply:**
  - Need for critical information on risks: global, timely, operational
  - Latest satellite technology / Copernicus: enabling new applications in crisis risk management and financial resilience

• **Bridging the gap: World Bank/ESA joint pipeline of activities**
  at the forefront of innovation on financial resilience against climate, crisis and disaster risks, for better protected populations and economies globally. Which does require capacity building for clients and sustainable integration/mainstreaming into World Bank activities over time.