GEOGLAM
GLOBAL AGRICULTURAL MONITORING

GEO GROUP ON EARTH OBSERVATIONS

G20 Global Agriculture Monitoring Initiative

GEOGLAM

Earth observation for Food Security

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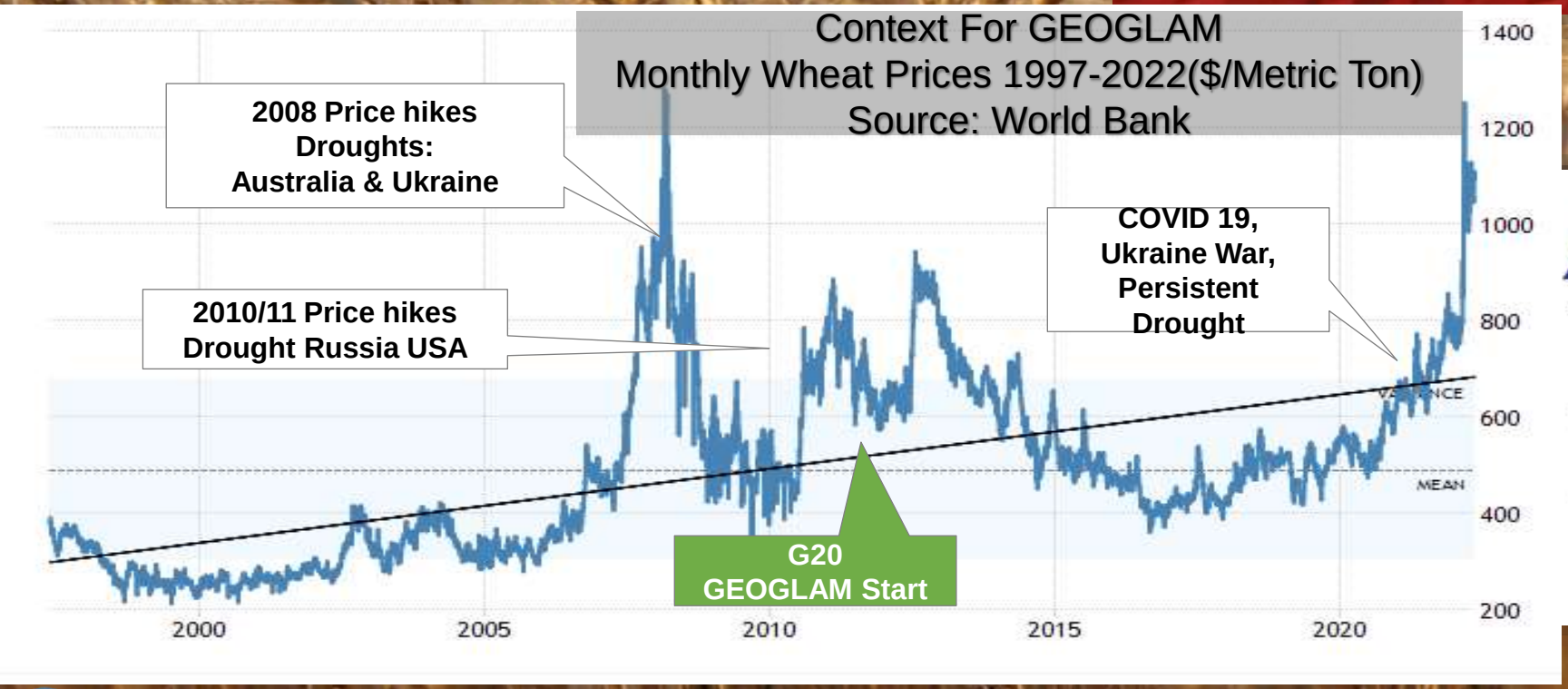
Outline

- GEOGLAM Overview
- Agriculture Monitoring
  - ASAP - JRC
  - WorldCereal - VITO
  - Sen4Stats - FAO
  - CropWatch - AIRCAS
- Capacity Development
- Research & Development
- Discussion / Q&A

GEOGLAM Launched by the G20 Agriculture Ministers in 2011



G20 Final Declaration

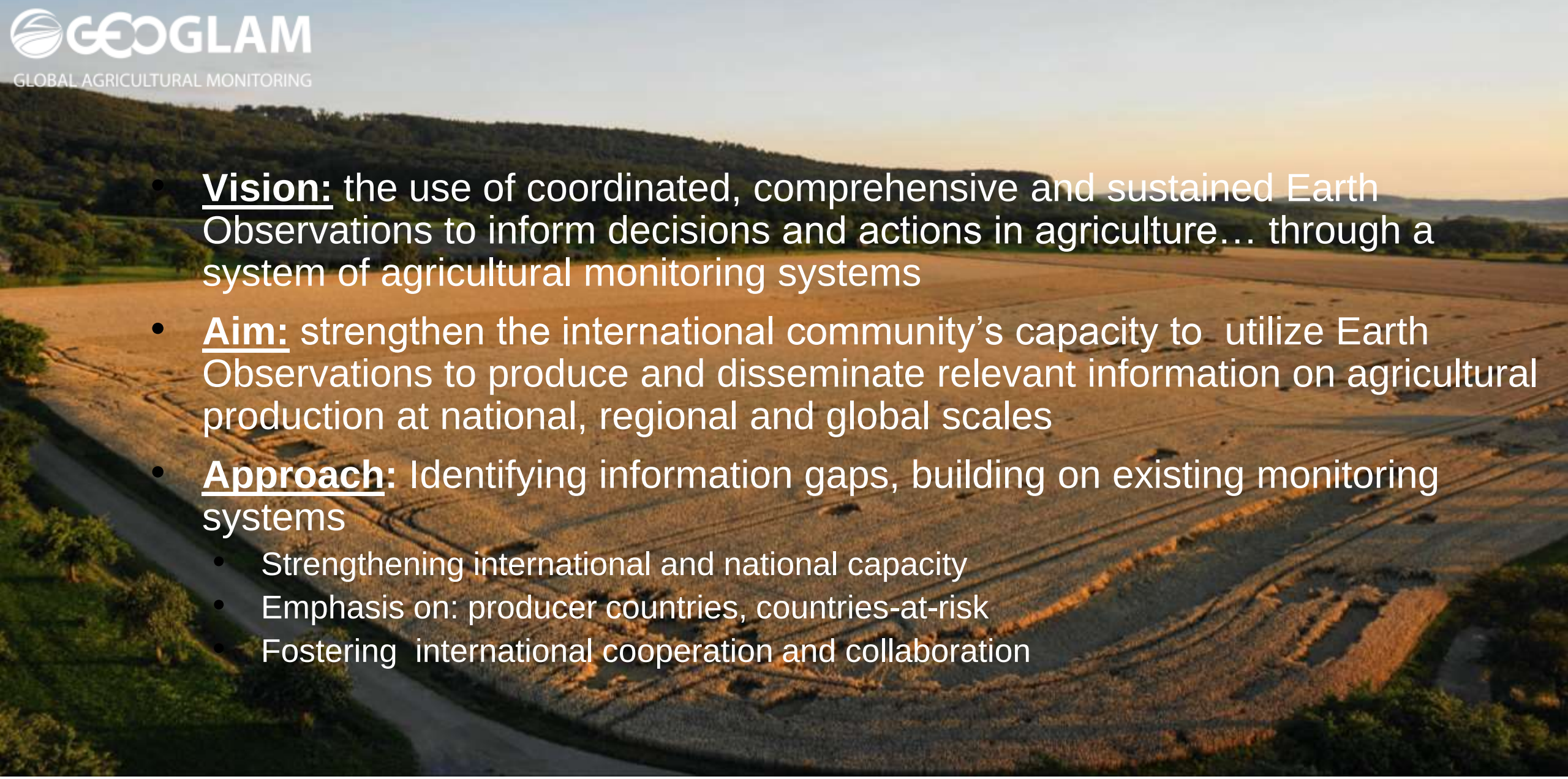
44. We commit to improve market information and transparency in order to make international markets for agricultural commodities more effective. To that end, we launched:

- The "Agricultural Market Information System" (AMIS) in Rome on September 15, 2011, to improve information on markets ...;
- The **"Global Agricultural Geo-monitoring Initiative" (GEO-GLAM)** in Geneva on September 22-23, 2011. This initiative will coordinate satellite monitoring observation systems in different regions of the world in order to enhance crop production projections and weather forecasting data.

Objective:

- Support markets and informing early warning for proactive response to emerging food emergencies
  - Increase market transparency
  - Enhance Early Warning
  - Improve food security

By producing and disseminating relevant, timely, and actionable EO-based information on agricultural conditions at national, regional, and global scales



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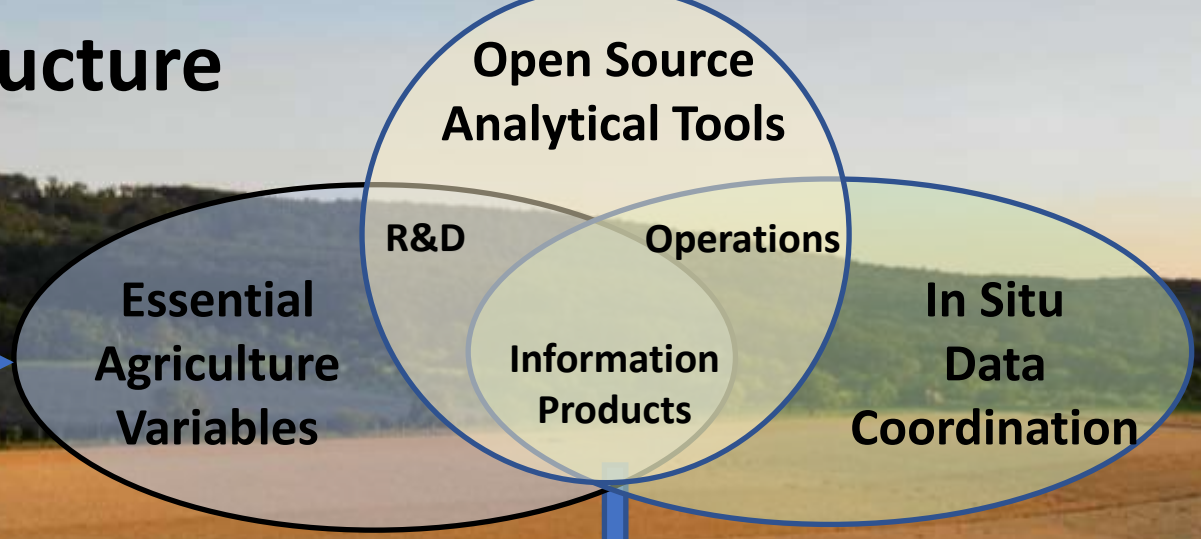
- **Vision:** the use of coordinated, comprehensive and sustained Earth Observations to inform decisions and actions in agriculture… through a system of agricultural monitoring systems
- **Aim:** strengthen the international community's capacity to utilize Earth Observations to produce and disseminate relevant information on agricultural production at national, regional and global scales
- **Approach:** Identifying information gaps, building on existing monitoring systems
  - Strengthening international and national capacity
  - Emphasis on: producer countries, countries-at-risk
  - Fostering international cooperation and collaboration

Thematic Structure



Ongoing Operations – Continue and Enhance:

- AMIS Crop Monitor
- CM4 Early Warning
- GEOGLAM Knowledge Hub
- JECAM

Needs

Capacity (co) Development Guidance
(National and International)

Early Warning & Food Security
Crop monitor for early warning
- Seasonal Forecasts
- Special Reports

Market Information
Agricultural Markets Information System (AMIS)
- Commodity Crop Conditions
- Seasonal Forecasts

Food Security

Adaptation
National Adaptation Plans (NAP)
UNFCCC Supplemental
NAP Guidance

Mitigation
Global Stocktake (GST)
Nationally Determined Contributions (NDCs)
AFOLU Roadmap

Climate

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Earth Observations for Food Security

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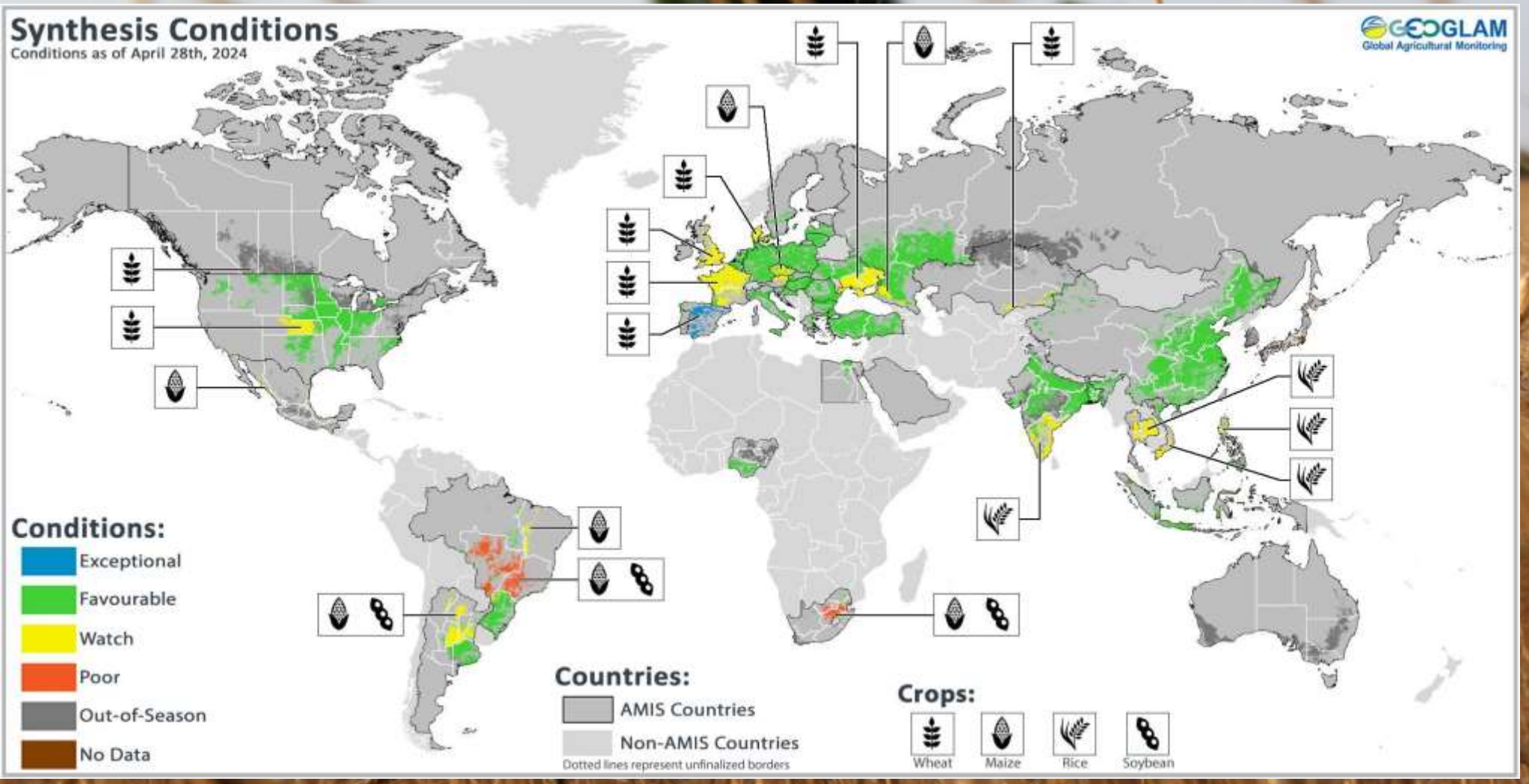
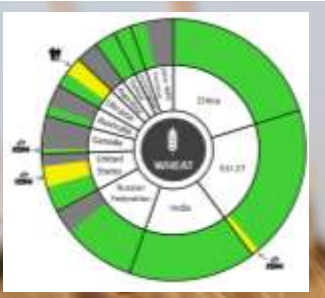
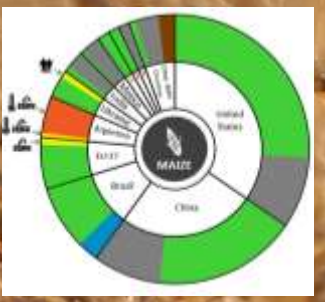
The Crop Monitor for AMIS

Flagship Initiative - Launched 2013

- Covers Wheat, Maize, Soybean, and Rice across multiple seasons
- Covering between 80-95% of global crop production (main production/export countries)
- Provision of timely and transparent consensus based monthly crop condition assessments in the primary agricultural production countries
- Over 40 contributing partners
- Short and mid-term weather forecasts in countries/regions of interest
- Monthly reports







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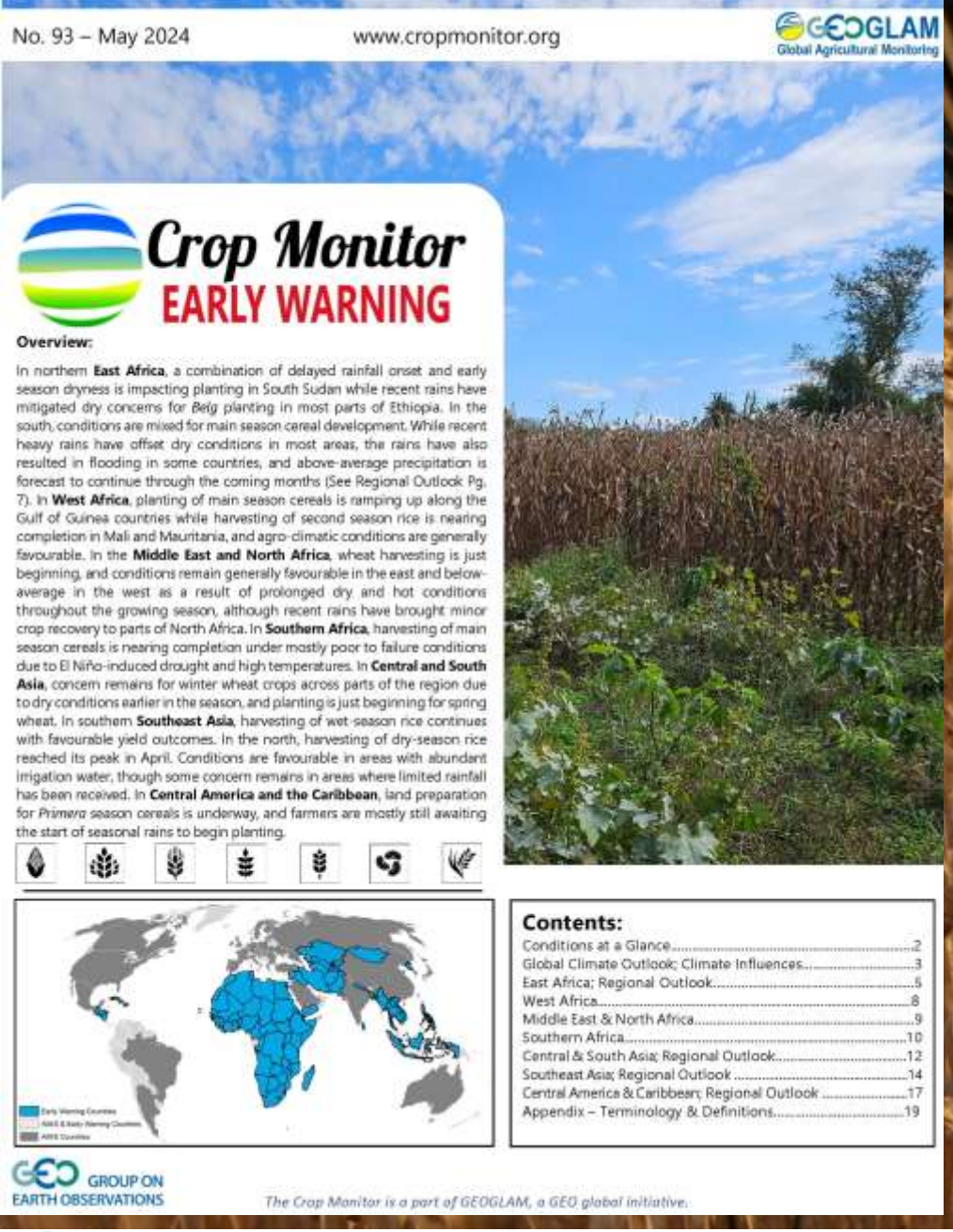
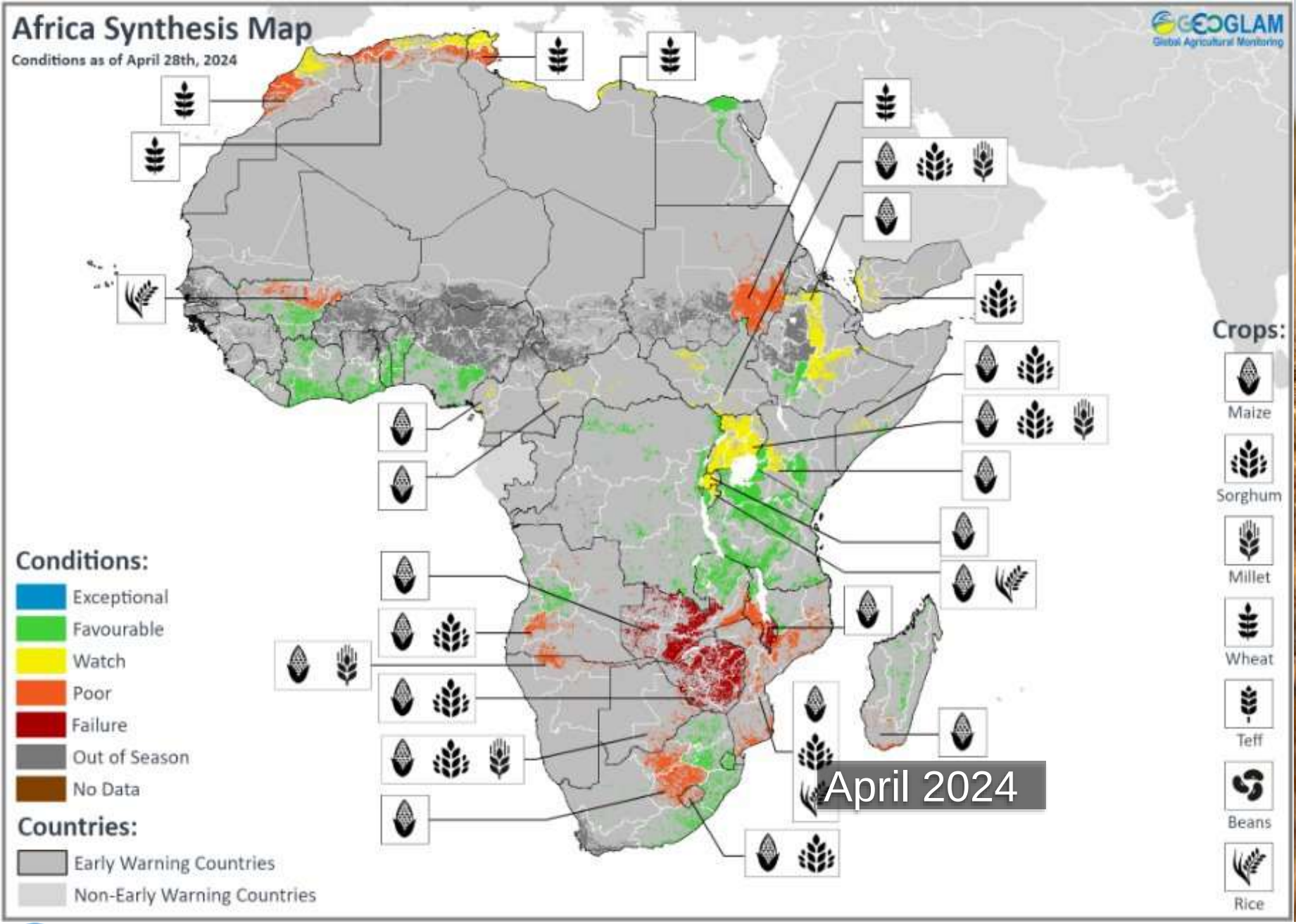


The Crop Monitor for Early Warning

Launched 2016

- Covers Maize, Sorghum, Millet, Wheat, Beans, Teff, and Rice across multiple seasons
- Focusing on the countries at risk of famine
- Reflecting an international consensus
- Short and mid-term weather forecasts and seasonal forecast alerts in countries/regions of interest
- Enhancing data and building capacity in support of food security decisions
- Monthly publications



Partnering with the major international agriculture and food security monitoring organizations

ARC • LNR
Asia-RiCE
Crop Estimation and Monitoring
FEWS NET
HARVEST
IGAD
ICPAC
WFP
FAO
GMES AND AFRICA
Climate Hazards Center
UC SANTA BARBARA
CSIR

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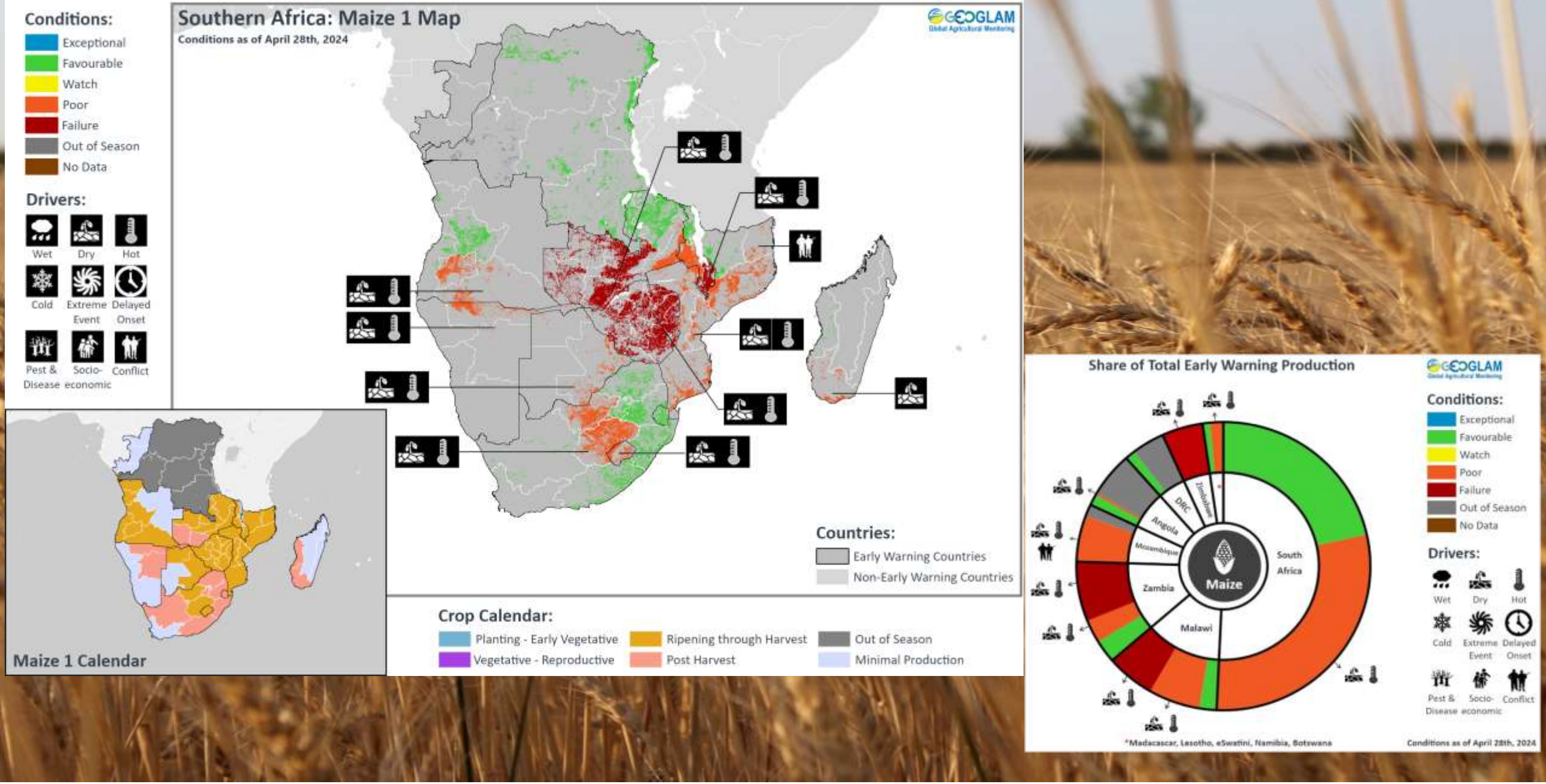

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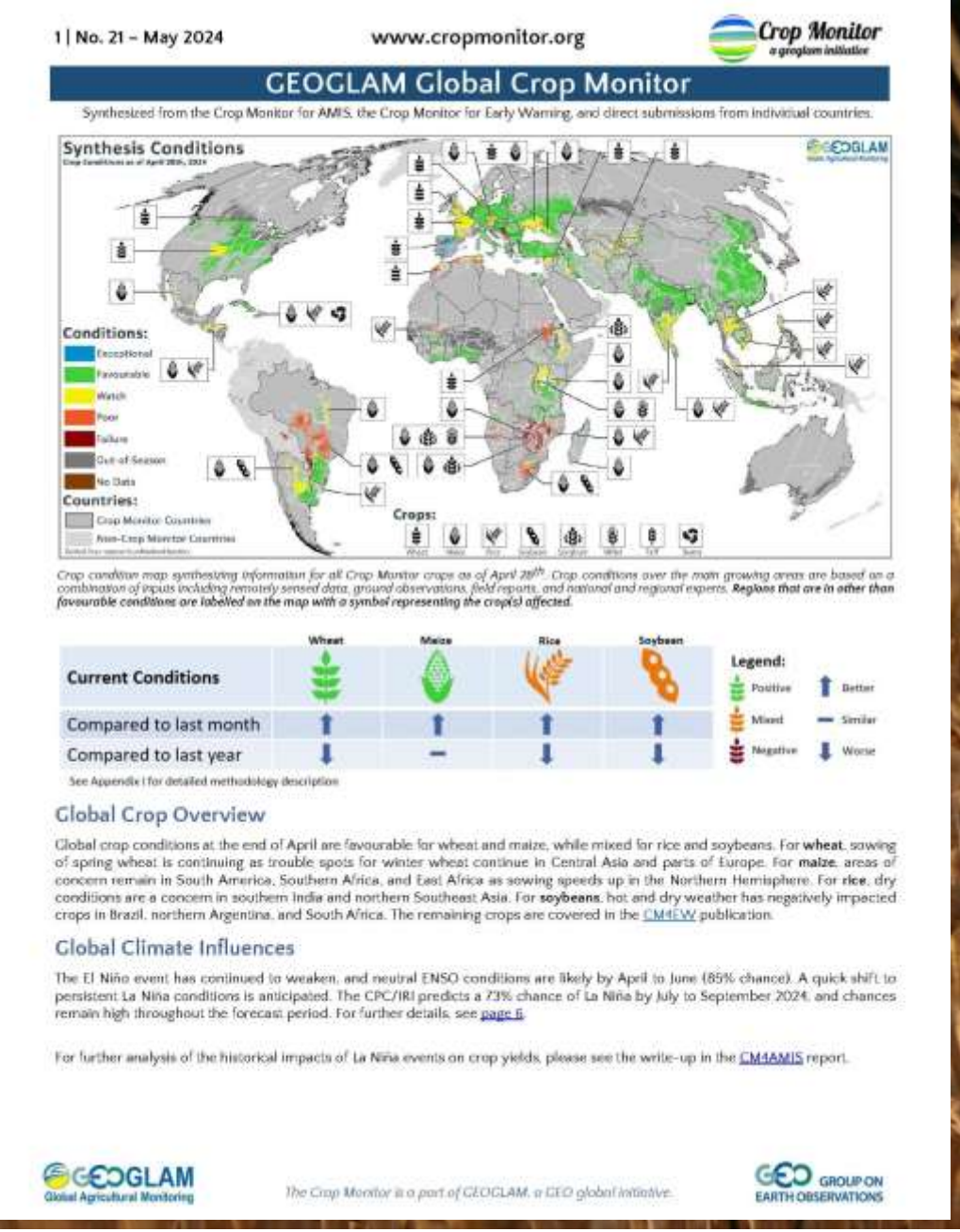


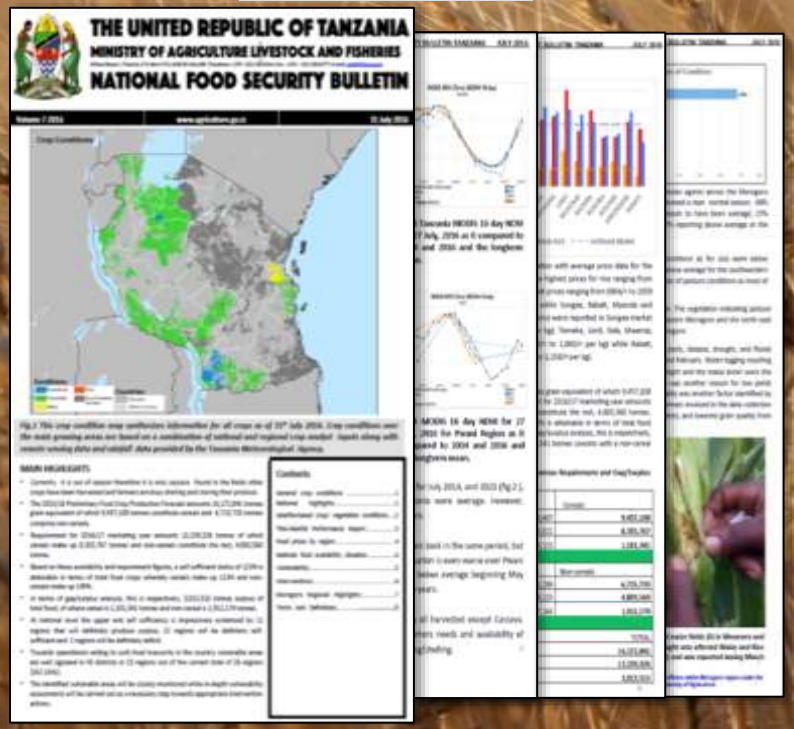
The Global Crop Monitor

Launched 2022

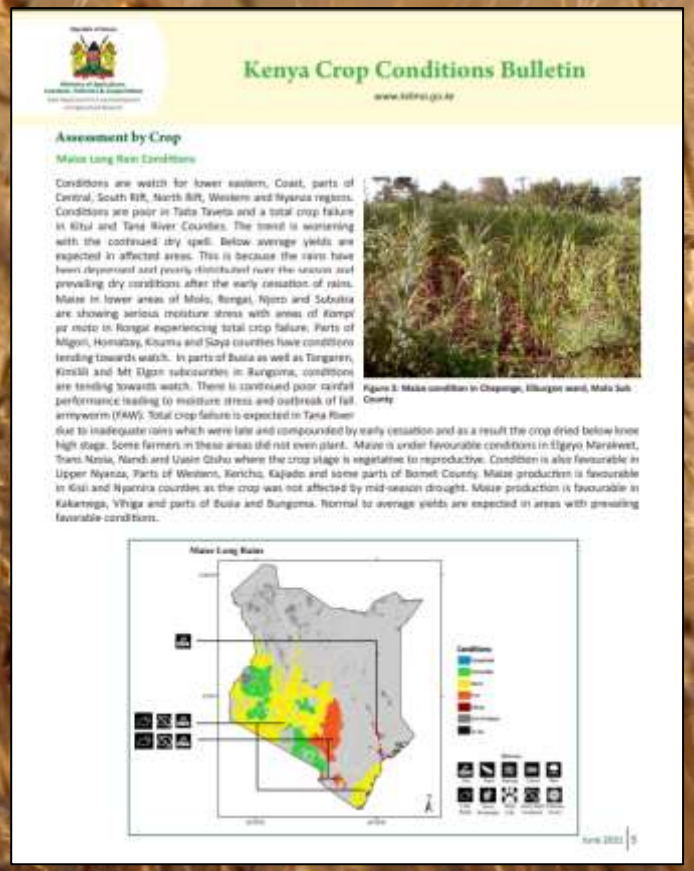
- A synthesis of both the Crop Monitor for AMIS and Crop Monitor for Early Warning

Co-Development of National Monitoring Systems

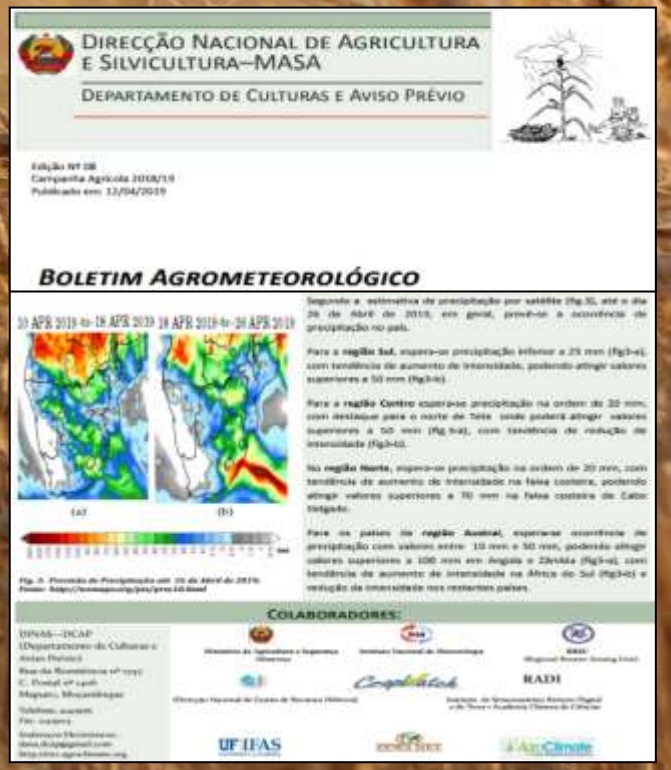
Tanzania



Kenya



Mozambique



8 Countries, 1 Region and Counting

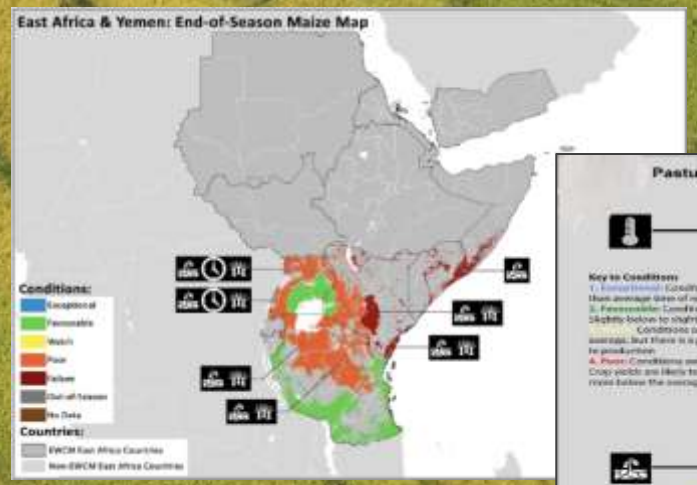
National Impact Stories: Food Security - Uganda

Karamoja Uganda, 2017

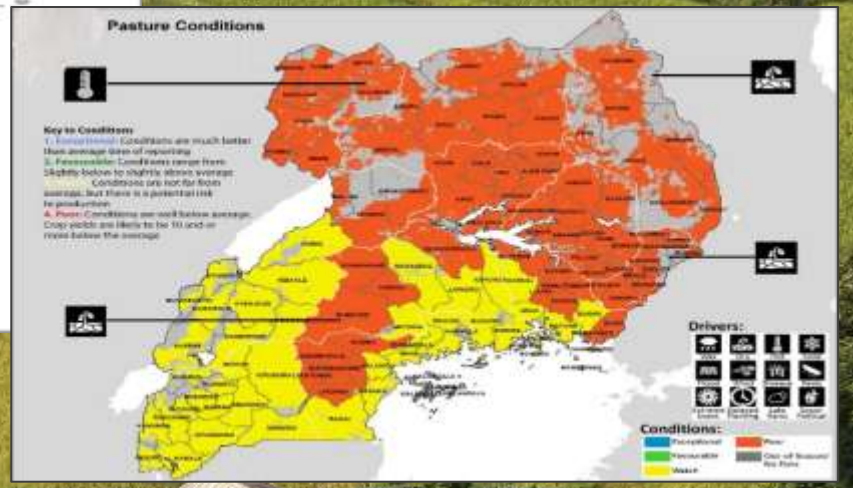
- GEOGLAM worked with the Ugandan Office of the Prime Minister to develop a crop monitor in 2016
- In 2017 the crop monitor provided **3 months** early warning of a likely crop failure due to drought, time to proactively **mitigate loss and damage**
- Monitoring triggered the Disaster Risk Financing (DRF) fund to scale-up public works projects in Karamoja, off-setting agricultural losses

End result: USD 2.6 million saved, 150k people helped

Crop Monitor
August 2017 for Uganda



Pasture Conditions



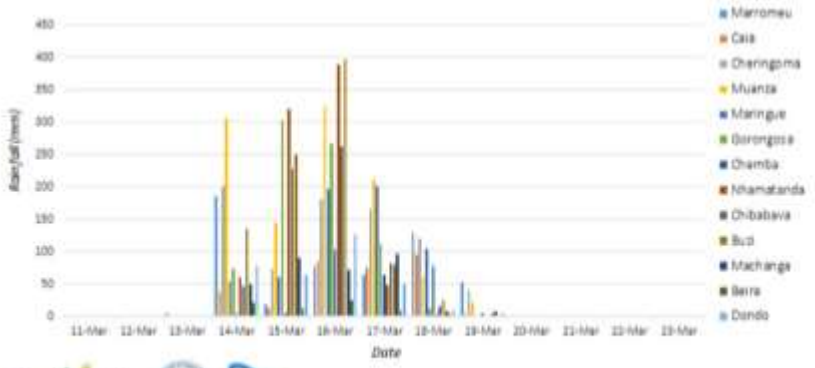
"In the past we always reacted to crop failure, spending billions of shillings to provide food aid in the region.
2017 was the first time we acted proactively because we had clear evidence from satellite data very early in the season"

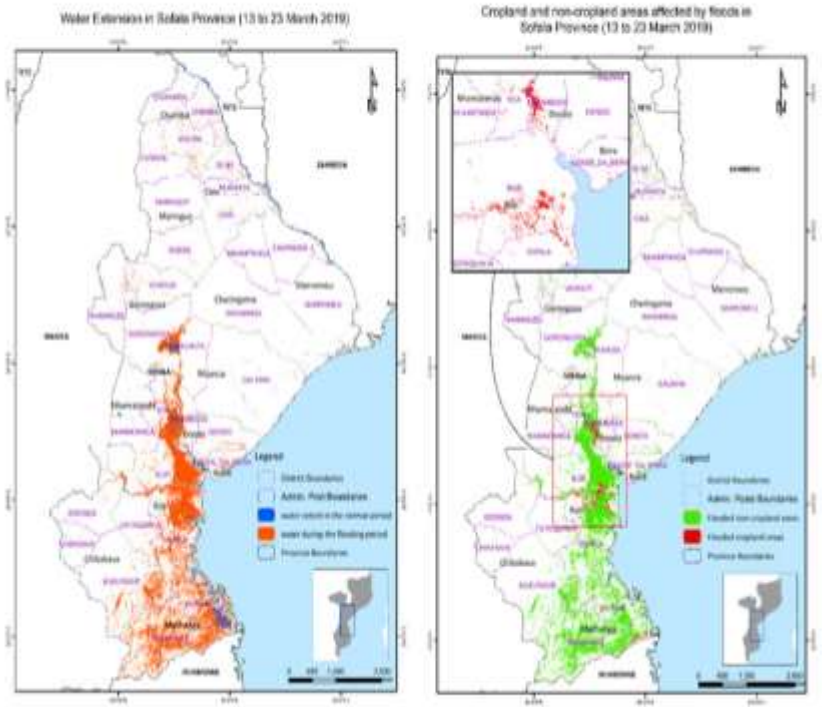
Commissioner, Office of the Prime Minister (OPM)

National Impact Stories: Customized CropWatch - Mozambique

Monitoring Flooded Cropland

- Daily rainfall for each district was calculated and flooded areas were mapped using Sentinel 1 radar data
- The information was used to identify flooded cropland post Idai, from early March to April
- Analysis generated statistical data to support food security response to the flooding





- High resolution crop type, phenology in Portuguese
- Enabled the leapfrog development of agricultural monitoring in Mozambique
- Proposed as the best rural solution by IFAD

How it is done

1. CROP CONDITIONS ASSESSMENT

The Crop Monitor approach brings together international experts from national, regional, and global monitoring systems.

2. OPEN DISCUSSION

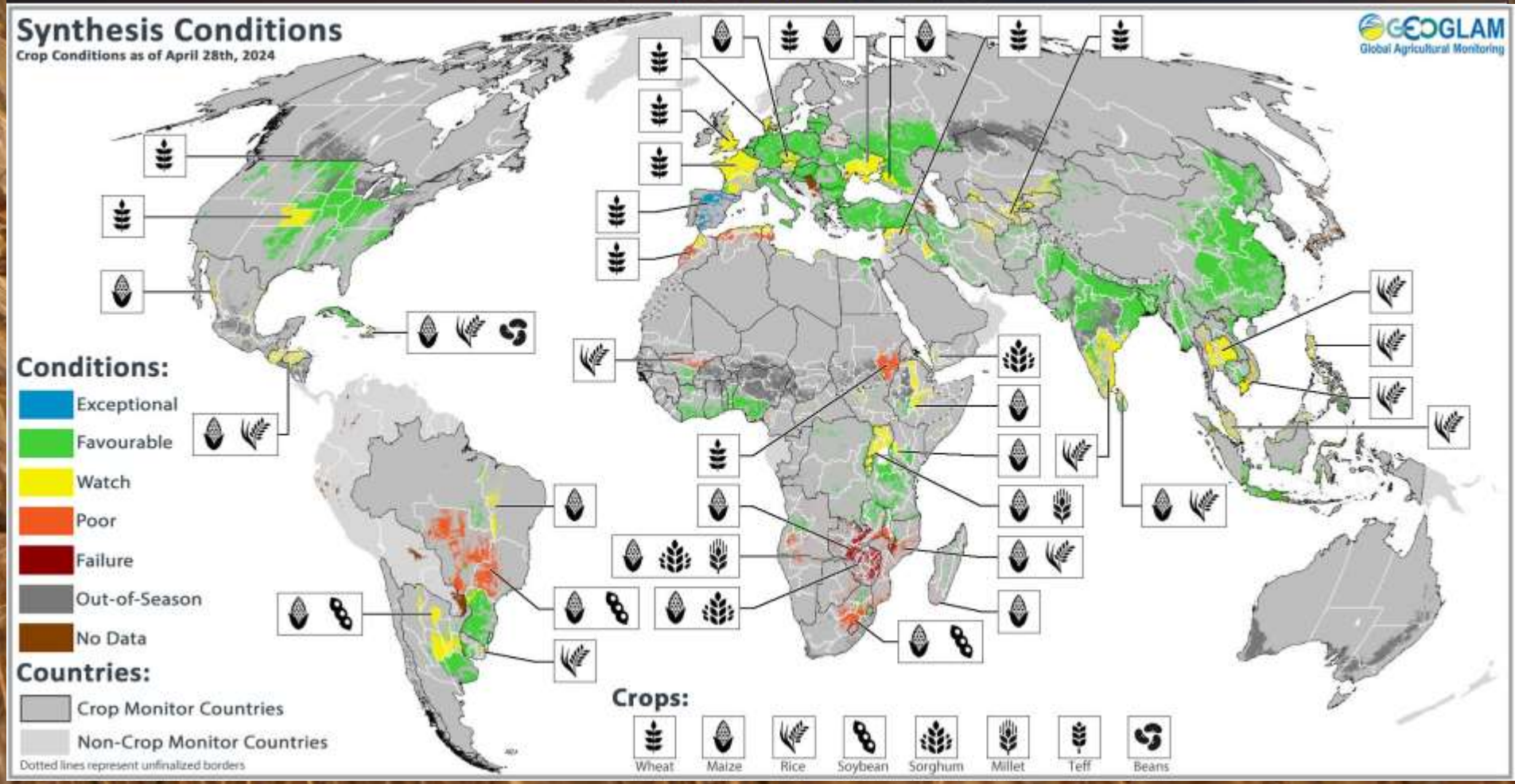
Partners discuss issues and discrepancies in the collection of all crop condition assessments.

3. SUMMARY REPORT

Once approved, the draft is readied for publication in the Crop Monitor for AMIS bulletin, or Crop Monitor for Early Warning bulletin.

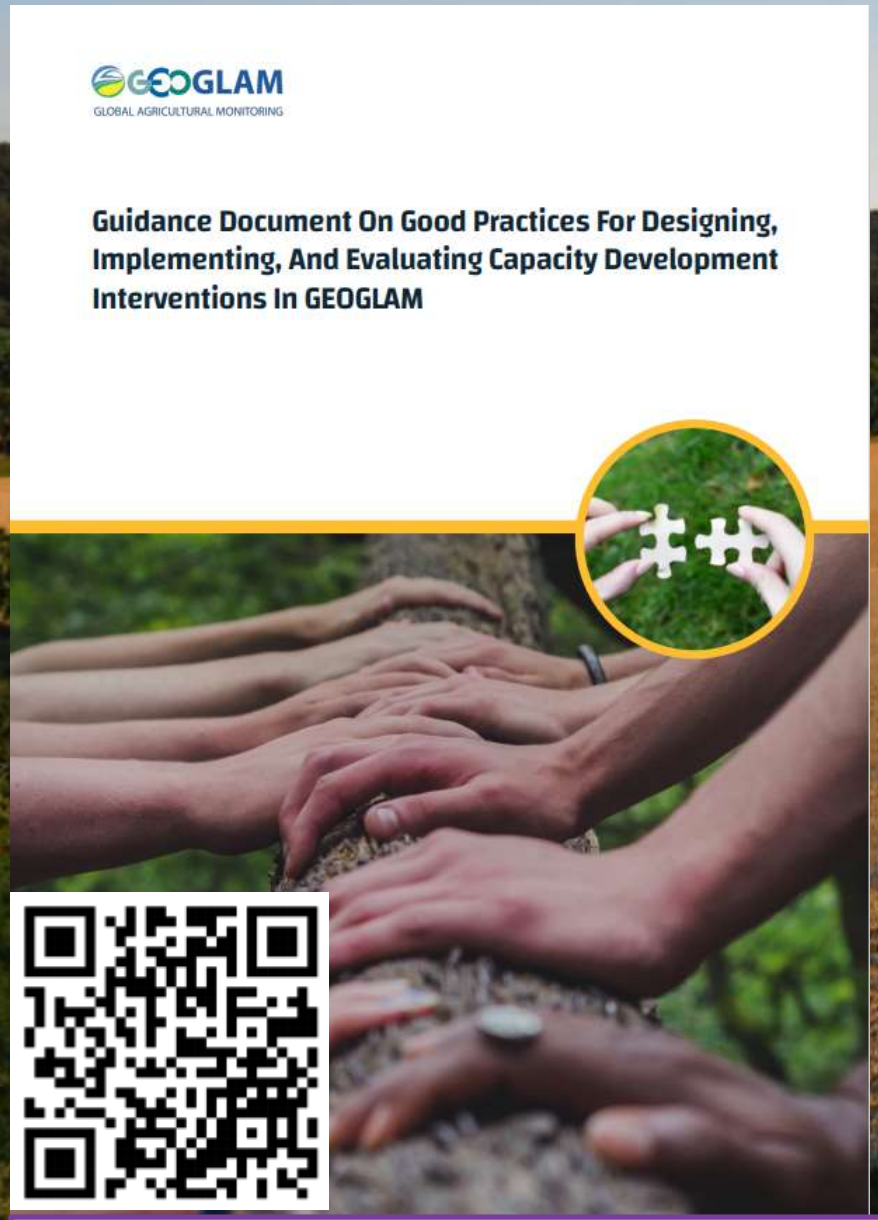
OPEN, TIMELY, AND SCIENCE-DRIVEN INFORMATION ON CROP CONDITIONS IN SUPPORT OF MARKET TRANSPARENCY AND EARLY WARNING OF PRODUCTION SHORTFALLS.

LATEST CONDITIONS PUBLISHED IN OUR REPORTS



Capacity Development & Resources

Developing the institutional capacity to use EO data



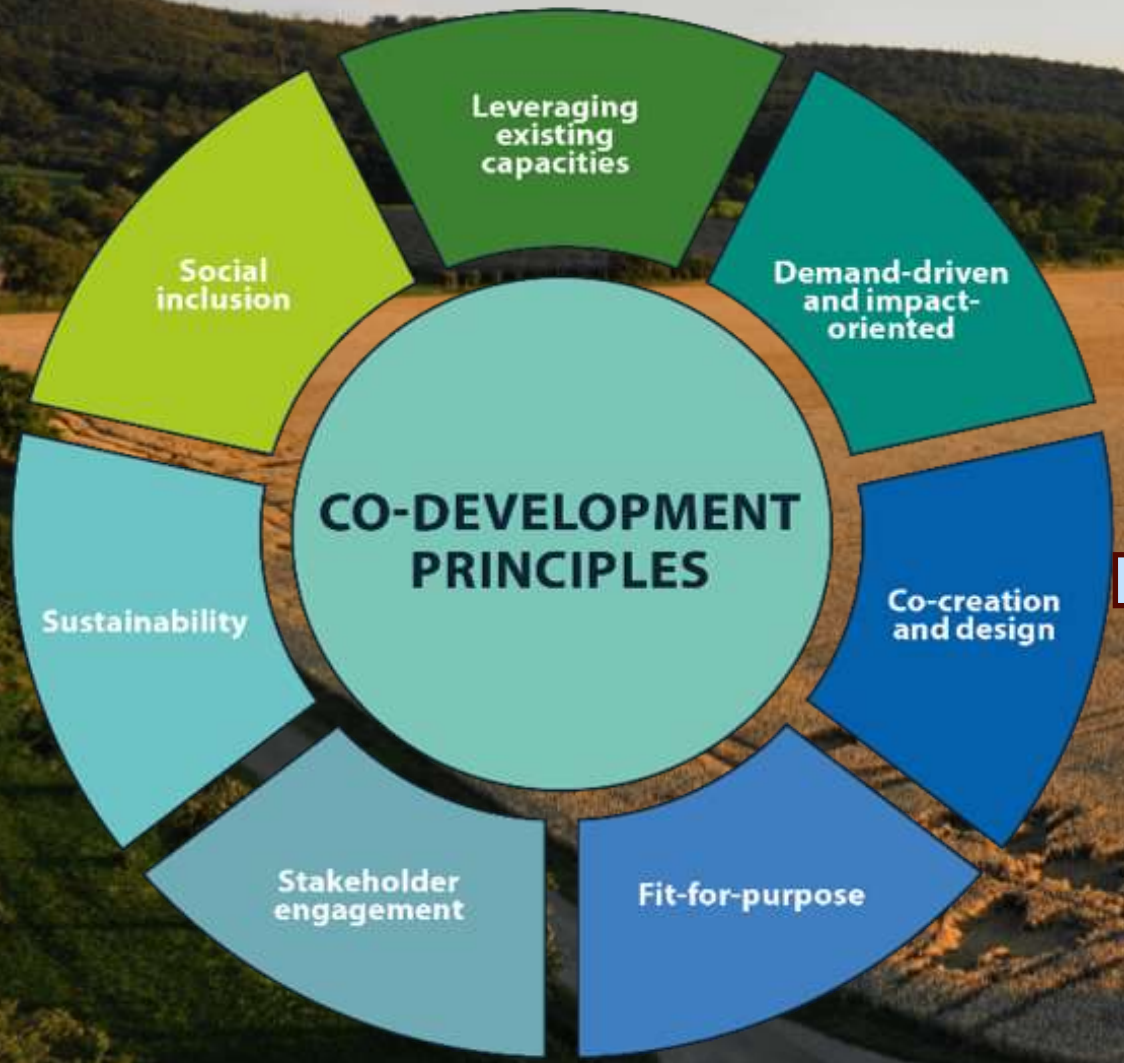
GEOGLAM strengthens its partners' operational monitoring systems which use EO to empower science-based decision making, action taking, and policy for food security.

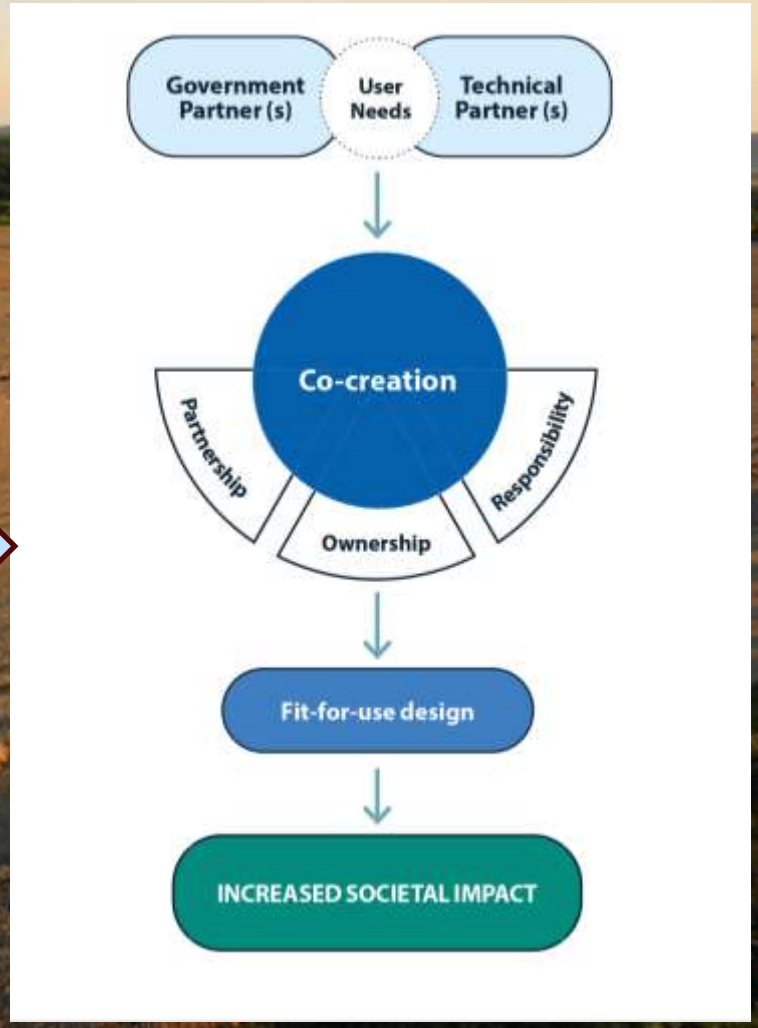
https://www.old.earthobservations.org/documents/geoglam/GEOGLAM%20Capacity%20Development%20Guidance%20Document.pdf

Strengthening capacity at scale...

- Fully utilizing/leveraging EO capabilities in agriculture-related decision-making
  - e.g. Reading and Interpreting Ready EO information and products
- Adapting organizational workflows to exploit or improve the use of EO in agriculture monitoring
  - Identify the best EO Data Applications to use according to your needs and existing resources
  - Develop ground data collection applications and workflows (where none exist)
  - Integrate and adapt workflows for RS and in-situ data

Guiding Principles

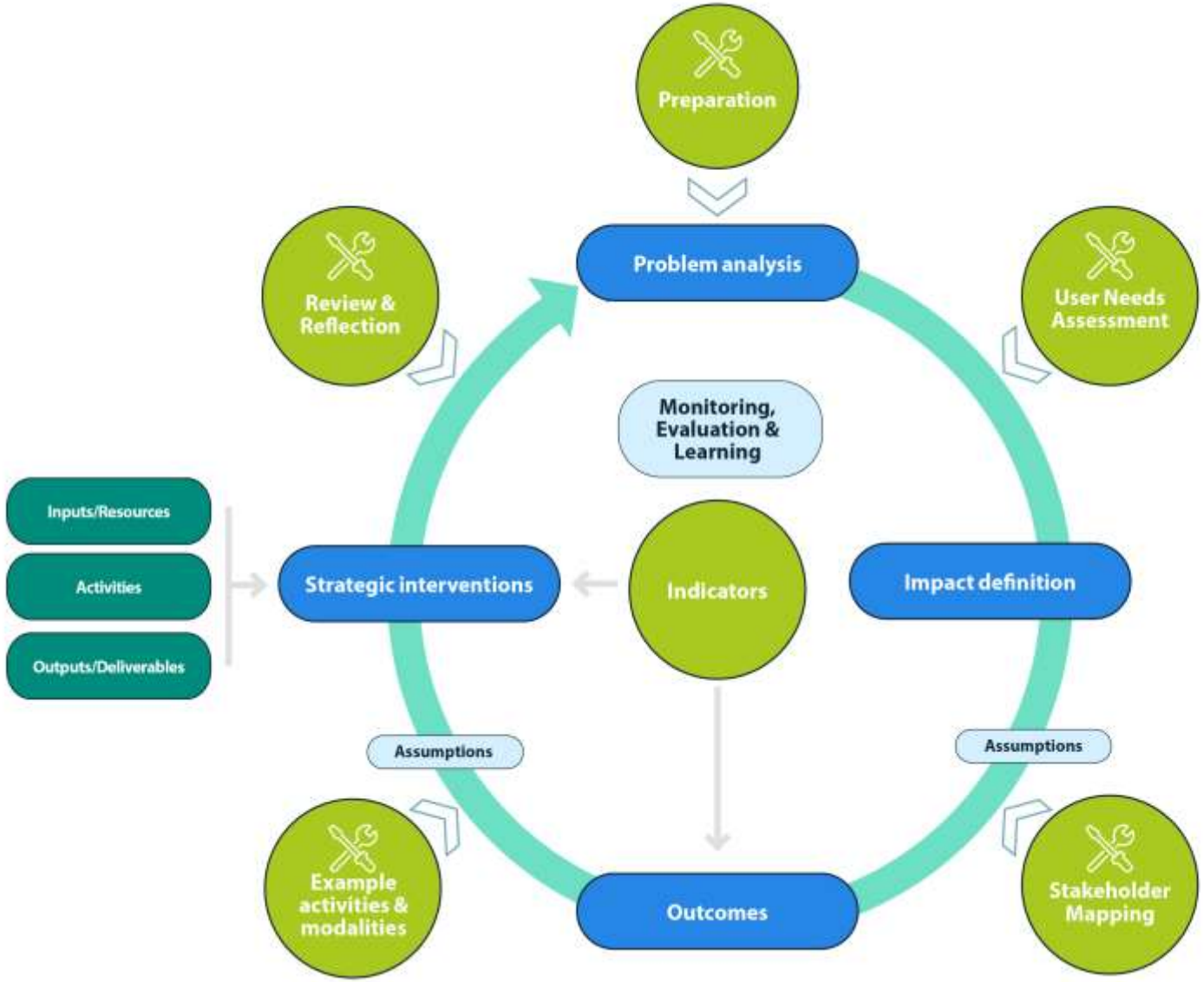




Designing your Impact and Theory of Change

- Starts with a **problem analysis** and then develops a **strategic pathway** towards the desired change/impact

- **Tools** to design, implement, and monitor a project



National and regional case studies in Africa

National crop estimation system In South Africa

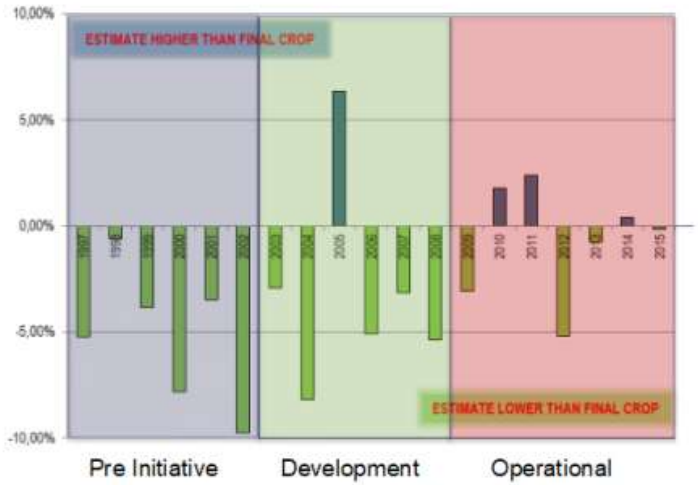


Figure 8 - Years in which the crop was estimated to be above/below actual. Note the decrease in both variance and number of above/below estimates once the system became operational (Source: E du Preeze, SIQ).

The disaster risk financing program In Uganda

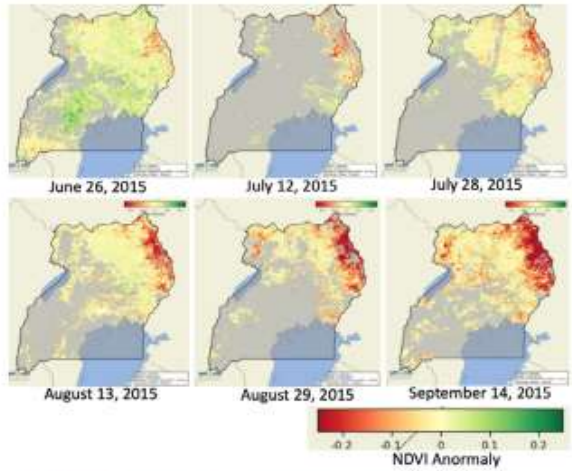


Figure 9 - Crop conditions across Uganda, showing deterioration of crop conditions (represented by NDVI) in Karamoja (top right corner) through time (June to September 2015); Source: GLAM

CropWatch for enhancing food security governance in Mozambique

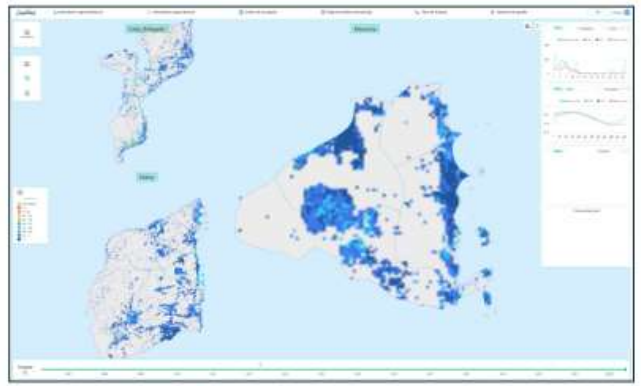


Figure 13 - Cropwatch For Mozambique (Left); Cropland Data At 10m Resolution (Right)

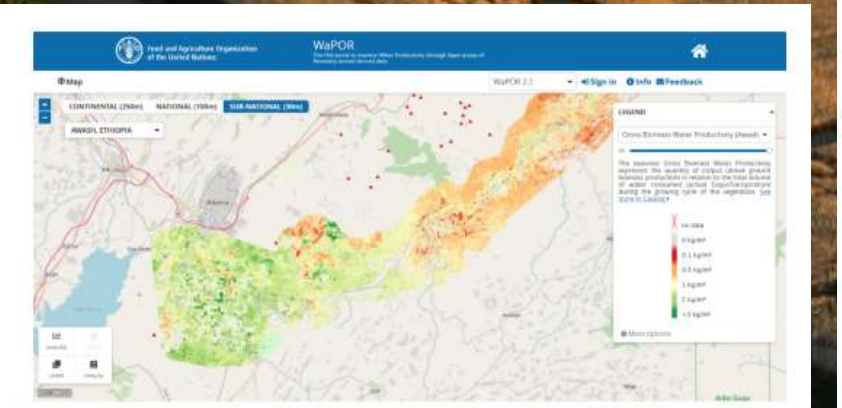


Figure 14 - Wapor Data Base At Level III In The Awash Region Of Ethiopia, Gross Biomass Water Productivity

Development of an online agricultural water accounting platform

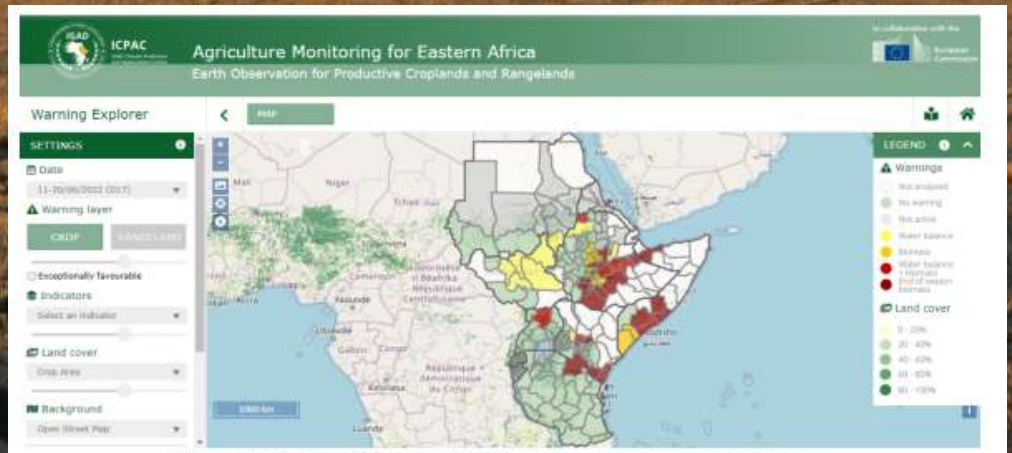


Figure 11 - Interface Of The East Africa Agriculture Warning Explorer Platform

Development of the agriculture watch platform for East Africa

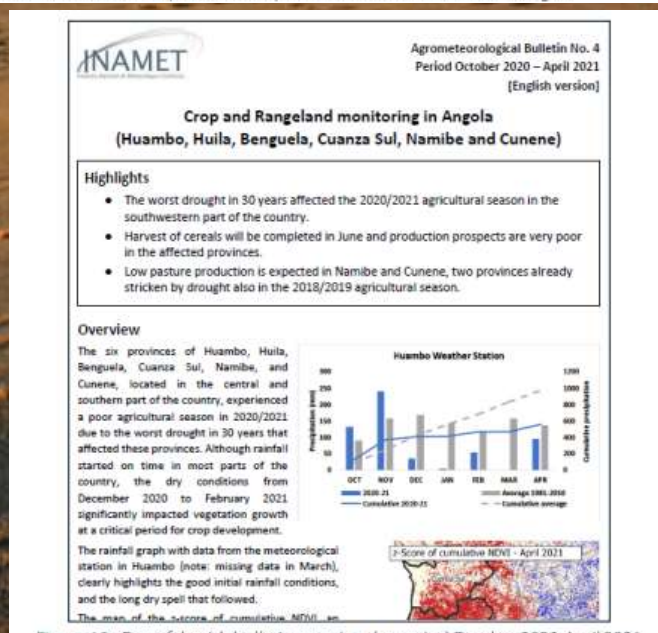


Figure 12 - Part of the 4th bulletin covering the period October 2020-April 2021

Capacity development to produce the agro-meteorological bulletin for Angola

UNFCCC NAP Central

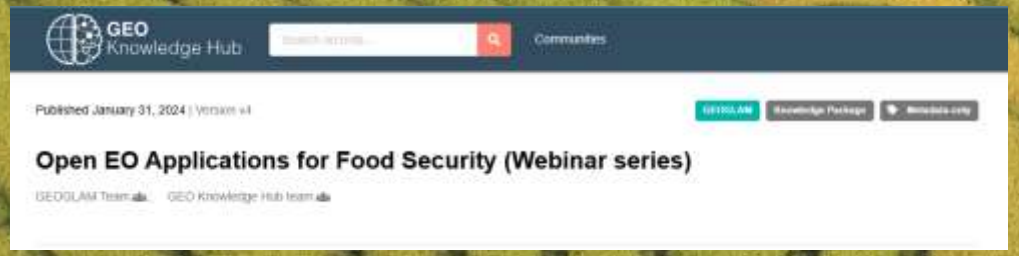
Laying the Groundwork and addressing gaps	A.1. Initiating the NAP process
	A.2.: Stocktaking
	A.3.: Addressing Capacity Gaps
	A.4.: Development Needs and Climate Vulnerabilities
Preparatory elements	B.1. Analysing Current & Future Climate
	B.2. Assessing Climate Vulnerabilities and Adaptation Options
	B.3. Review and Appraisal of Options
	B.4. Compiling, Communicating NAPs
	B.5.Integrating NAP into Development, Planning
Implementation strategies	C.1. Prioritizing CCA in National Planning
	C.2. Long-term Implementation Strategy
	C.3. Enhancing Capacity for Planning, Implementation
	C.4. Promoting Coordination and Synergy
Reporting, Monitoring, Review	D.1. Monitoring the NAP Process
	D.2. Assess Progress, Effectiveness, Gaps
	D.3. Iteratively Update NAPs
	D.4. Outreach and Reporting on Progress

Focus on technical and institutional resources required for the successful implementation of NAPs

Key steps needed to establish a National Agriculture Monitoring System based on Earth Observations:

1. Establishing the institutional framework
2. Establishing the technical framework
3. Accessing capacity (co-)development
4. Accessing financial support

Additional Capacity Resources



- 1. Focus on Crop Monitor (October 25, 2023)
- 2. Focus on ASAP (November 16, 2023)
- 3. Focus on GLAM (January 24, 2024)
- 4. Focus on CropWatch (January 31, 2024)
- 5. Capacity (Co)Development – February 28, 2024

https://gkhub.earthobservations.org/packages/qb27f-93m16

Workshops

Coming soon...

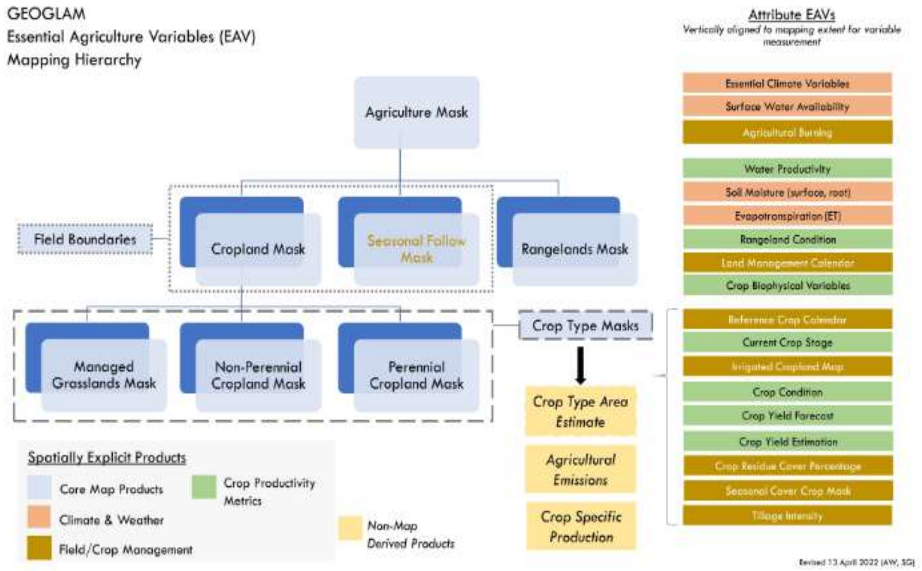
Webinar: Project Proposal Development – June 7, 2024

Research and Development

Essential Agriculture Variables & Agricultural Indicators for GEOGLAM

Essential Agricultural Variables for GEOGLAM are Earth observation-based "building blocks" that in combination with one another or with other non-EO information provide insight into the "GEOGLAM Agricultural Indicators" – which themselves provide actionable information on the state, change, and forecast of agricultural land use and productivity (Figure 1). GEOGLAM covers land devoted to agriculture, which is defined as the systematic and controlled use of land and livestock to produce food, fiber, and fuel. This includes croplands, rangelands, and short-term fallow lands.

The EAVs can be measured or inferred from satellite data, and are supported through field data for calibration and validation. They support the core work of GEOGLAM and its constituent communities, including supporting national and global policy frameworks (e.g. G20 Action Plan and UN Sustainable Development Goals).



Full EAV Table

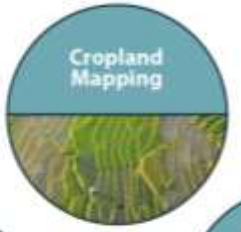
EO Data Requirements

EAV Product Priorities and Status Updates

Monitoring and Measuring Agriculture Land Use & Trends Using Earth Observations

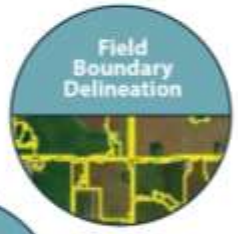
- Better information means better decisions across the value chain
- Improving information from the international to national and farm levels
- Driven by Open Science and Open Data

> Livestock production potential
> State and changes in land used for livestock production
> Early warning for food security



> Food production potential
> State and changes in land used for food production

> Crop production potential
> State and changes in land used for food production
> Farm support programs
> Greenhouse gas reporting



> Food production estimation
> State and changes in land used for food production
> Farm management and support

> Early warning for food security
> Crop pest and disease surveillance
> Inform markets and trade
> Targeting mitigation measures

> Early warning for food security
> Inform markets, trade and humanitarian activities
> Targeting potential mitigation measures

Earth Observation Application

> Policy Application

GEOGLAM In Situ Data Coordination

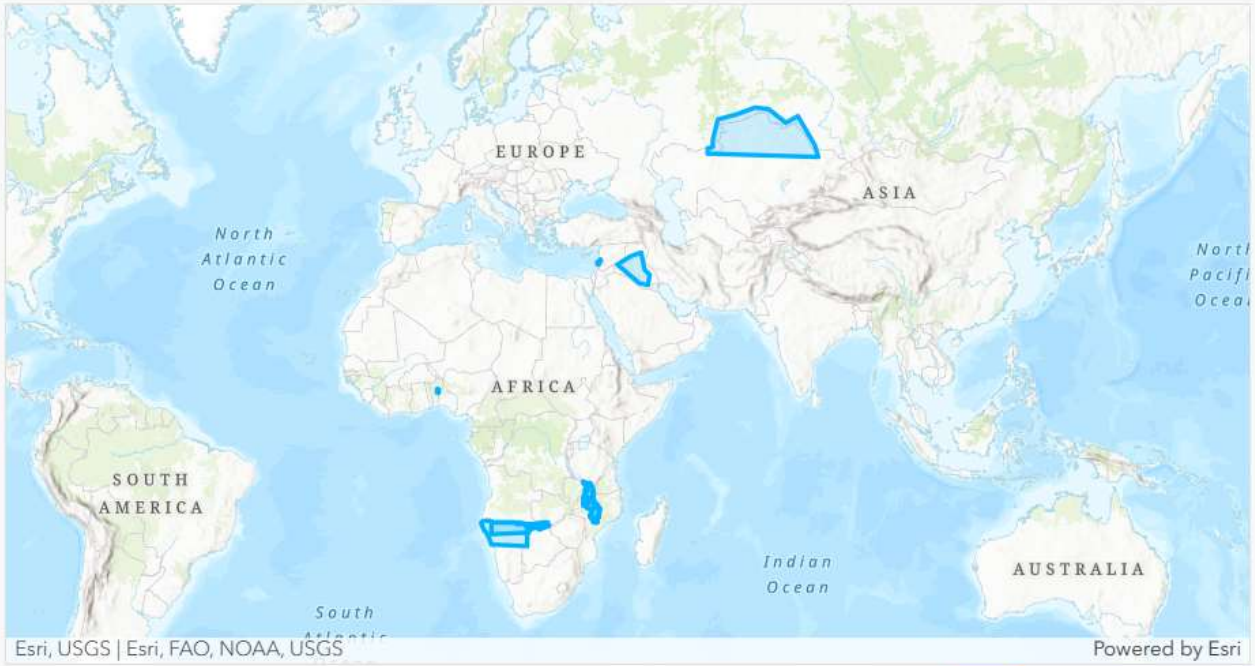
- Why :
  - In situ is a growing priority for many institutions and funders
  - Many activities across the EO for agriculture community focus on some aspect of in situ data
  - Some incremental coordination leveraging our existing activities could have a major impact at relatively low cost

“the whole can be greater than the sum of the parts”

Perhaps the last frontier to bridge:
Open access to high quality, well managed in situ data for training and validation

In-situ Collections

Esther Makabe
emakabe_geosec



Essential Agriculture

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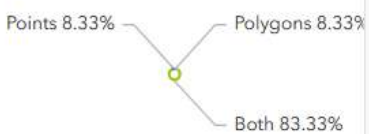
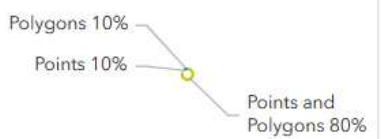
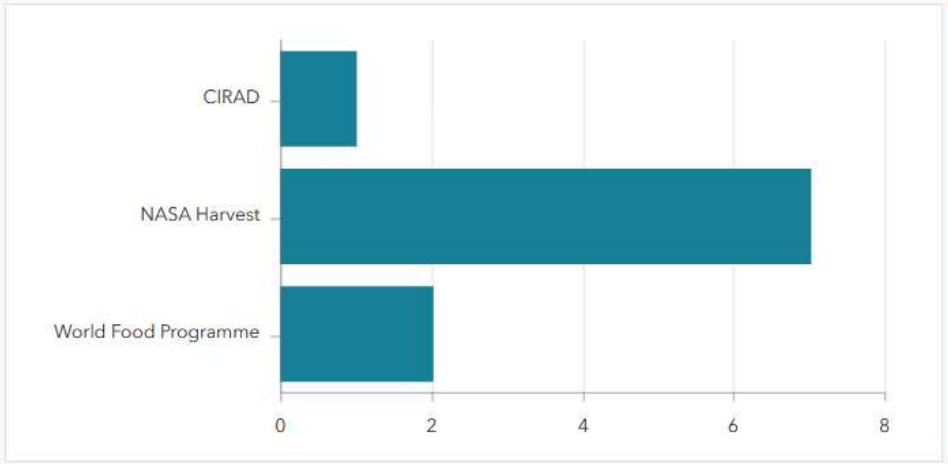
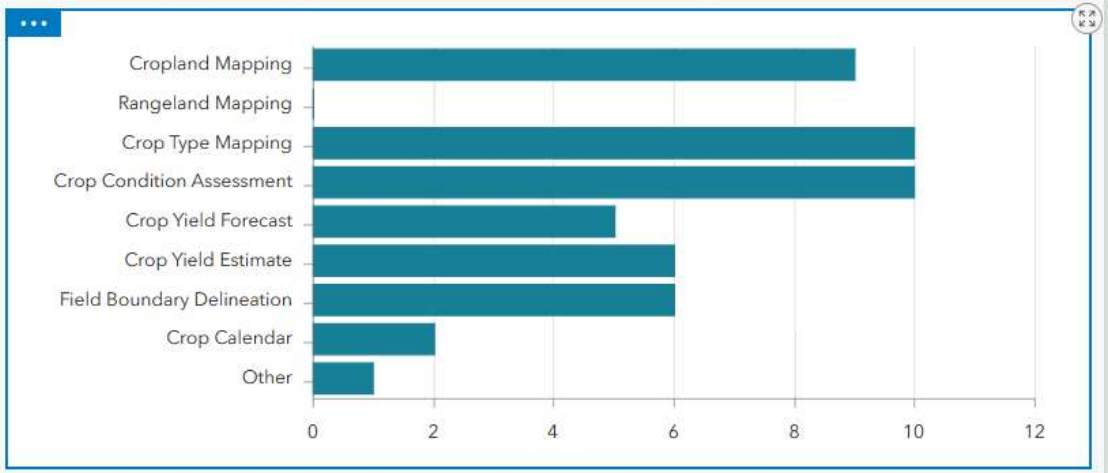
Instruments Used









JECAM
Joint Experiment for Crop Assessment and Monitoring

GROUP ON EARTH OBSERVATIONS

- Long term well established **global network** of ag. sites often selected for new EO mission priority acquisition
- **Collaborative partnership** of researchers eager to work together

Why Join?

- ✓ **Fast learning curve** based on **collaborative research** across JECAM network
- ✓ **Brand visibility** relevant to site managers and space agencies
- ✓ Unique coverage of the **diversity of agricultural system**

Global Network of Voluntary Research Sites

Concluding Thoughts ...

- Challenges for Food Security will only increase
  - Climate Extremes
  - Pest and disease
  - Conflict

UNFCCC NAP Central

UNDRR United Nations Office for Disaster Risk Reduction

… but so are our collective efforts

"the whole can be greater than the sum of the parts"

Contact us

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