



26th CSTD: Highlights of Technical cooperation activities under the CSTD

CropWatch-ICP: CropWatch Innovative Cooperation Programme for Crop Monitoring

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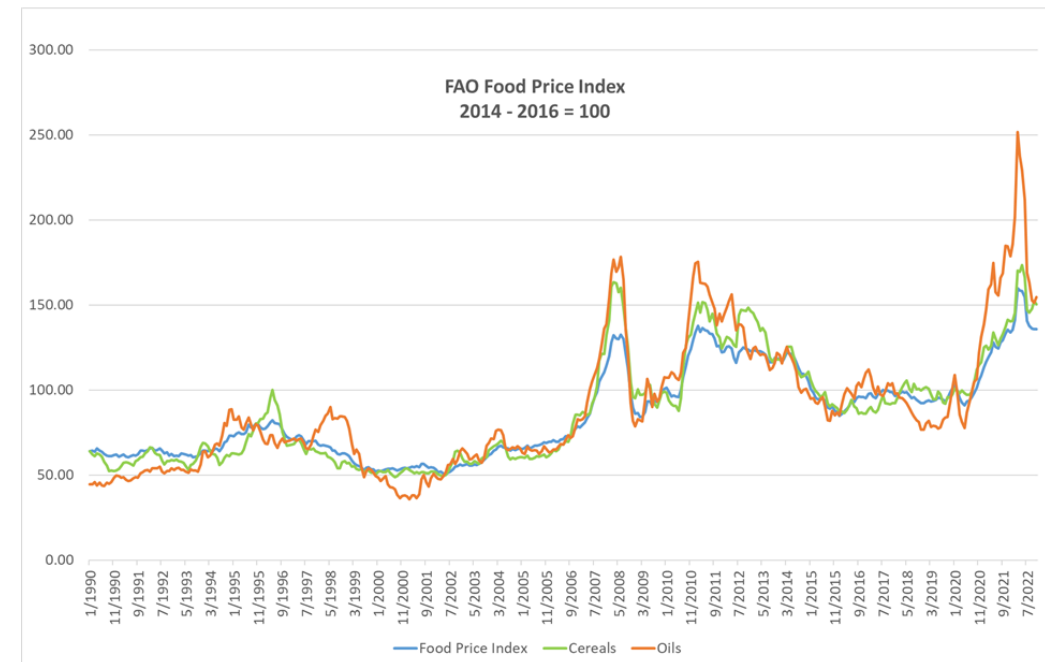
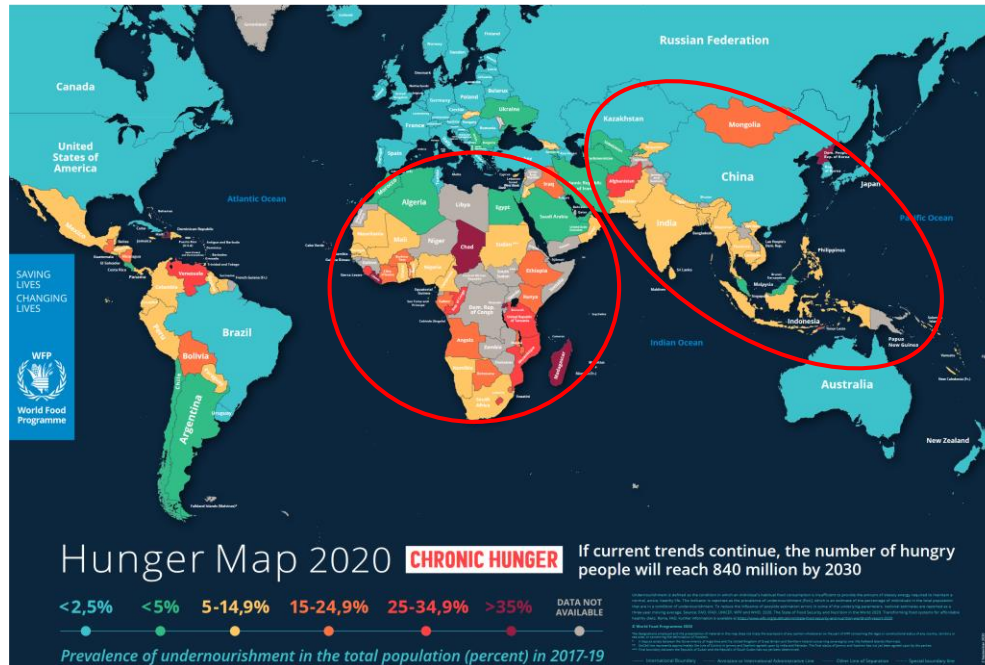
March 29, 2023

Outline

- **Background**
- **CropWatch-ICP Introduction**
- **CropWatch: capacity building**
- **Outlook**

Issues for Food Security

- Food security is still a challenge issue over the world, in particular in Africa, south & southeast Asia. COVID-19, Desert Locust, drought, flooding, etc. further threaten food security.
- The paucity of adequate capacity in obtain and accessing up-to-date staple crop production information pose the danger of taking decisions based on delayed and on not easily verifiable information.



Constraints

- Many countries want to set up their own crop monitoring systems
- Initiative input and operational cost as well as adequate technical skills constrain many countries to set-up, operate, and maintain crop monitoring system, which make
 - most countries in the world do not have an operational crop monitoring system
- Combining of crops, phenology, location makes crop monitoring data streams very complex
 - Existing global systems have limited functions, mainly crop condition assessment
 - Most existing algorithms and methods are not implemented as operational activities



CropWatch Cloud

- Release quarterly and annually bulletin on global crop monitoring, covering 173 countries and regions down to provincial scales, with special focus on 43 key agricultural countries
- Components: CropWatch-Pro, CropWatch-Explore, CropWatch-Project and CropWatch-Bulletin

<http://cloud.cropwatch.com.cn/>

 **CropWatch-Pro**

Cropwatch Pro

Enter

• An online tool for people to produce crop monitoring products at any time and anywhere.

 **CropWatch-Explore**

CropWatch Explorer

Enter


• An online interface for people to explore and analysis all the crop information data easily.

 **CropWatch-Project**

Cropwatch Project

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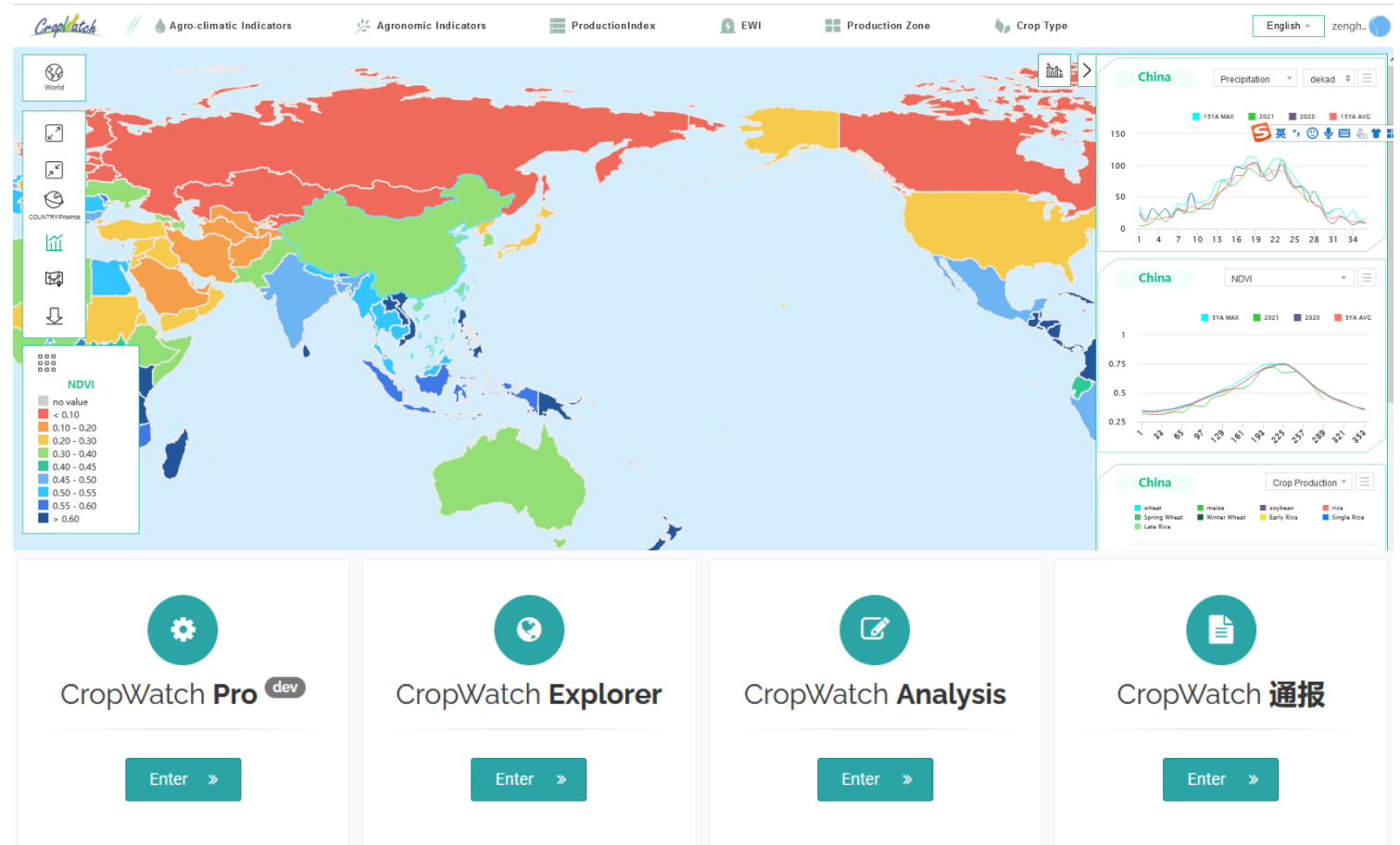
• An online platform for people to create and write the crop bulletin.

 **CropWatch-Bulletin**

Cropwatch Bulletin

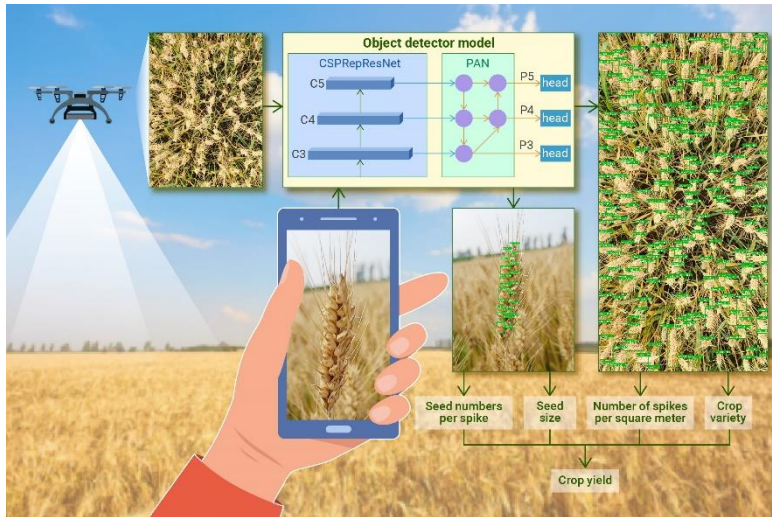
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• An webpage for people to read CropWatch bulletin.

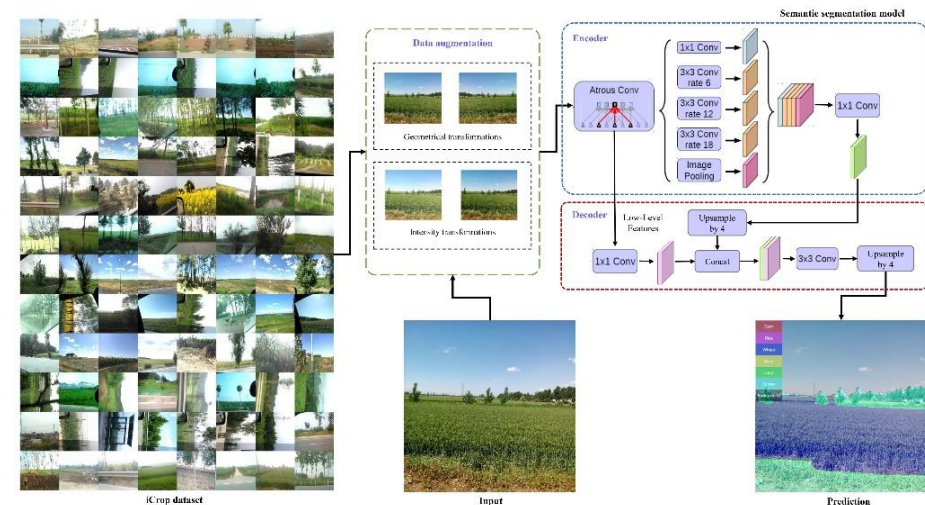


Tools for ground truth data collection

- The field data collection prevents most systems have crop area and yield components
 - Cost, labor and time consuming
- Two tools developed for free use
 - GVG app for crop identification and Fieldwatch for yield measurement with image recognition



FieldWatch for yield data measurements



GVG Crop type identification from geo-tagged photos

CropWatch Cloud

- CropWatch is a satellite-based hierarchical method of crop monitoring, including 4 agro-climatic indicators and 13 agronomic indicators, area, yield and production at different scales
- CropWatch Cloud provided APIs access to all functions of crop monitoring indicators and thematic maps.



February 2019 CropWatch Bulletin

This bulletin features the latest production outlook for the major producers in the southern hemisphere and some isolated northern hemisphere countries where crop development is sufficiently advanced. Focusing on the months of October 2018 to January 2019, chapters cover global, national, and regional agro-climatic conditions and the condition of crops that were growing or harvested during this time. For China, the bulletin presents crop condition for each of seven key agro-ecological zones. The focus section reports on recent disaster events with an impact on agriculture and the possibility of an El Niño event.

Bulletin →

CropWatch Sub System

- CropWatch Pro
- CropWatch Explorer
- CropWatch Analysis
- CropWatch Bulletin

Rainfall index	Maximum VCI	Normalized Difference Vegetation Index	Crop Condition based on NDVI anomaly
Temperature Index	Minimum Vegetation health Index	Leaf Area Index	Index Based Crop Development
Photosynthetic Active Radiation	Cropped Arable Land and Classification	Fraction of Absorbed PAR	Crop condition clustering
Potential Biomass	Cropping intensity	Normalized Difference Water Index	Crop Condition Classification
Index Based Yield Model	CPTP Method for Area Estimation	Production Outlook Indicator	Evapotranspiration
Agro-Meteorological Yield Model	Planted Area Early Warning Indicator	Supply Situation Indicator	Minimum Vegetation health Index (China)
Remote Sensing Based Production	Agro-Meteorological Suitability Index	Standardized Precipitation Index	Thematic Map
Trend Based Production for Minor Producers	Agro-Climatic Index Composite	Soil Moisture	Zonal Statistics








About
CropWatch is China's leading crop monitoring system. Using remote sensing and ground-based indicators the system assesses

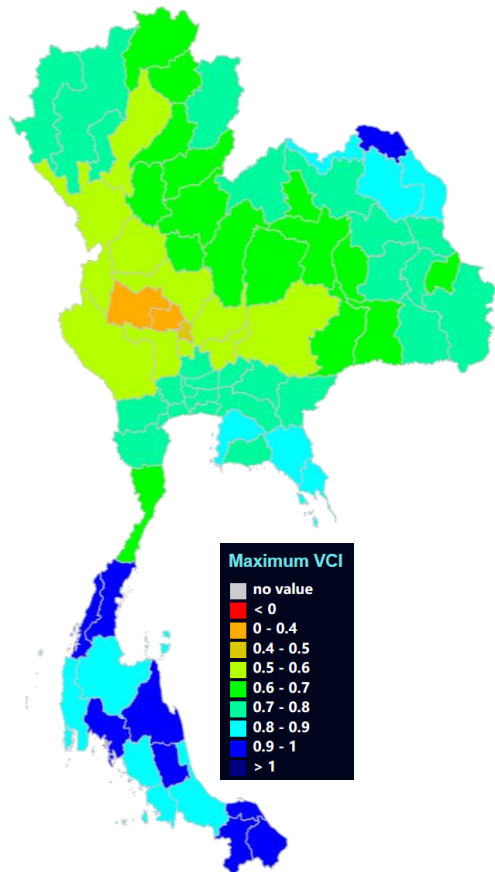
Bulletin
Each quarter, CropWatch findings are published in the CropWatch bulletin. The bulletin is issued in English and Chinese.

Publications
The CropWatch system and methodologies are described in various articles published in international and Chinese journals.

National Remote Sensing Center of China, Ministry of Science and Technology of the People's Republic of China

CropWatch acting data processing engine

- CropWatch and AGRI-Map of Thailand develop data access portal through APIs to share the indicators and data to each other



Provides Earth
Observation-based
Indicators through APIs:

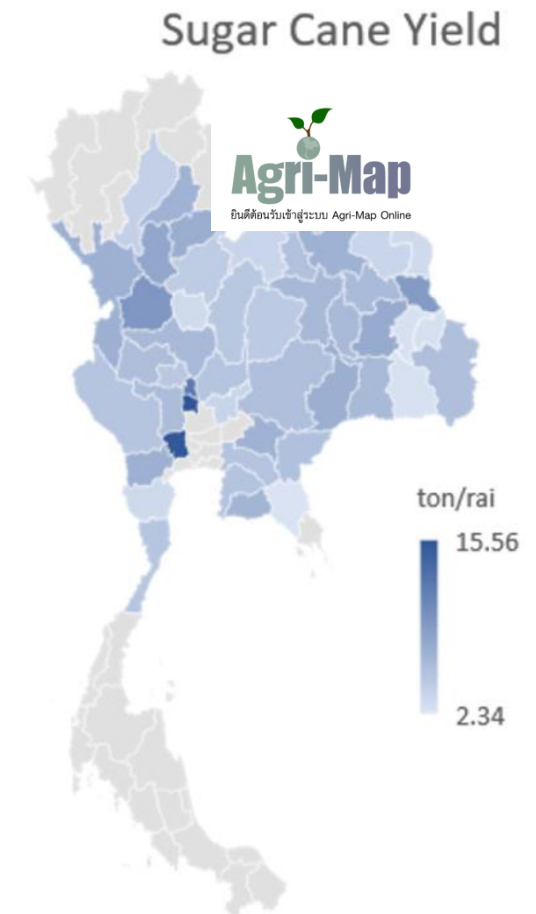
- Precipitation
- Temperature
- Radiation
- Biomass
- NDVI
- VCIx
- CALF
- VHI
- etc

EO-based indicators feeding
into AI models

Dynamically updated
with latest CropWatch
EO indicators

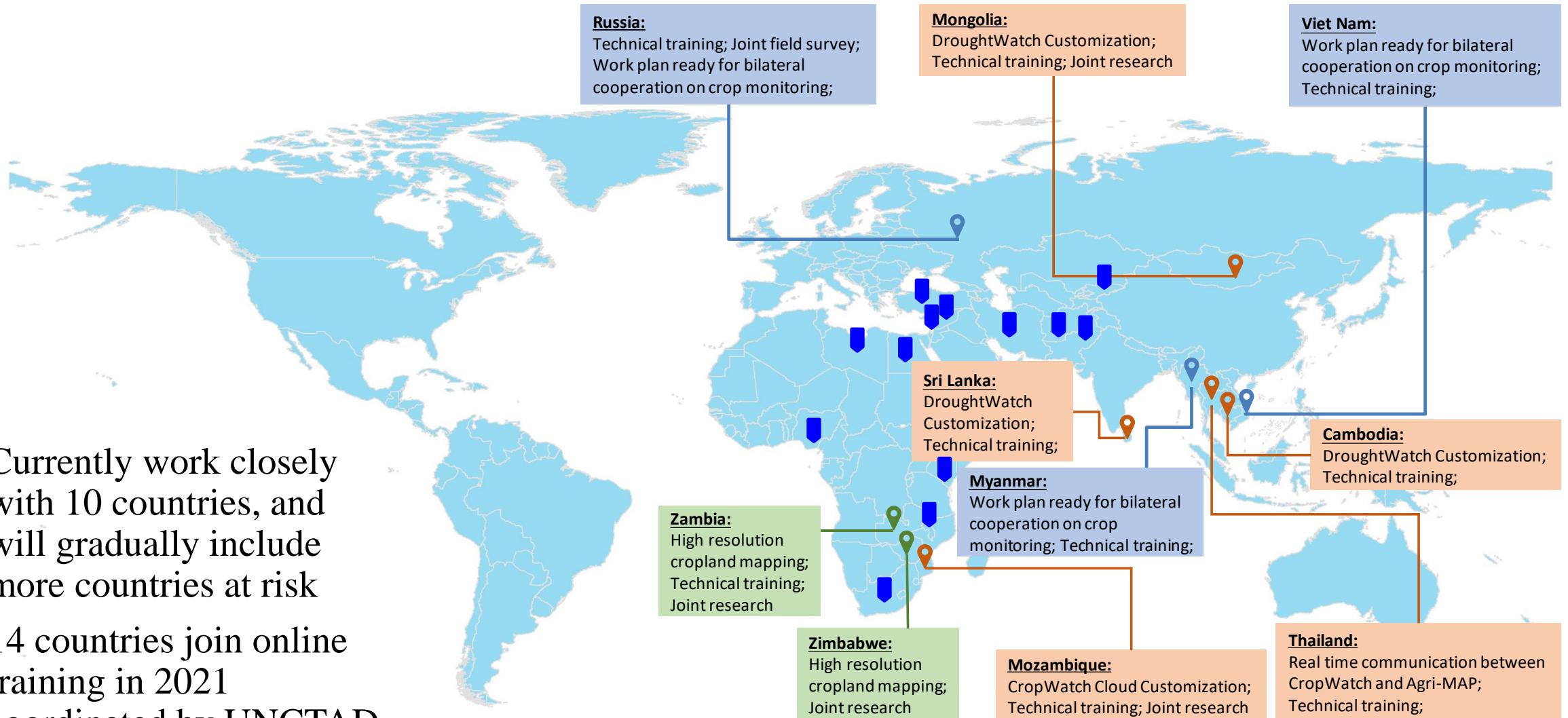
Ground station weather
information

Supporting high resolution
meteorological data
producing and services



Capacity building activities across the globe

- Currently work closely with 10 countries, and will gradually include more countries at risk
- 14 countries join online training in 2021 coordinated by UNCTAD



Outline

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- CropWatch: capacity building
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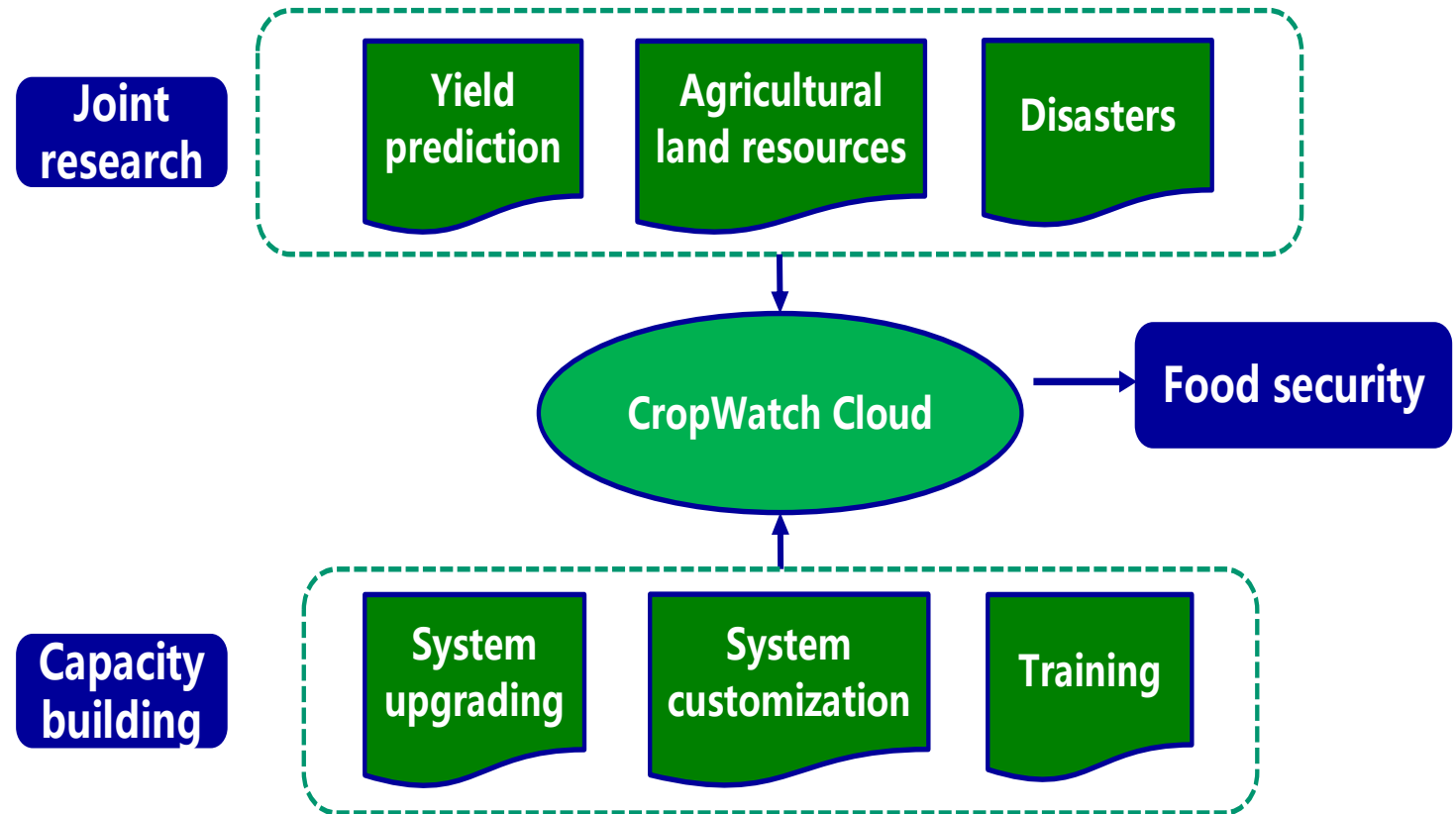
Project Objectives

Under coordination of UNCTAD, CropWatch Innovative Cooperation Programme for Crop Monitoring (CropWatch-ICP) is to **facilitate and stimulate crop monitoring at developing countries for the advancement of the SDG goal of zero hunger** through joint research and capacity building

- To enable pilot countries to do respective national or subnational crop monitoring on their own in real and near time
- To promote resilient agricultural practices by integrating geospatial information for crop monitoring

Key Actions on Capacity Building

- Training workshops
- On-job training in Beijing and in the field for verification
- CropWatch customization for Specific requirements
- Regional workshops on food security



Expectations

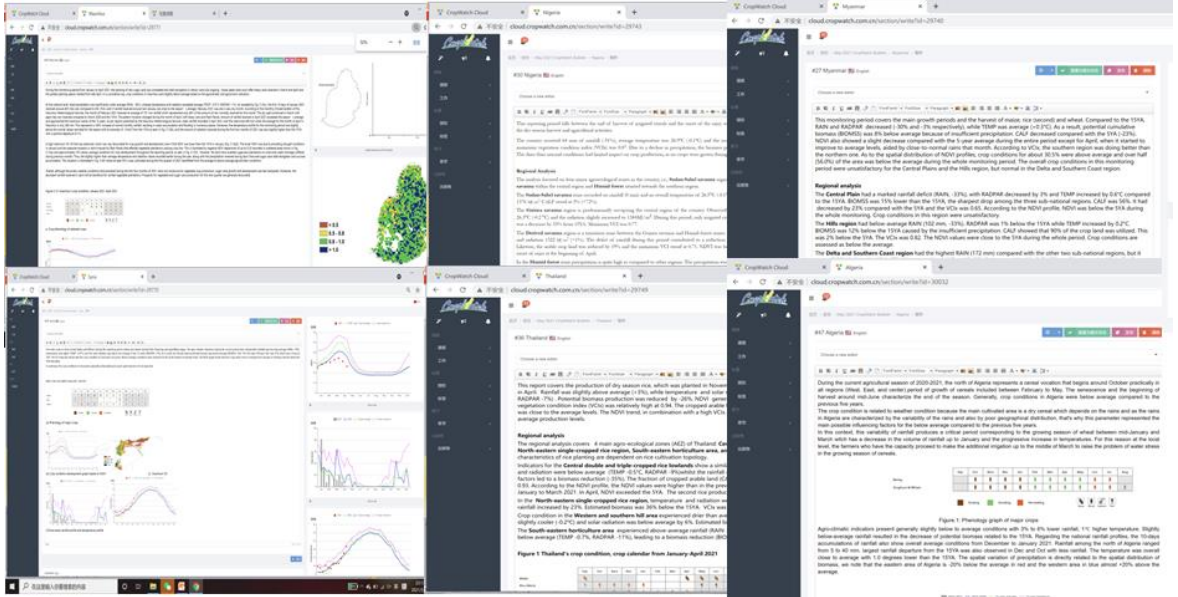
- Trained staff of the participating country will have the capacity to use the cloud based crop monitoring system. And they can **perform as trainers** for sub-national officials to empower more technical staff for crop monitoring
- Participating country to produce regular bulletin with support of CropWatch cloud to inform policy-making at national and provincial levels on the food market, annual food import-export prospects and disaster relief.

Outline

- Background
- CropWatch-ICP objectives
- **CropWatch-ICP: activities**
- Outlook

CropWatch technical training for 14 countries

- Online Training Workshop of Earth Observation Applications for crop Monitoring, coordinated by CTAD, for three months over 23 March- 25 May, 2021
- Participating countries: Nigeria, Zambia, Malawi, Mozambique, Kenya, South Africa, Lebanon, Turkey, Syria, Afghanistan, Iran, Laos, Myanmar, Thailand,
- Theory, Methodology and Application: 12 courses from invited experts and 6 courses from CropWatch team
- Online practices: Participants from Algeria, Myanmar, Nigeria, Syria, Thailand and Mauritius finished the country analysis for May Bulletin 2021



Technical support by country

- Work plan and requirement analysis
- Virtual field works and CropWatch data analysis training

AutoSave: OFF Requirement analysis docume... Grace Simon GS

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- In the south the main cash crops are oil palm, cocoa, and rubber.
- Low-lying and seasonally flooded areas are increasingly producing rice.

Major crops produced are rice, cassava, yam, maize, sorghum, millet, and groundnut. The country is self-sufficient in most basic staples such as cassava and yam, but it is still heavily dependent on import of processed agricultural products, particularly rice, wheat, livestock products and fish (FMWR, 2014). The main agricultural exports are cocoa, nuts, and sesame. Livestock in 2011 consisted of 19.5 million cattle, 72.5 million goats, 41.3 million sheep, 7.1 million pigs, 158 million poultrys, 0.97 million donkeys and 28 000 camels.

III- Agriculture monitoring (Current agriculture monitoring manners, existing agriculture monitoring systems, challenges)

CURRENT AGRICULTURAL MONITORING SYSTEMS IN NIGERIA AND CHALLENGES

A monitoring system is a software that helps system administrators monitor their infrastructure. These tools monitor system and improve the whole system infrastructure to send alarm in events of malfunctions and disruptions.

Agricultural monitoring systems collects data using different providers such as sensor, drone, and satellite and based on that data it uses artificial intelligence (AI) or machine learning (ML) to build solutions for the farmer or steps to be taken to tackle whatever the problem or challenge.

Current Agricultural Monitoring Systems in Nigeria

Due to low selling prices of crude oil in recent times, there is need for Nigeria to diversify its economy from crude oil to agriculture. For the African continent, agriculture is predicted to take Africa out of poverty if technology is properly utilized for mechanized farming. It is shocking to however note that, most Nigerians and Africans are still practicing agriculture using traditional approaches.

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Virtual Joint Field works in Mauritius and Algeria

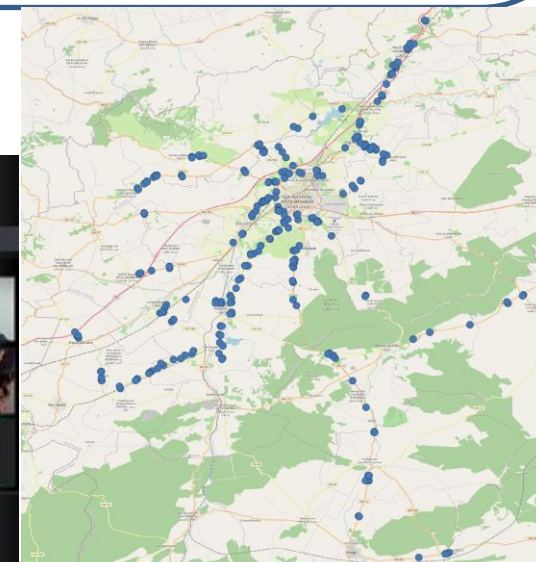
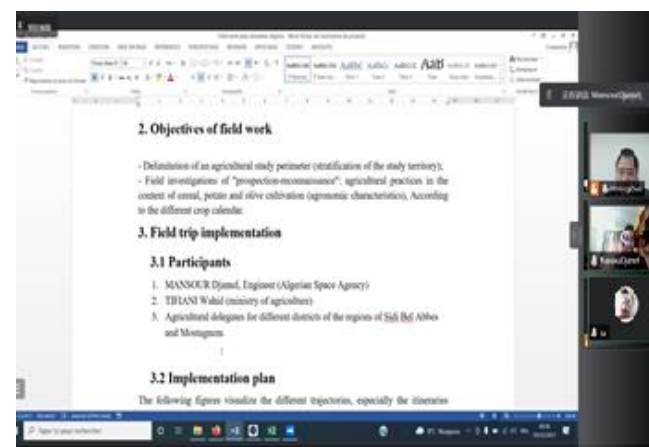
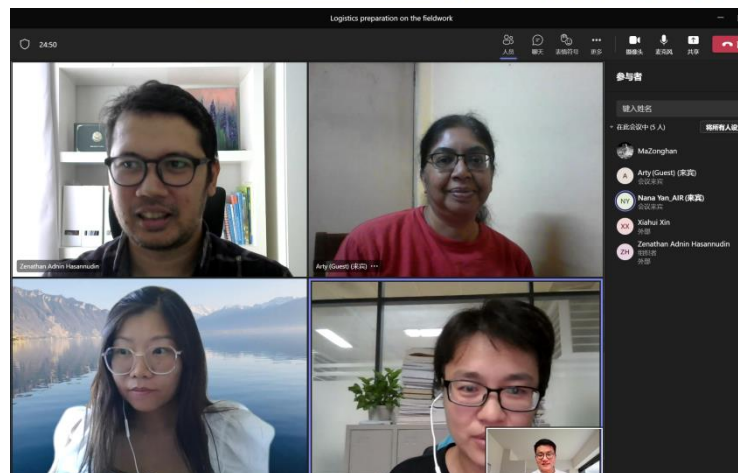
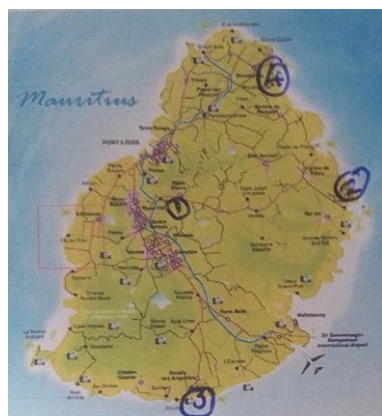
Mauritius

- Field work, 3days, October 4-14 2022
- Types : potato, tomato, pineapple
- Collected 320 samples



Algeria

- Field work, 3days, November 15-18 2022
- Types: potatoes, cauliflower, grains, olive and pomegranates
- Collected 279 samples

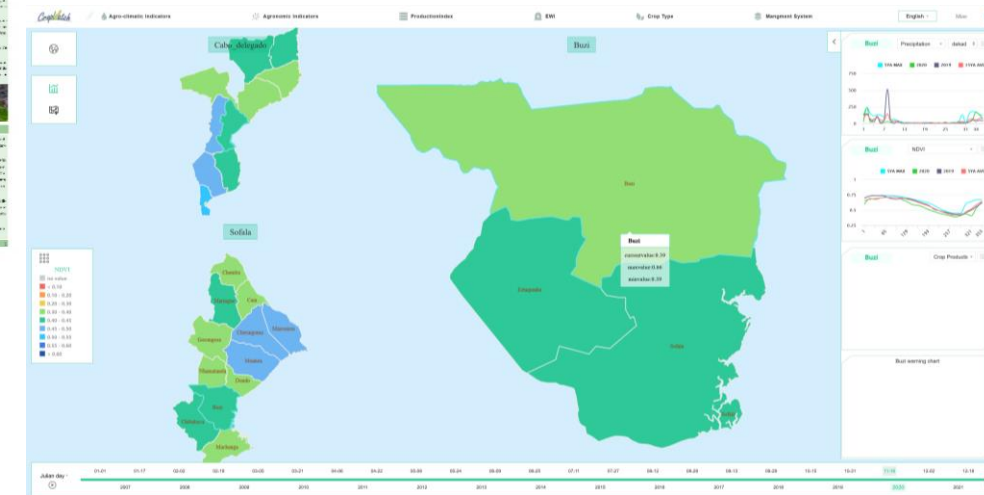
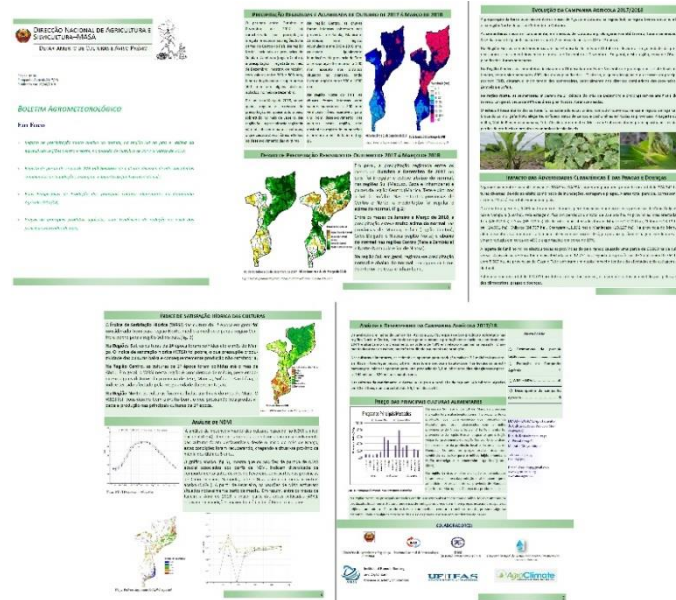


Technical training and national bulletin for Mozambique

- In-situ data collection training
- First CropWatch training for selected experts (3 persons)
- Extended CropWatch training (29 participants)
- CropWatch Cloud supports crop monitoring for food security in Mozambique – National Meteorological Bulletin powered by CropWatch
- CropWatch Cloud for Mozambique was included in Rural Solutions Portal by IFAD in 2020.



Activities	Outputs
Requirement analysis	Detailed Requirement report
Discussion and finalize the implementation plan	Detailed implementation plan
Discussion and joint field trip in Mozambique	In situ data in Maputo and Nampula
First technical training of CropWatch in Beijing	Agricultural monitoring report done by MOZ experts using CropWatch
Second technical training of CropWatch in MOZ	CropWatch based crop condition monitoring included in MOZ national meteorological bulletin
Training for national and provincial office	Mozambicans get some knowledge about crop monitoring on their own
Customize the CropWatch system for Mozambique	Provide system in Portuguese; Include all provinces for MOZ; Yield model calibrated



CropWatch for Mozambique

...the outputs



"We use CropWatch mainly for crop production forecast. Our team has been applying the tool to generate monthly agriculture bulletin during the rain season, which informs policy making at national and provincial-level agriculture departments."

Mr. Hilten, Department of Crops and Early Warning, Ministry of Agriculture and Rural Development, Mozambique

In 2019, CropWatch Cloud for Mozambique was selected as one of the **best "rural solutions"** by **the International Fund for Agricultural Development (IFAD)** due to its contributions in improving the capacities of Mozambique to access domestic and global agricultural information.

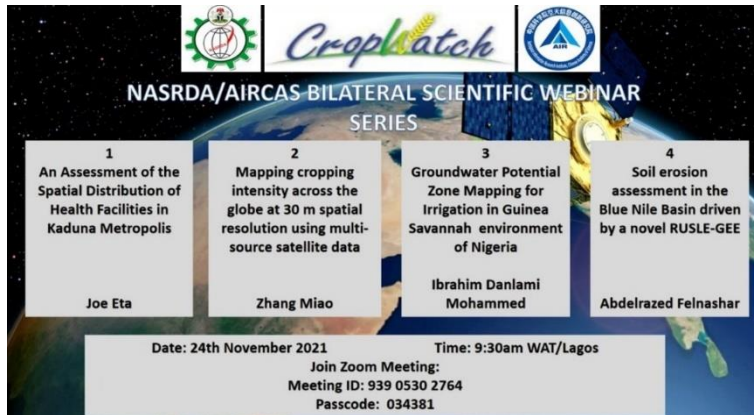
Collaborative **Crop conditions and Disaster's Updates** in **Portuguese language**



Powered by: 

Activities in Nigeria NASRDA

- Project implementation team
- All indicators are tailored for three Levels of national, state and local units
- Stakeholder meeting including ministries of agriculture, environment and water resources
- Technical support to regional countries

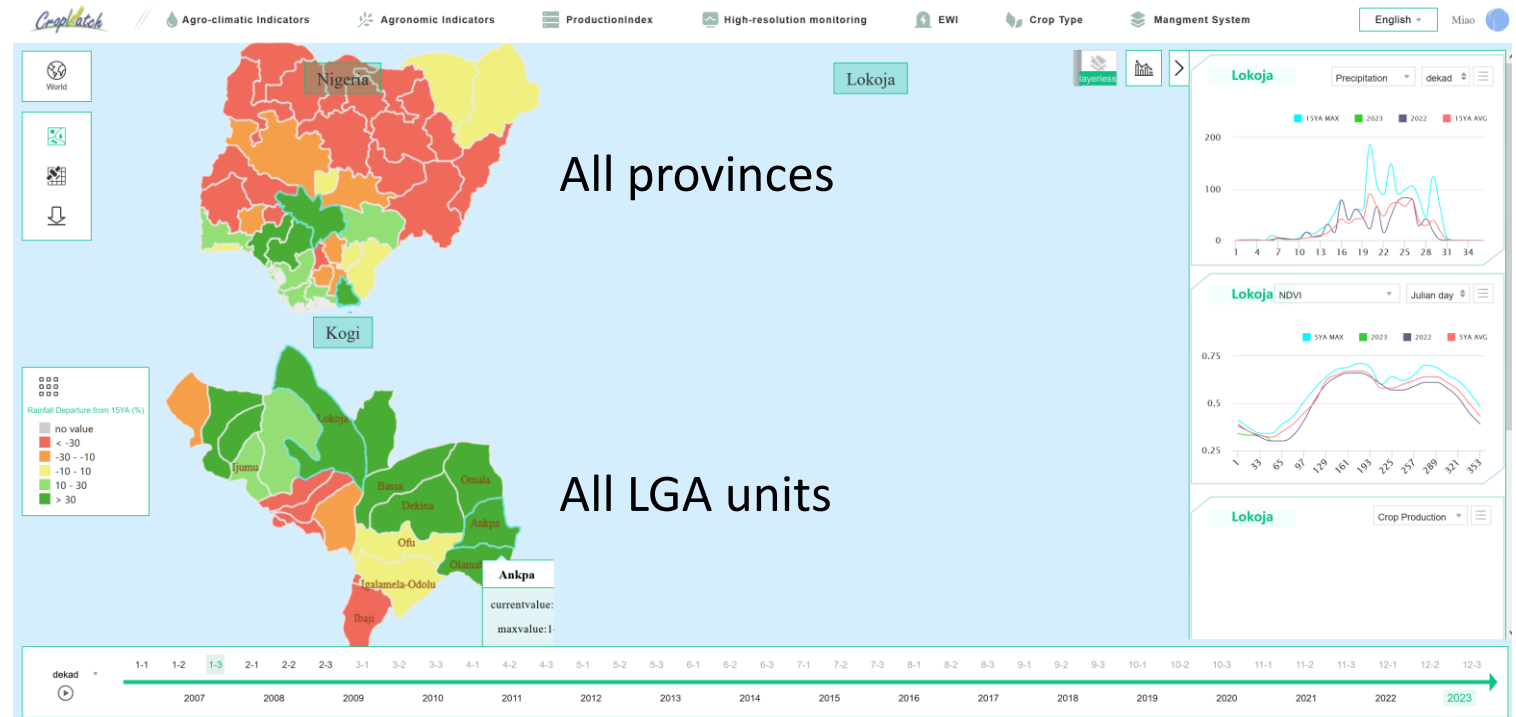


NASRDA/AIRCAS BILATERAL SCIENTIFIC WEBINAR SERIES

1 An Assessment of the Spatial Distribution of Health Facilities in Kaduna Metropolis Joe Eta	2 Mapping cropping intensity across the globe at 30 m spatial resolution using multi-source satellite data Zhang Miao	3 Groundwater Potential Zone Mapping for Irrigation in Guinea Savannah environment of Nigeria Ibrahim Danlami Mohammed	4 Soil erosion assessment in the Blue Nile Basin driven by a novel RUSLE-GEE Abdelrazed Felnashar
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Date: 24th November 2021 Time: 9:30am WAT/Lagos
Join Zoom Meeting:
Meeting ID: 939 0530 2764
Passcode: 034381

Online scientific webinars



CropWatch customization for Nigeria

Outline

- **Background**
- **CropWatch-ICP introduction**
- **CropWath: Capacity building**
- **Outlook**

Next steps

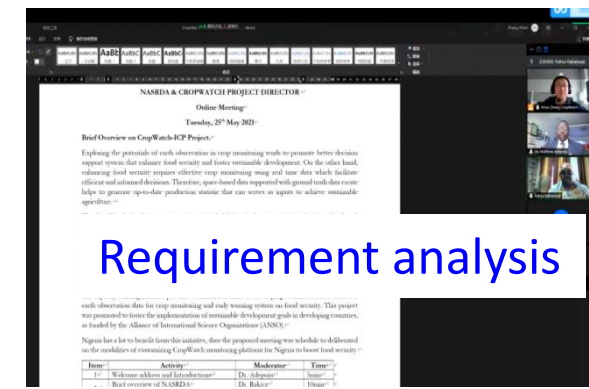
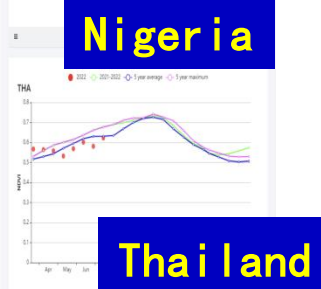
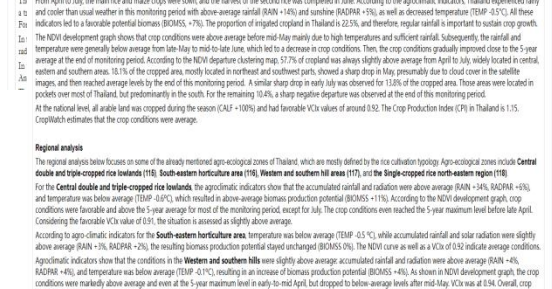
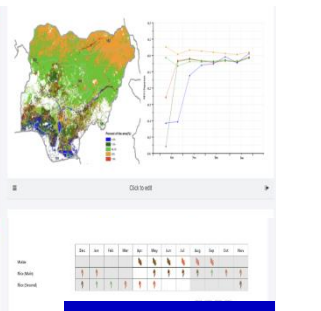
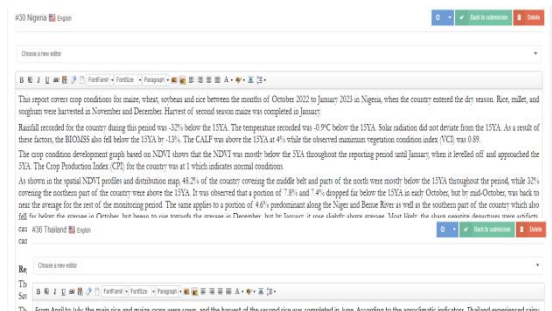
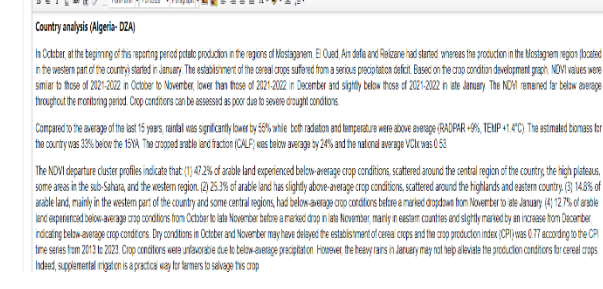
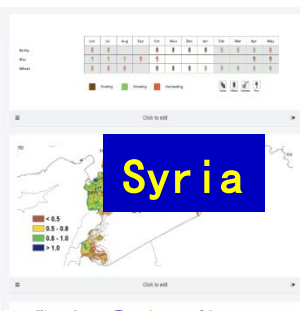
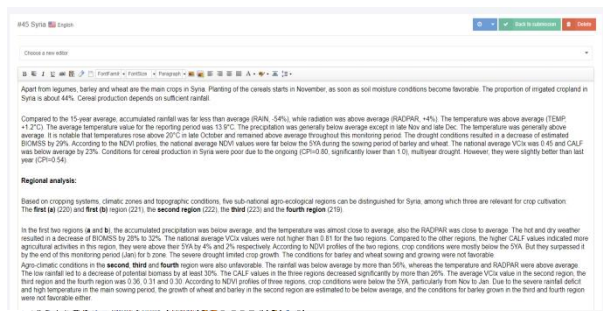
- Regional workshop in Mauritius (August) and Thailand (tbc)
- Food security session at ANSO conference (November, Beijing)
- Hand on training on the field in Cambodia, Thailand, Nigeria, Mauritius
- On-job training in Beijing for pilot countries from May to November
- CropWatch customization for technical transfer
- Upgrading the system to provide high resolution crop monitoring APIs to address the small holder farming systems

Ongoing system customization for pilot countries

- Specific requirements for function and models: Nigeria, Syria, Mauritius, Algeria, Thailand, Laos
- System languages documents: Vietnamese, Thai, Arabic
- Continuing participation on country analysis for CropWatch Bulletin: Nigeria, Syria, Thailand, Algeria



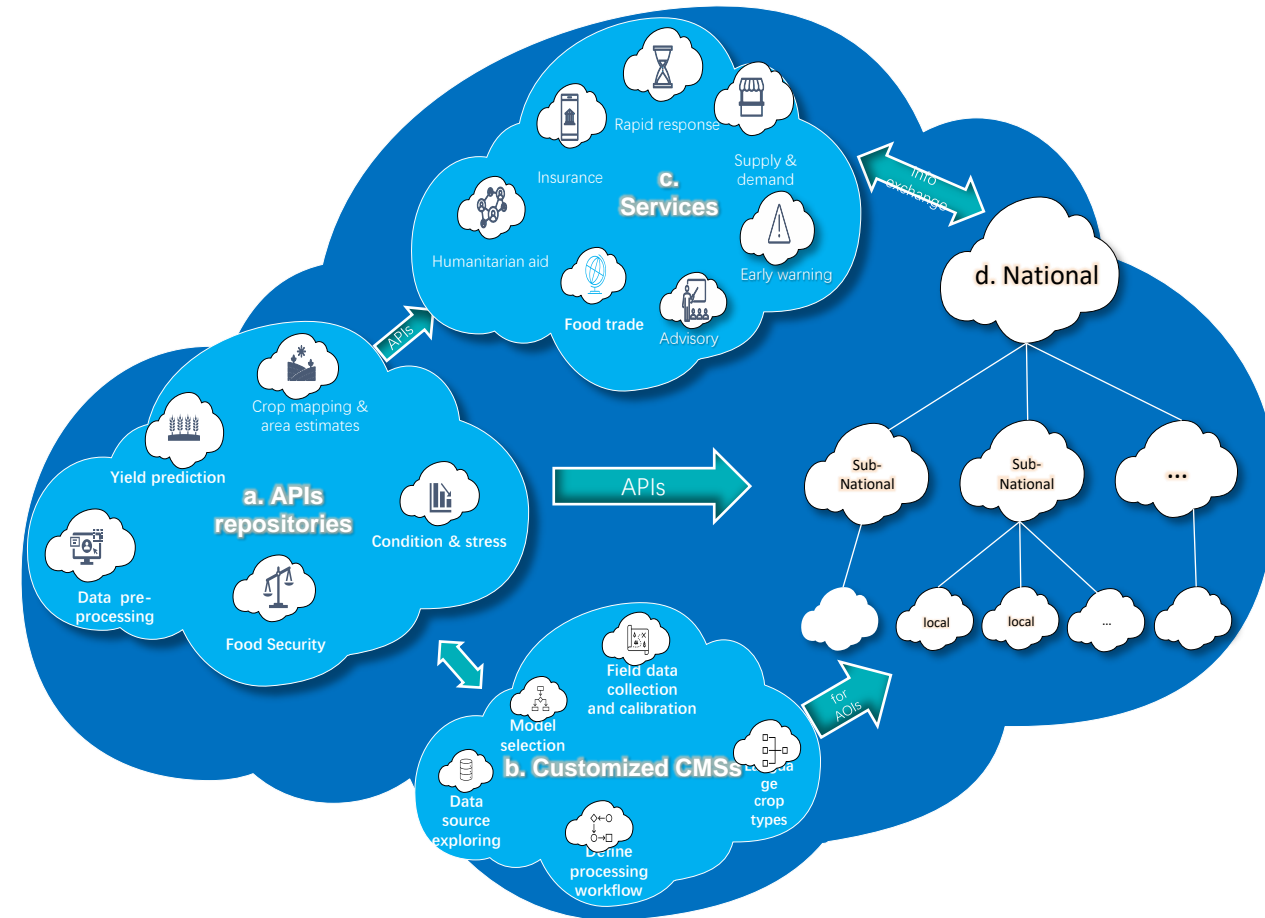
System Language



Requirement analysis

Outlook

- CropWatch is flexible to be tailored as their own crop monitoring system, it will enable developing countries have the capacity and ability to complete crop monitoring independently **without additional investment on storage and computation.**
- More countries are welcome to join us, please contact UNCTAD to express your interests



Thank you for your attention!

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