Aerospace Information Research Institute (AIR)
Chinese Academy of Sciences (CAS)

CropWatch Cloud Platform

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On behalf of the CropWatch team, AIRCAS

South Africa National GEO Capacity development workshop
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CropWatch Cloud Platform

- CropWatch is a satellite-based global crop monitoring system using a hierarchical approach, providing agro-climatic indicators, agronomic indicators, area, yield and production information at different scales

Cropwatch **Pro**

Enter

CropWatch-Pro

- **An online tool for people to produce crop monitoring products at any time and anywhere**

Cropwatch **Online**

Enter

CropWatch-Explorer

- **An online interface for people to explore and analysis all the crop information data easily**

Cropwatch **Project**

Enter

CropWatch-Project

- **An online platform for people to create and write the crop bulletin**

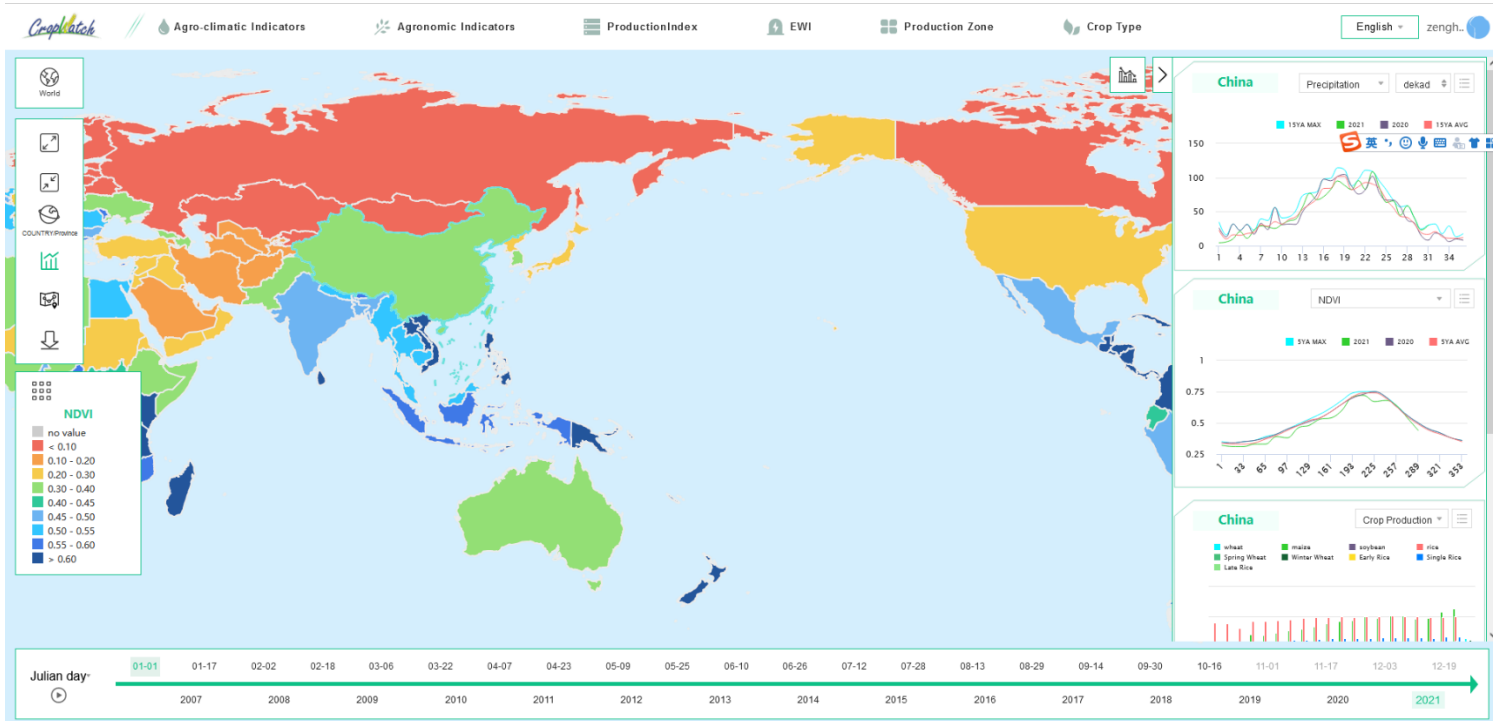
Cropwatch **Bulletin**

Enter

CropWatch-Bulletins

- **An web page for people to read CropWatch bulletin**

cloud.cropwatch.com.cn



CropWatch **Pro** dev

Enter »

CropWatch **Explorer**

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CropWatch **Analysis**

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CropWatch **通报**

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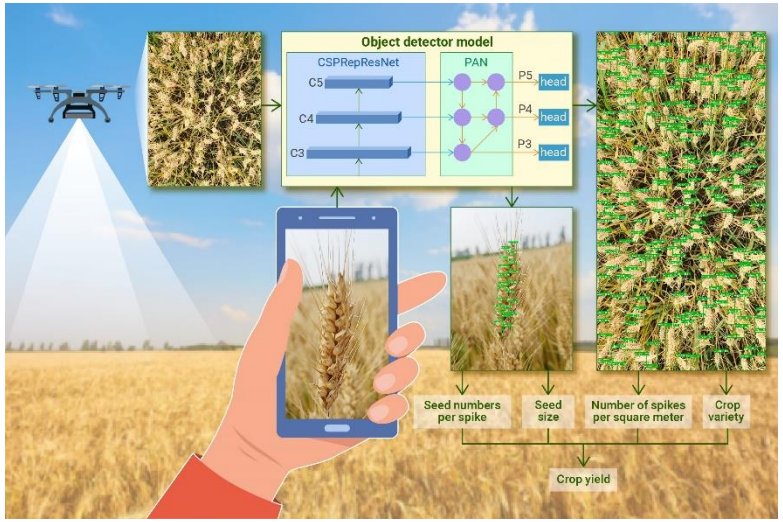
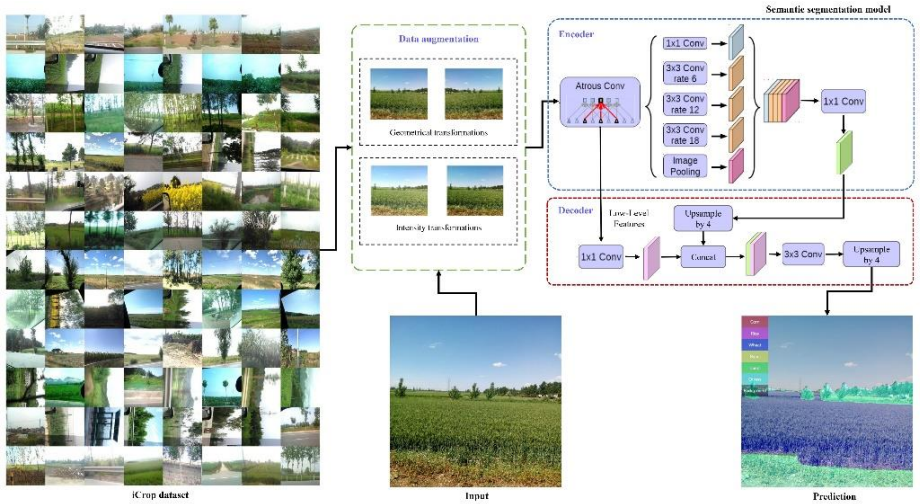
Tools for ground truth data collection

- 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

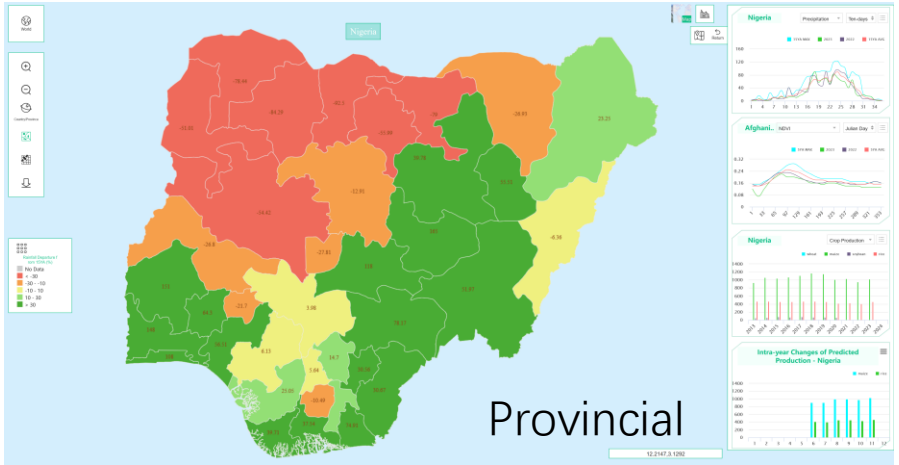


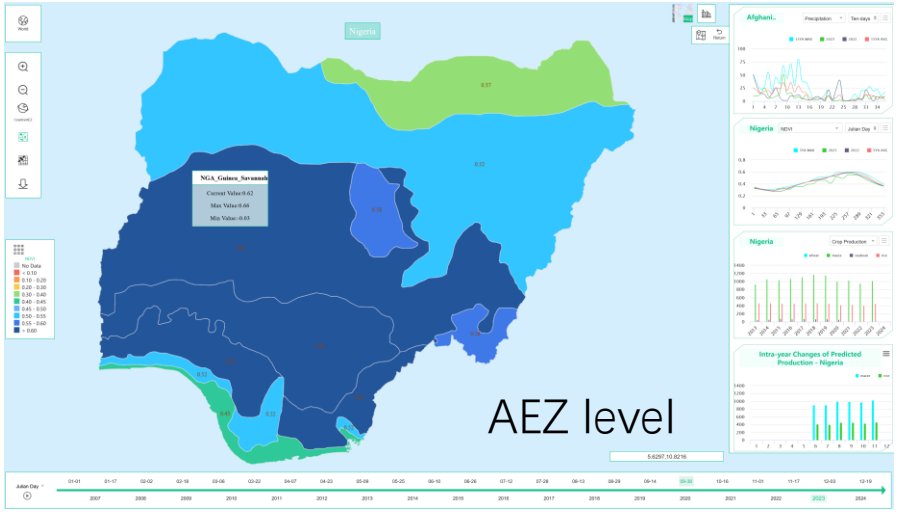
GVG Crop type identification from geo-tagged photos

Dashboard provide comprehensive view of crop conditions

Information available for all countries and provinces and update every 10 days

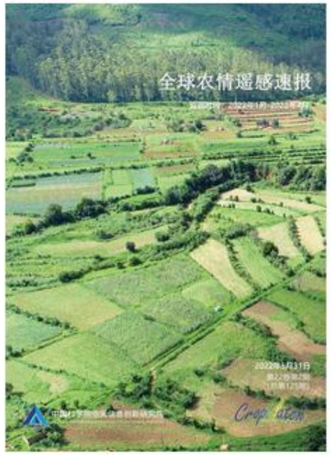
- Rain, temp, radiation, biomass
- VIs, fAPAR, Cropping intensity, Drought, Fallow, etc

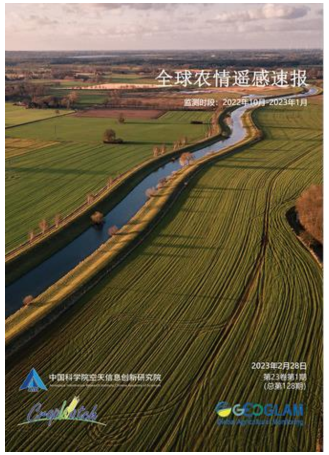




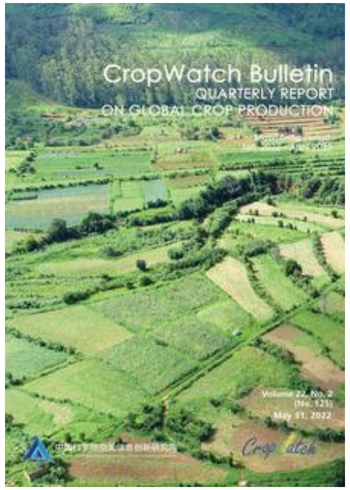
CropWatch quarterly bulletins and monthly updates

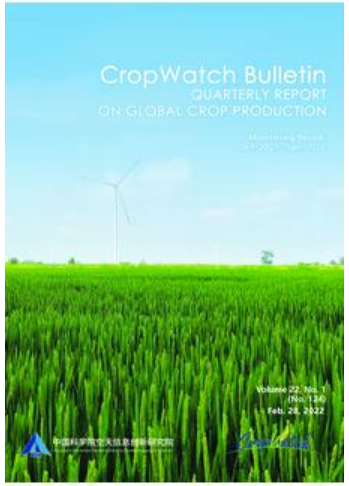
CropWatch releases the global crop reports to the public every 3 months through the website, everyone can access freely and easily, providing an alternative way to use agricultural information for policy making.

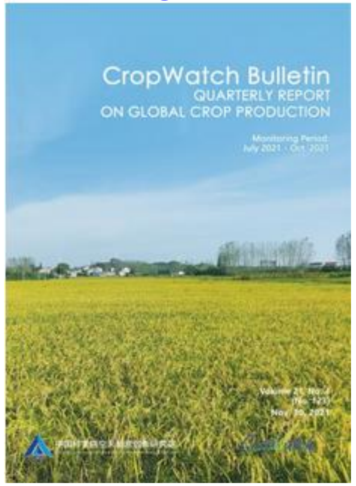


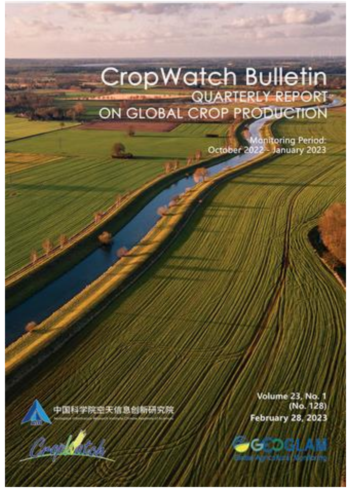


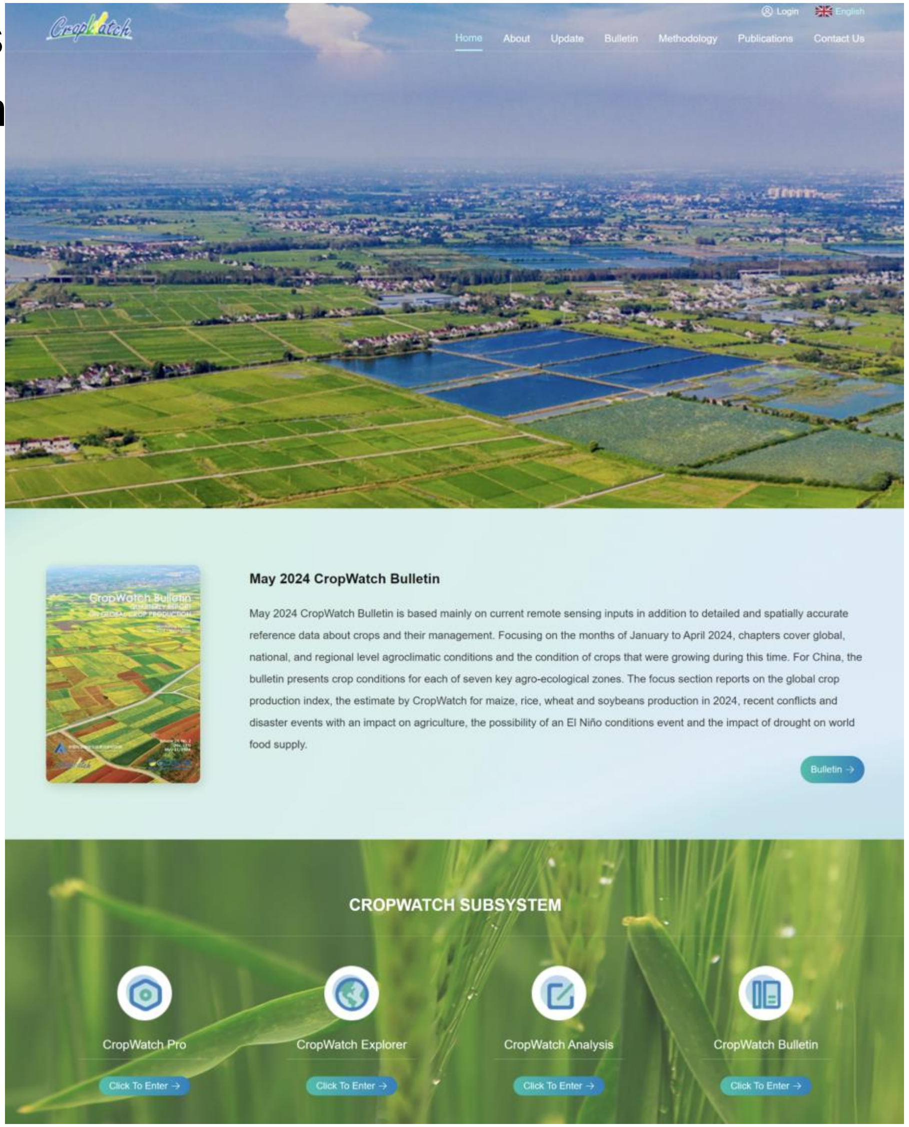
Feb 2023 | May 2023 | Aug 2022 | Oct 2022







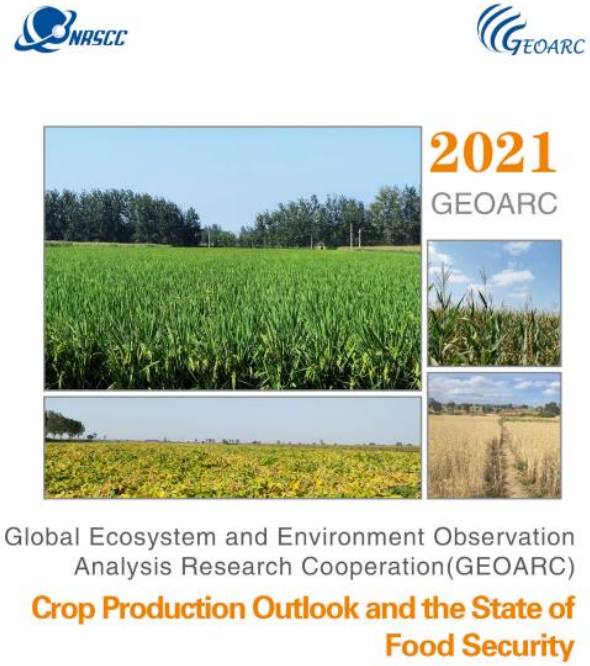




All quarterly bulletins can be downloaded from here:
http://cloud.cropwatch.com.cn/web/report

Annual Summary Report

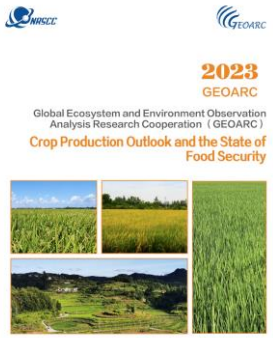
- CropWatch would publish the Global Crop Production Annual Outlook for the Global Ecosystem and Environment Observation Analysis Research Cooperation (GEOARC) with the support of ChinaGEO.
- The annual report covers the highlighted events affecting food security, the annual summary of global agricultural monitoring and food security outlook.



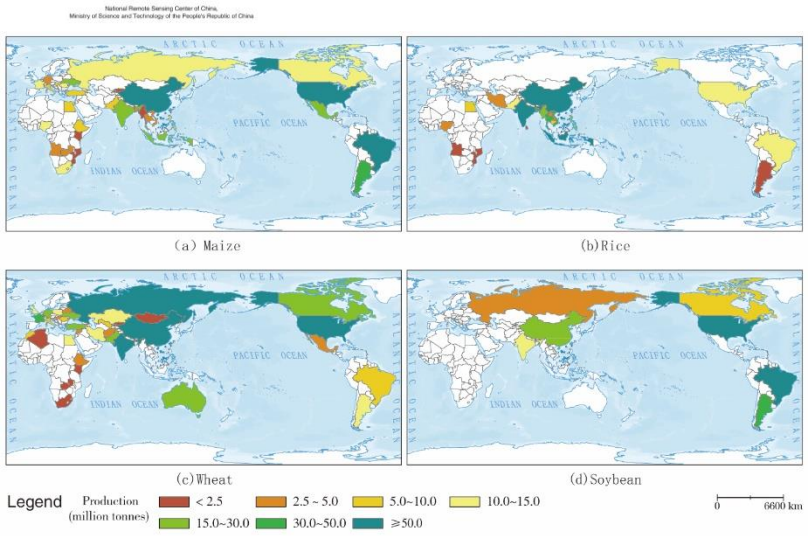
Access address: http://www.chinageoss.cn/geoarc

Resilient Agriculture-2023

Drought mitigation and fallow land

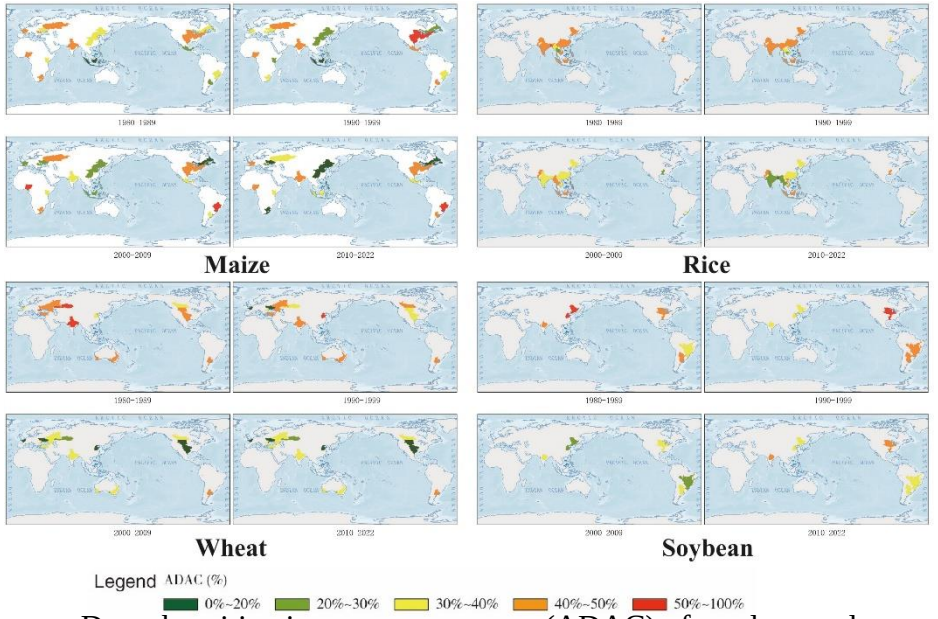


- Global staple cereal and oil crops production of 2023 is estimated to reach 2,876.96 million tonnes, up 0.6%



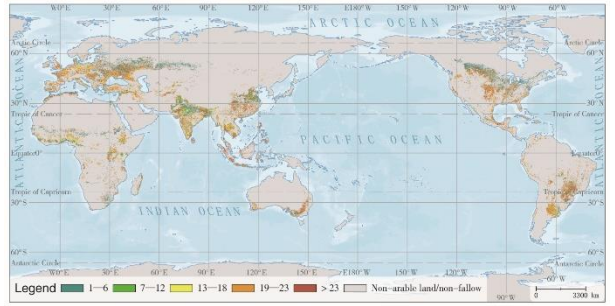
Production of staple cereal and oil crops in 47 major producing countries, 2023

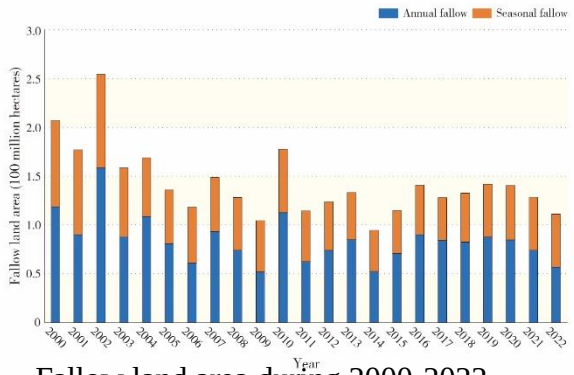
- Drought mitigation capabilities in global staple cereal and oil crops major producing regions have improved significantly with measures including improved irrigation, mulching, conservation tillage, crop structure adjustment and planting drought-resistant varieties



Drought mitigation area percentage (ADAC) of staple cereal and oil crops major producing regions

- Global fallow land area reduced 46.4% 2022 from 2000, indicating the global cropland utilization efficiency has steadily increased

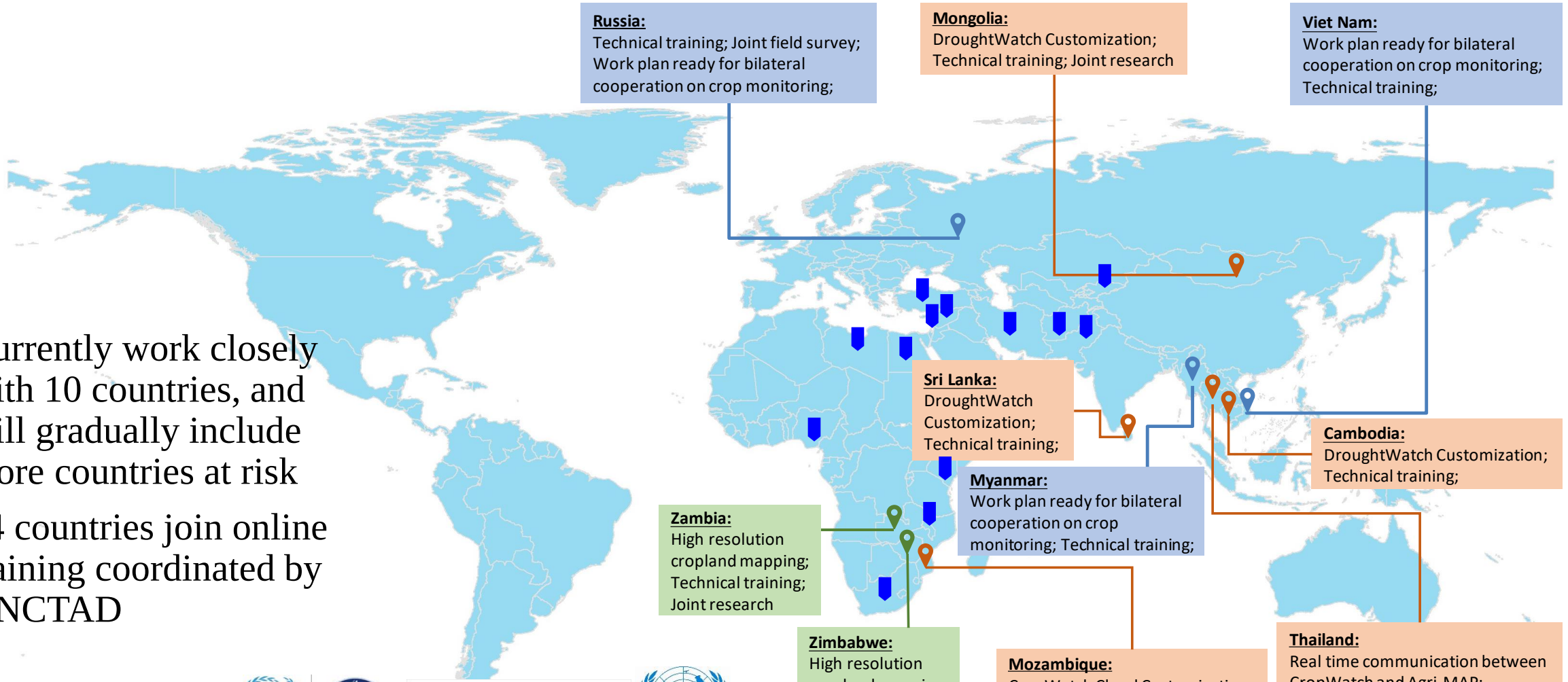




Fallow land area during 2000-2022

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 coordinated by UNCTAD



UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific

UNEP
International Ecosystem Management Partnership
国际生态系统管理伙伴计划

WORLD BANK GROUP

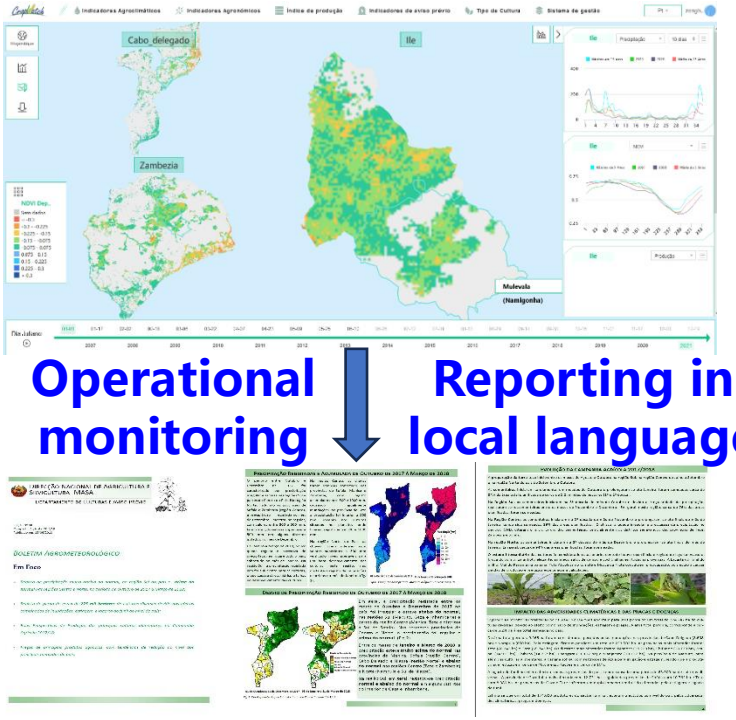
UNITED NATIONS UNCTAD

China GEO

GEOGLAM
Global Agricultural Monitoring

CropWatch provides three service modes

- Customization of CropWatch and/or development of CMS for specific needs (Mozambique)
- Data processing engine and access data for local services (Thailand)
- Independent analysis for a country or AOIs (Argentina, Cambodia, Mongolia)



Data processing and exchanges through APIs

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

Agri-Map

System customization for Cambodia

- Interfaces translated into the local language
- CropWatch4Cambodia provides detailed information of all available indicators (agro-climatic, agronomic, production, etc) for both national and sub-national units

អ្នកប្រើប្រាស់កំណត់ពាក្យឃ្លាមើលដំណាំដោយខ្លួនឯង

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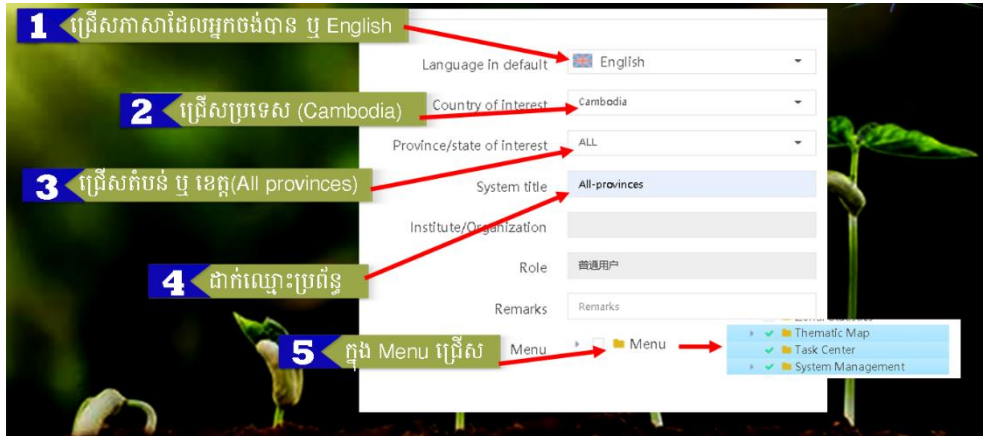
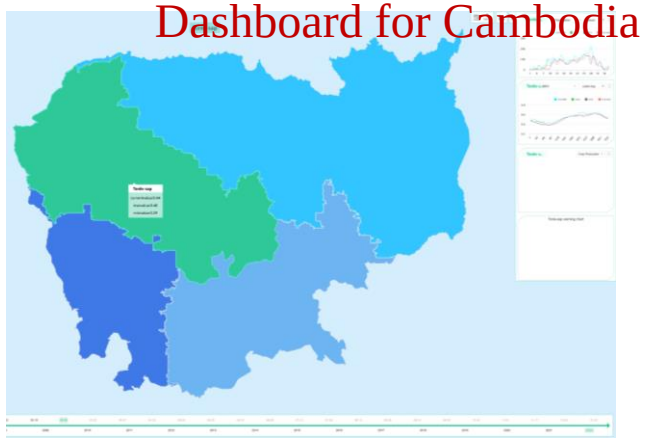
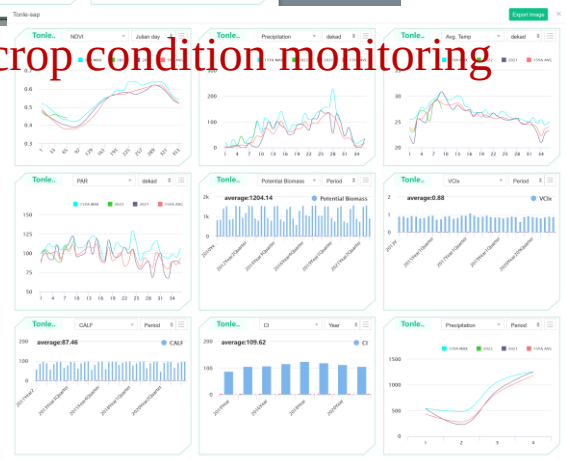
រំភាយស្ទីសកម្ម រស្មីសំយោគ	ចំណាត់ថ្នាក់ដីដាំដុះដំណាំបាន	ប្រភាគនៃរំភាយរស្មីស្រូបដោយរស្មីសំយោគ	បណ្តុំលក្ខខណ្ឌដំណាំ
សក្តានុពលដីរម៉ាស	អាំងតង់ស៊ីតេដំណាំ	សន្ទស្សន៍ភាពខុសគ្នាធម្មតានៃទឹក	ចំណាត់ថ្នាក់លក្ខណ្ឌដំណាំ

Dashboard for Cambodia crop condition monitoring

System configuration

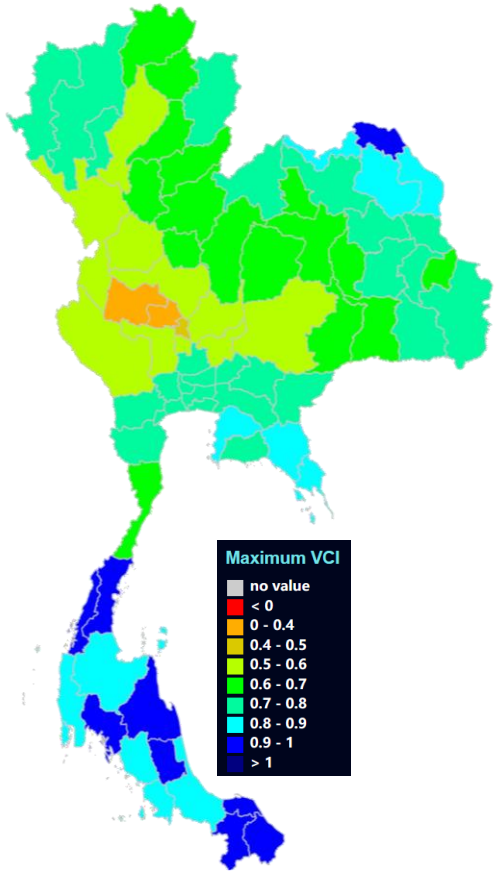






Case in THA: CropWatch acting data processing engine

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:

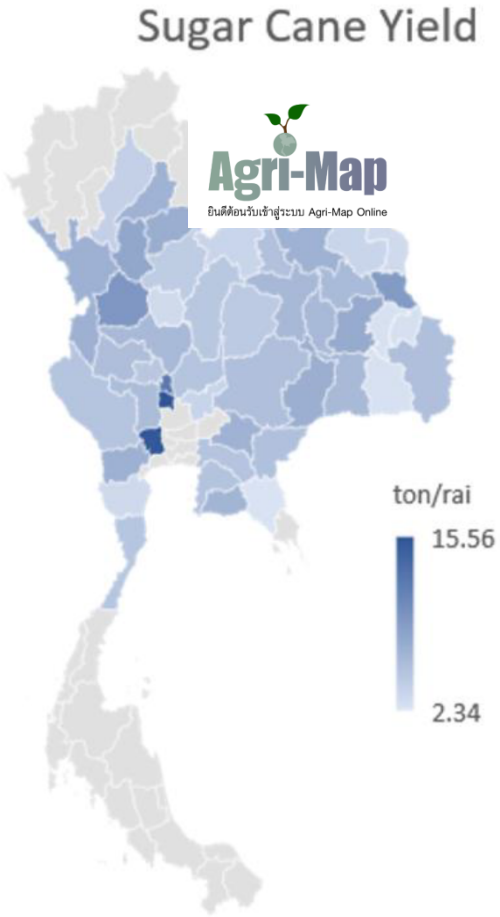
- Precipitation
- Temperature
- Radiation
- Biomass
- NDVI
- VCIx
- CALF
- VHI
- etc

Dynamically updated with latest CropWatch EO indicators

EO-based indicators feeding into AI models

Ground station weather information

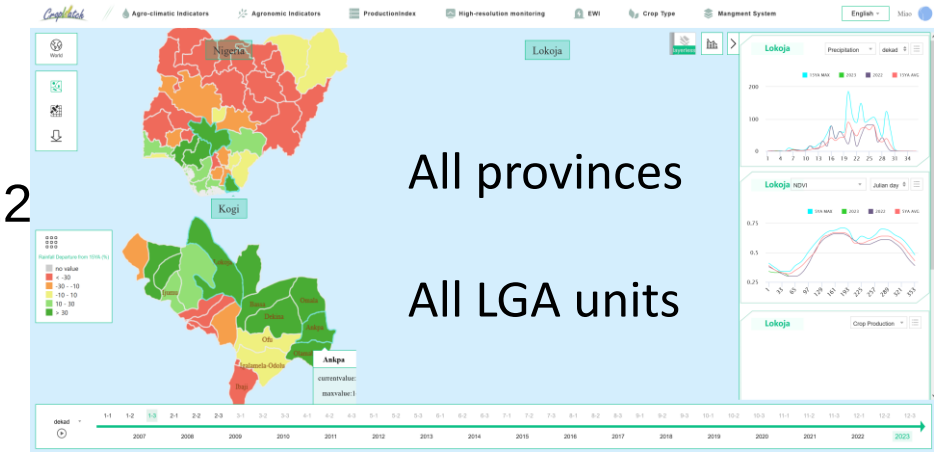
Supporting high resolution meteorological data producing and services



Support by UNESCAP

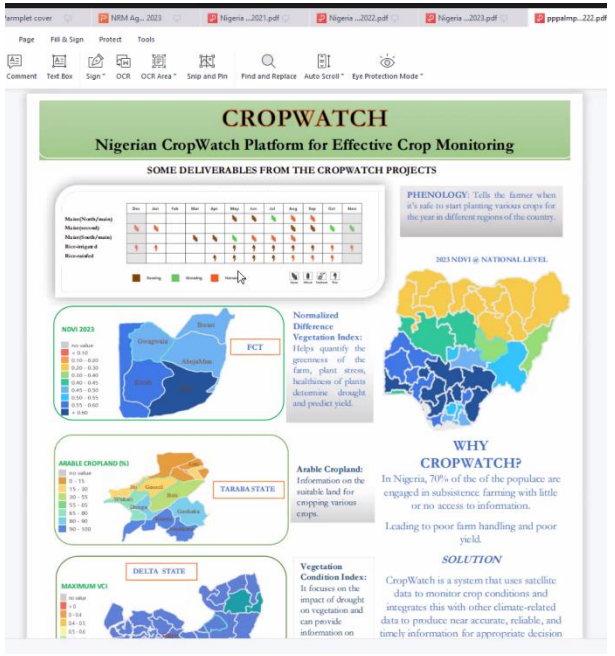
Activities in Nigeria NASRDA

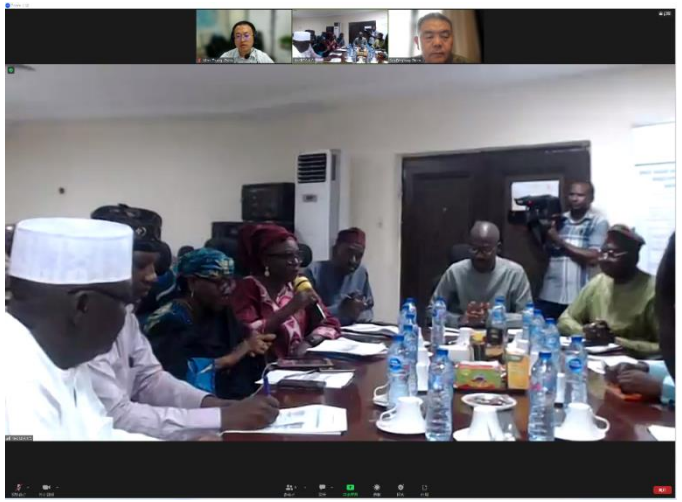
- **MOU between AIRCAS CropWatch team and Nigerian Aerospace Agency (NASRDA)** on Cooperation to strengthen capacity building on crop monitoring was signed on 4 July 2022
- Activities
  - Project implementation team
  - Implementation and work plan
  - All indicators for all provinces, and 775 LGA units available
  - Showcase at GEO annual workshop
  - Two stakeholder meetings involving 11 agencies



CropWatch customization for Nigeria

Distributed bulletins in Nigeria





1st Stakeholder meeting involving 16 agencies

2nd Stakeholder meeting

Steps to implement CropWatch

- Requirements analysis, targeting crops, monitoring units
- Stakeholder meeting for further requirement analysis
- Formulation of work plans and baseline data preparation
- Trainings both in house and field, at national and subnational levels
- Joint customization, independent models incorporated
- Analysis, reporting and services independently, technical support remotely
  - guarantee that CropWatch cloud is available, accessible, functionable, flexible
- Promoting ownership and no investment needed for infrastructure

CropWatch Vision

- Promoting ownership
  - Customized according to the specific demand for each country and work as a national/regional system
- Respecting privacy and data sovereignty
  - Providing crop monitoring APIs to address the data sovereignty
  - Countries will strengthen the agricultural monitoring capacity on their own
- Reducing constraints
  - Cloud based system assessable from internet everywhere without investment on computing infrastructure, storage, etc

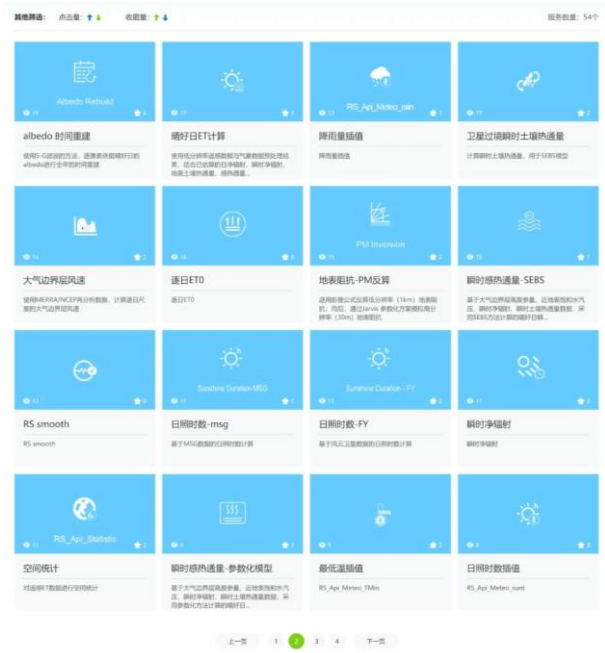
Users to conduct crop monitoring on your own

- Through training, we expect users to carry out self-serviced crop monitoring by selecting their preferred indicators, models for the user's area of interest, allowing users actively involved from remote sensing data preparation to the final synthesized analysis

地面调查APP

单产观测APP

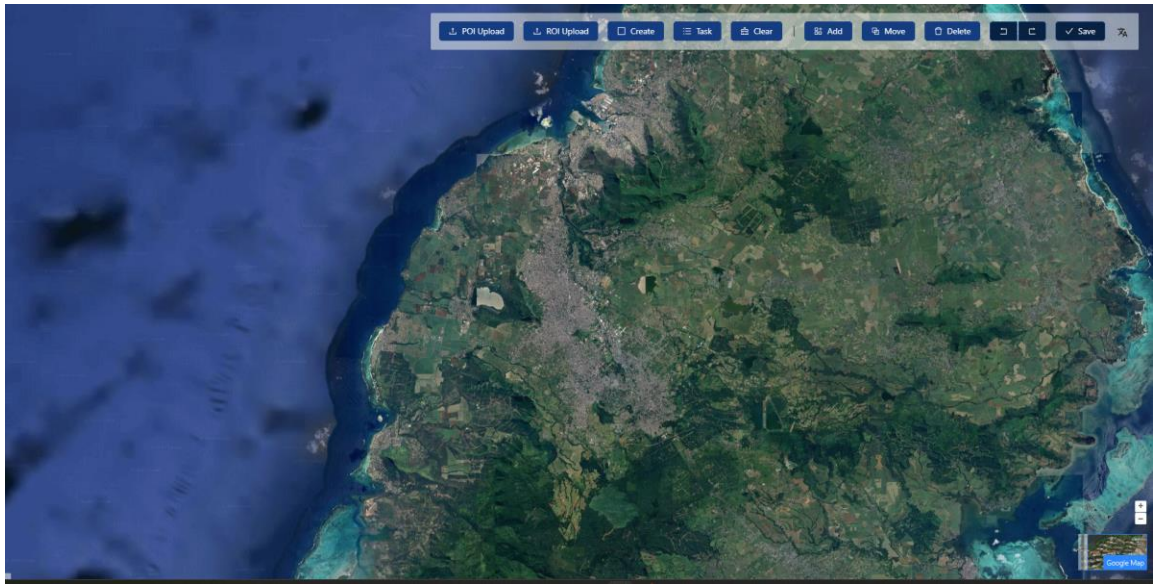
Smart APPs providing ground truth data support



API Center

Microservice

Process engine



User-defined roi, indicators, models and self-calibration

Dockerization

Algorithms in Docker

Deploy

User devices

Edge computing mode

- ✓ **Computation on user devices, enabling users allocate computing resources for high-performance tasks.**
- ✓ **Data retained locally, protecting user data sovereignty.**

Take home message

- Website http://cloud.cropwatch.com.cn/
- GVG APP: https://gvgserver.cropwatch.com.cn/download (Android) https://apps.apple.com/py/app/gvg%E5%86%9C%E6%83%85%E9%87%87%E9%9B%86/id1244686128 (iOS)
- FieldWatch APP: https://play.google.com/store/apps/details?id=com.wisewoods.xtt&pli=1
- CropWatch Knowledge Package on GEO Knowledge Hub: https://gkhub.earthobservations.org/packages/pps5h-ea276
- Archive bulletins: http://cloud.cropwatch.com.cn/site/bulletin
- Research publications: http://cloud.cropwatch.com.cn/publications/index
- Email address: cropwatch@aircas.ac.cn

Openly shared datasets

- Global cropland mask @30m: https://data.casearth.cn/thematic/cbas_2022/158
- Global cropping intensity @30m: https://doi.org/10.7910/DVN/86M4PO https://data.casearth.cn/thematic/cbas_2022/160
- Global irrigation proportion @100m: https://doi.org/10.7910/DVN/HKBAQQ
- Global crop area, yield and production: https://doi.org/10.7910/DVN/G1HBNK
- Synthesis of Global ET: https://doi.org/10.7910/DVN/ZGOUED
- Africa Cropland Layer: https://doi.org/10.6084/m9.figshare.13520141.v1

Thank you!

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