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Use of Geospatial Data at FAO

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Introduction

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Integration between statistical and geospatial information can help improve the monitoring of national and global development outcomes.

FAO work related to EO is focused mainly on the following key areas:

1. Improve survey design and the efficiency of the sample
2. Support the disaggregation of national data, especially for SDG purposes
3. Direct measurement of some agricultural variables, including SDG indicators
4. Crop production prospects and early warning

Key milestones of FAO Geospatial Work

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Over the last decade, FAO has supported abut 70 Countries in using EO data for producing various statistical products:

- National land cover databases (forest cover, crop area, etc.)
- Crop monitoring/forecasting => food security emergencies
- Other topics: Spread of pests and animal diseases, Soil degradation, Biodiversity

Key milestones of FAO Geospatial Work

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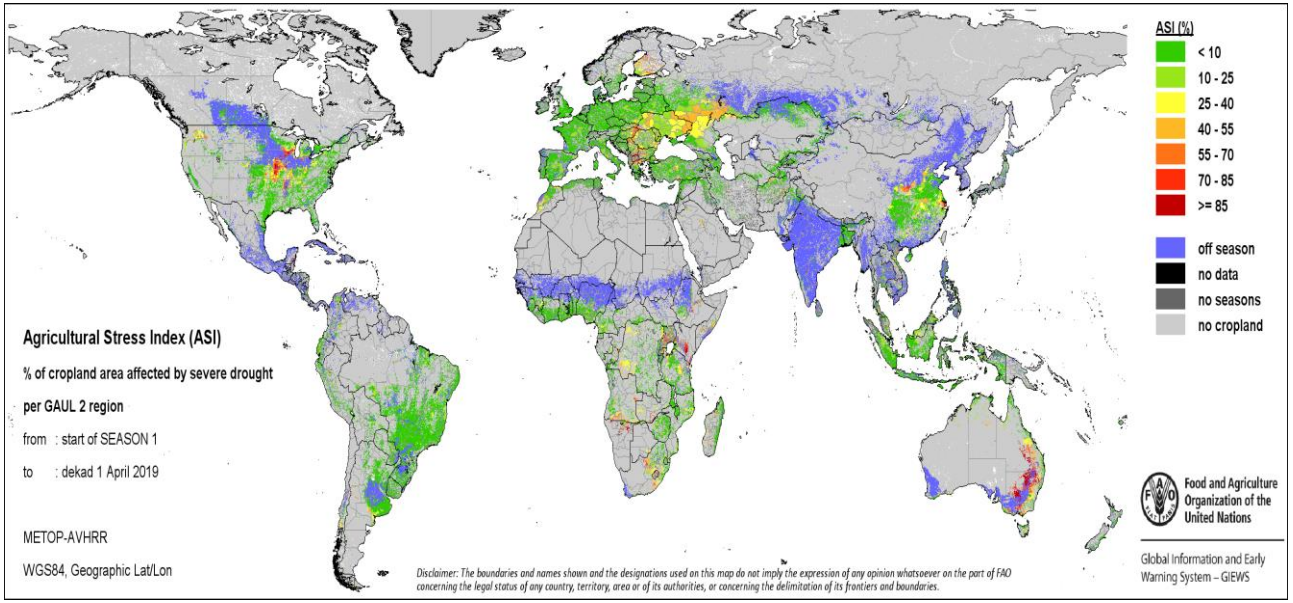
Major milestones:

- 2005: Land Cover Classification Standards, endorsed by ISO & SEEA
- 2010: Global Agro Ecological Zoning (GAEZ), the largest online geospatial database with more than 360,000 online layers
- FAO launched the Agricultural Stress Index System in 2014



Key milestones of FAO Geospatial Work

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Major milestones:

- 2015: MoU with Google Earth Engine: open access to RS images
- 2014-16: FAO-ESA-University of Louvain co-developed the Sent2Agri toolbox: methods & tools for using Sentinel data for ag. statistics
- 2018: FAO-ESA joint implementation of the Sent2Agri toolbox in 12 developing countries (Sen4STAT project)

Key milestones of FAO Geospatial Work

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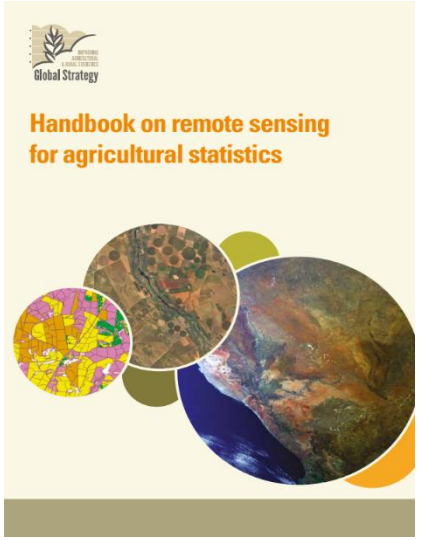
Handbooks on the use Remote Sensing (RS) for agricultural statistics, covering:

- Cost-effectiveness of RS for different uses in agricultural statistics;
- Development of efficient methods for using RS in agricultural statistics
- Use of GPS, GIS and RS in setting up Master sampling Frames
- Spatial disaggregation and small-area estimation methods for agricultural surveys
- Detailed land cover mapping using RS data (estimation of forest area, crop area, water basins, etc.)



Key milestones of FAO Geospatial Work

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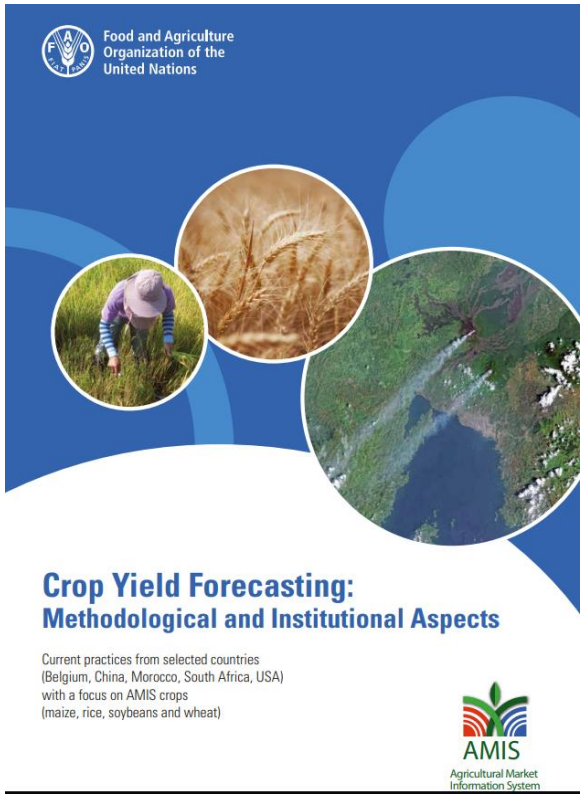
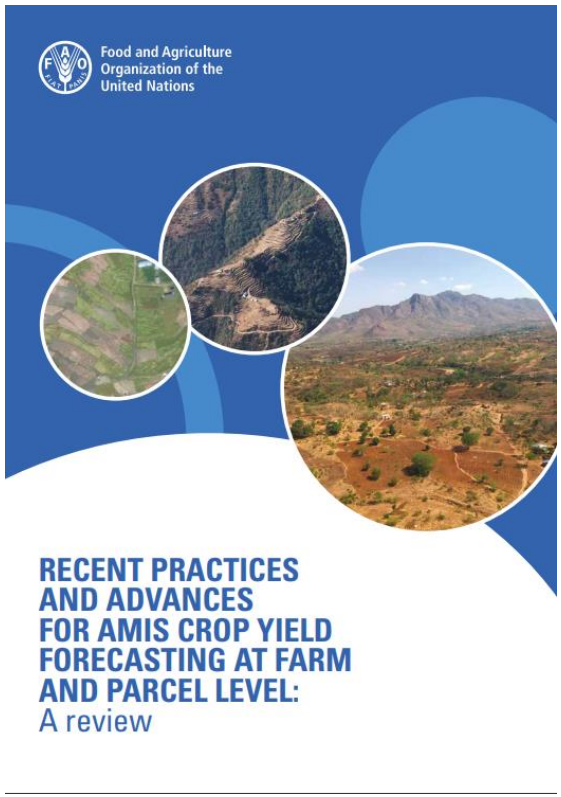
Handbooks on Crop production/yield forecasting using RS (in collaboration with AMIS - the G20 initiative launched in 2011 to enhance food market transparency, after the global food price crises in 2007/08 and 2010)





Earth Observation (EO) Data for SDG Monitoring

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- Monitoring SDG's is data intensive

- Generating data for SDG monitoring through the traditional surveys and censuses is very expensive (cost up to $253 billion globally during the lifetime of the SDGs)

- Depending on the type of indicator, EO data and Geospatial analysis can be used for one or a combination of the following:
  - Direct measurement, or contribution to direct measurement (Area statistics, Pixel counting, Image classification)
  - Disaggregation (dissymmetric mapping, modelling)
  - Support agricultural survey sample design, including AGRIS (Stratification, Area frame)

Earth Observation (EO) Data for SDG Monitoring

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- Depending on the type of indicator, EO data and Geospatial analysis will be used for one or a combination of the following statistical results

Ind. Number	Indicator	Direct measure	Disaggregation	Survey design
2.1.1	Hunger		✓	
2.1.2	Severity of food insecurity		✓	
2.3.1	Productiviity of small-scale food producers		✓	✓
2.3.2	Income of small -scale food producers		✓	✓
2.4.1	Agricultural sustainability	✓ Support	✓	✓
5.a.1	Women's ownership of agricultural land			✓
6.4.1	Water use efficiency	✓ Support	✓	✓
6.4.2	Water stress	✓ Support	✓	✓
15.1.1	Forest area	✓	✓	✓
15.2.1	Sustainable forest management	✓ Support	✓	✓
15.4.2	Mountain Green Cover	✓	✓	✓

Direct measure

- Zonal statistics
- Pixel counting
- Image classification

Disaggregation

- dissymmetric mapping
- regressions

Support agricultural survey sample design including AGRIS

- Stratification
- Area frame

Earth Observation (EO) Data for SDG Monitoring

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FAO is developing a project that delivers the following:

- Create the EO database (based on the freely available EO data)
  - Establish a baseline
  - Conduct field visits to collect in-situ geo reference data that will be used for calibration
  - Testing and validation of the EO

- Develop a methodology that help countries utilize EO to measure SDGs, disaggregate data and support agricultural survey sample design

- Prepare a guidelines on how to use EO to measure SDGs, disaggregate data and surveys sample design.

- Validate the guidelines through field testing

- Invest on building national capacity in selected 12 countries for effective use of the guidelines

Earth Observation (EO) Data for SDG Monitoring

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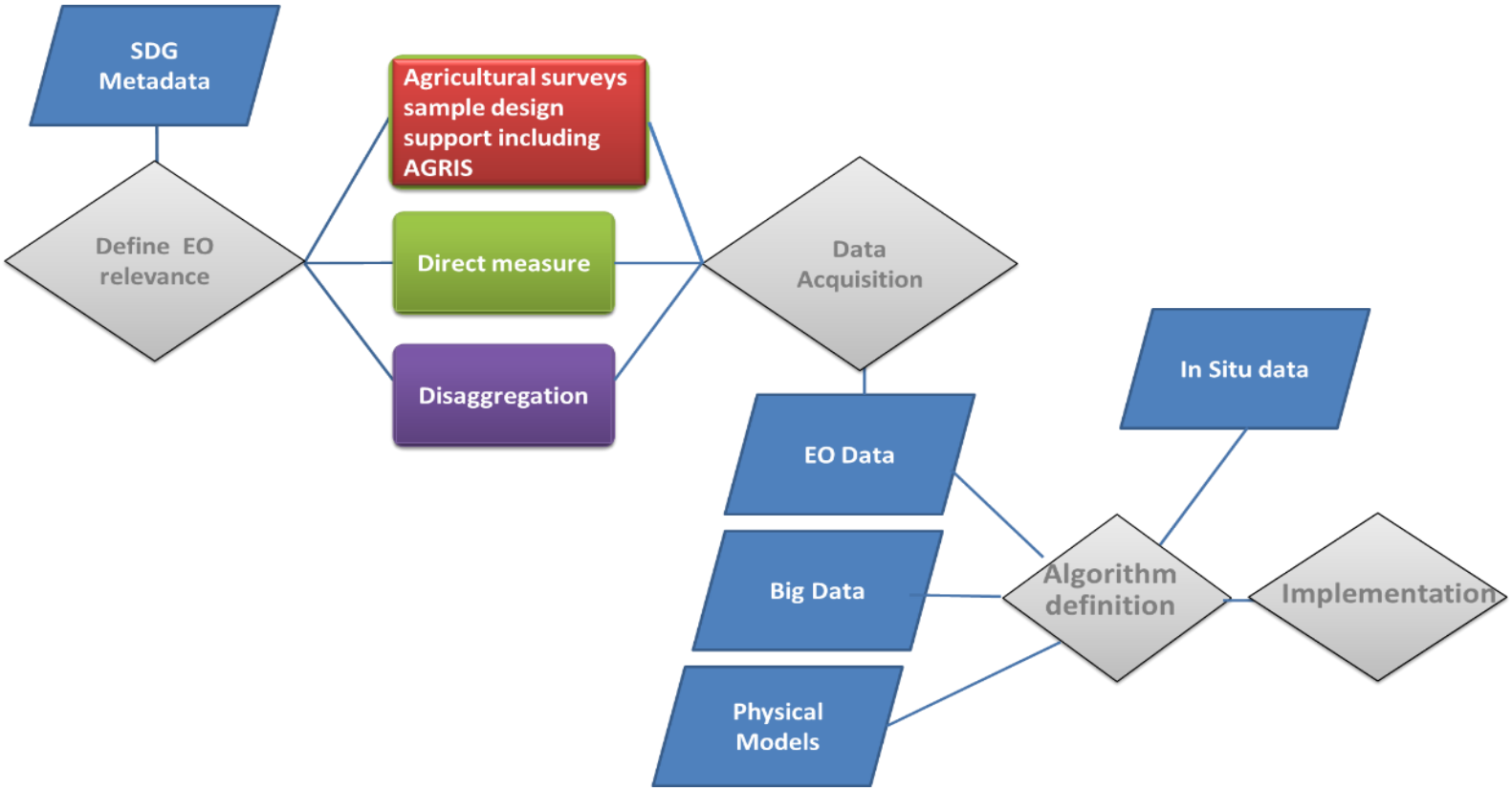
High level methodology: starting from review of SDG metadata, EO relevance is determined, data acquired, algorithm developed and solution(s) implemented in countries



Working with Countries on EO-based SDG monitoring

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- Work with 12 countries on utilization of EO data for SDG monitoring

Approach followed:

- FAO to work jointly with NSOs to set up the analytical environment on site and calculate the SDG baselines and time series.
- Use of Public domain EO data & applications through cloud computing platforms and free EO/GIS tools delivered to NSOs
- Use of local in situ data collected in the field and managed by NSO's to validate EO products to improve accuracy of SDG estimation and other national statistics
- Designing and implementing of technical solutions in close collaboration with the National Statistical Offices.
- Delivery of training to ensure NSO capacity to run the EO analysis in time using low cost tools.

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Thank you
for your attention