UN FAO Tools

Douglas Muchoney, FAO
Forum of Experts in SEEA Experimental Accounting 2018
Glen Cove, New York
18-20 June 2018
Land evaluation and planning

• **The Agro - Ecological Zones (AEZ) process** is the main system for assessing agricultural resources and potential

• Can be applied at global, regional and national levels for better planning, management and monitoring of land resources

• FAO involved in methodology development since 1978

• Used as SO-2 indicator (area with improved agricultural productivity and crop suitability)
GAEZ - Global Agro-Ecological Zones

- By FAO and the International Institute for Applied Systems Analysis (IIASA).
- GAEZ database is publicly available through a WEB portal.

http://gaez.fao.org/Main.html
GAEZ Data Portal capabilities

- Designed to facilitate access to the GAEZ database and resources
- Enables users management
- Delivers terabytes of spatial data, maps, tables, statistics, metadata, reports
- Fully documented (Data model, User’s Manual, GAEZ definitions, FAQ, limitations, and hints available)
- Compliant with FAO definitions, classifications and standards, ISO metadata standards to feed FAO GeoNetwork

http://gaez.fao.org/Main.html
**GAEZ Data Portal**

- **Brief summary of content:**
  - 5 thematic areas (Land and water resources; Agro-climatic resources; Suitability and potential yields; Actual yields and production; Yield and production gaps)
  - >300,000 global datasets at mainly 5 arc-minutes, also core layers at 30 arc-seconds
  - 11 crop groups, 49 crops, 92 crop types and 280 Crop/LUTs
  - Yield and production gap analysis for 17 crops/commodities
  - 5 water supply types
  - 4 Input levels (High, Intermediate, Low, Mixed)
  - Historical 1961-2000, 30 year average (1961-1990) and Future, 2020s, 2050s, 2080s

[www.fao.org/nr/gaez](http://www.fao.org/nr/gaez)
National AEZ: Thailand

Agro-ecological assessment of crop suitability and productivity

- **Input:** resource databases; crop requirements and crop suitability criteria; crop calendars; crop statistics; industry and research data of potential attainable yields.

- **Output:** Mapped suitability and attainable yields by single crop and selected multi-cropping systems.

http://www.fao.org/3/a-i7077e.pdf
Agro-ecological Suitability

Attainable Yield (kg/ha)

Rain-fed Major Rice

Legend:
- SI > 75: Very high
- SI > 63: High
- SI > 50: Good
- SI > 35: Medium
- SI > 20: Moderate
- SI > 10: Marginal
- SI > 0: Very marginal
- Not suitable
- Forest
- Water
- Urban
Rain-fed Major Rice

Rain-fed Maize

Agro-economic Suitability
Estimation of ‘optimized’ spatial production structure
Land Resources Information Management System (LRIMS)

- Integrated processing environment where physical and socio-economic data are analyzed;
- Help identify sustainable land management practices;
- Allows implementation of an integrated and interactive approach to land use planning;
- Support for technicians and policy makers;
- Enables assessment and modeling of land suitability and responses to potential agricultural production;
- Developed and applied in Libya; Currently under development in Laos, Afghanistan and Macedonia
i) map the ecosystems

ii) determine the ecosystem condition

iii) determine relevant ecosystem services for provisioning and regulating services

iv) select indicators or modelled outputs of the ecosystem services for which viable data are available

v) map the ecosystem services and service potential
National mapping
ECO-NET Africa
Land Cover Mapping: national.....regional.....global

- ECO-NET: mapping based on a statistical method approach
- GOAL: ensure reliable information at country levels
- MAPPING METHOD based on samples chosen on a fixed grid with appropriate density interval.
- OUTPUT: successfully validated in several demonstration countries in Africa
GLC-SHARE initiative

- New global land cover database created by FAO in partnership and with contributions from various partners and institutions;

- First global product created using the ISO standard for land cover classification ISO TC 211 – 19144-2 LMCL (Land Cover Meta Language);

- It provides a set of eleven major thematic land cover layers (FAO SEEA LCML legend);

- Resulted by a combination of “best available” high resolution national, regional and/or sub-national land cover databases;

- The database is produced with a resolution of 30 arc-second (~1sqkm).
Land Cover Classification System

- LCCS / LCML: Comprehensive methodology for description, characterization, classification and comparison of most land cover features identified anywhere in the world, at any scale or level of detail: basis for comparative classification. (6 UN official languages)
- Created in response to a need for a harmonized and standardized collection and reporting on the status and trends of land cover
From land cover to land use (LCML to LCHML)
The functional relationship between physical objects, land events and related socio economic functions key parameters to built up a “Land Representation” system
Vulnerable Ecosystems: DECCMA project

DECCMA: Deltas Vulnerability and Climate Change: Migration and Adaptation” examines the vulnerability, environmental stressors and hazards of a range of climate change and biophysically driven scenarios across the study deltas.

[Diagram showing modelling workflow and threatened deltas]

Population potentially displaced by current sea-level trends to 2050
(Extreme >1 million; high =1 million-50,000; medium 50,000–5,000 people)
Global population in deltas is about 500 million people
GeoNetwork – FAO metadata catalogue

- Internet access to interactive maps, satellite imagery and related spatial databases maintained by FAO and its partners;
- Powered by GeoNetwork opensource, which was developed by FAO and other UN agencies based on Free and Open Source Software (FOSS) principles and international standards;
- Almost 7000 records are stored;
- Ongoing upgrade to latest opensource version.

Pakistan Crop Information Portal

- The **Pakistan’s Crop Portal** is a component of the *Pakistan Agriculture Information System*;

- It is being developed to support data and information dissemination on major crops (area, yield and production) and agro-meteorological conditions affecting crop growth;

- The Crop Portal uses **District** based crop data (wheat, maize, sugarcane, rice and cotton) and agromet conditions

[http://cip.sgs-suparco.gov.pk]
Afghanistan Agriculture Information Portal (AAIP)

**MAIN OBJECTIVES OF THE CROP PORTAL:**

1. Sharing historical statistics and forecasts on crop yields and area.
2. Sharing historical and near real-time agronomic, meteorological, and hydrological data.
3. Monitoring crop conditions during main growing stages to detect stresses affecting future crop results.
4. GIS interface for the mapping of crop production information, natural resources, infrastructure, and vegetation indexes from remote sensing.
GEOGLAM

Monitoring Crop Production

• In this context a global system to monitor and assess production is seen as an important decision making tool to:
  – provide timely information on crop production and yield in a standardized and regular fashion at the regional to global level.
  – provide estimates as early as possible during the growing season(s) and update the estimates periodically through the season until harvest.

• Examples of current global crop estimation systems is GEOGLAM, which combines in-situ information, weather and satellite data in a convergence of evidence approach to estimate production and yield.
SIGMA

Stimulating innovation for Global Monitoring of Agriculture (SIGMA)

• FP7 EC Project.

• SIGMA’s main challenge is to develop innovative methods and indicators to monitor and assess progress towards ‘sustainable agriculture’.

• The project is a contribution to GEOGLAM initiative started by the G20.

• Reinforce awareness of the impact of agriculture on the global environment enabling the prediction of the impact of crop production on natural resources and ecosystems.
This is the name of the Conference

18 May 2015
Remote sensing for water productivity
Sustainable Forest Management (SFM) Toolbox

What is SFM

Sustainable forest management (SFM) can be viewed as the sustainable use and conservation of forests with the aim of maintaining and enhancing multiple forest values through human interventions. People are at the centre of SFM because it aims to contribute to society's diverse needs in perpetuity.

The United Nations describes SFM as:

A dynamic and evolving concept that aims to maintain and enhance the economic, social and environmental values of all types of forests, for the benefit of all people.
This is the name of the Conference
Fisheries and Resources Monitoring System (FIRMS)

Our mission...
The primary aim of the Fisheries and Resources Monitoring System (FIRMS) is to provide access to a wide range of high-quality information on the global monitoring and management of fishery marine resources.

Our data...
Launch the Stocks and Fisheries map viewer

Get Marine Resource and Fishery fact sheets by clicking a fishing area on the map.

Latest news...
CECAF - check latest updates in the Eastern Central Atlantic
Free open-source solutions for environmental monitoring

What is openforis?
Collect Earth System Overview

- User friendly, java-based data collection tool
- Fully customizable data entry
- Limited computer skills necessary
- Internet connectivity recommended, but not required if other data sources are provided
- Individual or team based data collection
- Open-source software with code available on Github.com
Collect Earth user cases

Collect Earth facilitates the analysis of high and very high resolution satellite imagery for a wide variety of purposes, including:

- Support **multi-phase National Forest Inventories**
- **Land Use, Land Use Change and Forestry (LULUCF) assessments** (18 partnering countries)
- **Monitoring agricultural land** and urban areas
- Accuracy assessment of existing maps (DRC, Zambia)
- Collection of spatially explicit socio-economic data (Vietnam)
- Quantifying deforestation, reforestation and desertification
Thank You!!

Douglas.Muchoney@fao.org

Geospatial: [www.fao.org/geospatial](http://www.fao.org/geospatial)
SEPAL: [https://sepal.io](https://sepal.io)
GAEZ: [http://gaez.fao.org/Main.html](http://gaez.fao.org/Main.html)