



Food and Agriculture
Organization of the
United Nations

30th Workshop on Space Technology for Socio-Economic Benefits: "Challenges and Capacity-building Opportunities for Emerging Space Nations"

Land Cover Land Use at Food and Agriculture Organization of the United Nations (FAO)

Matieu Henry

*Technical Officer, a.i. Head of Geospatial Unit,
Land and Water Division (NSL)- FAO*

3. Panel "Needs of new space-faring nations or of non-space-faring nations to develop and obtain space-related knowledge and skills"

29 September 2023

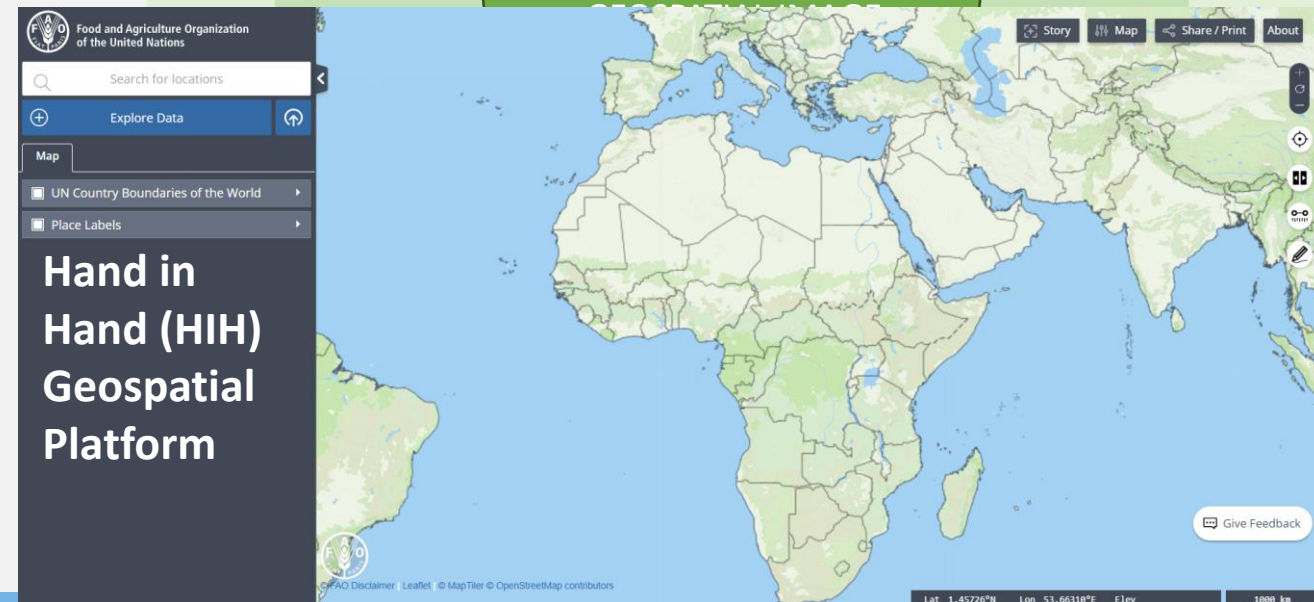
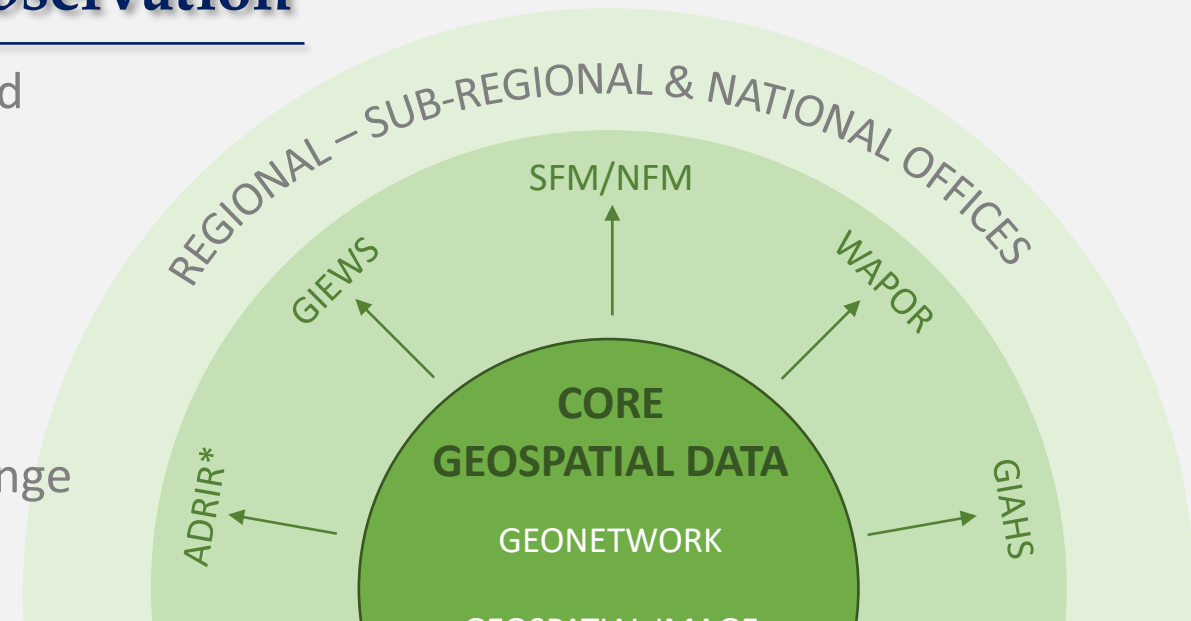
FAO's work - a general overview

- Founded in 1945, FAO leads international efforts to defeat **hunger and improve nutrition and food security**.
- Article 1 of the convention - Functions of the Organization
- *The Organization shall collect, analyse, interpret and disseminate information relating to nutrition, food and agriculture. In this Constitution, the term "agriculture" and its derivatives include fisheries, marine products, forestry and primary forestry products.*
- FAO supports development plans, strategies and decision-making processes in member states through the transformation to MORE efficient, inclusive, resilient and sustainable agri-food systems for **better production, better nutrition, a better environment, and a better life**, leaving no one behind.
- FAO is the custodian UN agency for **21 SDG indicators** and is a contributing agency for a further 5. In this capacity, FAO is supporting countries' efforts in monitoring the 2030 Agenda.



Programmes and activities relevant to earth observation

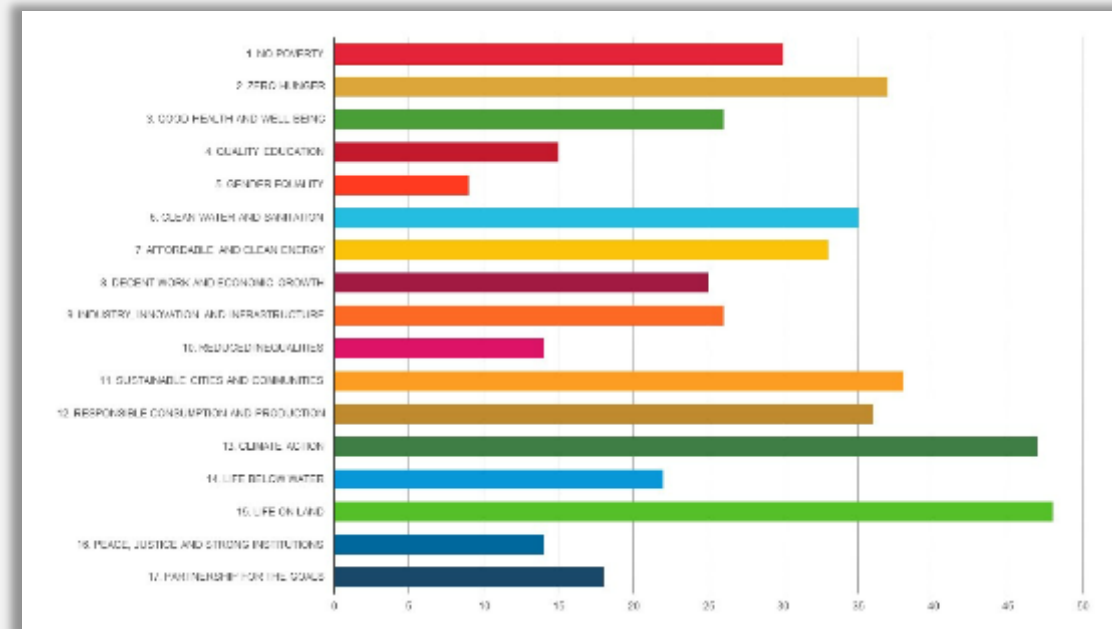
- Global Information and Early Warning System on Food and Agriculture ([GIEWS](#))
- National Forest Monitoring ([NFM](#))
- Remote sensing for water productivity ([WAPOR](#))
- Globally Important Agricultural Heritage Systems ([GIAHS](#))
- Modelling System for Agricultural Impacts of Climate Change ([MOSAICC](#))
- Agricultural Stress Index System ([ASIS](#))
- Global Land Cover Network (GLCN)
- Global Agro-Ecological Zones ([GAEZ](#))
- Global information system on water resources and agricultural water management ([AQUASTAT](#))
- Land cover legend registry ([LCLR](#))
- The Hand-in-Hand (HIH) Initiative ([HiHi](#)).
- Emergency data Hub ([DIEM](#)).



<https://www.fao.org/hand-in-hand/en>

Importance of land cover land use for SDGs

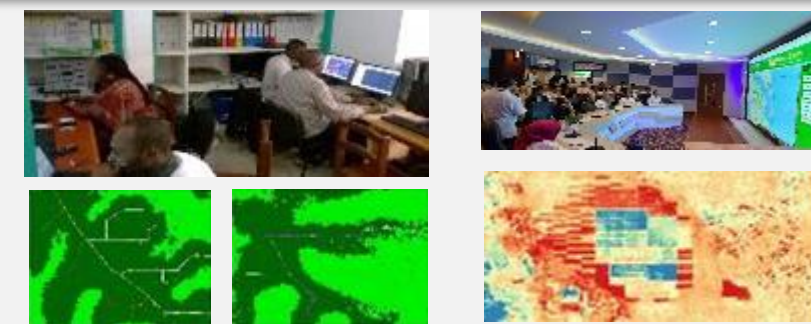
- Land resources play a vital role in tackling climate change, securing biodiversity and maintaining crucial ecosystem services, while ensuring resilient livelihoods and food security.
- Assessing land-cover and land-use is essential and critical and one of the fourteenth fundamental data theme under UN-GGIM.
- Contributes to all SDGs its cross-sectoral nature as well as other international goals and initiatives including UNFCCC, ISOTC211 AG13, UNFCCC, UNCCD, UNCEEA and others.
- It is an important baseline information in national reporting to international reporting, land suitability, assessment, monitoring of various sectors (agriculture, forestry, fishery, energy, emergency) and many others



Reference systems



Rapid assessment



Agriculture, crop, forest Monitoring

Peatland restoration

<https://www.fao.org/geospatial/en/>

FAO's presence - hq, regional, sub-regional and country offices

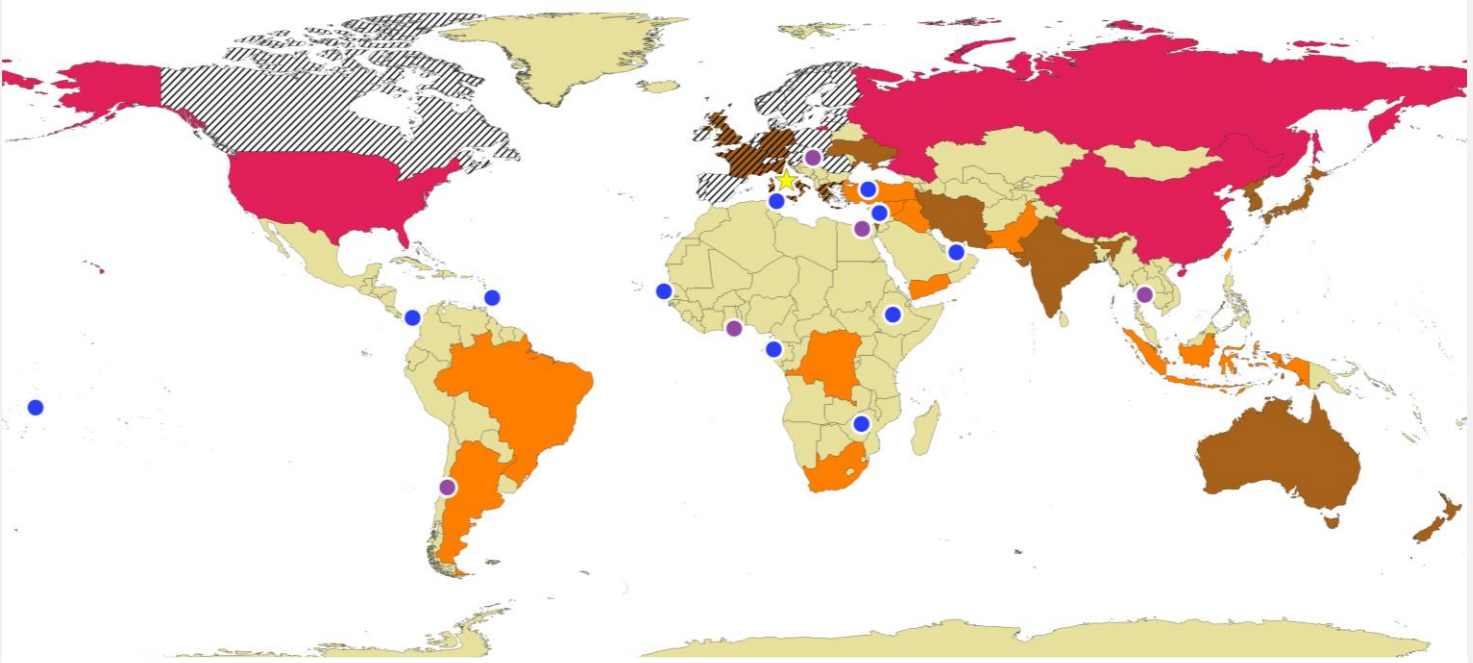
- FAO is providing technical support in > 130 [countries](#) among 195 [Member Nations](#)
- HQ is located in Rome, Italy.
- Consist of 5 regional offices, 11 sub-regional offices, 6 liaison offices and 7 partnership & liaisons offices.

Regional offices

Regional Office for Africa, Ghana, Accra
 Regional Office for Asia and the Pacific, Thailand, Bangkok
 Regional Office for Europe and Central Asia, Hungary, Budapest
 Regional Office for Latin America and the Caribbean, Chile, Santiago
 Regional Office for the Near East, Egypt, Cairo

Sub-regional offices

Subregional Office for Central Africa, Gabon, Libreville
 Subregional Office for Mashreq, Lebanon, Beirut
 Subregional Office for Mesoamerica, Panama, Panama City
 Subregional Office for Central Asia, Turkey, Ankara
 Subregional Office for Eastern Africa, Ethiopia, Addis Ababa
 Subregional Office for North Africa, Tunisia, Tunis
 Subregional Office for Southern Africa, Zimbabwe, Harare
 Subregional Office for West Africa, Dakar, Sénégal
 Subregional Office for the Caribbean, Barbados, Bridgetown
 Subregional Office for the Gulf Cooperation Council States and Yemen, United Arab Emirates, Abu Dhab
 Subregional Office for the Pacific Islands, Samoa, Apia



An illustration of the diversity of space related involvement with regards to FAO presence

Source: [Spaceflight - Wikipedia](#)

FAO offices

- ★ HQ
- Regional
- Sub-region

Countries

- Crewed space-faring countries
- Uncrewed space-faring countries
- ▨ Space-faring countries in ESA
- Sub-orbital space-faring countries
- Non space-faring countries

SETTING COMMON RULES: FAO LAND COVER LEGEND REGISTRY

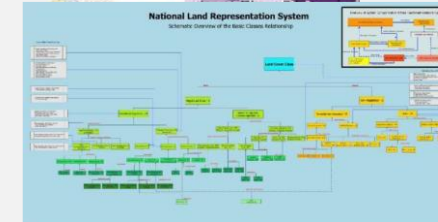
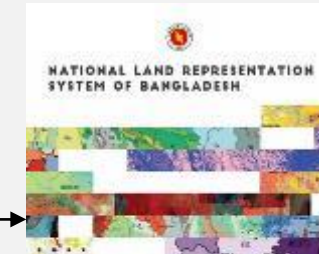
- It is an online library established and maintained by FAO for accessing existing land cover legend, legend class, datasets and related reference documents.

Web portal Interface

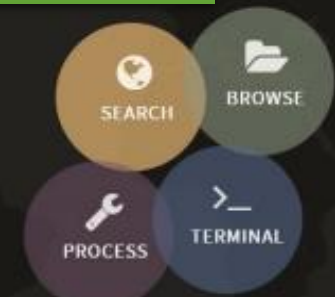
Web portal interface showing a search for "Land cover legend for Bangladesh". The interface includes a search bar with filters for Country (Bangladesh), Year (2015), and Legend Code (LCCS3). A table lists land cover classes with columns for ID, Alpha Code, Name, Definition, Class Code, and File.

Id	Alpha Code	Name	Definition	Class Code	File
112	B1	Evergreen hill forest	Natural forest area within the reserve forest boundary and protected forest boundary of Chittagong Hill Tracts (CHT) is known as hill forest. It consists of moist tropical evergreen and semi-evergreen trees. Tree cover ranges from 80% - 100% and top canopy of trees reach a height of 25-62 m.	FEh	
113	B2	Forest plantation	The area where trees are planted for high volume of timber and wood under long-term or short-term management. Trees are generally even-aged, planted in rows in a large enough area. Tree height ranges 5 - 40 m and cover ranges 80% - 100%. Agroforestry can also be incorporated with this class.	FP	Download

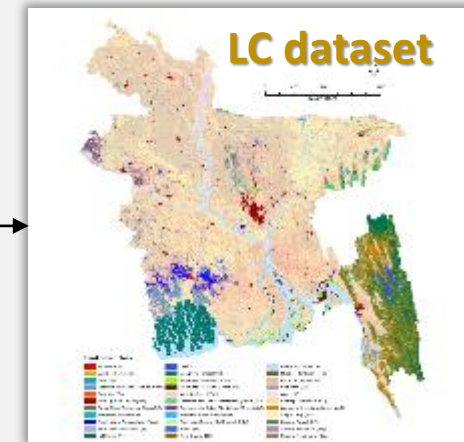
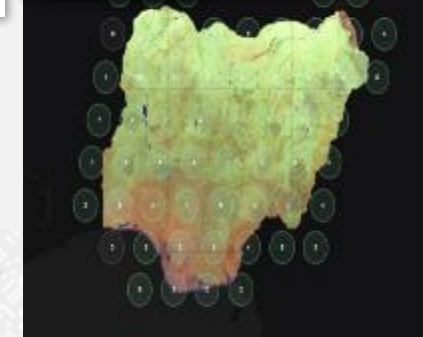
LC Legend



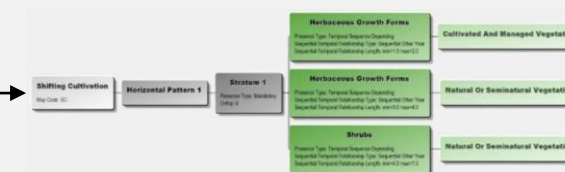
SEPAL



Nigeria land cover classification



LC Class

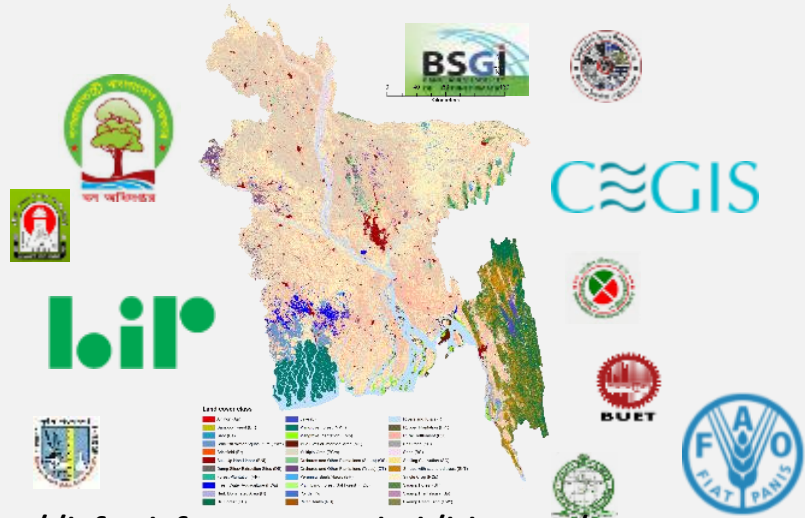


INSTITUTIONAL COLLABORATION

- Multiple institutions (13)
- Different sectors
- Diverse objectives
- Different programs/projects
- Different approaches
- National and international reporting
- National and local planning

REGIONAL PARTNERSHIPS E.G. WEST AFRICA

- Regional & international organizations: ECOWAS, CILSS, AGRHYMET, OSS, FAO, NASA SERVIR
- 17 countries : Benin, Burkina Faso, Cape Verde, Côte D'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, and Togo.
- Area: 8 million square kilometers.
- Ecological belts: region can be sub-divided based on climate and vegetation characteristics into 5 ecological belts including Guineo-Congolian, Guinean, Sudanian, Sahelian and Saharan belts



http://bfis.bforest.gov.bd/library/wp-content/uploads/2019/11/LRSB_final_11.11.19.pdf

<https://www.fao.org/publications/card/en/c/CC0730EN>

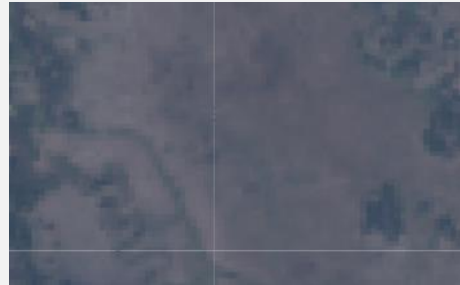
DATA INPUT FOR INFORMATION RETRIEVAL

Diverse satellite imagery and sensors are used to assess and monitor natural resources and agriculture

MODIS (250 m spatial resolution)



Landsat (30 m spatial resolution)



Sentinel 2 (10 m spatial resolution)



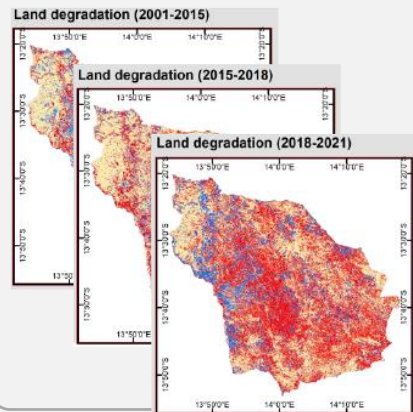
SPOT 6/7 (6 m spatial resolution)



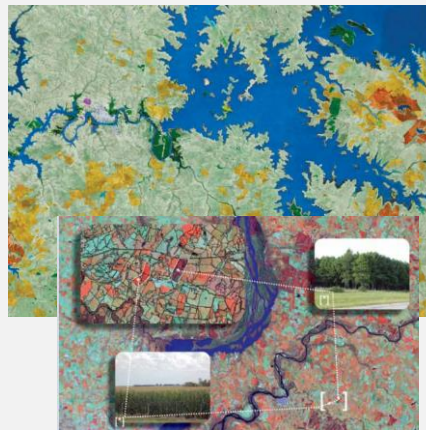
And many others... NICFI
Planet, Worldview, MAXAR etc.

Ex. of applications

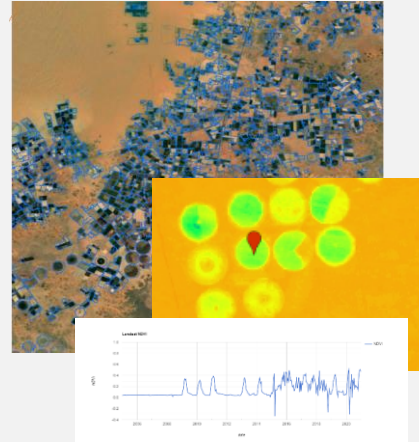
Land degradation in Angola



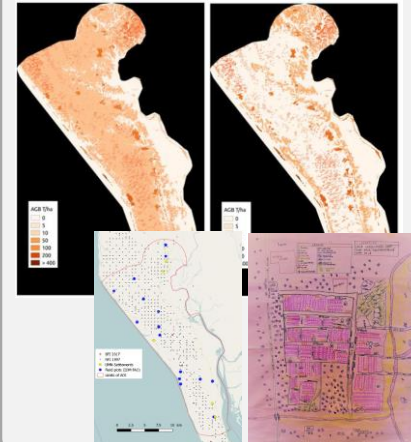
Land cover in Uruguay



Crop mapping in Libya



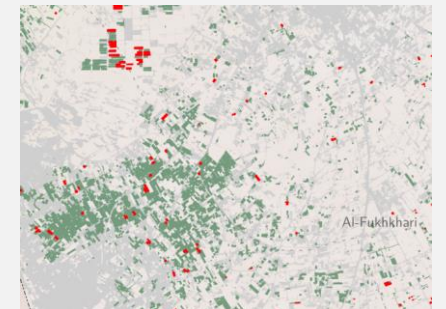
Woodfuel in Bangladesh



Infrasructure



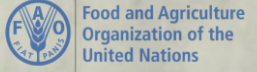
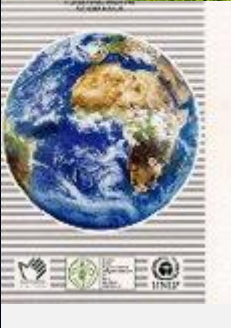
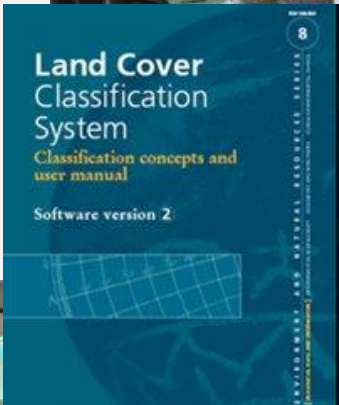
Greenhouses

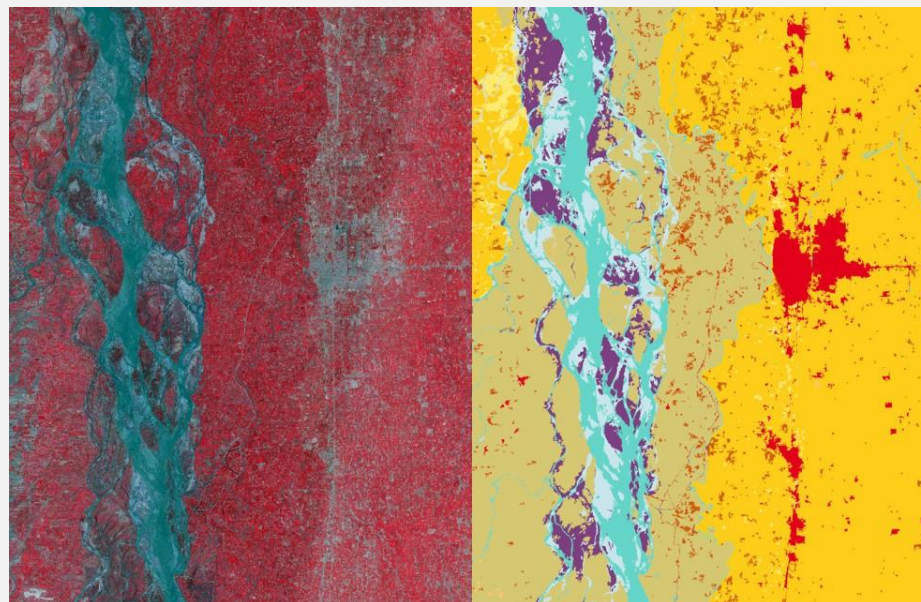


Challenges: compromise between temporal, spatial & spectral resolutions with available imagery (cost/ size / cloud etc.)

Conclusion

Need capacities to use standards for EO data interoperability, consistency, transparency and accuracy
To establish sustainable frameworks, plans and programs
To benefit from the diversity of satellite data and technologies
And provide data availability and accessibility in timely manner and collaboratively
For adoptable and adaptable solutions





Thank you!

Matieu.henry@fao.org

<https://www.fao.org/geospatial/en/>



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