FAOSTAT Statistics for Climate Change

Agriculture, Forestry and Other Land use

Final Workshop on Environment Statistics for the East African Community Region
Arusha, Tanzania 23 – 27 October 2017

ENVIRONMENT Team
FAO STATISTICS DIVISION

Food and Agriculture Organization
of the United Nations

Outline

- *Climate Change Statistics and Relevance to FAO work*
- *FAOSTAT Emissions Statistics*
- *FAOSTAT Climate Change Statistics beyond Emissions*

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Relevance to FAO work

- Climate change threatens our ability to achieve **global food security**, **eradicate poverty** and achieve **sustainable development**;

- Has both direct and indirect effects on **agricultural productivity** (changing rainfall patterns, drought, flooding and the geographical redistribution of pests and diseases);

- Greenhouse gas (**GHG**) emissions from human activity are a significant driver of climate change;

- Elevated CO_2 causes oceans acidification, influencing the health of our oceans and livelihoods.

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FAOSTAT Climate Change-relevant Statistics

- Climate Change statistics support enhanced transparency under UNFCCC Paris Agreement, i.e. for National Determined Contributions (NDCs);
- FAO contributes to UNECE/UNSD on CC Relevant Statistics;
- Recent FAO work on Climate Change Indicators: Piloting current set of indicators;
- New: FAOSTAT Temperature Change (with NASA);
- Focus on communication of results to non-specialized users.

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FAOSTAT Global default estimates

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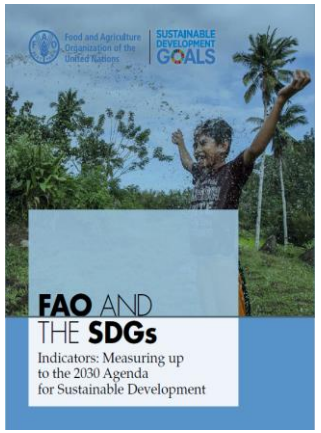
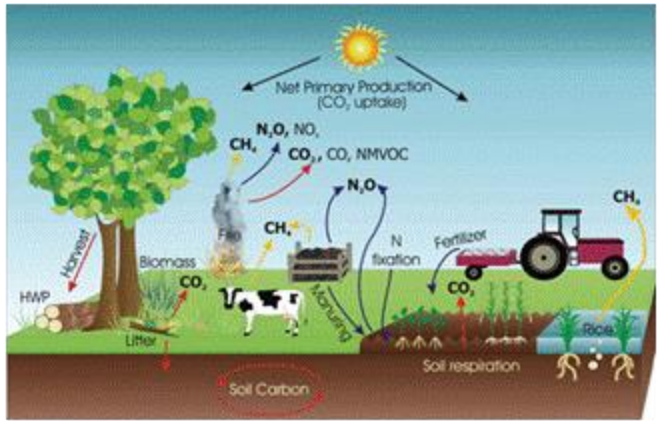
FAOSTAT

& geospatial data

+



IPCC 2006 Guidelines



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Level 1

Level 2

Level 3

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http://www.fao.org/faostat/en/#data

FAOSTAT Climate Change Relevant Statistics

- **GHG** Emissions from **AFOLU** Agriculture, Forestry and Other Land Use (*Carbon Stock Change; Deforestation, Degradation; Peatland; Fire Statistics*);
- Emissions Intensities;
- Emissions by Sector;
- Land Cover;
- Temperature Change.

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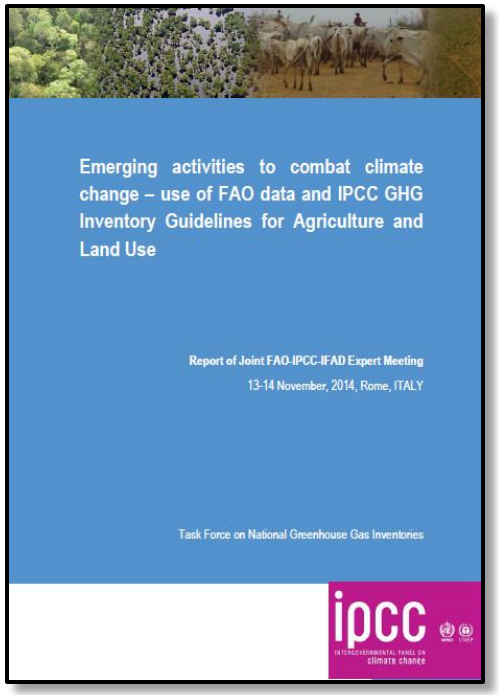
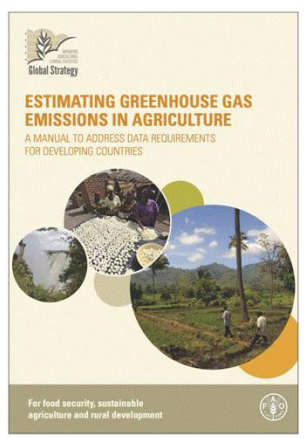
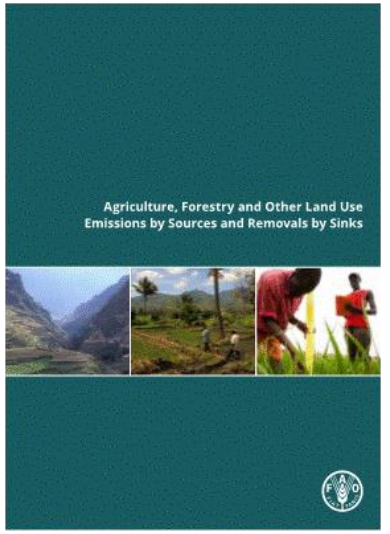
FAO Statistical Work on GHG Emissions

- FAO database with estimates and updates GHG Emissions from AFOLU;
- 1961- now updating to 2015 (Agriculture); 1990-2015 (LULUCF): ~185 Countries
- Reference **Tier 1** GHG Inventory using 2006 IPCC Guidelines:







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www.ipcc-nggip.iges.or.jp/public/mtdocs/pdfiles/1411_FAO-IPCC-IFAD_Rome_AFOLU.pdf

Emissions

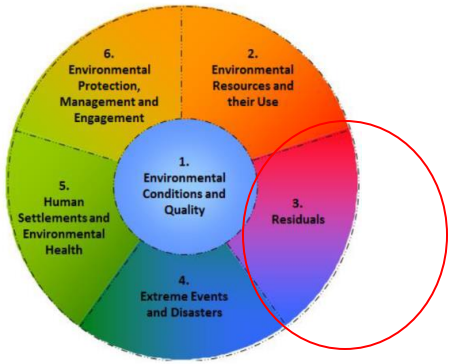
Emissions - Land Use

- Land Use Total
- Forest Land
- Cropland
- Grassland
- Burning - Biomass

Emissions - Agriculture

- Agriculture Total
- Enteric Fermentation
- Manure Management
- Rice Cultivation
- Synthetic Fertilizers
- Manure applied to Soils
- Manure left on Pasture
- Crop Residues
- Cultivation of Organic Soils
- Burning - Savanna
- Burning - Crop Residues
- Energy Use

http://www.fao.org/faostat/en/#data



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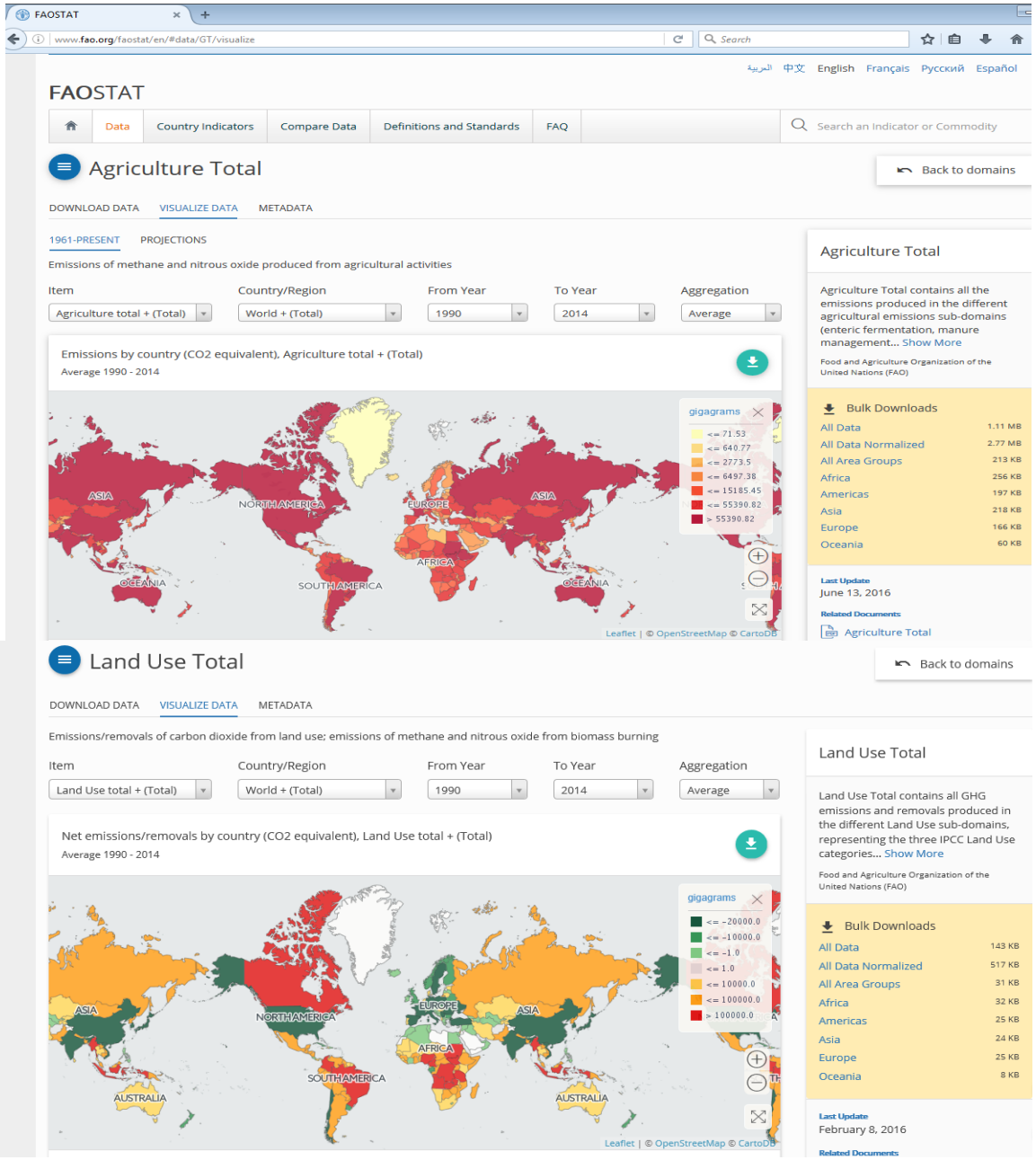
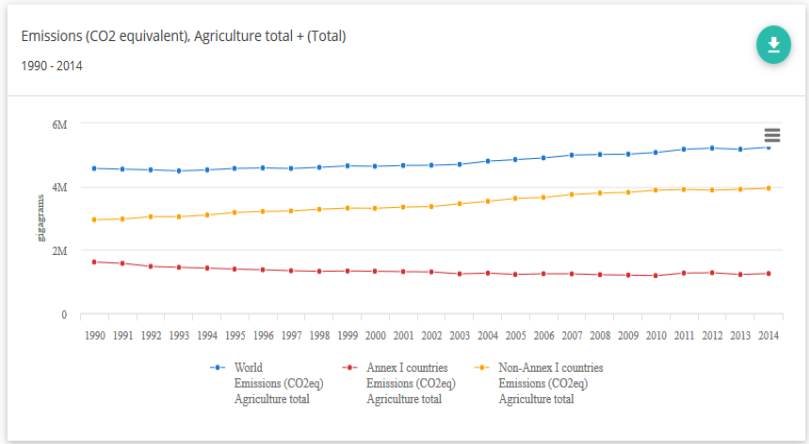
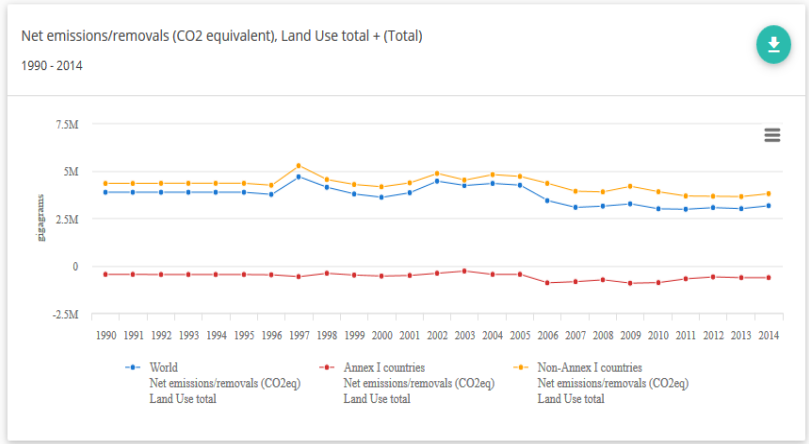
FAOSTAT Emissions Database







FAO emissions database: Addressing different data analysis needs

- **Facilitate National, Regional and Global analyses:** regional comparisons and trend analysis for AFOLU, including IPCC assessment reports;
- **Fill data gaps and QA/QC procedures:** Support member countries report under UNFCCC, addressing data gaps and needs in data QA/QC; e.g. a reference, Tier 1 data framework for analysis of AFOLU GHG trends for all countries–EU 28 QA/QC in 2014;
- Explore **policy-relevant** emission **indicators** in support of analyses linked to resilience, food security, including SDGs processes (UNSD/UNECE);

Emissions by Sector

AEIndicators EM

Emissions by sector

The Emissions by sector domain of the FAOSTAT Agri-Environmental Indicators section contains data on emissions of greenhouse gases (GHG) by gas... Show More

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Bulk Downloads

All Data	2.79 MB
All Data Normalized	6.8 MB
All Area Groups	398 KB
Africa	612 KB
Americas	515 KB
Asia	547 KB
Europe	456 KB
Oceania	160 KB

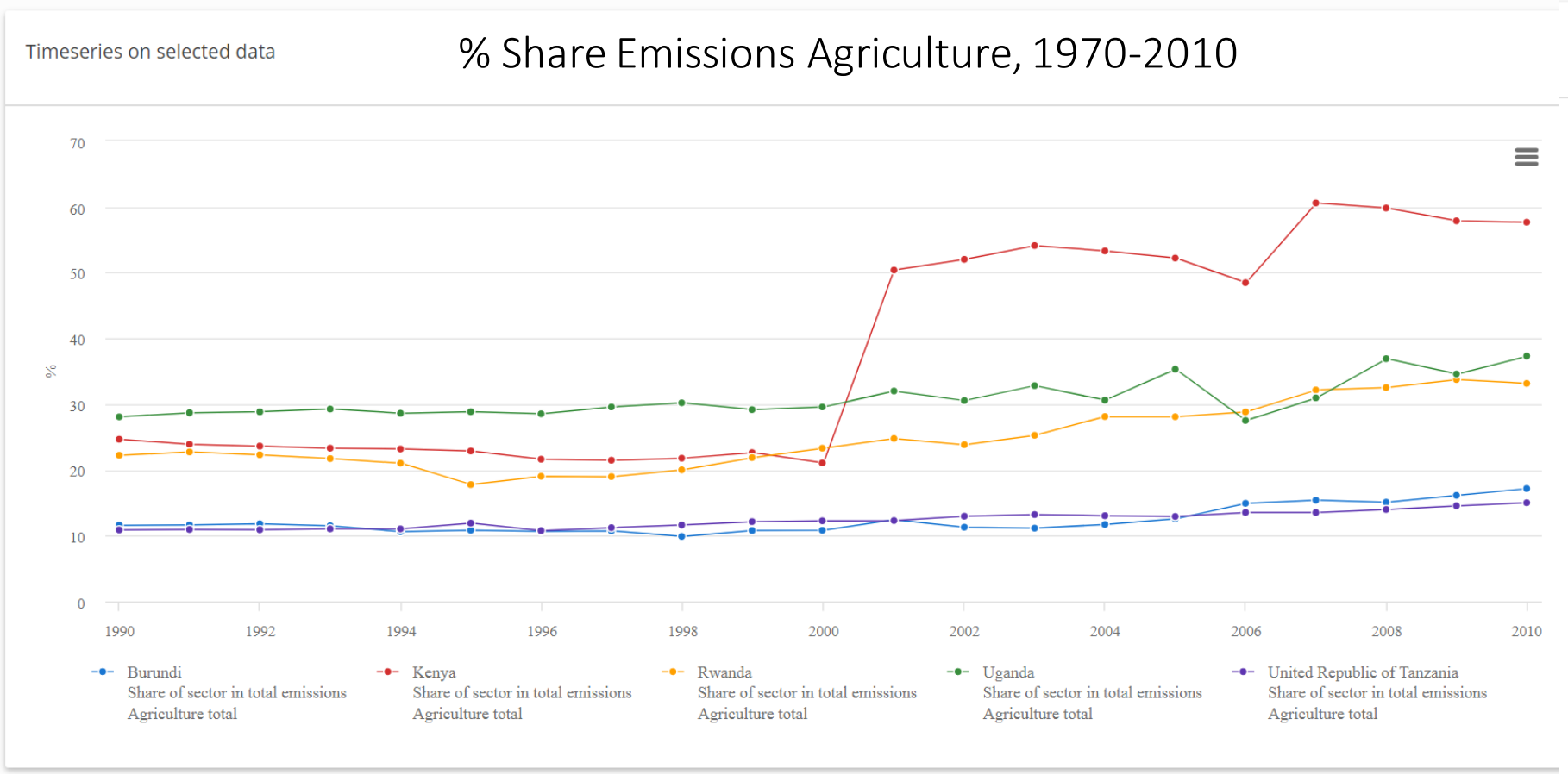
Last Update
September 6, 2016

Related Documents
Emissions by sector

Definitions and standa...

Metadata

Timeseries on selected data



http://www.fao.org/faostat/en/#compare

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Other sectors Emissions Database for Global Atmospheric Research EDGAR
http://edgar.jrc.ec.europa.eu/

AEIndicators EI

Emissions Intensities

Emissions intensities

Intensities of greenhouse gas (GHG) emissions by production unit for a selection of agricultural commodities.

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Bulk Downloads

All Data	1.47 MB
All Data Normalized	3.24 MB
All Area Groups	251 KB
Africa	319 KB
Americas	227 KB
Asia	298 KB
Europe	209 KB
Oceania	59 KB

Last Update
January 19, 2017

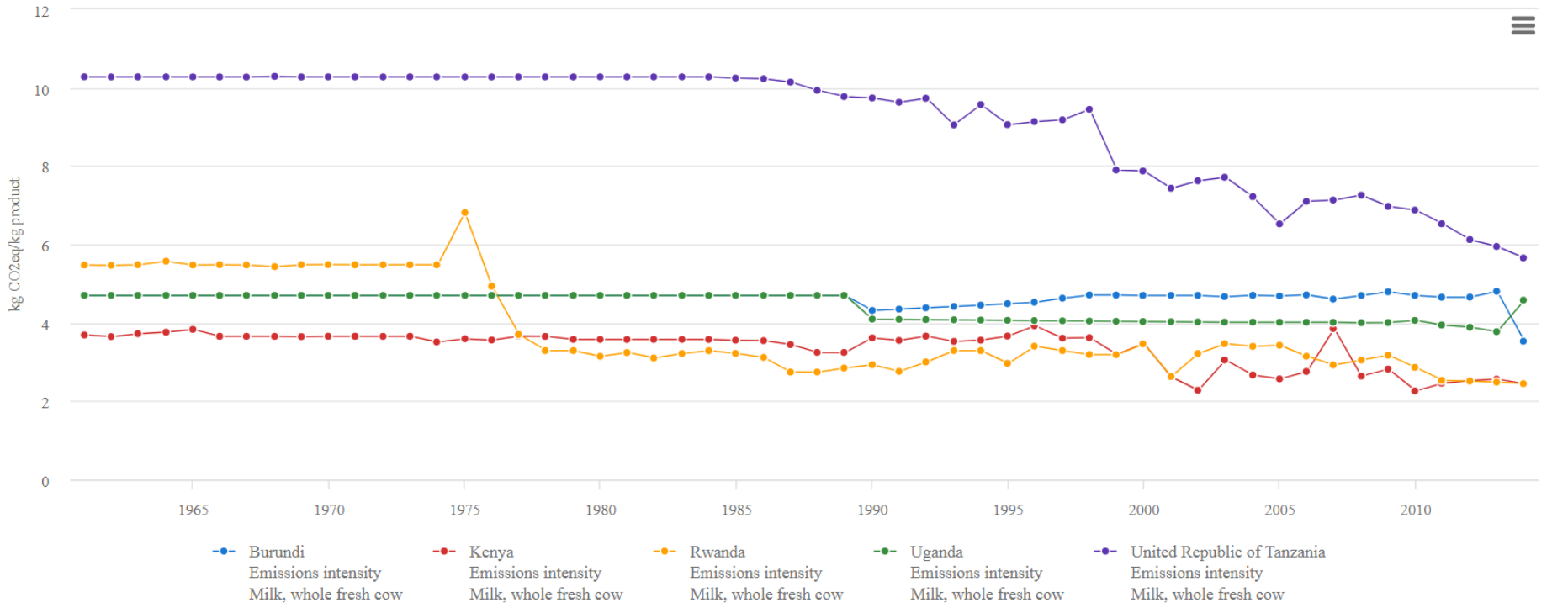
Related Documents
Emissions intensities

Definitions and standa...

Metadata

Timeseries on selected data

kg CO2 per kg of whole fresh milk, 1961 - onward



http://www.fao.org/faostat/en/#compare

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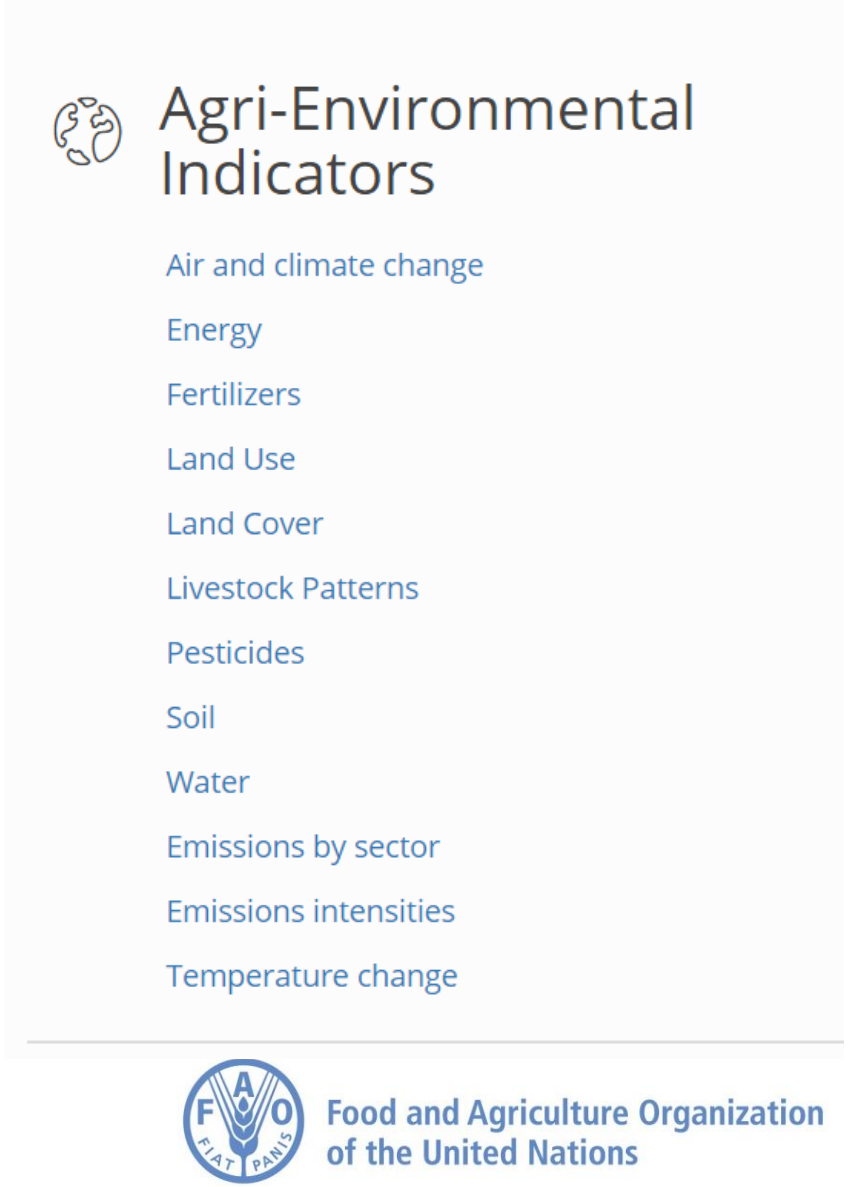
Beyond emissions: Climate change statistics in FAOSTAT Agri-Environmental Indicators



• **Land Use**	Share of land use category in Land, Agricultural area, Forest area,	1961-2014
• **Emissions Intensities**	kg CO_2 / kg product	1961-2014
• **Emissions by sector**	Tot emissions; Share by Gas; Share (gas) in sector	1990-2010
• **Land Cove**	1000 ha	1992-2015
• **Temperatu**	°C anomalies; standard deviation	1961-2016

Recently released

Land Cover

One of the Terrestrial Essential Climate Variables

https://www.ncdc.noaa.gov/gosic/gcos-essential-climate-variable-ecv-data-access-matrix

WORLD METEOROLOGICAL ORGANIZATION

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION

- **SDG 15.3.1**: Sub-indicator for proportion of land degraded;
- FDES – UNECE indicators and statistics;
- Environmental and Economic Accounting system (SEEA CF; SEEA AFF).

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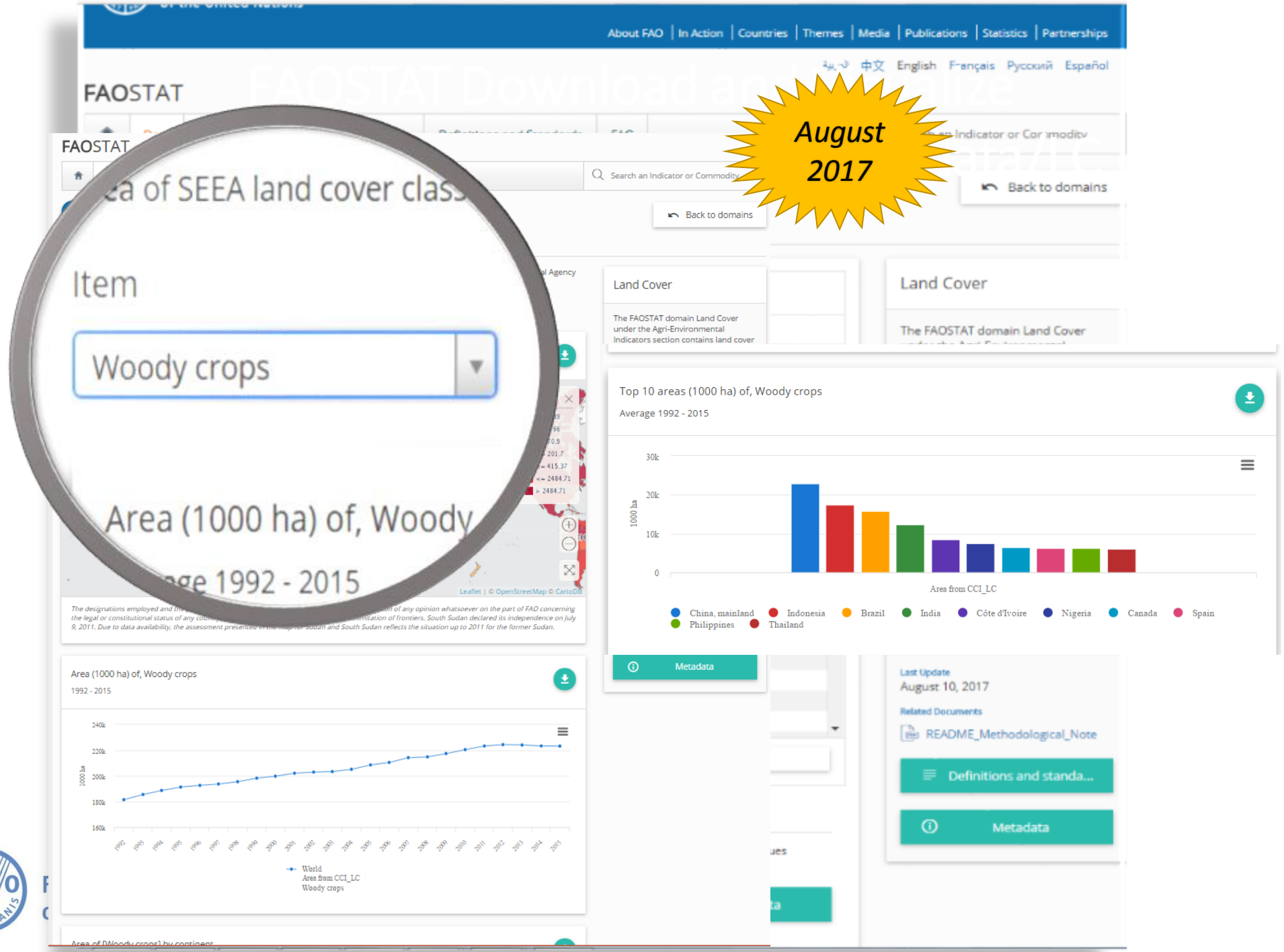
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FAOSTAT
August 2017
Back to domains
Item
Woody crops
Area (1000 ha) of, Woody
1992 - 2015
Land Cover
The FAOSTAT domain Land Cover under the Agri-Environmental Indicators section contains land cover
Top 10 areas (1000 ha) of, Woody crops
Average 1992 - 2015
1000 ha
Area from CCI_LC
China, mainland
Indonesia
Brazil
India
Côte d'Ivoire
Nigeria
Canada
Spain
Philippines
Thailand
Metadata
Area (1000 ha) of, Woody crops
1992 - 2015
World
Area from CCI_LC
Woody crops
Last Update
August 10, 2017
Related Documents
README_Methodological_Note
Definitions and standa...
Metadata

Reference standard: SEEA CF Land Cover

Land cover basic rules

Category	Basic rule
Artificial surfaces (including urban and associated areas)	The category is composed of any type of artificial surfaces.
Herbaceous crops	The category is composed of a main layer of cultivated herbaceous plants.
Woody crops	The category is composed of a main layer of cultivated tree or shrub plants.
Multiple or layered crops	The category is composed of at least two layers of cultivated woody and herbaceous plants or different layers of cultivated plants combined with natural vegetation.
Grassland	The category is composed of a main layer of natural herbaceous vegetation with a cover from 10 to 100 per cent.
Tree-covered areas	The category is composed of a main layer of natural trees with a cover from 10 to 100 per cent.
Mangroves	The category is composed of natural trees with a cover from 10 to 100 per cent in aquatic or regularly flooded areas in salt and brackish water.
Shrub-covered areas	The category is composed of a main layer of natural shrubs with a cover from 10 to 100 per cent.
Shrubs and/or herbaceous vegetation, aquatic or regularly flooded	The category is composed of natural shrubs or herbs with a cover from 10 to 100 per cent in aquatic or regularly flooded areas with water persistence from 2 to 12 months per year.
Sparsely natural vegetated areas	The category is composed of any type of natural vegetation (all growth forms) with a cover from 2 to 10 per cent.
Terrestrial barren land	The category is composed of abiotic natural surfaces.
Permanent snow and glaciers	The category is composed of any type of glacier and perennial snow with persistence of 12 months per year.
Inland water bodies	The category is composed of any type of inland water body with a water persistence of 12 months per year.
Coastal water bodies and inter-tidal areas	The category is composed on the basis of geographical features in relation to the sea (lagoons and estuaries) and abiotic surfaces subject to water persistence (intertidal variations).

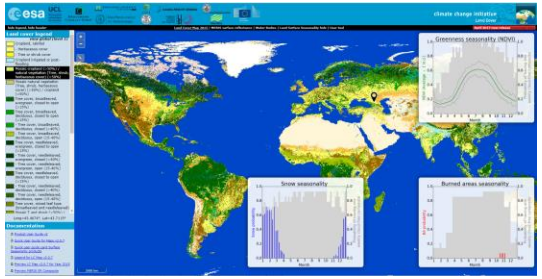
14 LC classes;

Based on FAO, Land Cover Classification System (LCCS) and Rules

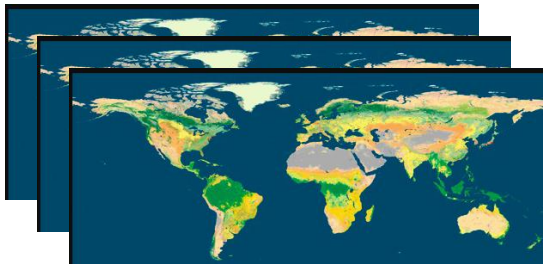
UN SEEA Central Framework, 2012

Geospatial data to populate the SEEA Land Cover

1) **Global LC maps**: land accounts: global and multi-temporal – matching LCC classifiers;



ESA CCI - LC (1992 – 2015) *UCL Geomatics, 2017*
MODIS v5 IGBP (2001 – 2012) *Herold et al., 2008*

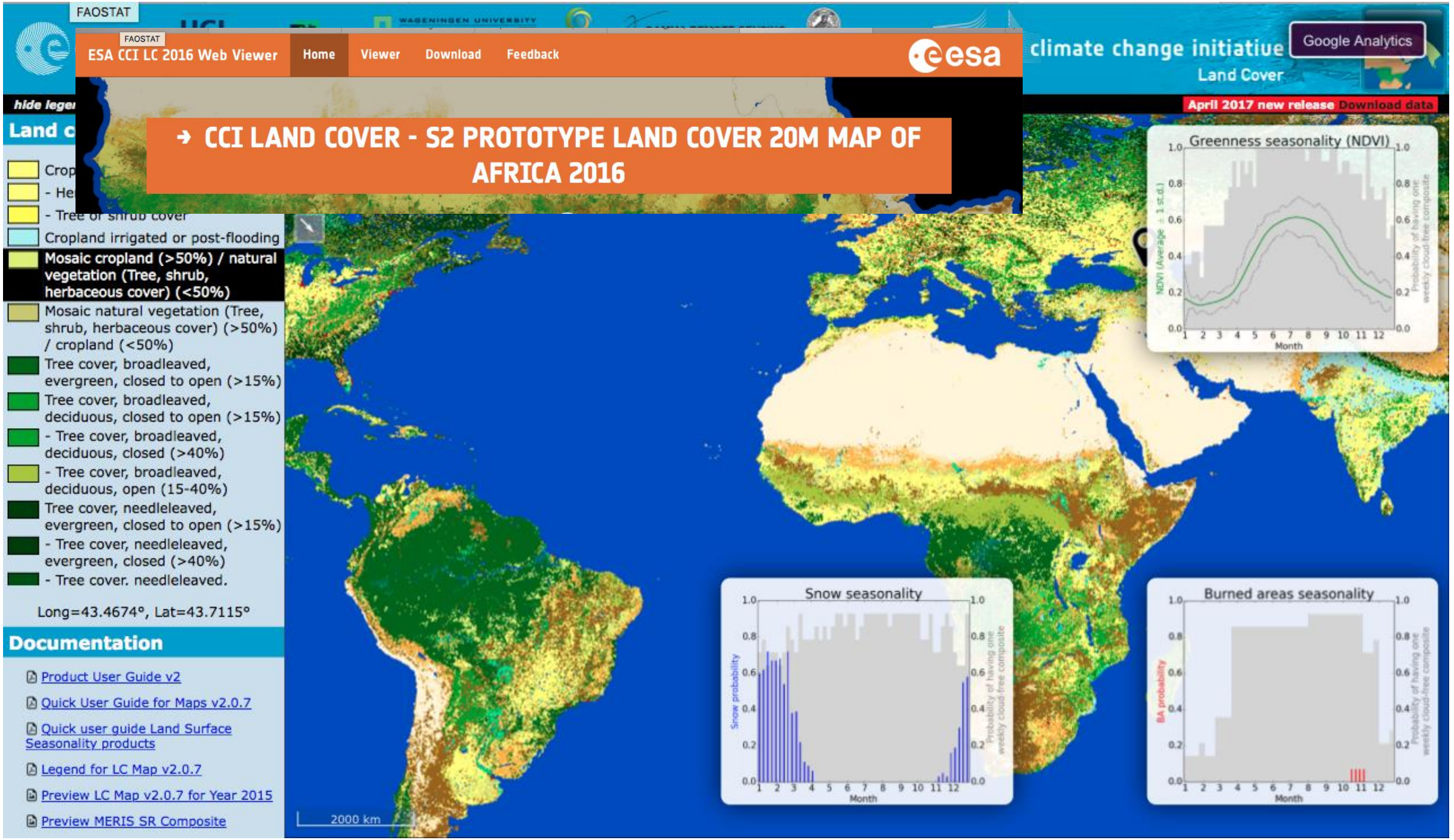


2) Geoprocessing: GAUL (2014) - normalized to official Country areas;

c) Translating original land cover legends to common SEEA LC classes **using UN Land Cover Classifiers (standard).**

SEEA Land cover applications

- In support of **Land Use statistical process with countries**;
- Internal **QA/QC - Trend analyses – Gap filling for Land Use**;
- Relevant processes (including SDGs)/collaborations/SEEA database);
- Increasing role of geospatial information: SDGs process (covariate; stratification in integrated agricultural surveys). http://2016africalandcover20m.esrin.esa.int/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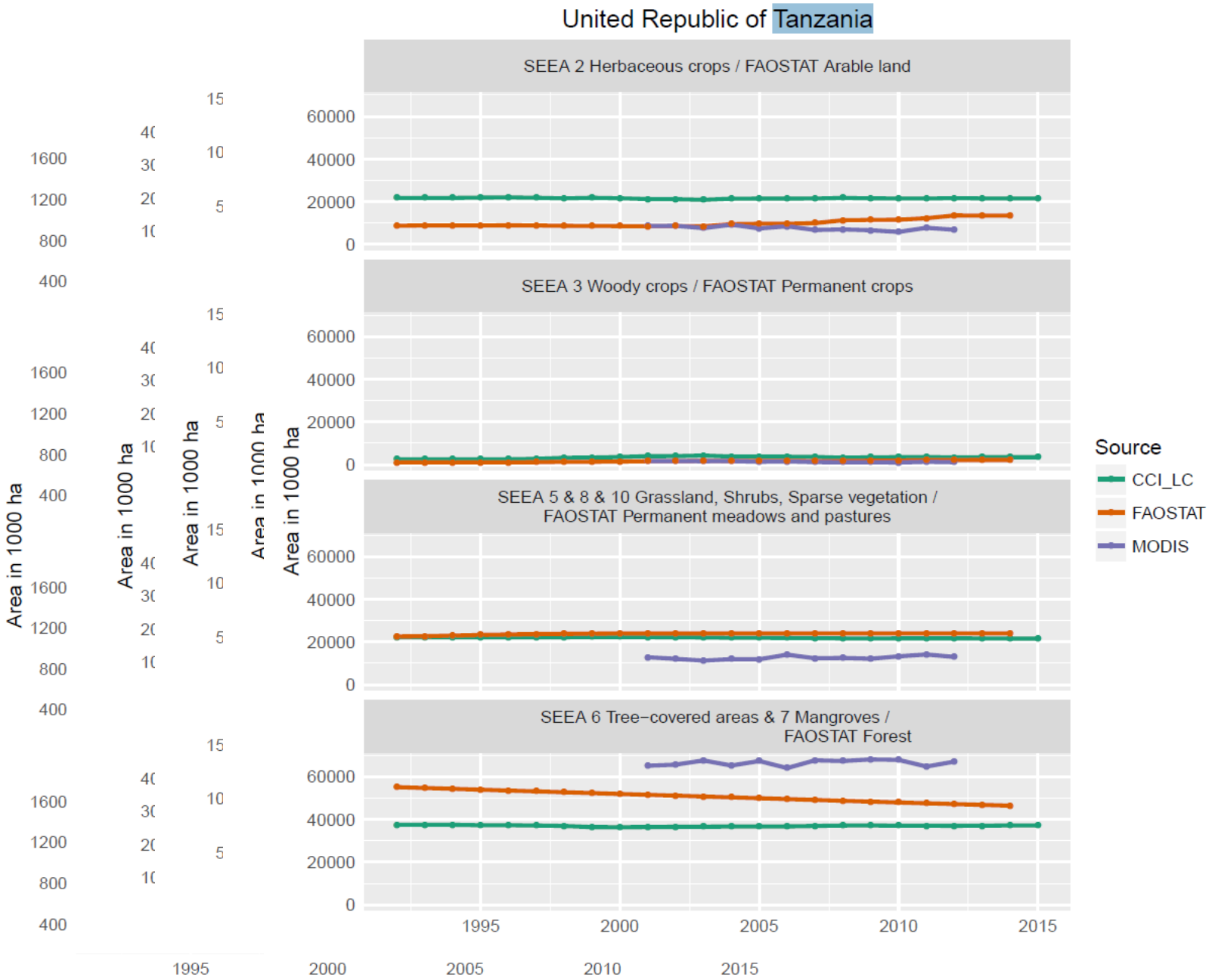
→ CCI LAND COVER - S2 PROTOTYPE LAND COVER 20M MAP OF AFRICA 2016
Land c
Cropland irrigated or post-flooding
Mosaic cropland (>50%) / natural vegetation (Tree, shrub, herbaceous cover) (<50%)
Mosaic natural vegetation (Tree, shrub, herbaceous cover) (>50%) / cropland (<50%)
Tree cover, broadleaved, evergreen, closed to open (>15%)
Tree cover, broadleaved, deciduous, closed to open (>15%)
- Tree cover, broadleaved, deciduous, closed (>40%)
- Tree cover, broadleaved, deciduous, open (15-40%)
Tree cover, needleleaved, evergreen, closed to open (>15%)
- Tree cover, needleleaved, evergreen, closed (>40%)
- Tree cover. needleleaved.
Long=43.4674°, Lat=43.7115°
Documentation
Product User Guide v2
Quick User Guide for Maps v2.0.7
Quick user guide Land Surface Seasonality products
Legend for LC Map v2.0.7
Preview LC Map v2.0.7 for Year 2015
Preview MERIS SR Composite
Greenness seasonality (NDVI)
Snow seasonality
Burned areas seasonality
Month
2000 km



Preliminary mapping of Land Cover to Land Use

Internal QA/QC

Work with countries

Assessment of uncertainties

Refinement

Temperature Changes

Higher temperatures impact negatively crop growth and yields throughout the world, putting livelihoods of million of farmers and communities at risk, in all regions

FAOSTAT Climate Change Indicators: Temperature Change

- Collaboration with NASA Goddard Institute for Space Studies https://data.giss.nasa.gov/gistemp/;
- Country data set of temperature anomalies compared to a climatology reference (1951-1980);
- Data 1961 – 2016, will be updated yearly.

http://www.fao.org/faostat/en/#data/ET

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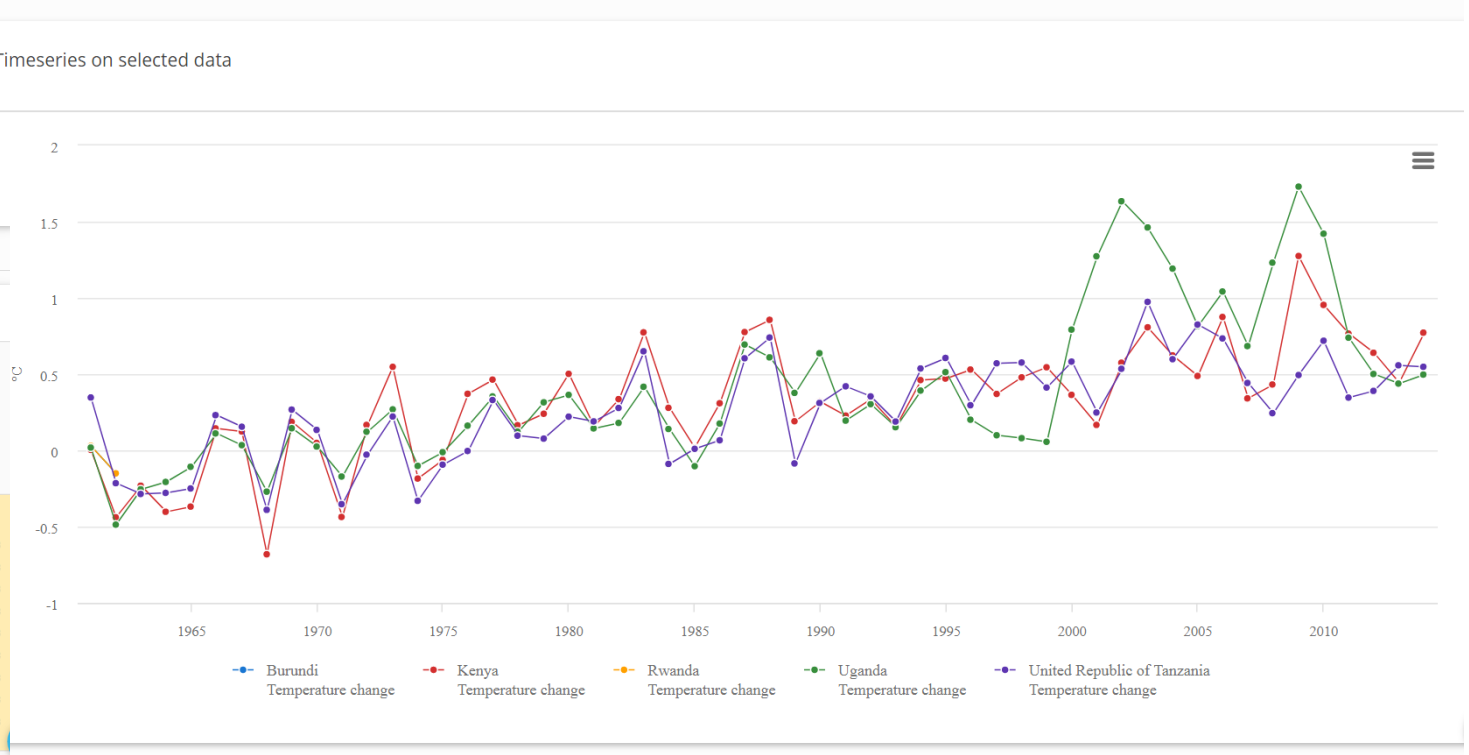
Temperature Change

Temperature Change & Standard Deviations for annual, seasonal and monthly means, 1961-2016

October 2017



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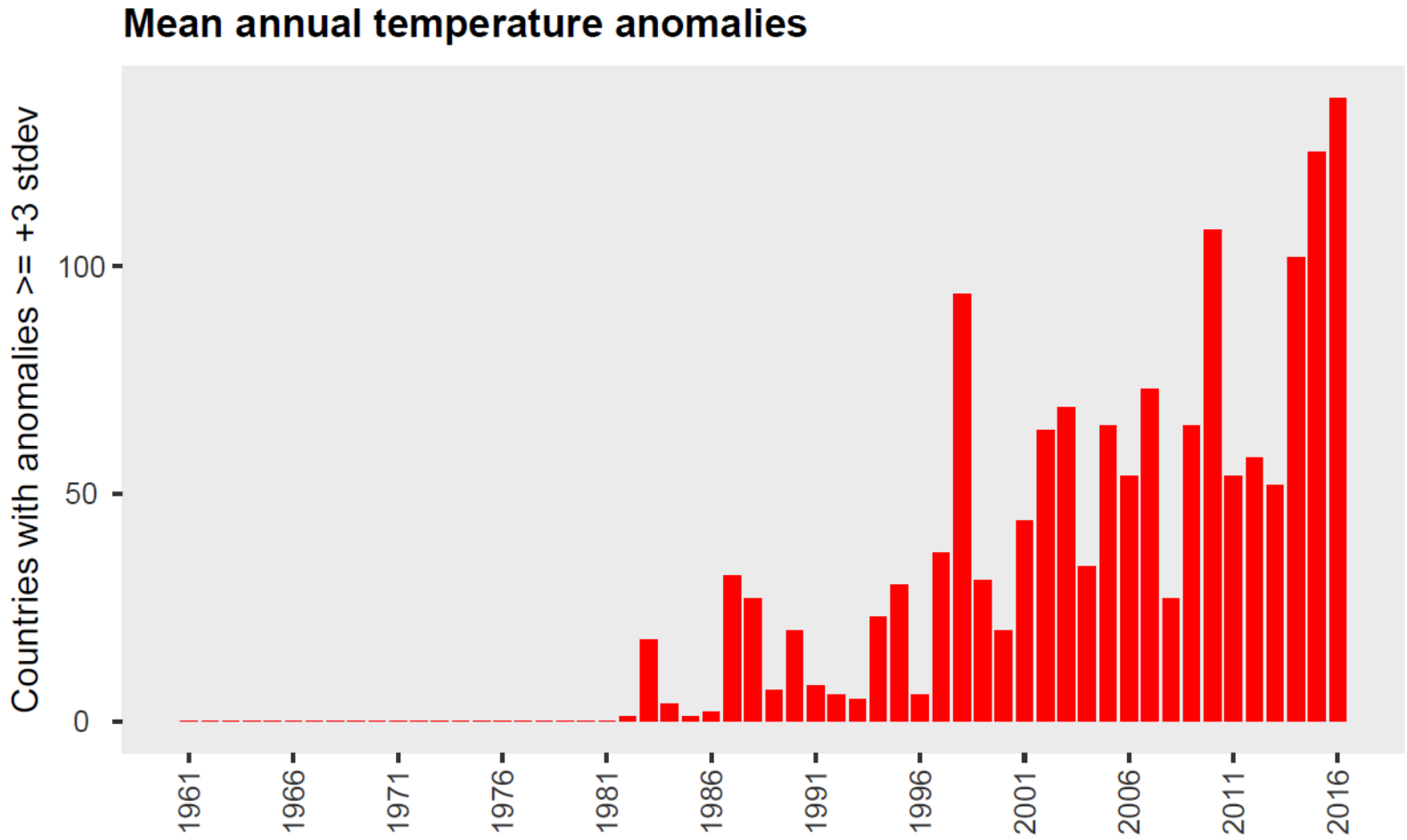
Communicating Climate Change Indicators

Indicator **FDES Basic Set of Statistics**:

Deviation of annual average temperature from long-term annual average



Source: FAOSTAT, 2017

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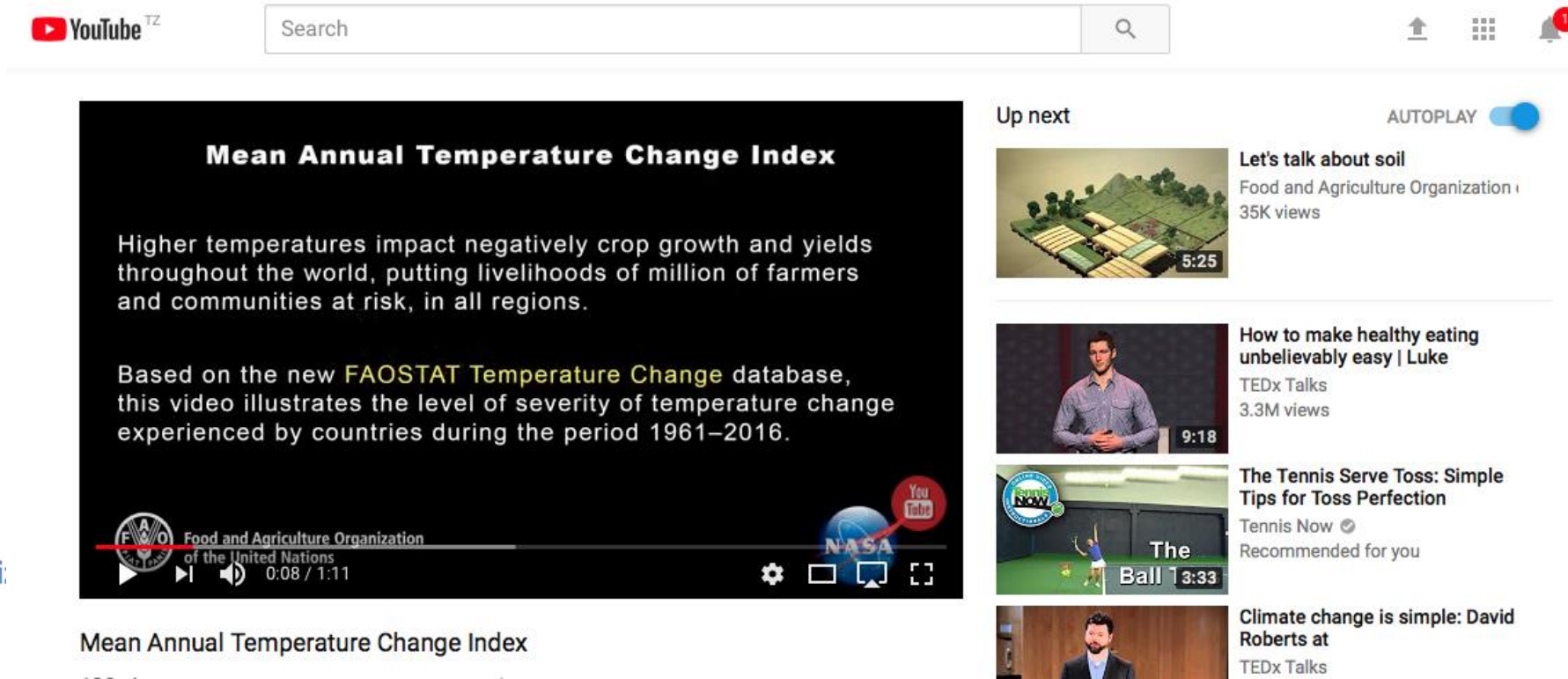
Mean Annual Change Temperature Index

FAO youtube channel:

https://www.youtube.com/watch?v=FFp08Jxto6w



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Conclusions

- FAOSTAT agri-environment and climate change statistics in support of member countries;
- Focus on climate change statistics, in support to NSOs for relevant international reporting processes, under the Paris Agreement and in connection to the SDGs;
- Close collaboration with UNSD/UNECE for set of climate change statistics and meeting emerging data needs;
- Geospatial increasingly part of the process – need for integration.

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THANK YOU

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FAOSTAT domains http://www.fao.org/faostat/en/#data
under
Inputs;
Agri-environmental indicators;
Emissions – Agriculture
Emissions – Land use