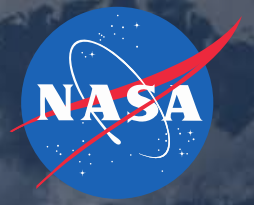
Making Space for Earth

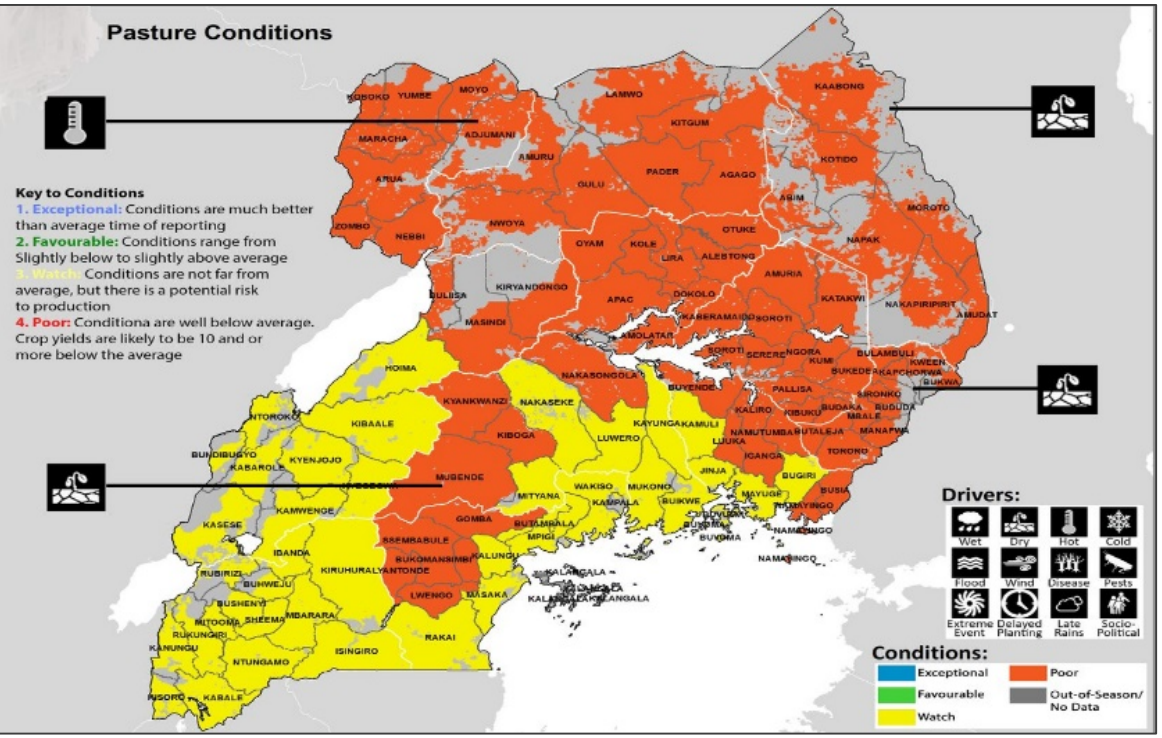
NASA Earth Science Applications

Lawrence Friedl

NASA Earth

Applied Sciences Program





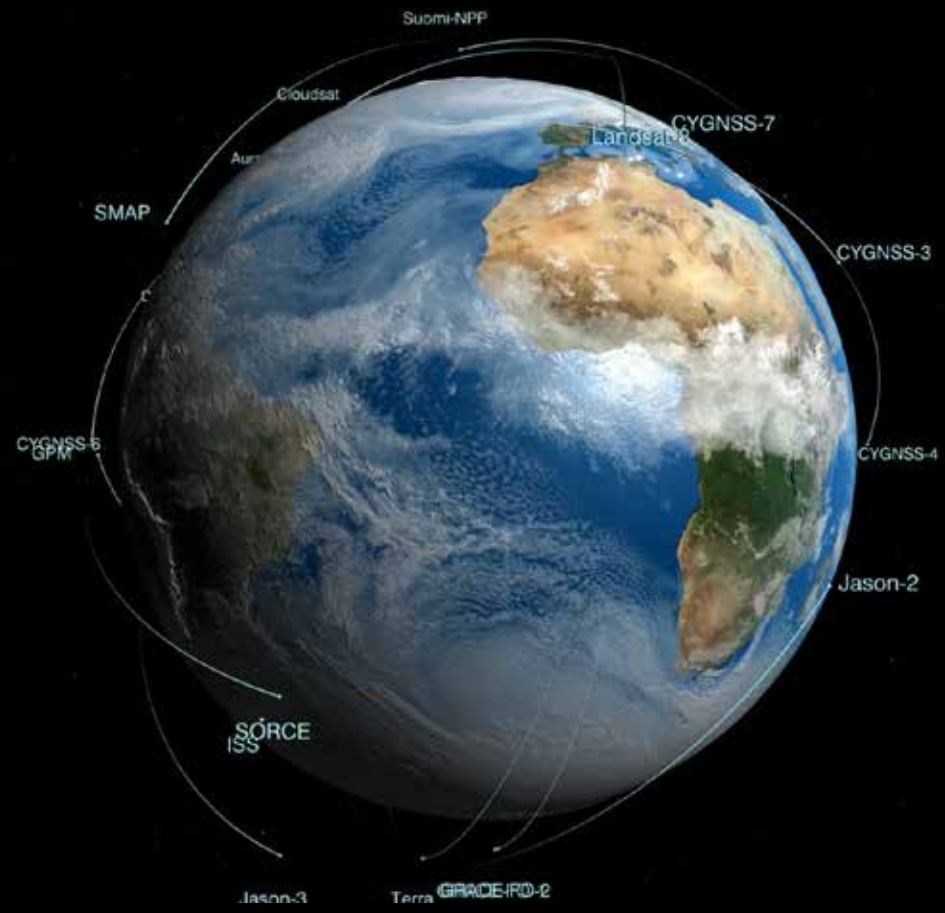
Early Warning from Satellite Data Strengthens Food Security in Uganda

GEOGLAM Crop Monitor uses NASA MODIS satellite data to monitor crop and vegetation conditions. Poor conditions in satellite and field data trigger the Disaster Risk Financing fund, and the combined information supports proactive response to food insecurity from drought and crop failure.

2017: DRF funds (USD 4.11M) paid to 31K households for ~150,000 people. Ugandan gov't saved USD 2.6 million.

2018: DRF funds (USD 2.6M) paid to 23K households when NDVI fell under threshold in 3 districts.


“In the past we always reacted to crop failure, spending billions of shillings to provide food aid. 2017 was the first time we acted proactively because we had clear evidence from satellite data very early in the season.”
– Office of the Prime Minister, Uganda



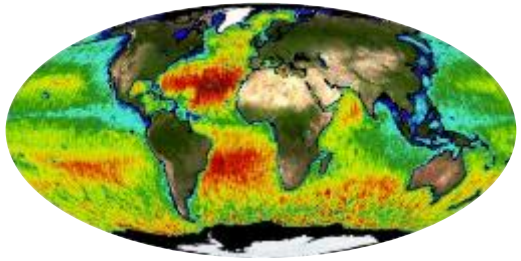
Video at: https://svs.gsfc.nasa.gov/4662

Some Types of Earth Observations at Global to Local Scales . . .

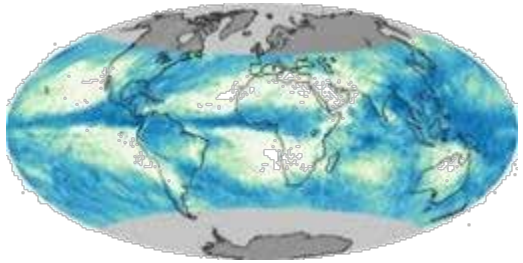
Land Temperature

Sea Surface Temperature

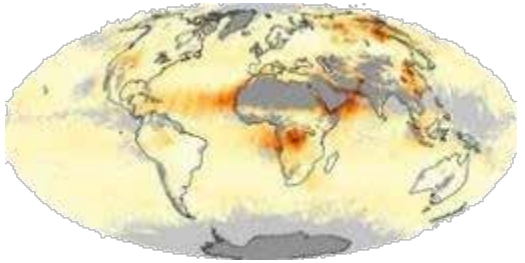
Vegetation



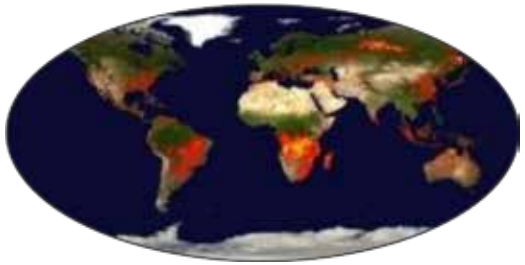
Sea Surface Salinity



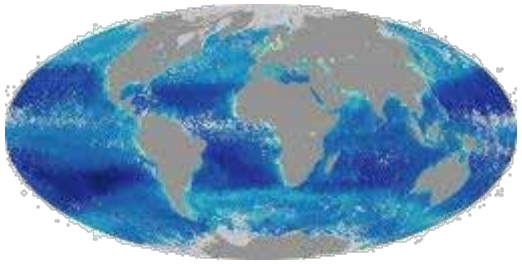
Total Rainfall



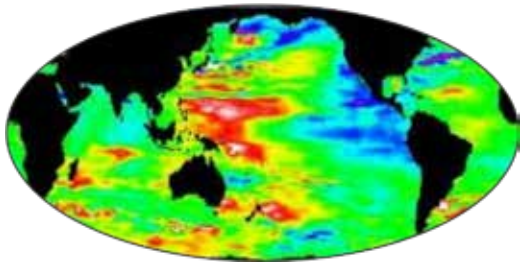
Aerosols



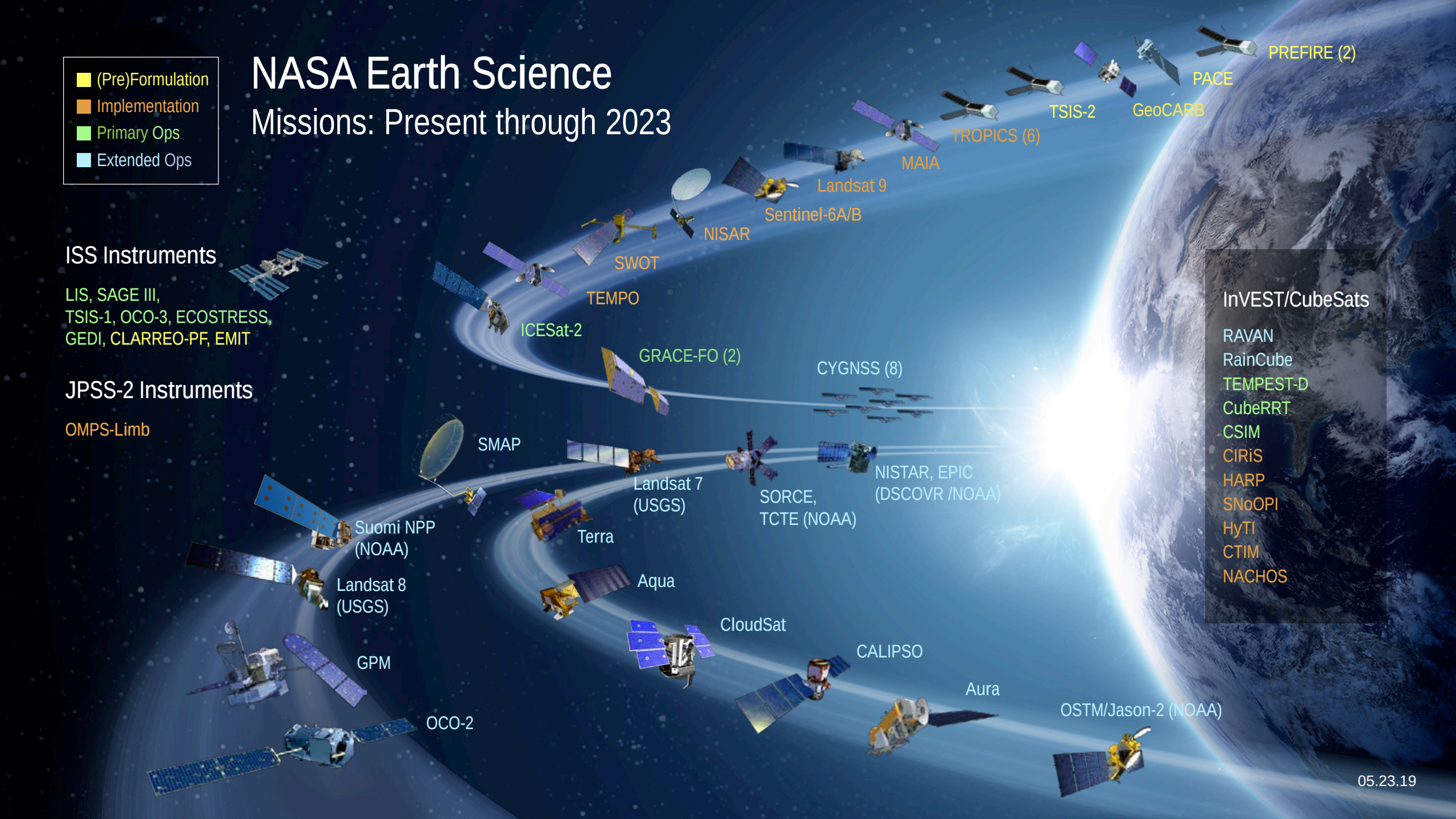
Fires & Thermal Anomalies

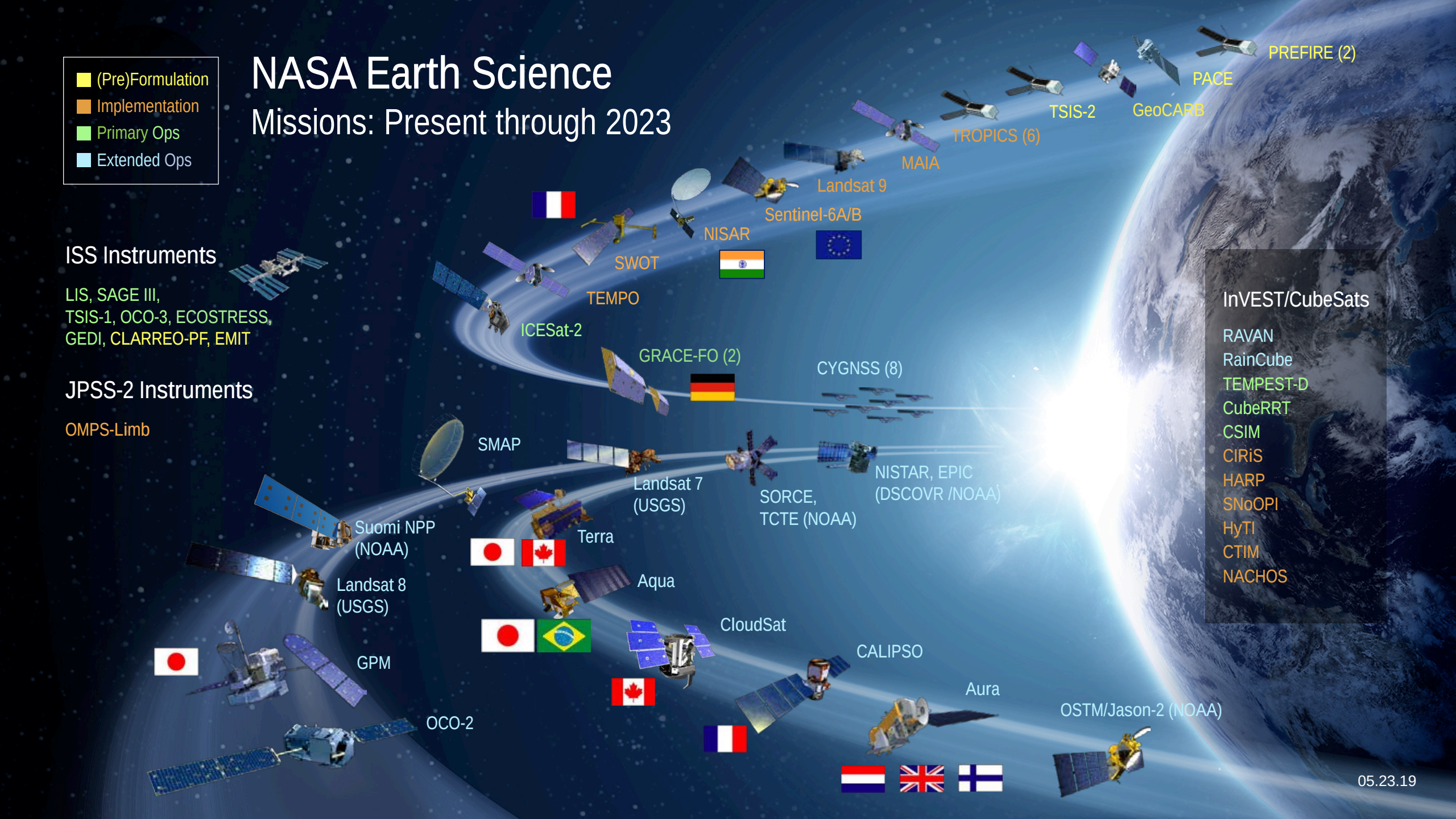


Chlorophyll



Sea Surface Height


(Pre)Formulation
Implementation
Primary Ops
Extended Ops
NASA Earth Science
Missions: Present through 2023
ISS Instruments
LIS, SAGE III,
TSIS-1, OCO-3, ECOSTRESS,
GEDI, CLARREO-PF, EMIT
JPSS-2 Instruments
OMPS-Limb
PREFIRE (2)
PACE
GeoCARB
TSIS-2
TROPICS (6)
MAIA
Landsat 9
Sentinel-6A/B
NISAR
SWOT
TEMPO
ICESat-2
GRACE-FO (2)
CYGNSS (8)
SMAP
Landsat 7
(USGS)
SORCE,
TCTE (NOAA)
NISTAR, EPIC
(DSCOVR /NOAA)
Suomi NPP
(NOAA)
Terra
Aqua
Landsat 8
(USGS)
CloudSat
CALIPSO
GPM
Aura
OCO-2
OSTM/Jason-2 (NOAA)
InVEST/CubeSats
RAVAN
RainCube
TEMPEST-D
CubeRRT
CSIM
CIRiS
HARP
SNoOPI
HyTI
CTIM
NACHOS
05.23.19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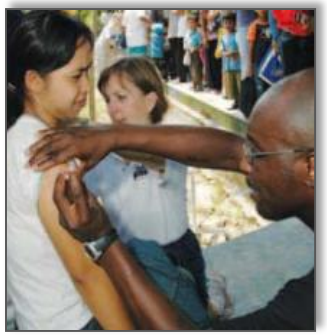
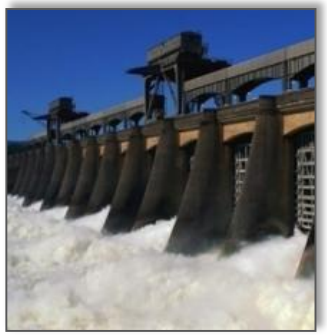
Landsat 8
(USGS)
Aqua
CloudSat
CALIPSO
GPM
Aura
OCO-2
OSTM/Jason-2 (NOAA)
InVEST/CubeSats
RAVAN
RainCube
TEMPEST-D
CubeRRT
CSIM
CIRiS
HARP
SNoOPI
HyTI
CTIM
NACHOS
05.23.19

NASA Earth

Applications and Capacity Development



Health & Air Quality



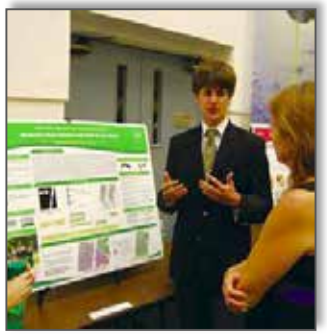
Water Resources

Ecosystems

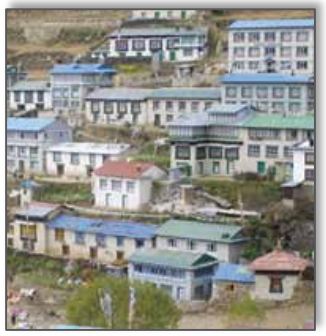
Food Security

Disasters

Geospatial Training



Workforce



International Development

All areas incorporate climate and weather effects.

NASA Earth

Applications and Capacity Development

Decision-Support Applications: Three Styles

Enhancement of an existing decision support tool or process together with the partner organizations

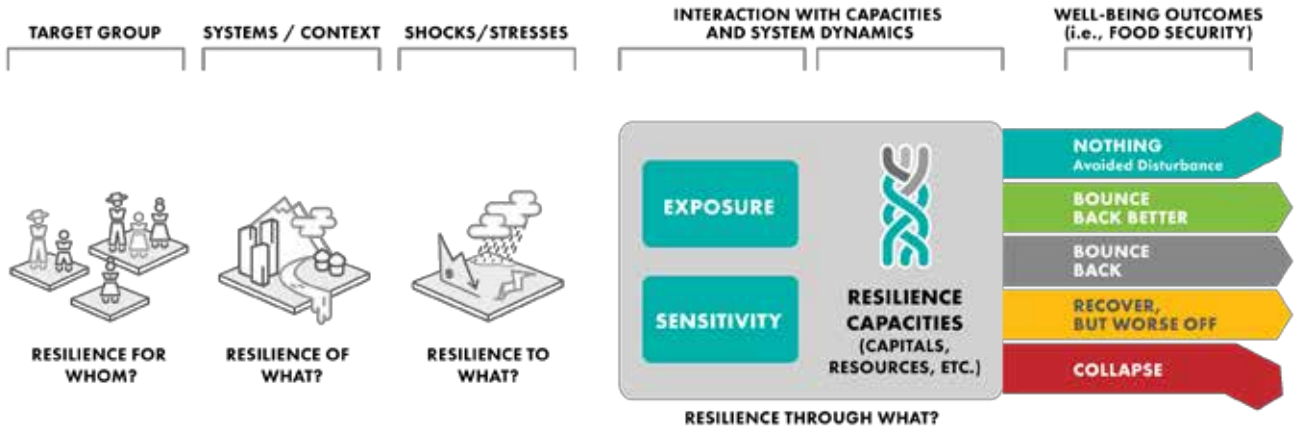
Development of a new application and decision support tool or process together with the partner organizations

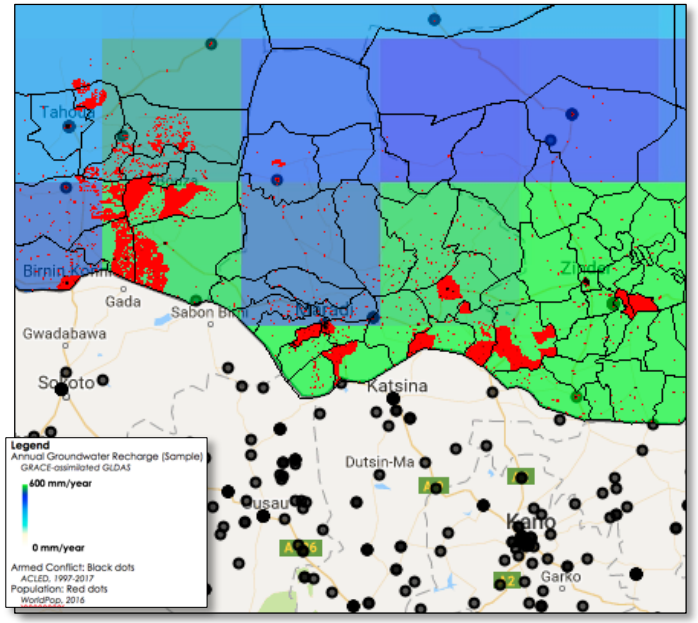
Development of information products, maps, and tools used by partner organizations to serve their customers, clients, and public

Mercy Corps & NASA

This partnership focuses on a collaborative approach to better understand humanitarian challenges by integrating Mercy Corps' expertise in resilience-focused intervention and in-country stakeholder relationships along with NASA's expertise in Earth system science and global datasets.

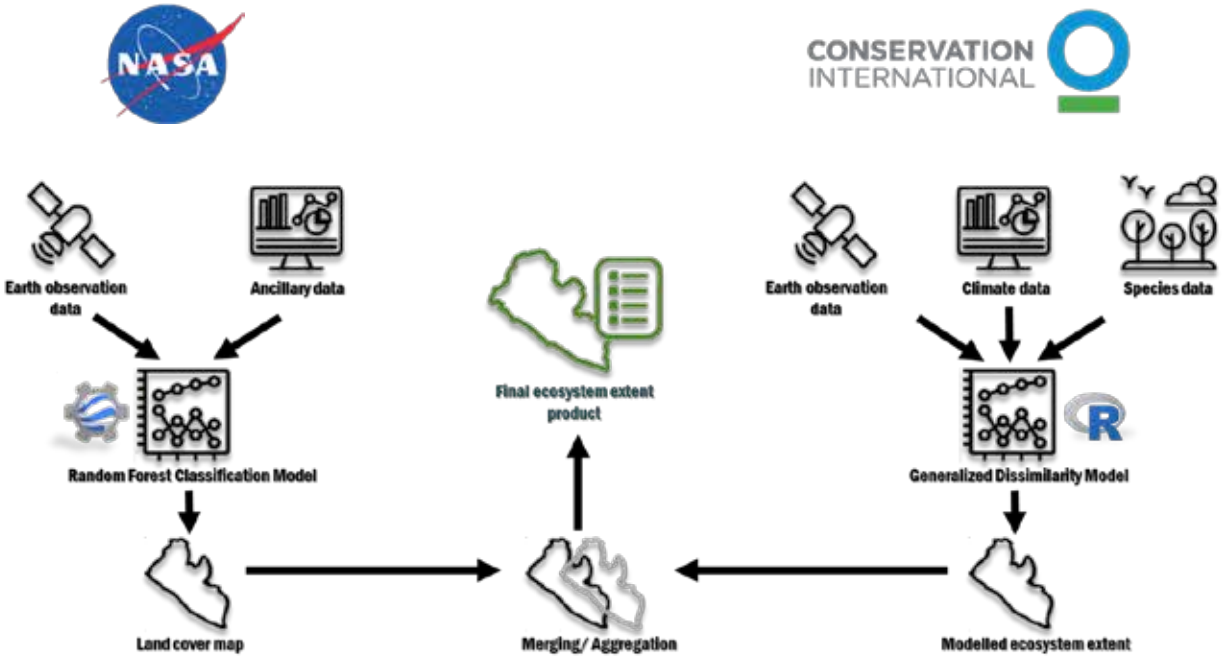
Together we will reach new audiences and users, and influence the broader Earth Science and humanitarian sectors to demonstrate what is achievable when science is integrated into risk-informed decision making.





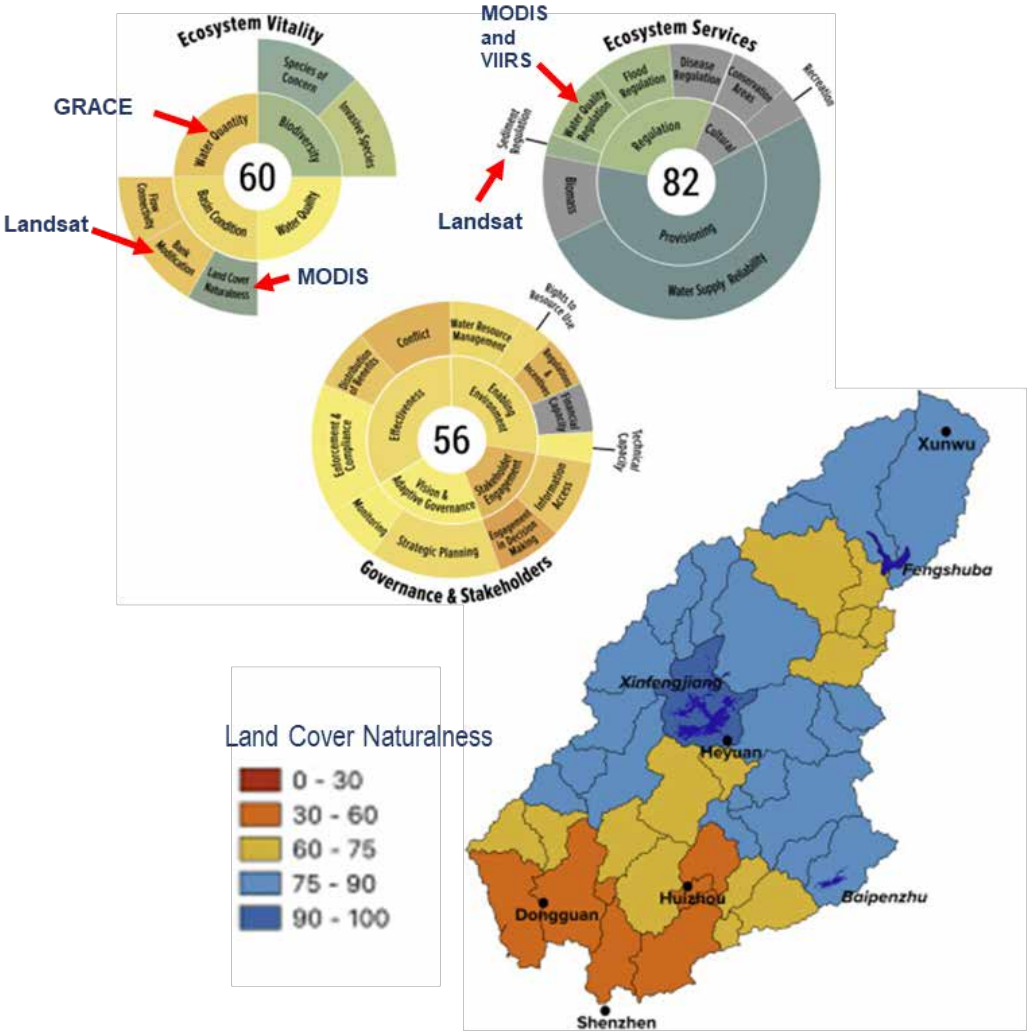
Example collaboration on water stress and conflict in Niger.

Conservation International & NASA

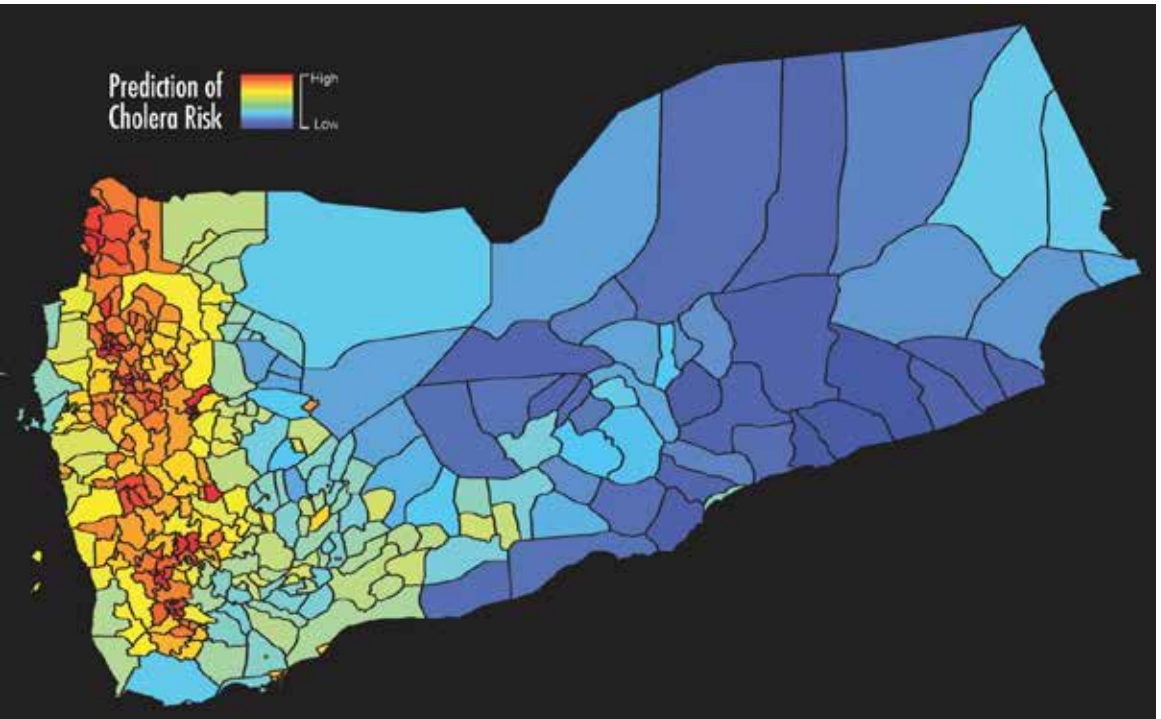


Natural Capital Accounting

Freshwater Health Index



Vollmer, D., Shaad, K., Souter, N.J., Farrell, T., Dudgeon, D., Sullivan, C.A., Fauconnier, I., MacDonald, G.M., McCartney, M.P., Power, A.G. and McNally, A., 2018. Integrating the social, hydrological and ecological dimensions of freshwater health: The Freshwater Health Index. Science of the Total Environment, 627, pp.304-313.



Cholera Forecasts Help Save Lives

For the first time ever, measurements from NASA Earth-observing research satellites are being used to help combat a potential outbreak of life-threatening cholera.

Humanitarian teams in Yemen are targeting areas identified by a NASA-supported project that precisely forecasts high-risk regions based on environmental conditions observed from space.

Upcoming Trainings

https://arset.gsfc.nasa.gov/

Water

Advanced Webinar: Integrating Remote Sensing into a Water Quality Monitoring Program

June 19, 2019

Disasters

Introductory Webinar: Earth Observations for Disaster Risk Assessment & Resilience

August 6, 2019

August 8, 2019

August 13, 2019

August 15, 2019

Land

Advanced Webinar: Sensing for Monitoring Land Degradation and Sustainable Cities SDGs

July 9, 2019

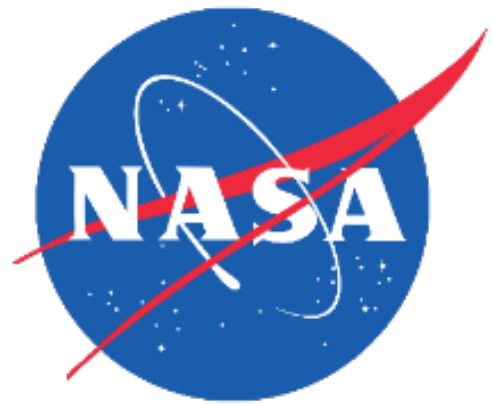
July 16, 2019

July 23, 2019

Q&A Session on Radar Remote Sensing

June 17, 2019


gef


NASA

NASA Earth

Imagery, Earth observations, and Earth science data are objective, transparent, and policy-neutral.

Agencies and organizations use the data and scientific results in their policy analysis and development.


EXPLORE EARTH
ABOUT THIS SITE
SPACE FOR U.S.
TOGETHER FOR A BETTER EARTH
This is Space For U.S., where the power of NASA's Earth observations come to life through state-by-state stories featuring communities like yours—solving our country's biggest challenges with innovative technology, groundbreaking insights, and extraordinary collaboration.
nasa.gov/spaceforus

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Resources

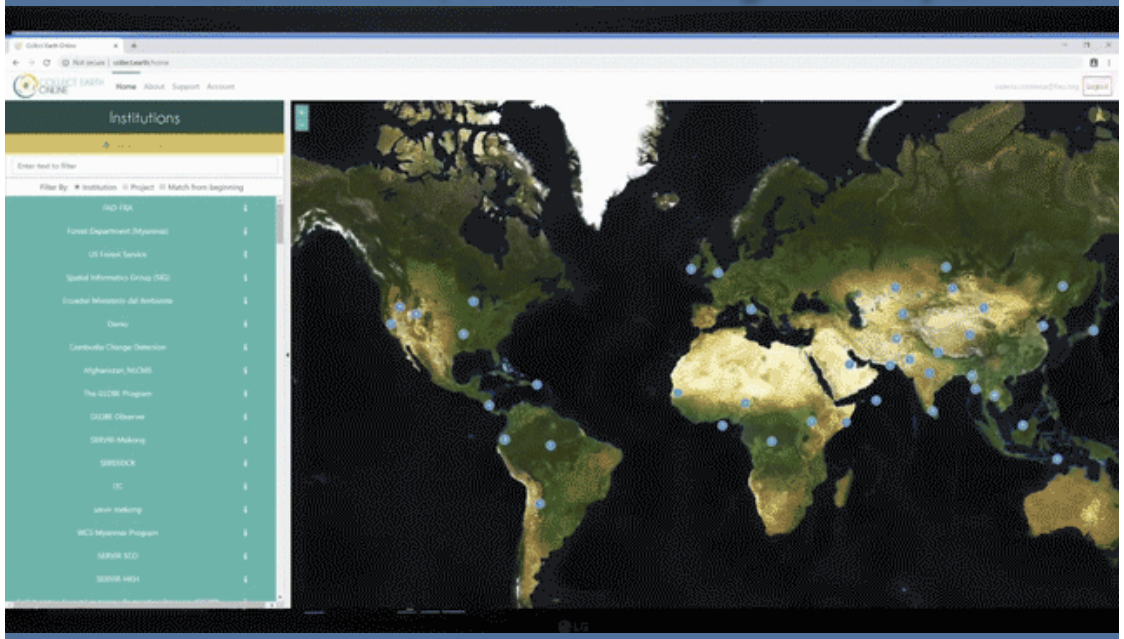
NASA Worldview
https://worldview.earthdata.nasa.gov/

Scientific Visualization Studio
https://svs.gsfc.nasa.gov/

Earth Observatory
https://earthobservatory.nasa.gov

SERVIR announces launch of Collect Earth Online (CEO)

CEO interface; available through FAO Open Foris



"This innovation allows the collection of up-to-date data about our environment and its changes in a more efficient and participatory manner, using the local experts that know the landscape and the underlying ecology"

– Mette Wilki,
Head of Policy and Resources at FAO's Forestry Division

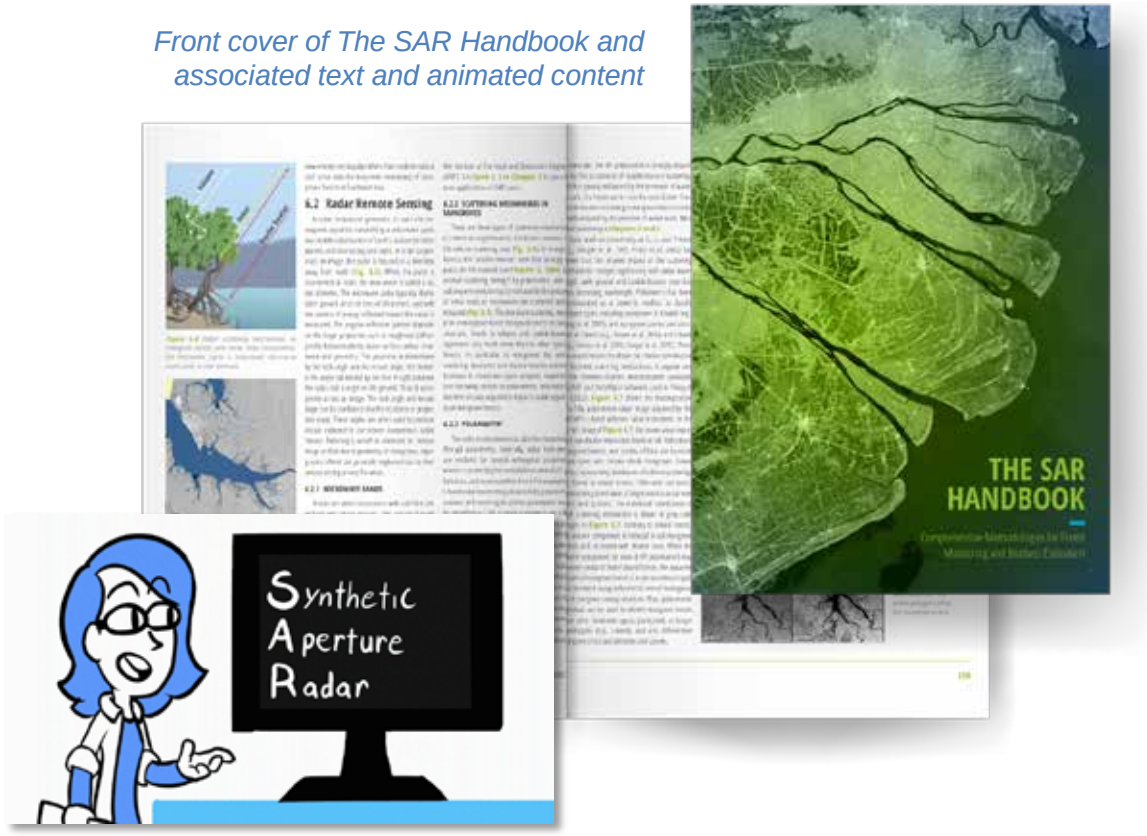
Launch date: December 12, 2018

- Developed by SERVIR in partnership with UN's Food and Agriculture Organization, the Google Earth Engine Team and the USG SilvaCarbon Program
- Simplifies surveying, sample collection, incorporates crowdsourcing techniques for land cover monitoring and forest classification

Collect Earth Online is the primary data collection tool for FAO's 2020 Global Forest Resources Assessment and will be used in ~190 countries. The first CEO collection was used for forest resource inventory in India in March 2019.

SERVIR Develops Free Resource to Empower Monitoring and Protection of Forests Worldwide

Front cover of The SAR Handbook and associated text and animated content



The SAR Handbook: Comprehensive Methodologies for Forest Monitoring and Biomass Estimation

- **136,000+** Handbook page views from April 10 – May 5, 2019
- Downloads from **140+** countries, closely aligning to GEF recipient countries

The **SAR Handbook,** launched April 10, helps forestry professionals use Synthetic Aperture Radar (SAR) to measure forest health with an **eBook** and **training materials**

- SERVIR and SilvaCarbon partnered to build international capacity using SAR for forest monitoring
- Leveraging the global SERVIR Hub network, a series of training workshops were held throughout 2018 as part of the development of Handbook materials
- This initiative fills the gap of applied SAR knowledge, empowering the global remote sensing community to use freely-available datasets and prepare for the upcoming NISAR and BIOMASS SAR missions

The Handbook can be accessed from SERVIRglobal.net