NASA & USAID
Capacity Building Efforts

Nancy D. Searby, PhD
Capacity Building Program Manager

EARTH SCIENCE
APPLIED SCIENCES

Harnessing Earth observations to find solutions to Earth's greatest challenges.

The **Applied Sciences Program** helps people across the world use NASA data to solve big problems right here on Earth.

- Provides support and funding to help institutions and individuals make better decisions about our environment, food, water, health & safety
- Enables the early and ongoing involvement of users throughout the lifecycle of Earth science satellite and instrument missions
- Supports improved abilities for users to ideate applications, contribute to planning and design, be prepared to use the data after launch, engage with mission scientists, & provide unique feedback to mission teams

Three lines of business: mission engagement, thematic applications, and capacity building

EARTH. SCIENCE. ACTION.

https://appliedsciences.nasa.gov/

Explore the new Applications Guidebook: https://appliedsciences.nasa.gov/guidebook/

NASA | EARTH + USAID's PEER - final year

PEER = Partnerships for Enhanced Engagement in Research

- Competitive grants program that invited scientists in developing countries, partnered with USG-supported collaborators, to apply for funds
- Supported research and capacity-building activities on topics with strong potential development impacts

  + US scientists learned from scientists across the globe
  + Improved NASA Earth system science
  + Met USAID development objectives

- NASA wass 1 of 9 USG partner agencies and Earth Science Division has led cross-division engagement since 2016
  - Coordinate dwith the National Academies and facilitated partnerships between potential PEER PIs and NASA PIs
  - **LCLUC PIs were actively sought as partners:** 1 LCLUC-funded PI as partner in PEER Cycle 9 (2020); 2 LCLUC-funded PIs in PEER Cycle 5 (2016)

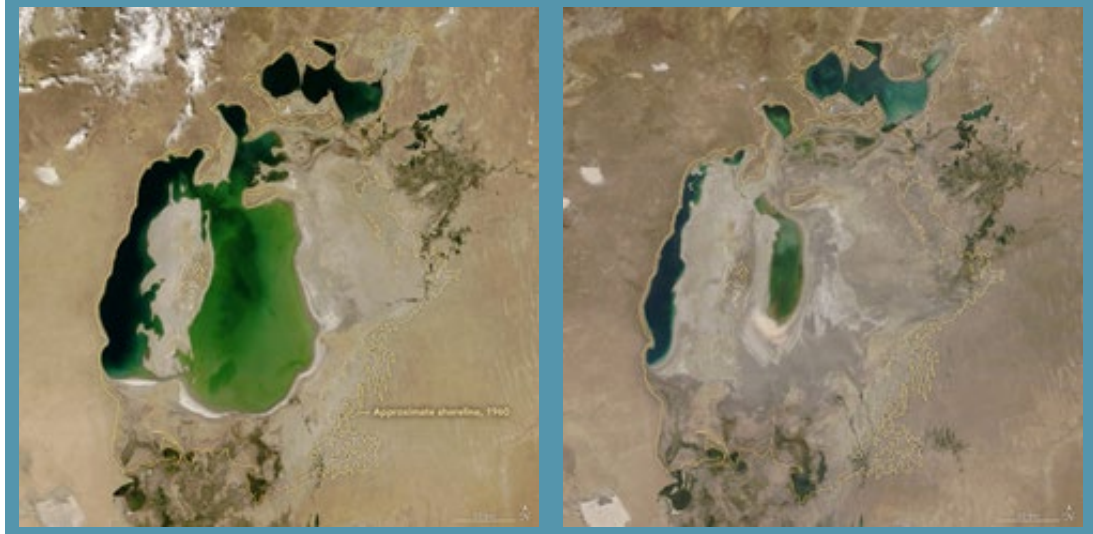
1 of 3 projects with a NASA partner funded under PEER Cycle 9 announced in December 2020

"Kazakhstan: Effects of excessive water use and agricultural intensification on Aral Sea shrinkage: socioeconomic-environmental systems dynamics within the Syr Darya River Basin"

Principal Investigator: Maira Kussainova, Kazakh National Agrarian University

U.S. Partners with NASA Funding: Ranjeet John, University of South Dakota; and Jiquan Chen, Michigan State University

NASA Program Manager: Garik Gutman, Land-Cover Land-Use Change



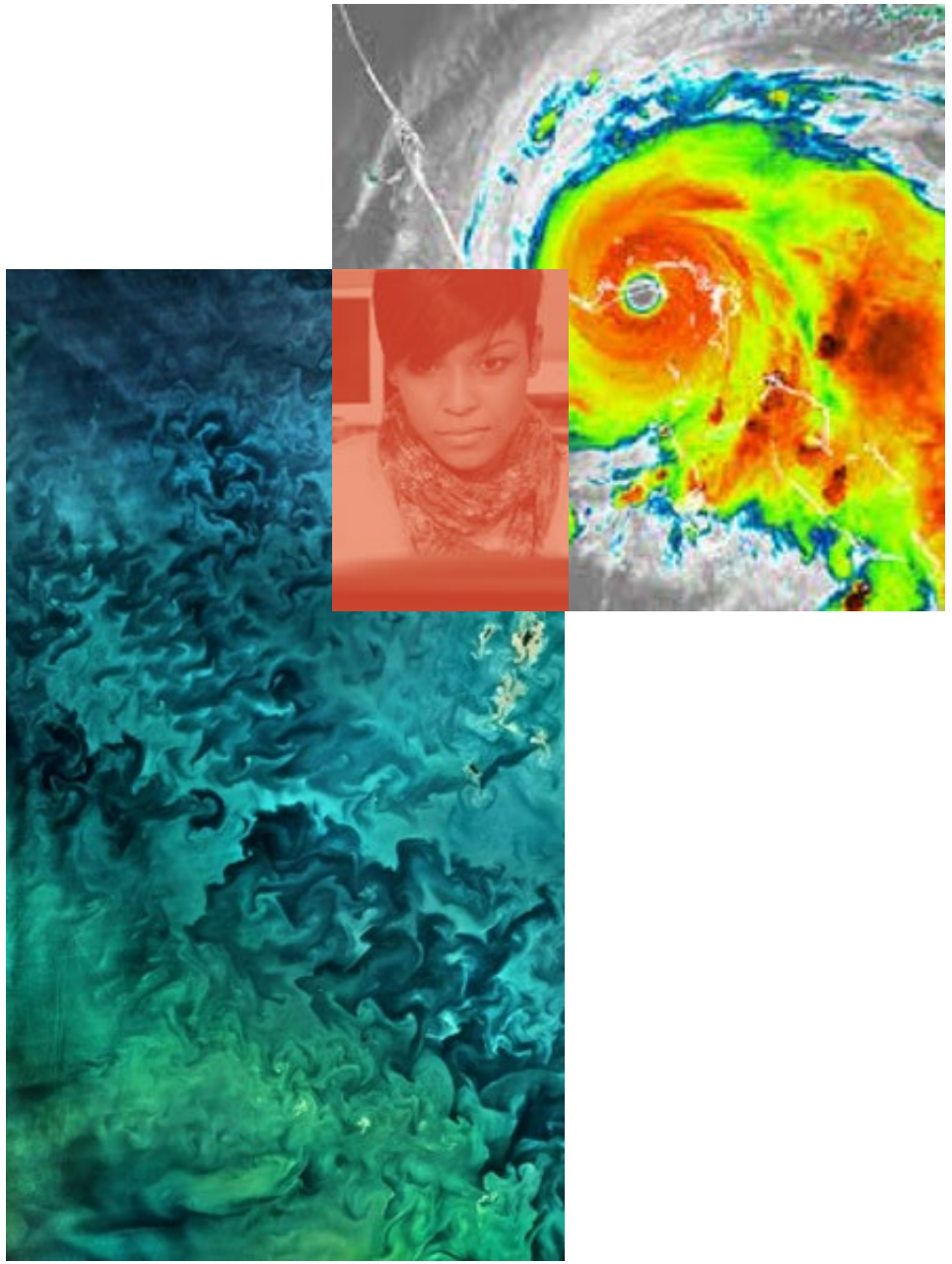
MODIS on Terra satellite imagery of the Aral Sea in August 2000 (left) and August 2018 (right).

Capacity Building

Part of NASA's Applied Sciences, the **Capacity Building Program** provides individuals and institutions with workforce development, training activities, and collaborative projects to strengthen understanding of Earth observations and expand their use around the world.

Through ARSET, DEVELOP, SERVIR and Community Action elements, we work with everyone at every level — from first-time users to long-time professional users of Earth observation data.

We work through global and domestic networks and organizations, to promote open data access and coordinate capacity building activities focused on users needs.



Indigenous Peoples

Builds relationships across NASA and Indigenous communities through place-based remote sensing training, community engagement, and co-production of knowledge.

Environmental Justice

Builds connections with communities to advance equity and environmental justice – co-development in uses of Earth and social science. Initial work is engagement, feasibility projects, data fusion activities, and DEVELOP projects.

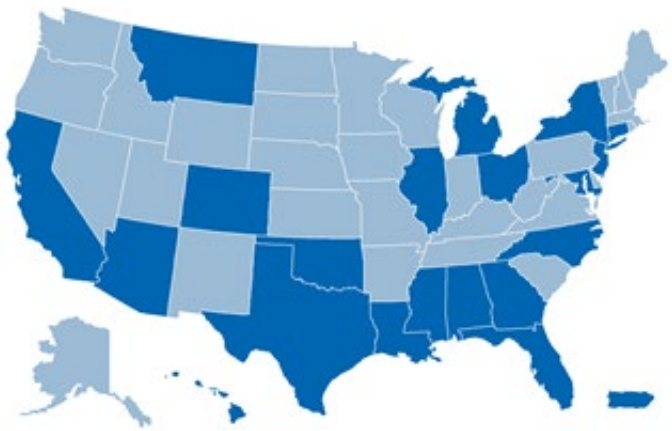
Prizes & Challenges

Builds partnerships with other federal agencies, international space agencies, and private organizations to host competitions, “challenges”, and hackathons aimed at open innovation and public participation.

Indigenous Peoples Capacity Building Initiative

https://appliedsciences.nasa.gov/indigenous-peoples-pilot

39 Equity and Environmental Justice Grants Selected



Direct community impact

Indirect community impact

Geographic Reach of Proposals Accepted

Thematic Areas Addressed

	Ag, Food Security & Ag Burning	Climate Hazards / Heat / UHI	Health & Air Quality	Energy / Utilities	Greenspace / Tree Canopy	Disasters / Flooding	Wildfires	Water Resources	Transit / Prisons	Urban Development	Cross-Cutting
Data Integration Projects	3	9	10	0	7	4	2	1	1	6	1
Feasibility Studies	0	8	6	1	4	4	1	2	1	5	3
Landscape Analyses	1	6	4	0	3	1	2	3	1	1	3

CAPACITY BUILDING PROGRAM

ARSET

ARSET offers trainings (virtual and in-person) on a variety of satellite remote sensing topics to build skills for integrating Earth observations into decision-making activities around the world.

https://appliedsciences.nasa.gov/arset

DEVELOP

DEVELOP addresses decision-makers' needs through interdisciplinary 10-week feasibility studies that apply the lens of NASA Earth observations to environmental issues around the globe.

https://develop.larc.nasa.gov

SERVIR

A partnership between NASA and USAID, SERVIR connects space to village by helping developing countries use satellite data to address critical challenges and develop innovative solutions to improve livelihoods and foster self-reliance.

https://servirglobal.net

NASA Applied Remote Sensing Training (ARSET)

https://appliedsciences.nasa.gov/arset

- ***ARSET provides accessible, relevant, and cost-free training on remote sensing satellites, sensors, methods, and tools.***
- Our trainings are:
  - Online and in-person
  - Open to everyone
  - Live, instructor-led, or self-guided
  - Provided at no cost, with materials and recordings available from our website
  - Often multi-lingual
  - Tailored to those with a range of experience in remote sensing, from **introductory** to **advanced**

ARSET offers trainings for:

- Disasters
- Health & Air Quality
- Land Management
- Water Resources
- Climate

ARSET now offers climate trainings, our newest thematic area

Recent + Upcoming Land Trainings

ARSET's Training Curriculum includes 26 land-related trainings

- Introductory, 3-part training
- Basics of ecosystem services and natural capital accounting
- How to use EO to support global frameworks and initiatives like UN-SEEA

Stats

- 1,668 participants
- 800 organizations
- 120 countries
- 42 US states

Next training:
Disaster Assessment Using SAR

- Intermediate, English and Spanish
- Covers floods, landslides, and oil spills in three 2-hour sessions
- **October 19 – 27, 2022**

*IMPACTS AND PARTNERS ARE TENTATIVE

DEVELOP 2022 FALL PORTFOLIO

ENGAGEMENT:

87 PARTICIPANTS

50 PARTNER ORGS

22 PROJECTS

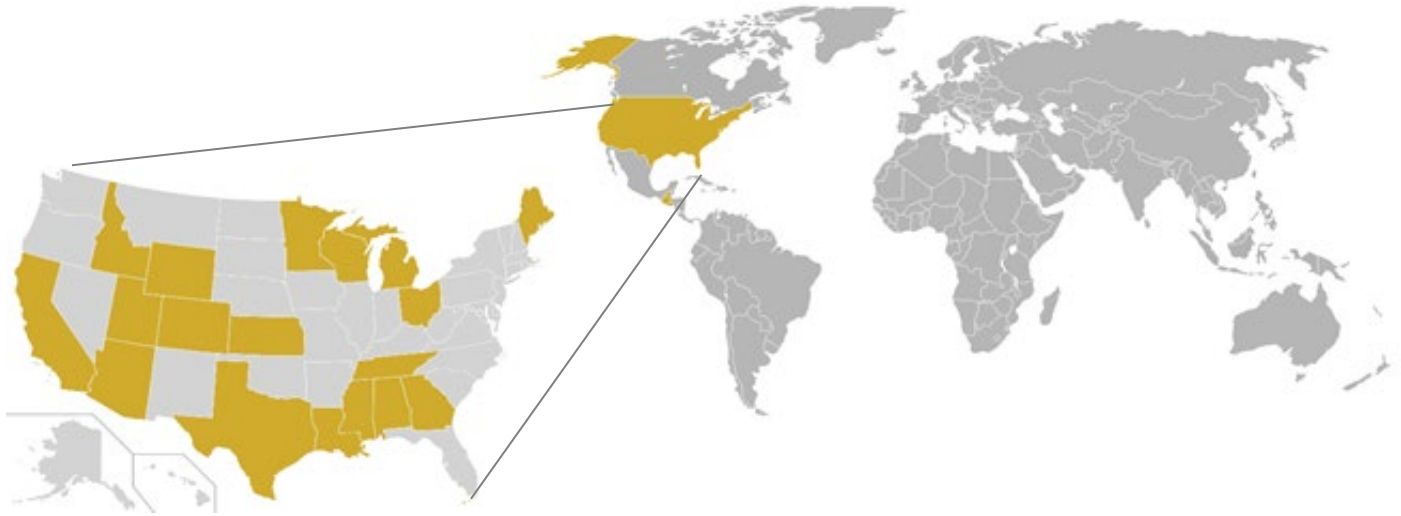
TERM I: 15

TERM II: 7

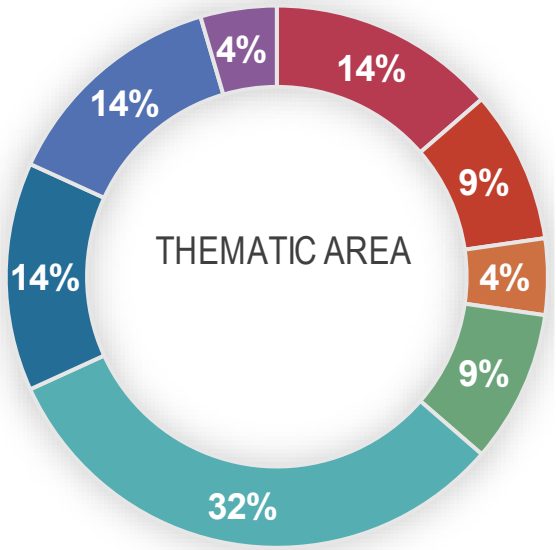
IMPACT:

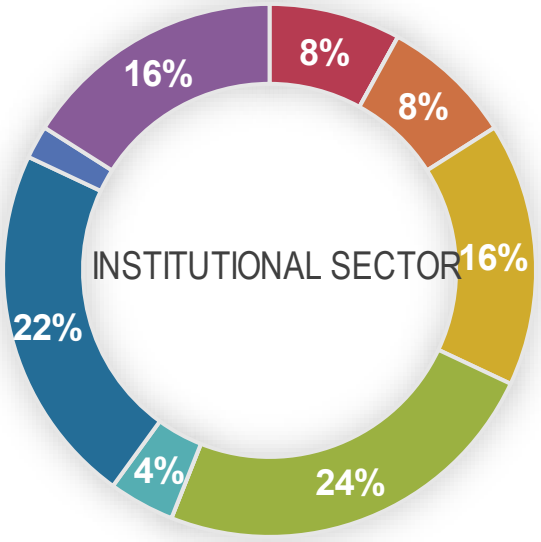
18 U.S. STATES

4 COUNTRIES



- DISASTERS
- WILDFIRES
- AGRICULTURE
- ENERGY
- ECOLOGICAL FORECASTING
- WATER RESOURCES
- URBAN DEVELOPMENT
- CLIMATE
- HEALTH & AIR QUALITY





- ACADEMIC
- CONSORTIUM
- LOCAL GOVERNMENT
- STATE GOVERNMENT
- FEDERAL GOVERNMENT
- INTERGOVERNMENTAL
- FOR-PROFIT
- NON-PROFIT
- TRIBAL
- INTERNATIONAL

DEVELOP Project Highlight

Haiti Agriculture

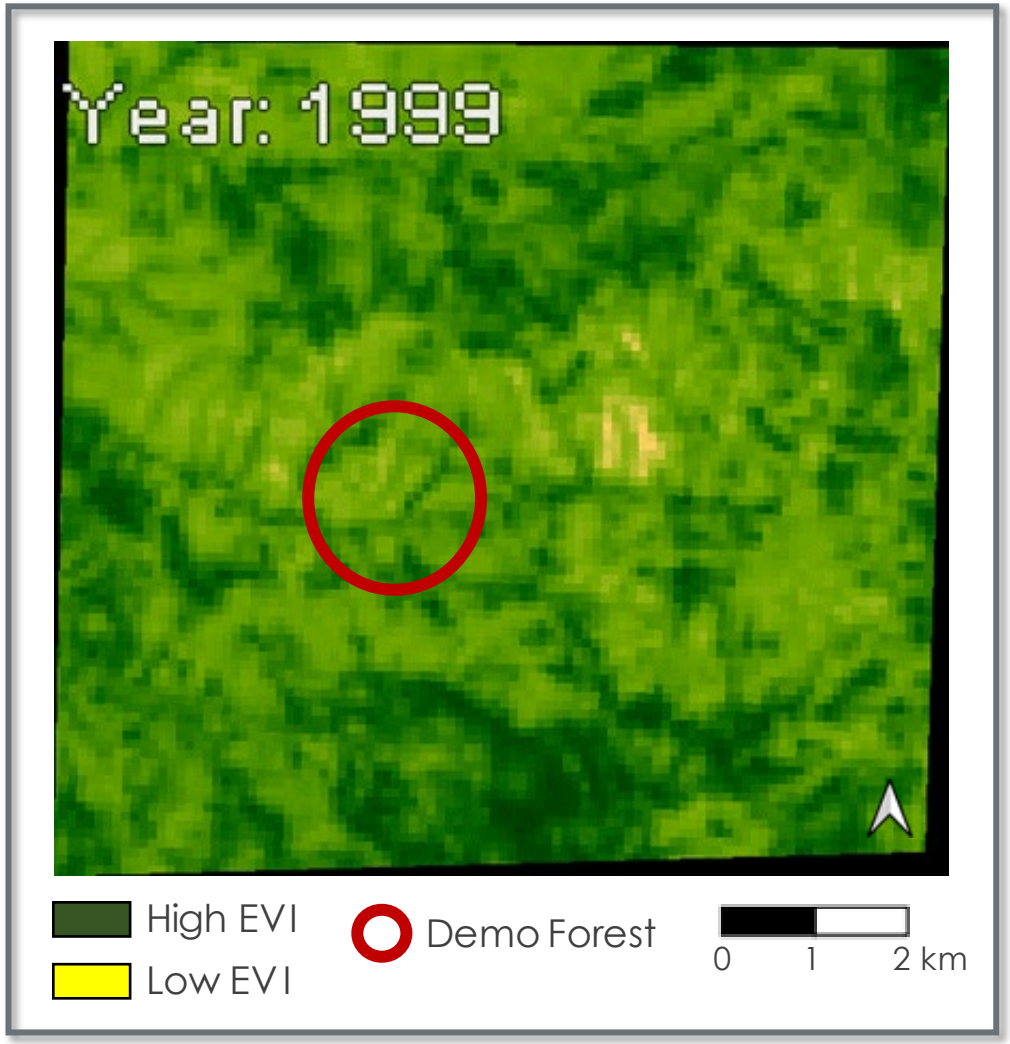
The Haiti Reforestation Partnership (HRP) has planted over 15 million trees in Haiti in the last 30 years to revegetate degraded land. The NASA DEVELOP team partnered with the HRP to conduct a comprehensive analysis of **forest stand survival**. The team produced a time series showing trends in the Enhanced Vegetation Index (EVI) from 1984 to 2021, as well as a habitat suitability map.

Earth Observations:

- Landsat 9 OLI-2
- Landsat 8 OLI
- Landsat 7 ETM+
- Landsat 5 TM
- Sentinel-2 MSI

Conclusions:

- EVI within a demonstration forest increased at a greater rate than the surrounding area
- The habitat model suggested there are 49,000 hectares of habitat suitable for planting

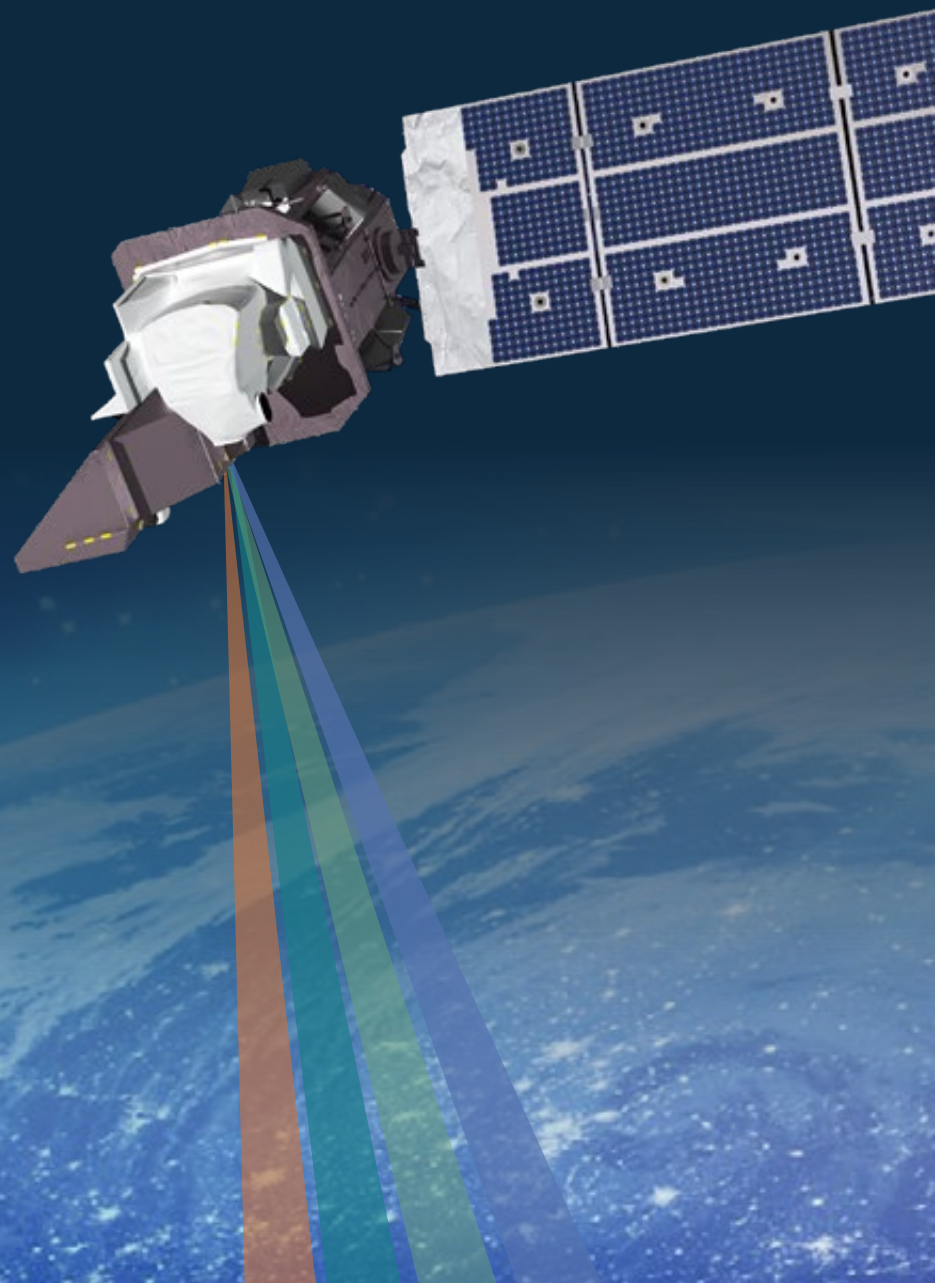


"As a small grassroots organization, Haiti Reforestation Partnership has struggled to document and evaluate the impact of our efforts over the past 30 years. The NASA DEVELOP team's extensive efforts to stitch together historical images helped us look at the evolution of the project over time, but more importantly helped us change our perspective and reinvigorate our strategy for the future." - *Jamie Rhoads, Haiti Reforestation Partnership Board Member*

CONNECTING SPACE TO VILLAGE

SERVIR is a joint initiative of NASA, USAID, and leading geospatial organizations in Asia, Africa, and Latin America, that partners with countries and organizations in these regions to address critical challenges in climate change, food security, water and related disasters, land use, and air quality.

.



USAID FROM THE AMERICAN PEOPLE | NASA | SERVIR | RCMRD | ICIMOD | adpc | ALLIANCE Bioversity CIAT

CONNECTING SPACE TO VILLAGE

Agriculture & Food Security

Water & Water-Related Disasters

Land Cover, Land Use Change & Ecosystems

Weather & Climate

USAID FROM THE AMERICAN PEOPLE | NASA | SERVIR | RCMRD | ICIMOD | adpc | ALLIANCE Bioversity International CIAT

SERVIR Focuses on Countries in Asia, Africa, & the Americas

SERVIR Brings Climate Adaptation and Mitigation

- Each of SERVIR's 49 services address climate adaptation, mitigation, or both
- SERVIR services support implementation of partner countries' climate priorities
- SERVIR contributes to the goal, objectives, and targets of:
  - USAID's Climate Strategy
  - President's Emergency Plan for Adaptation and Resilience (PREPARE).
  - Forest Data Partnership
  - plus others

SERVIR Crop Maps Help Protect Over 1.4 Million Kenyan Farmers

SERVIR

- For farmers in East Africa, **microinsurance is an adaptive strategy to cope with drought.**
- SERVIR Eastern and Southern Africa is partnering with the Government of Kenya on an insurance program. SERVIR developed **a satellite approach to map and assess crop area and crop conditions at scale** .
- SERVIR helped the government of Kenya **reduce data collection costs by 70%.**
- ***Outcomes***: The Government of Kenya now offers **agriculture microinsurance nationwide** ; five years ago, there were 900 farmers insured against crop loss -- today there are over **1.4 million insured farmers** .
- Actively targeting **women farmers** to participate in index-based insurance.

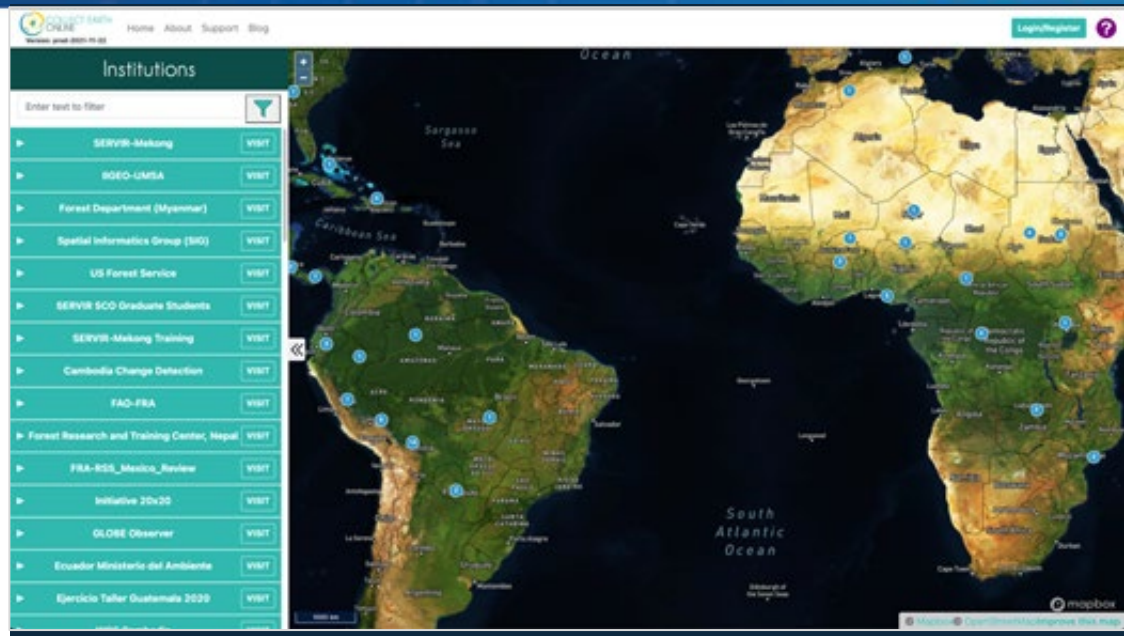
Farmers in Makueni County, Kenya, have been some of the hardest hit by drought in all east Africa. Since 2016, ~275,000,000 KSH to over 37,000 farmers in Kenya. (PHOTO CREDIT: USAID)

Collect Earth Online Enables Improved Global Land Cover Monitoring

SERVIR

Collect Earth Online (CEO) promotes collaborative, consistent, and quality - controlled reference data collection:

- Collecting field data is expensive and time consuming
- CEO provides free access to multiple sources of satellite imagery, enabling collaborative projects via an intuitive, web-based collection interface
- SERVIR scaled CEO from a service in the Mekong to the globe, enabling broader use
- FAO used CEO as the **primary data collection tool** for 2020 Global Forest Resources Assessment (FRA)
- As of 2022, CEO has **4,500+ users** and over **9 million sample points**



> [CEO] 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, UN FAO Forestry Division*

THANK YOU

Q + A

Capacity Building: nancy.d.searby@nasa.gov
SERVIR: daniel.irwin@nasa.gov
ARSET: melanie.cook@nasa.gov
DEVELOP: michael.l.ruiz@nasa.gov
EEJ: richard.o.hooks@nasa.gov

EARTH SCIENCE
APPLIED SCIENCES