NASA - Conservation International Partnership

Mainstreaming Ecosystem Accounting in Africa

Celio Sousa
Post-doctoral researcher
Universities Space Research Association

MAIN IDEA

We are piloting work with **three countries**: Liberia, Gabon and Botswana. We are **partnering** with Conservation International **to target** one of the most important part of an ecosystem service accounting framework, which is to **map the extent of the land cover**.

BACKGROUND

- Ecosystems provide a wide range of services that are important for human-well being.

- Ecosystem Accounting generates essential information on the status of ecosystems and their flows of benefits to the economy over time.

- The foundation of E.A. is the "Ecosystem Extent Account". This account is measured by mapping the ecosystem distribution (extent) and tracking their change over time.

- NASA and Conservation International partnered to develop a low-cost, replicable approach and tools that countries can use for ecosystem extent mapping.

TECHNICAL TEAMS

NASA Team: Dr. Celio Sousa, Dr. Chris Neigh and Dr. Lola Fatoyinbo.

Conservation international Team: Dr. Miroslav Honzak and Dr. Trond Larsen.

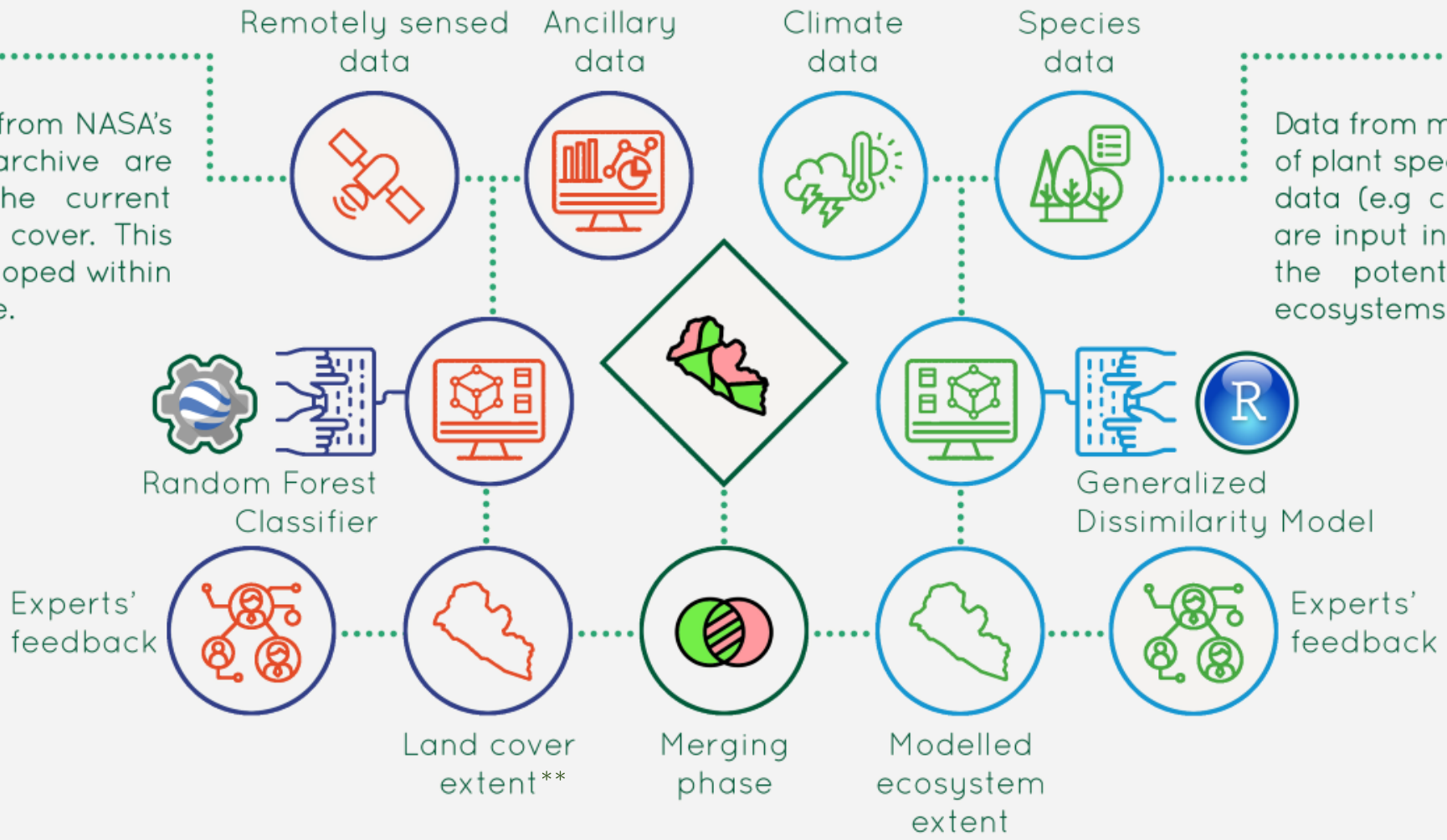
NASA Team's goal is to leverage NASA's expertise in remote sensing and earth observations to support the quantification and monitoring of the land cover extent for countries that pledged to include the value of nature into their national decision-making through the Gaborone Declaration for Sustainability in Africa. Our pilot countries are: Liberia, Gabon and Botswana.

NASA CI

More information about the NASA - CI Partnership can be found at tinyurl.com/qodfkaa

GENERAL APPROACH

Earth observations from NASA's satellite imagery archive are used to assess the current extent of the land cover. This approach was developed within Google Earth Engine.



Data from multiple observations of plant species and biophysical data (e.g climate, soil, rainfall) are input into the GDM to map the potential distribution of ecosystems.

** De Sousa et. al (2020) *Cloud-computing and machine learning in support of country-level land cover and ecosystem extent mapping in Liberia and Gabon*

PRODUCTS

LIBERIA

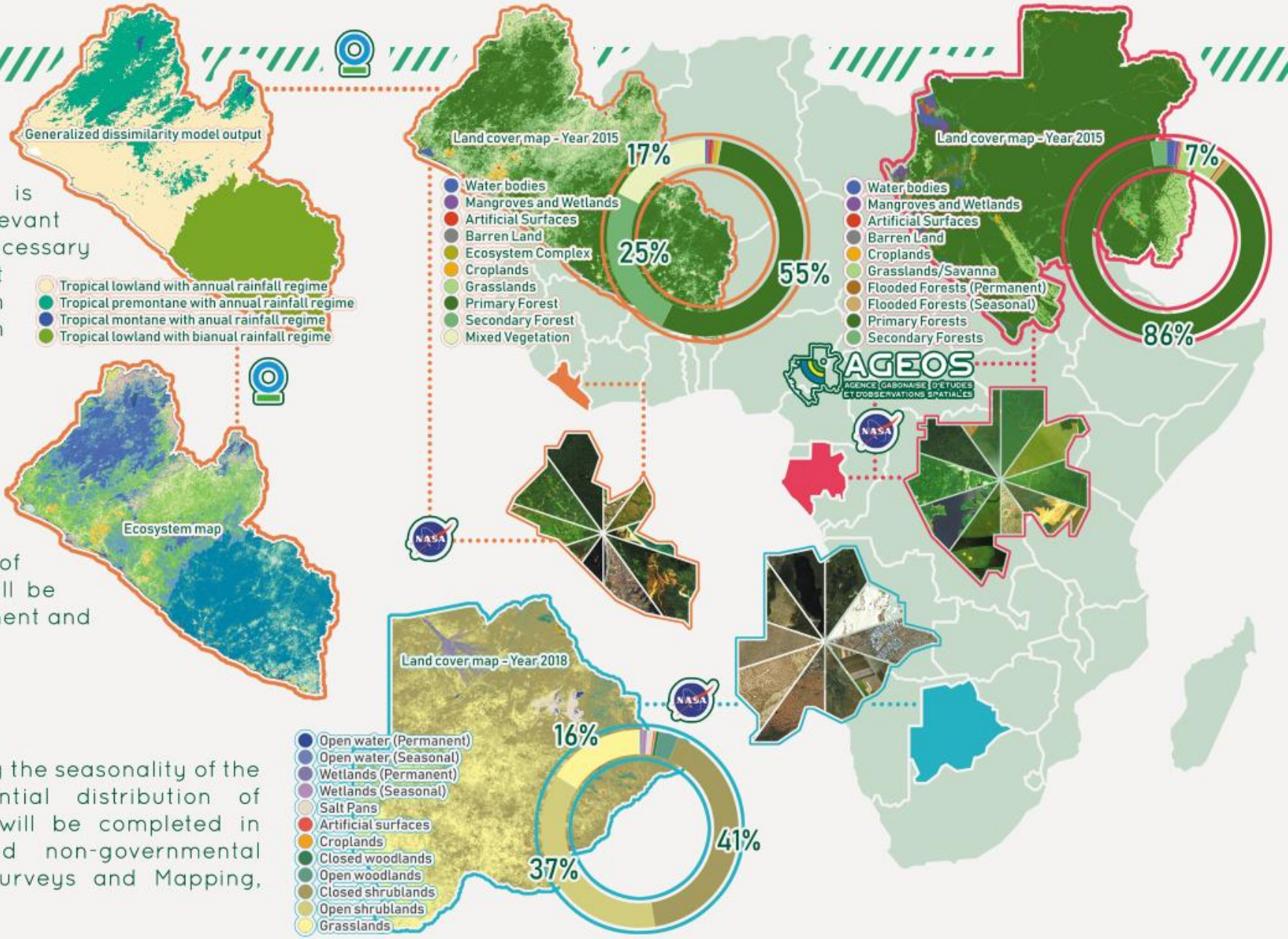
An ecosystem extent map for Liberia for 2015 is completed. The map, if endorsed by relevant government agencies, will provide necessary information to compile the Ecosystem Extent Account of Liberia and will be critical foundation for the development of a full set of ecosystem accounts.

GABON

A land cover map for Gabon for 2015 was produced in collaboration with the Agence Gabonaise d'Etudes et d'Observations Spatiales (AGEOS). The potential distribution of ecosystems and ultimately ecosystem maps will be completed in colaboration with relevant government and non-governmental organizations.

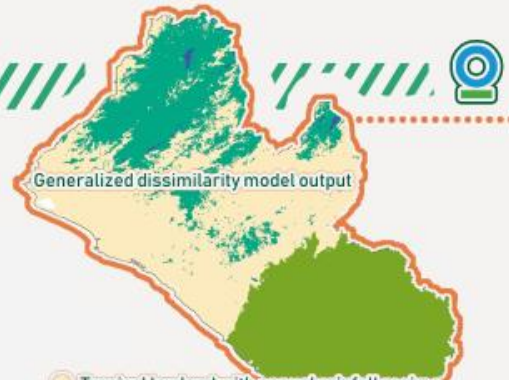
BOTSWANA

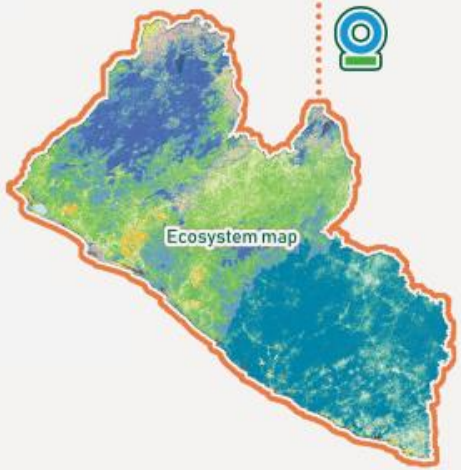
A land cover map for Botswana for 2018 capturing the seasonality of the Okavango Delta was produced. The potential distribution of ecosystems and ultimately ecosystem maps will be completed in colaboration with relevant government and non-governmental organizations including the Department of Surveys and Mapping, Department of Environmental Affairs and others.

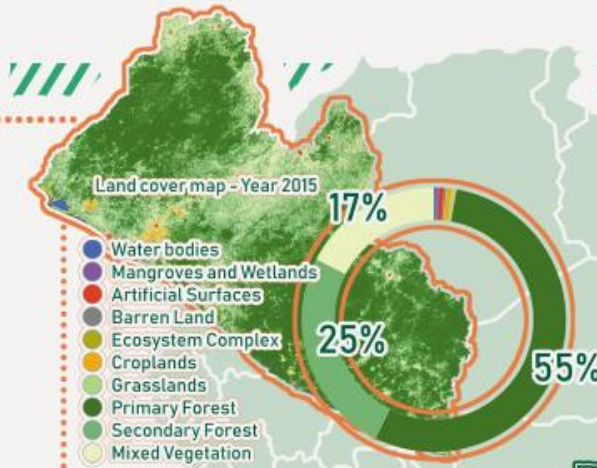


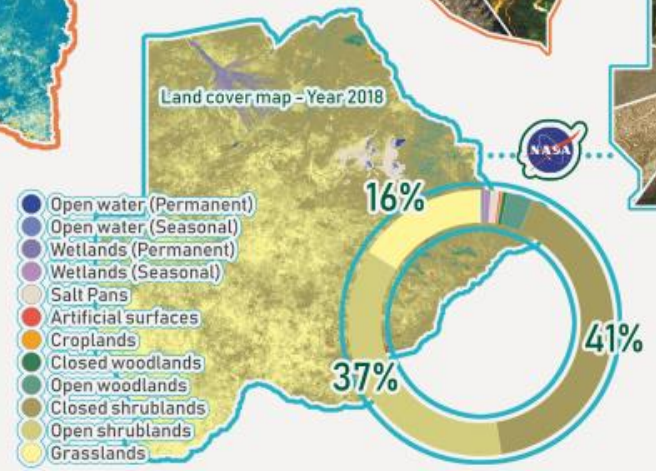
PRODUCTS

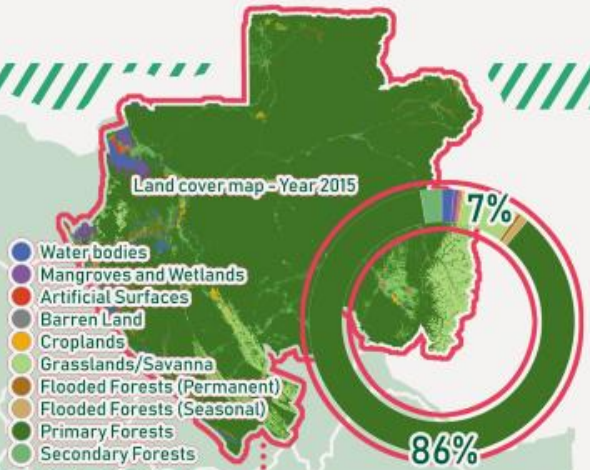
BOTSWANA GABON LIBERIA









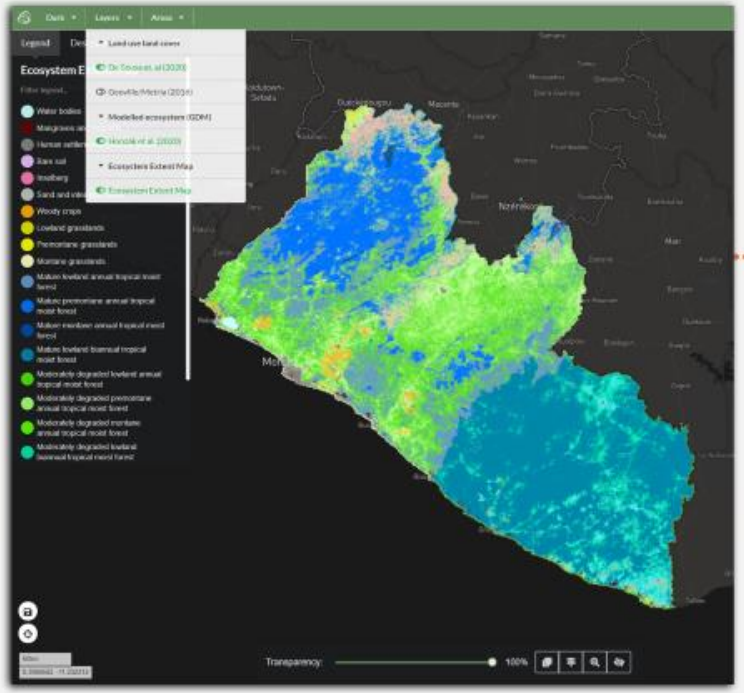


AGEOS
AGENCE GABONAISE D'ÉTUDES ET D'OBSERVATIONS SPATIALES

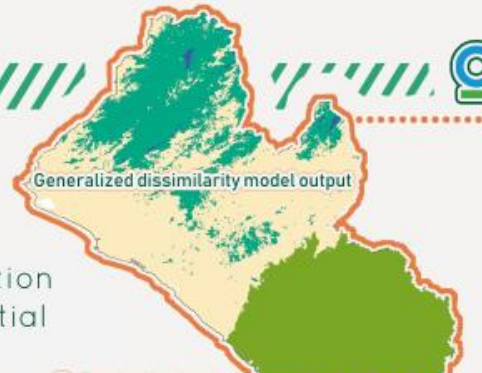
PRODUCTS

LIBERIA

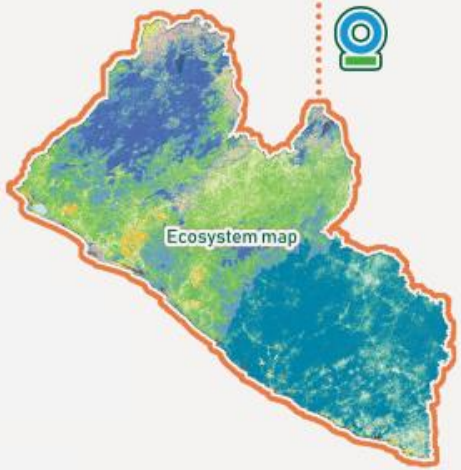
An app was developed to facilitate the socialization of the products with the stakeholders and potential end users.

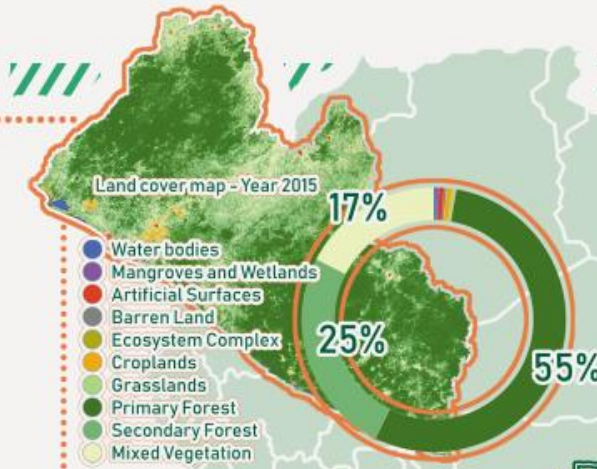


liberia-lcm.umd.ourecosystem.com/interface/

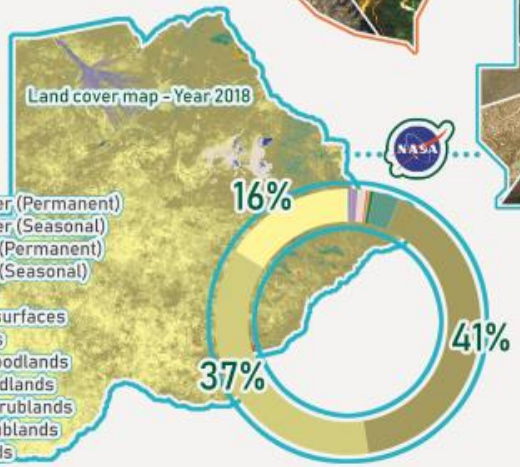


- Tropical lowland with annual rainfall regime
- Tropical premontane with annual rainfall regime
- Tropical montane with anual rainfall regime
- Tropical lowland with bianual rainfall regime

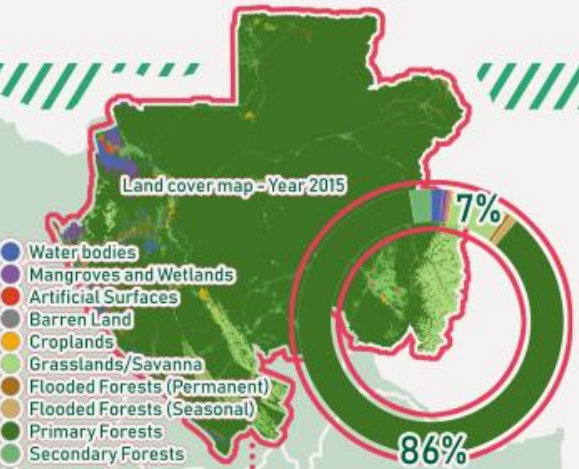




- Water bodies
- Mangroves and Wetlands
- Artificial Surfaces
- Barren Land
- Ecosystem Complex
- Croplands
- Grasslands
- Primary Forest
- Secondary Forest
- Mixed Vegetation



- Open water (Permanent)
- Open water (Seasonal)
- Wetlands (Permanent)
- Wetlands (Seasonal)
- Salt Pans
- Artificial surfaces
- Croplands
- Closed woodlands
- Open woodlands
- Closed shrublands
- Open shrublands
- Grasslands



- Water bodies
- Mangroves and Wetlands
- Artificial Surfaces
- Barren Land
- Croplands
- Grasslands/Savanna
- Flooded Forests (Permanent)
- Flooded Forests (Seasonal)
- Primary Forests
- Secondary Forests

AGEOS
AGENCE GABONAISE D'ÉTUDES ET D'OBSERVATIONS SPATIALES

PRODUCTS

LIBERIA

In June, 2020, the government of Liberia has formally endorsed the map and accounts developed under the CI-NASA Parnership:

REPUBLIC OF LIBERIA
ENVIRONMENTAL PROTECTION AGENCY
P. O. BOX 4024
4th Street Sinkor, Tubman Boulevard
1000 Monrovia, 10 Liberia

DED/EPA-02/00316/20/RL

June 5, 2020

ENDORSEMENT LETTER

Peter G. Mulbah
Acting Country Director
Conservation International
Monrovia, Liberia

Dear Mr. Mulbah:

I have the honor to formally endorse the land and ecosystem extent map, which EPA developed in collaboration with Conservation international (CI) and the National Aeronautics and Space Administration (NASA) of the United States, as the basis for a national system of Ecosystem Accounting in Liberia. The map was produced using state-of-the-art methodologies and following the guidelines of the ongoing revision of the System of Environmental-Economic Accounting 2012—Experimental Ecosystem Accounting (SEEA EEA) under the auspices of the United Nations Statistical Commission (UNSC).

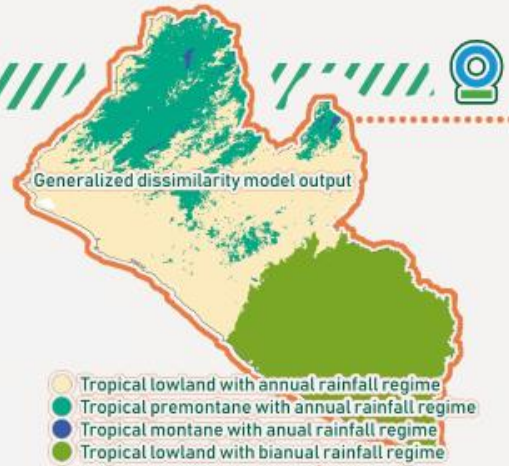
As a SEEA EEA extent account, we understand that the map and accounting tables are intended to be updated periodically, allowing for annual and timely reporting of Liberia's extent of different ecosystem types in terms of area, and its changes over time at the national scale. With this map, a common starting point for Ecosystem Accounting, the government of Liberia is delighted to formally begin SEEA-compliant Ecosystem Accounting.

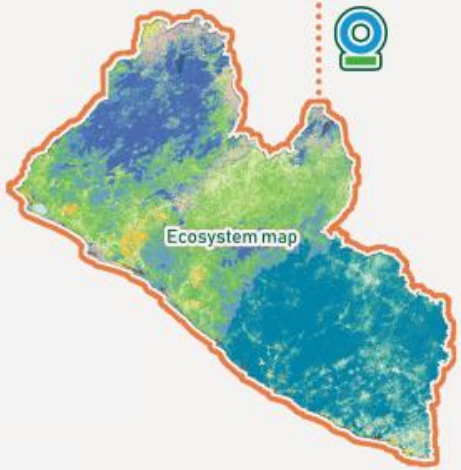
Please accept the assurance of my highest esteem and consideration as we strive for environmental sustainability for now and successive generation.

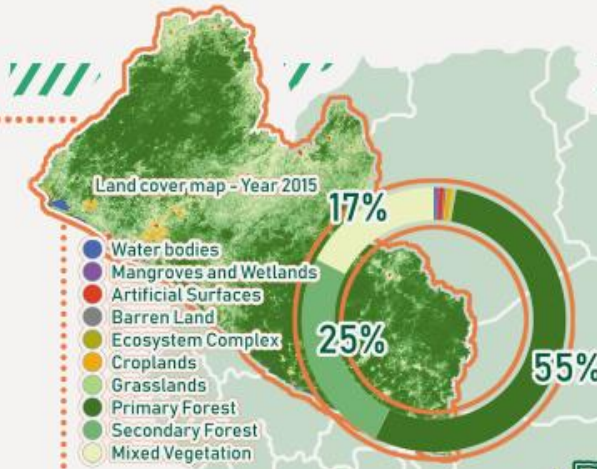
Kind regards,

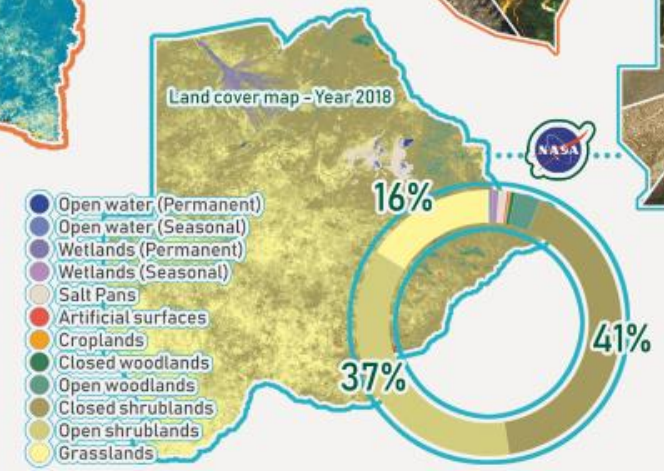
Randall M. D...
ACTING EXECUTIVE DIRECTOR/CEO

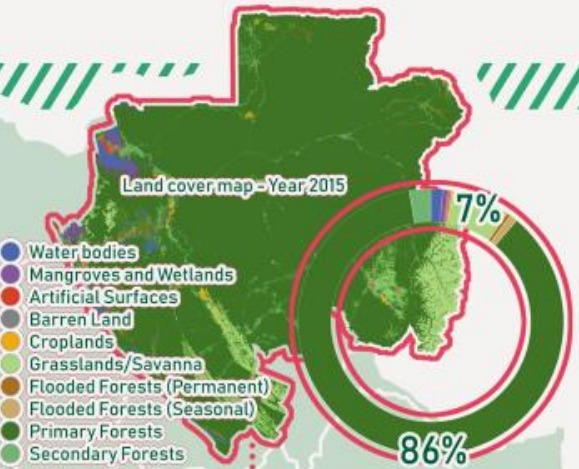
Mobile: +(231) 778 777578 / 777 556238 Email: rdobayou@epa.gov.lr











WHAT'S NEXT?

SHORT TERM GOALS:

A) Phase II - "Condition" of the ecosystems.

B) Focus on in-country training and capacity building;

LONG TERM GOALS:

A) More in-country engagement with stakeholds from the three pilot countries.

B) Include more country-members of the Gaborone Declaration for Sustainability in Africa.

THANK YOU

Celio Sousa
celio.h.resendedesousa@ nasa.gov