



# Application of geospatial methods and remote sensing and for evaluation

Blending quantitative with qualitative analysis in understanding change

Anupam Anand  
Evaluation Officer  
GEF IEO

# Why do we need geospatial methods?



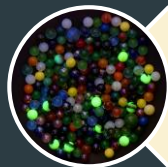
Efficiency



Analysis at different scales



Aiding objectivity and transparency



Applicable to variety of evaluation methods



Helps deal with methodological challenges

GOOD NEWS!  
YOU ARE GROWING



M. Muneef

# SDGs and Remote Sensing



European Space Agency

Big data such as from satellite imagery and sensor networks make environment and development indicators increasingly measurable

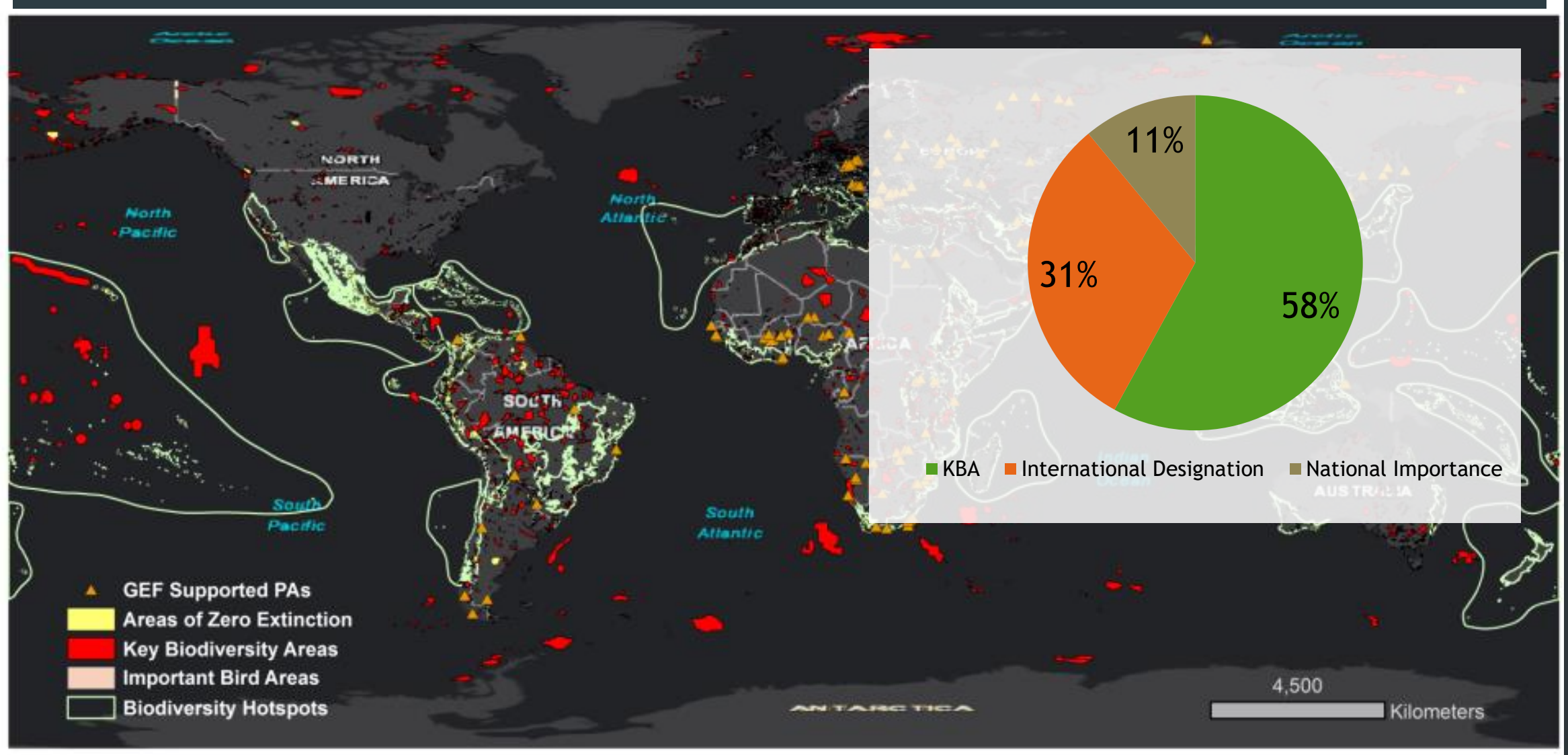
A photograph of a savanna landscape. In the foreground on the left, an elephant is walking, carrying a platform with four people (three women and one man) on its back. In the middle ground on the right, a rhinoceros is standing and facing left. The background consists of tall grasses and a line of trees under a clear sky. The word "Biodiversity" is written in white text in the center of the image.

# Biodiversity



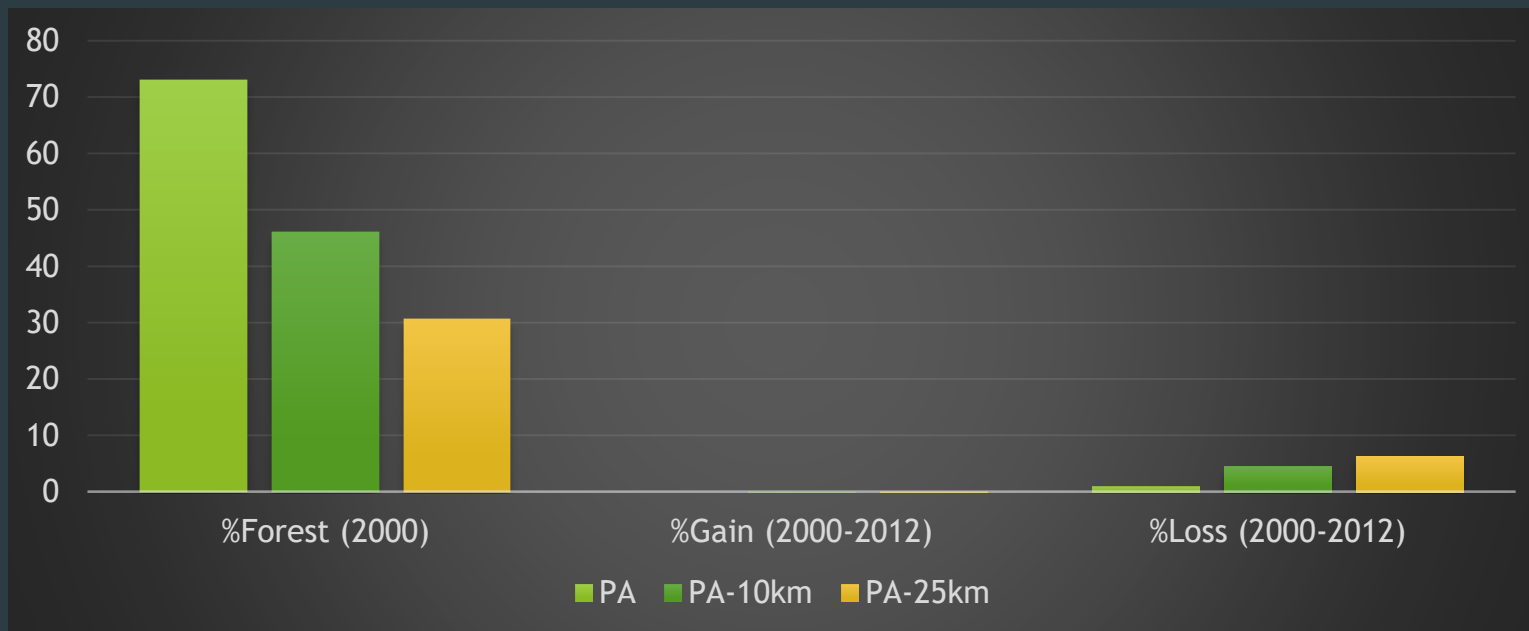
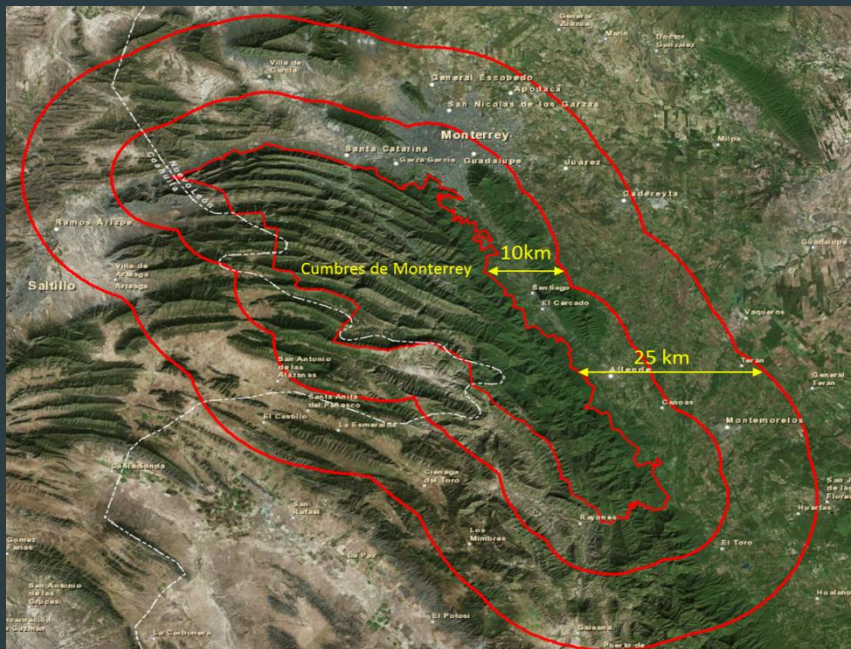
# Biodiversity: Relevance

Study the impact of GEF support to 1292 global protected areas across 147 countries

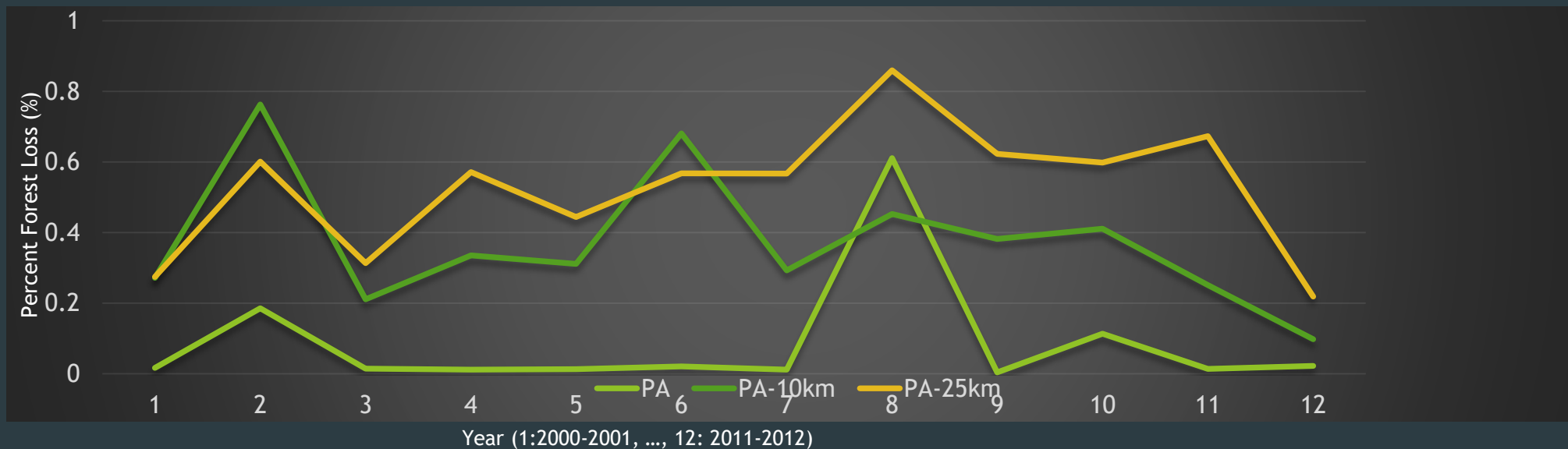


# Forest Cover Change Analysis: Impact

Decadal Forest Cover, Gain and Loss (2000 – 2012)



Yearly Percent of Forest Loss (2000 – 2012)

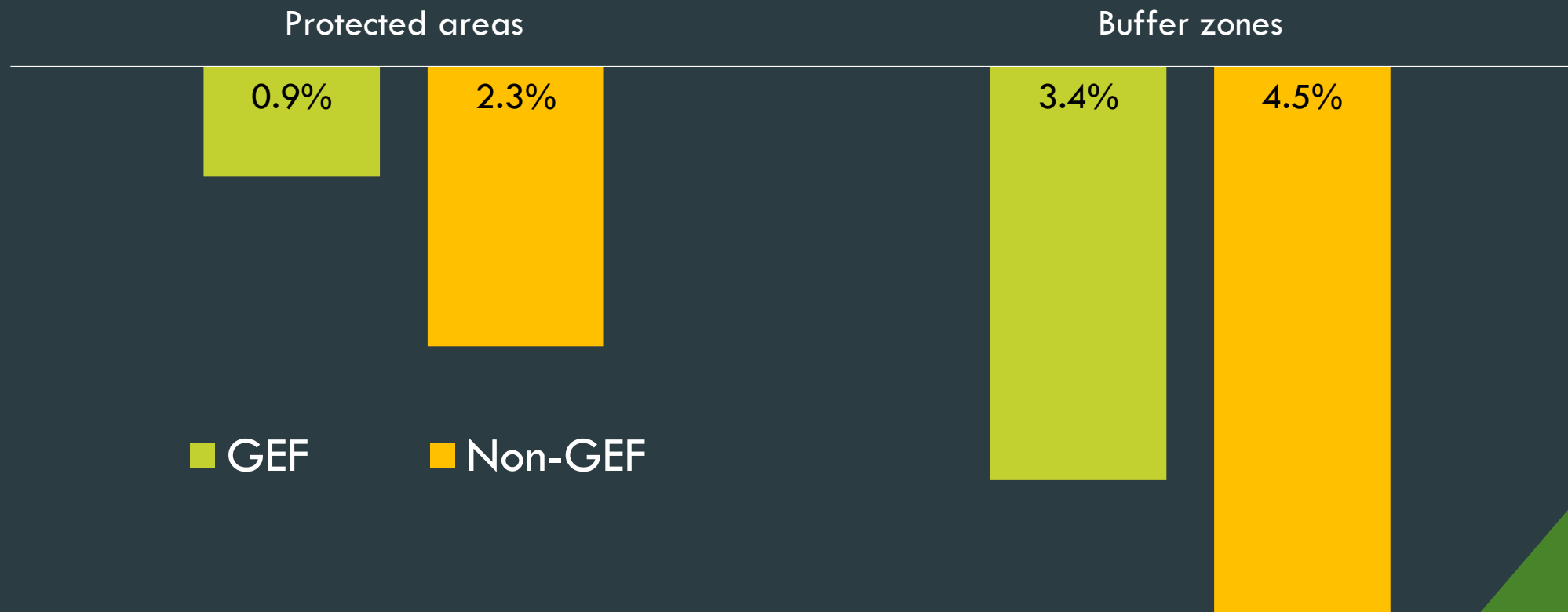




# Biodiversity: Global Analysis

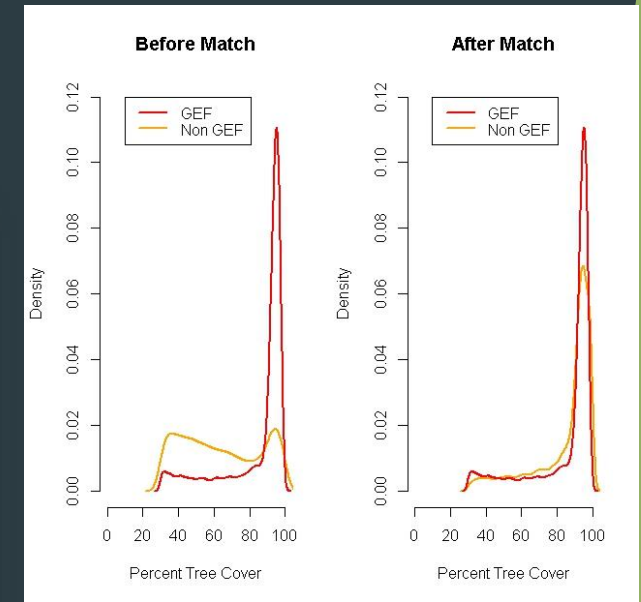
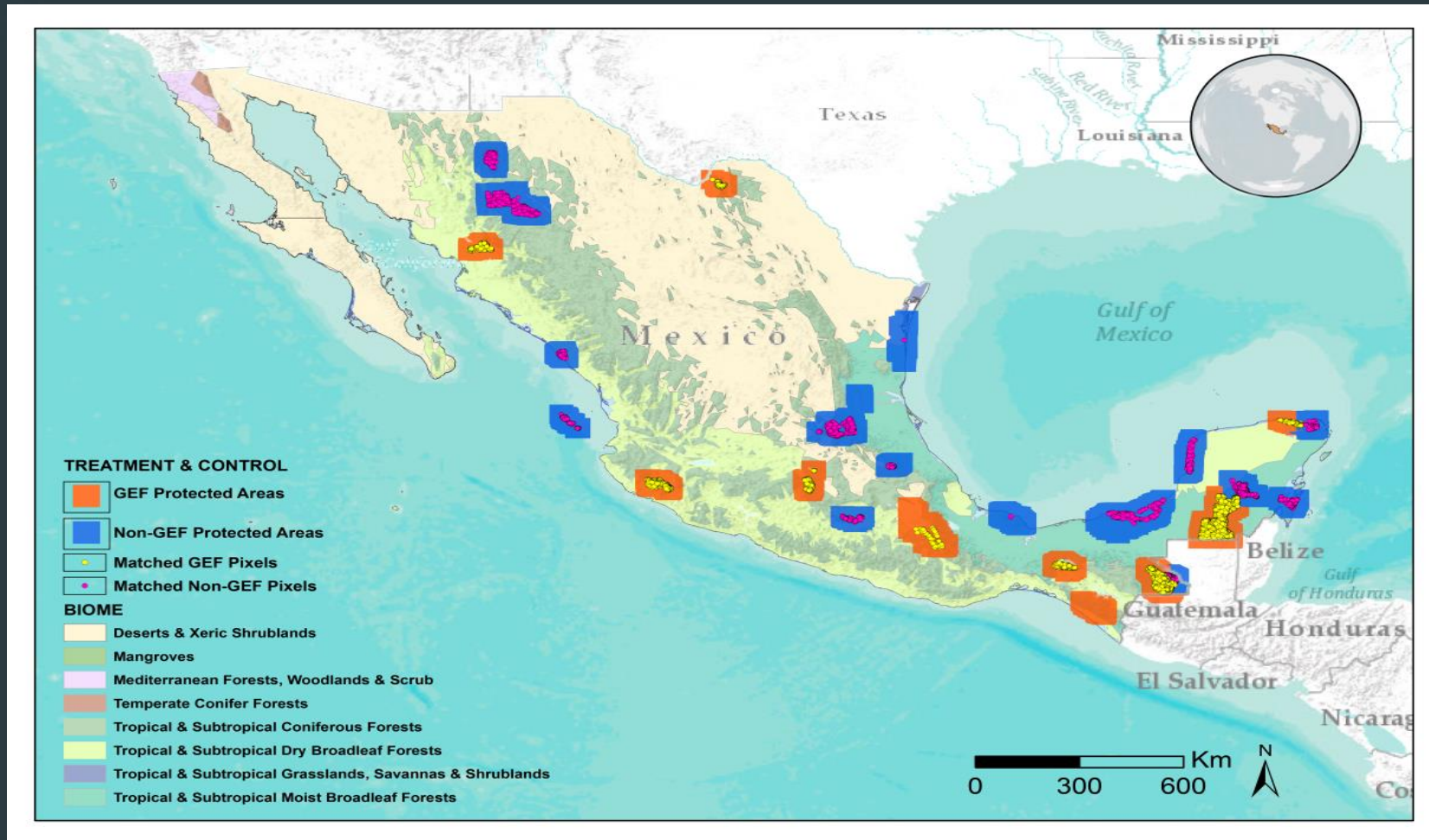


## Forest cover loss (2000-2012)



■ GEF    ■ Non-GEF

# Did the intervention cause the change?



GEF-supported PAs have  
23% less forest loss

Quasi-experimental evaluation design based on Propensity score matching

# International Waters

An aerial photograph of a vast, calm blue lake that perfectly reflects the sky above. The sky is filled with soft, white and grey clouds. On the left side of the frame, a steep, forested hillside descends towards the water's edge. The forest is dense and green. In the distance, across the lake, a small town with red-roofed buildings is visible, nestled in a valley. The background features rolling hills and mountains under a bright, slightly overcast sky. The overall scene is peaceful and scenic.



# Lake Victoria: Vegetation presence



2000

2003

2005

2007

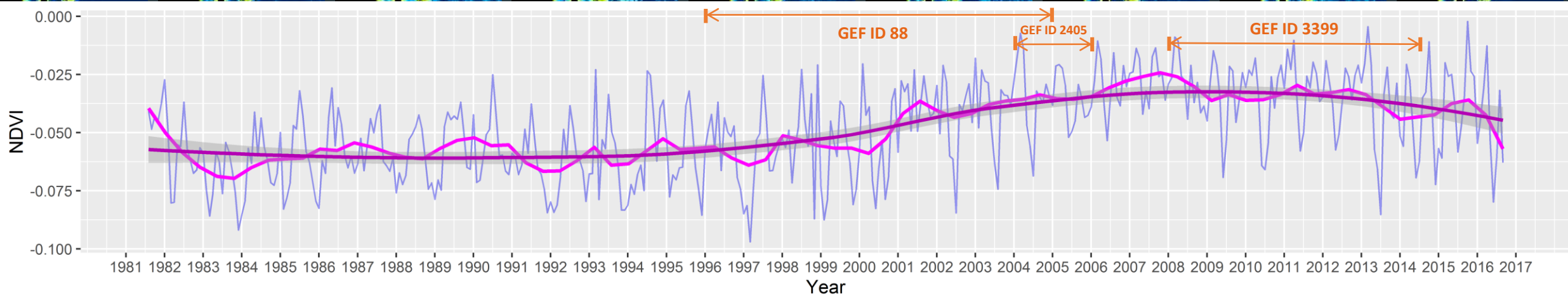
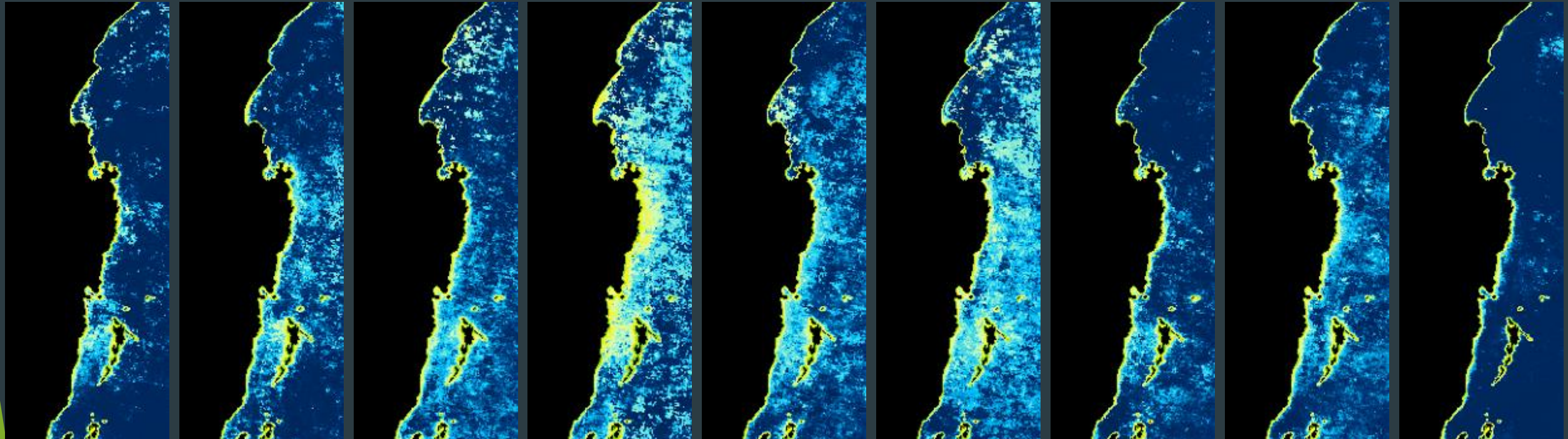
2009

2011

2013

2015

2016



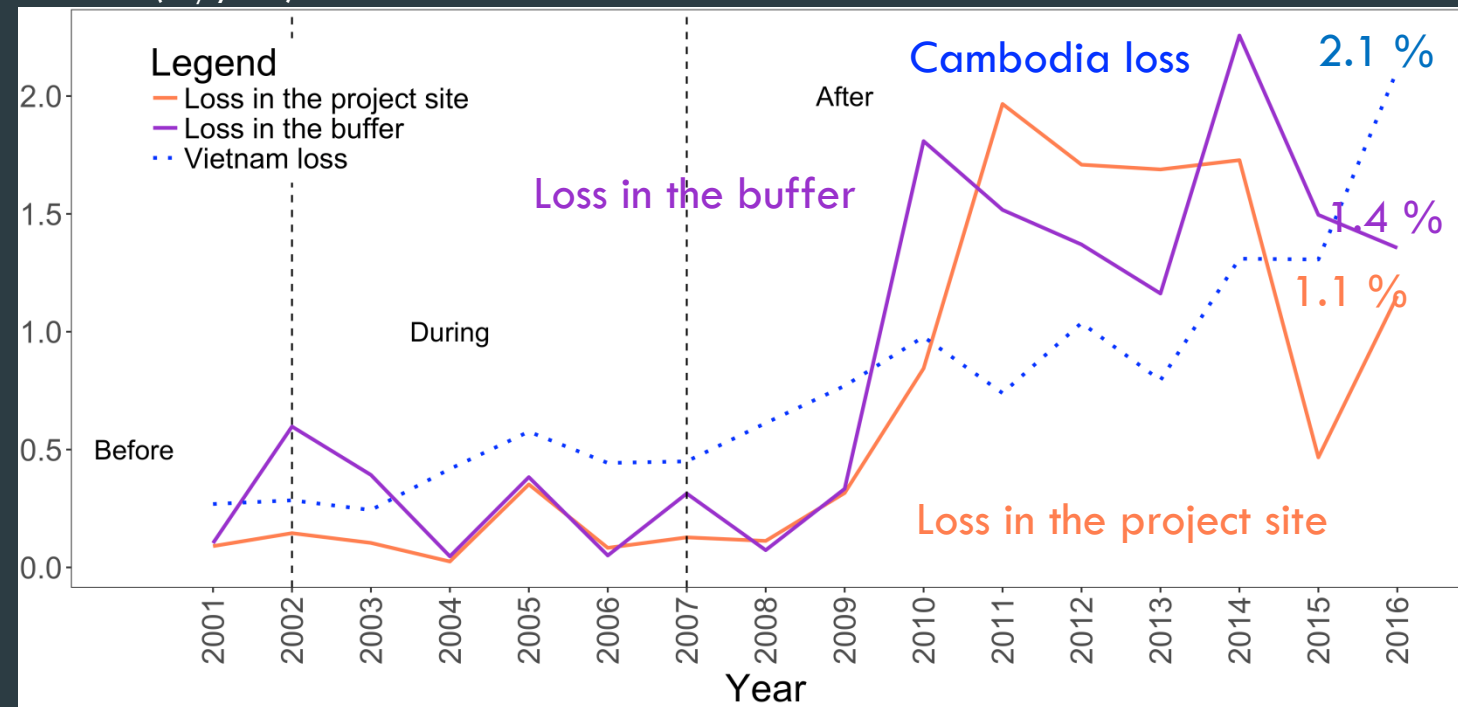
# SUSTAINABILITY



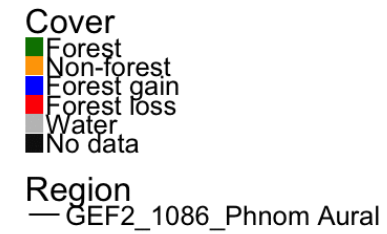
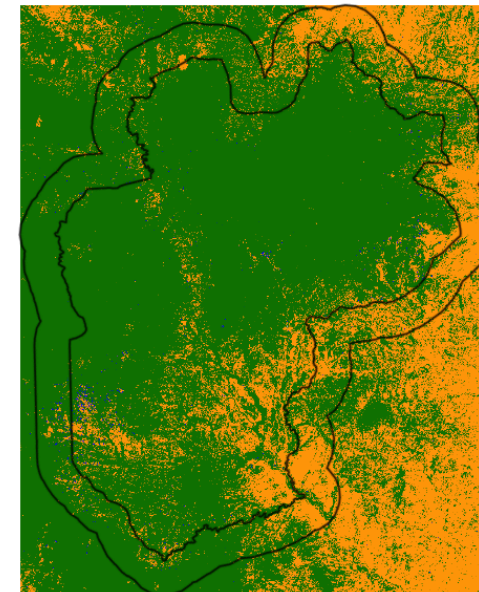
## Cardamom Mountains

### Integrated Protected Area System, Cambodia

Loss rate (%/year)



2000



Was this intervention sustainable?

# Triangulating Across Methods



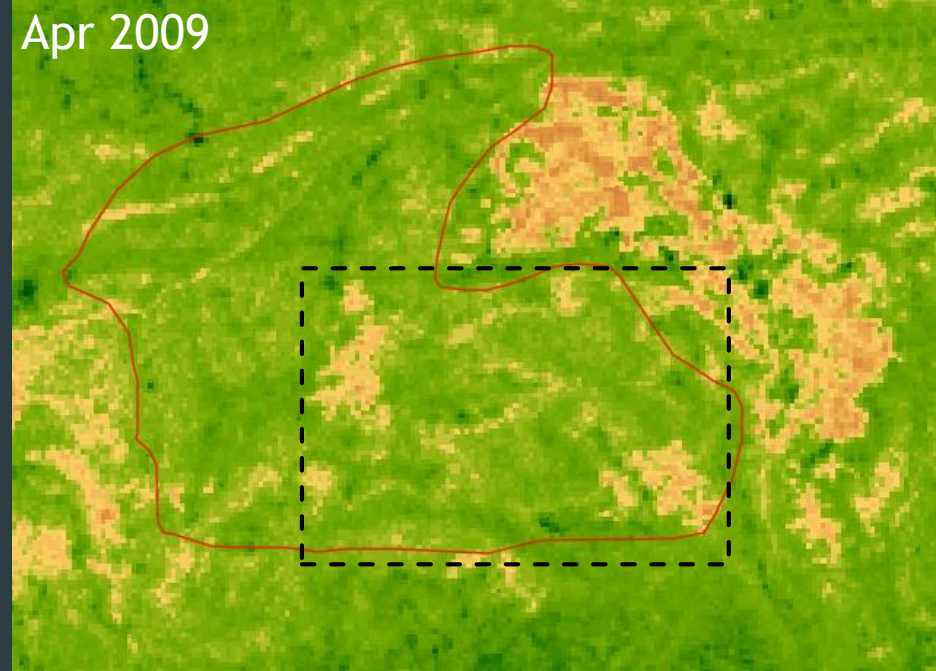




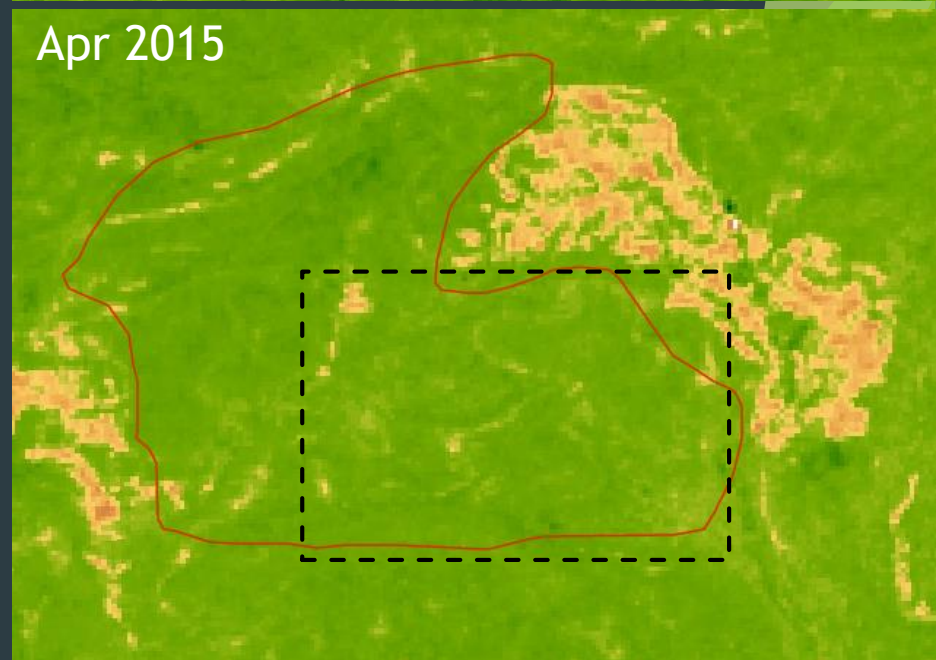
# India: SLEM PMIS 3472(2009-2015)


## Time series analysis using Satellite data

Apr 2009



Apr 2015



Question	Response
Whats the current date and time	2016-09-18T13:27:00.000+05:30
Where is this interview taking place?	21.76722166205057 78.66110602300134 486.3959563433866 24.0
Can I take a picture?	
Name of Interviewee(s)	Premlal anke
What is your role in the project?	beneficiary
Name of Organization	Borpani
Is the project creating any positive impact in the area/region/site?	yes
Did this project contribute to better land management ?	to_a_moderate_
Has the project increased productivity in rangelands? (Y/N)	yes
Has the project allowed for creating of new jobs and livelihood?	yes

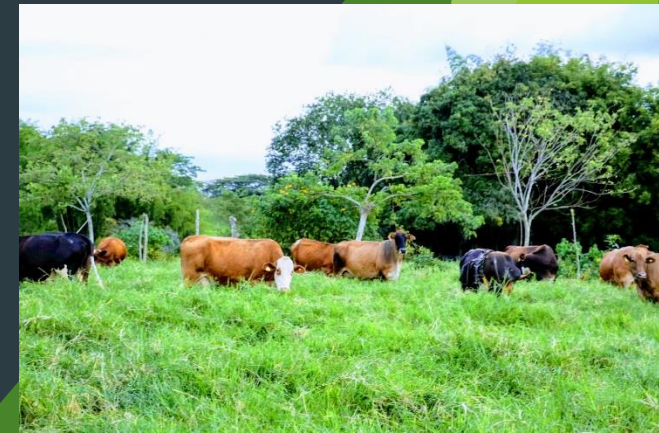
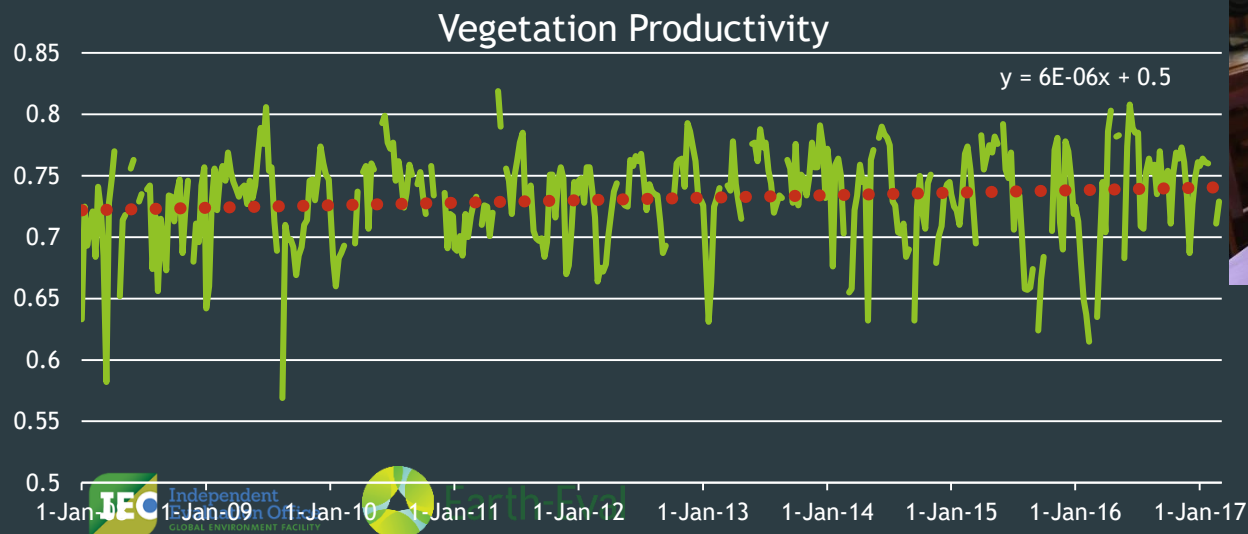


## Beneficiary survey

### Bamboo Forest



# Silva-pastoral Project, Colombia

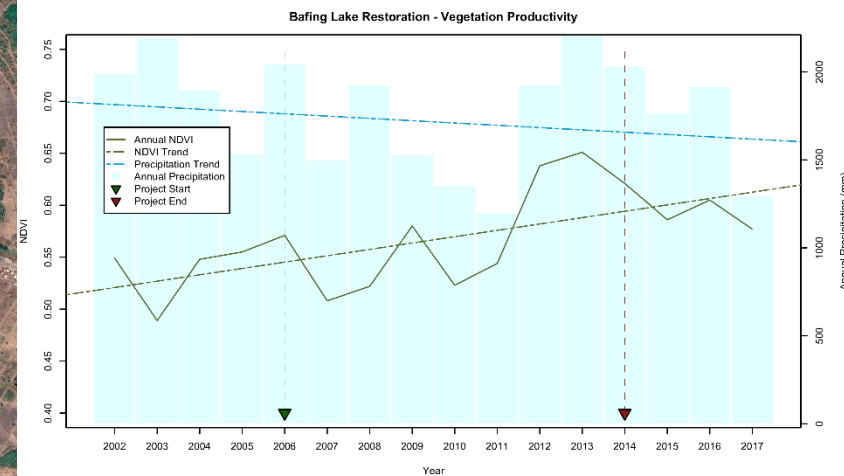


# Restoration in Bafing Lake, Guinea

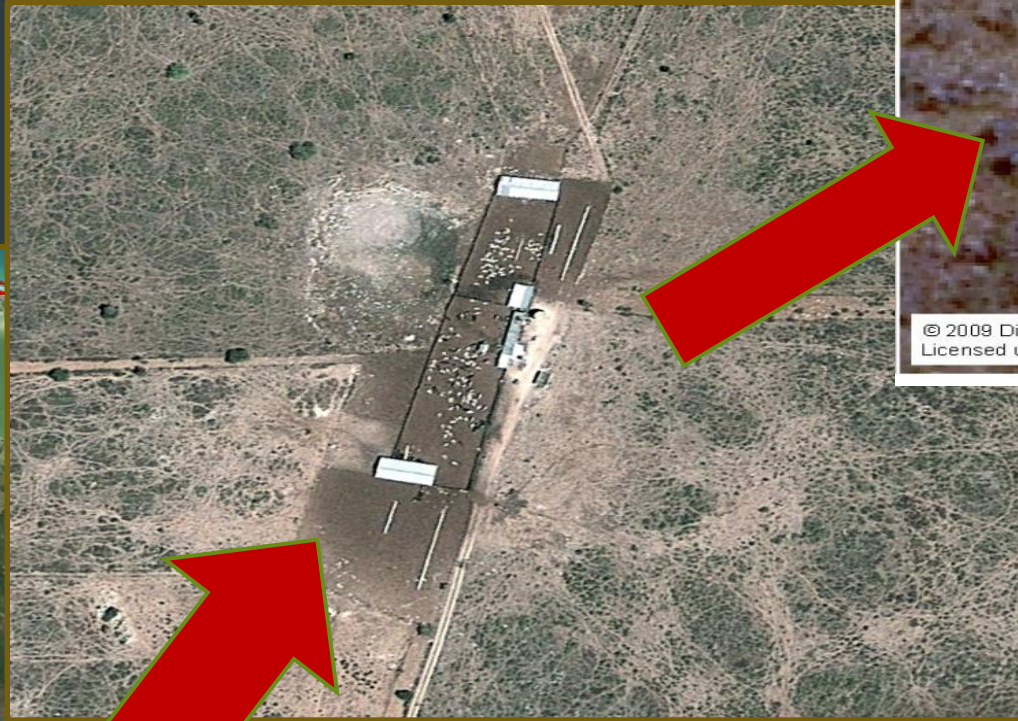
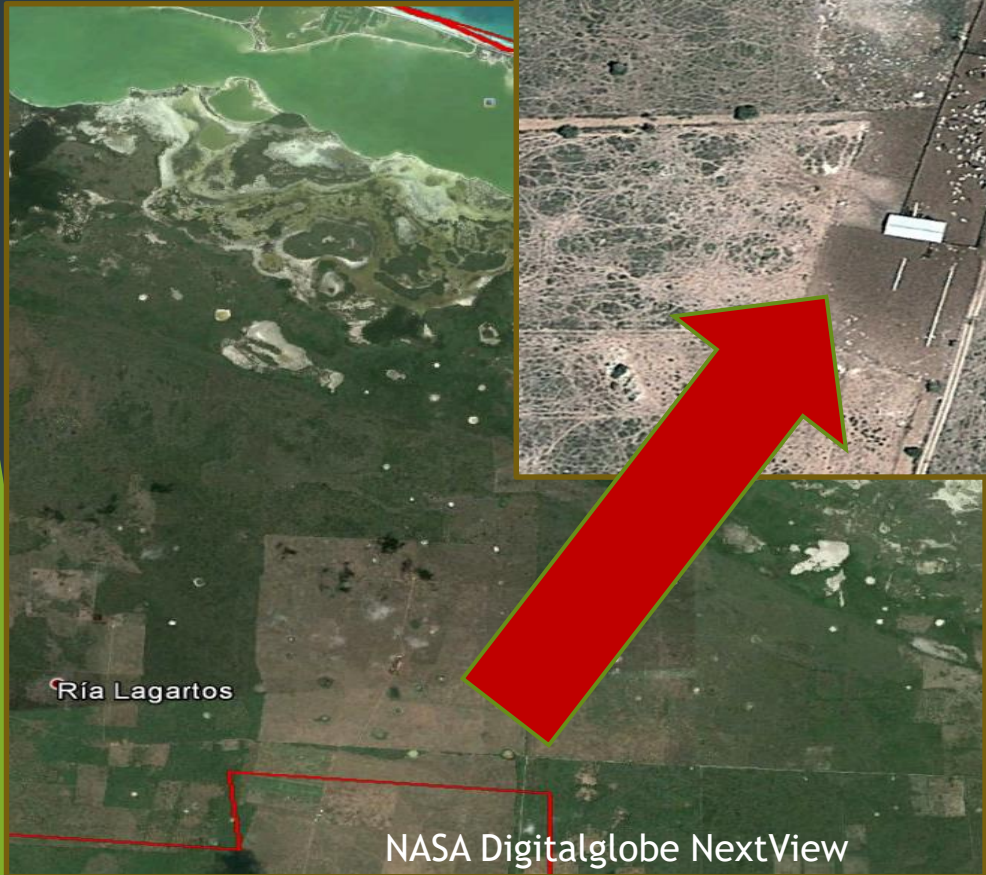
2012



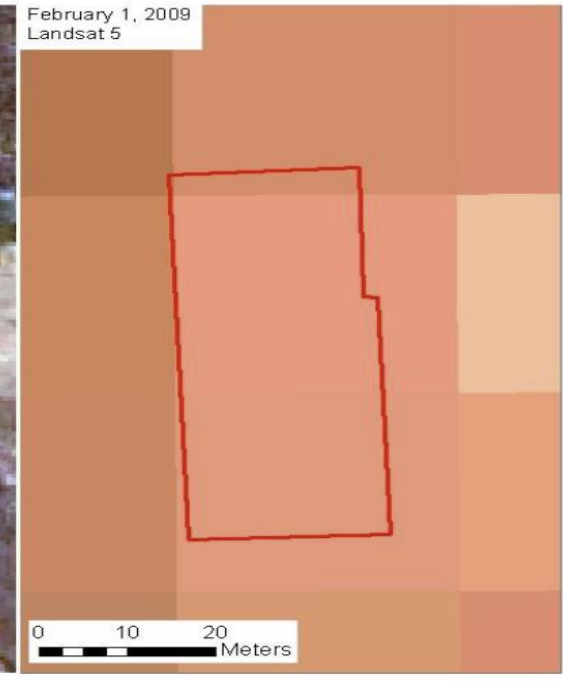
2019



# Identify the drivers



2.5 m



30 m zoomed in to  
2.5 m

Images at 2.5 to 0.5 m resolution used to identify drivers of change that hinder success of GEF support

# Challenges



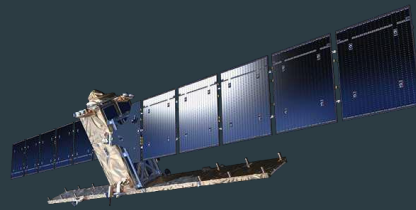
- Need to make a business case
- Need to manage costs
- Require good technical skills
- Requires multidisciplinary teams for evaluation
- Requires keeping up with dynamic learning and upgrading of skills

# Lessons for the future



- Partner with global institutions and leverage open data and tools
- Leverage Geospatial methods within mixed approaches and methods
- Variable costs which depends on scale and scope of the evaluation, type of questions, skills, partnership, software

# Resources



## Interactive tools

<http://www.globalforestwatch.org/> : GFW offers data, and tools for forests monitoring

<https://global-surface-water.appspot.com/> : Global Surface Water

## Data visualization and download

<http://earthexplorer.usgs.gov> : NASA-USGS Earth Explorer for raw data

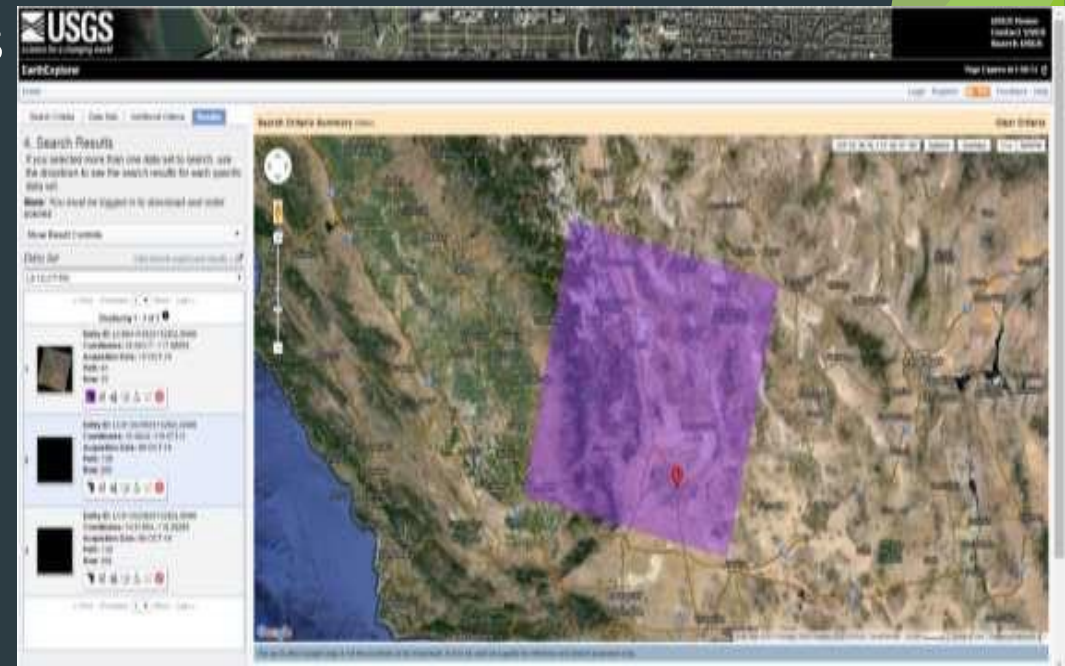
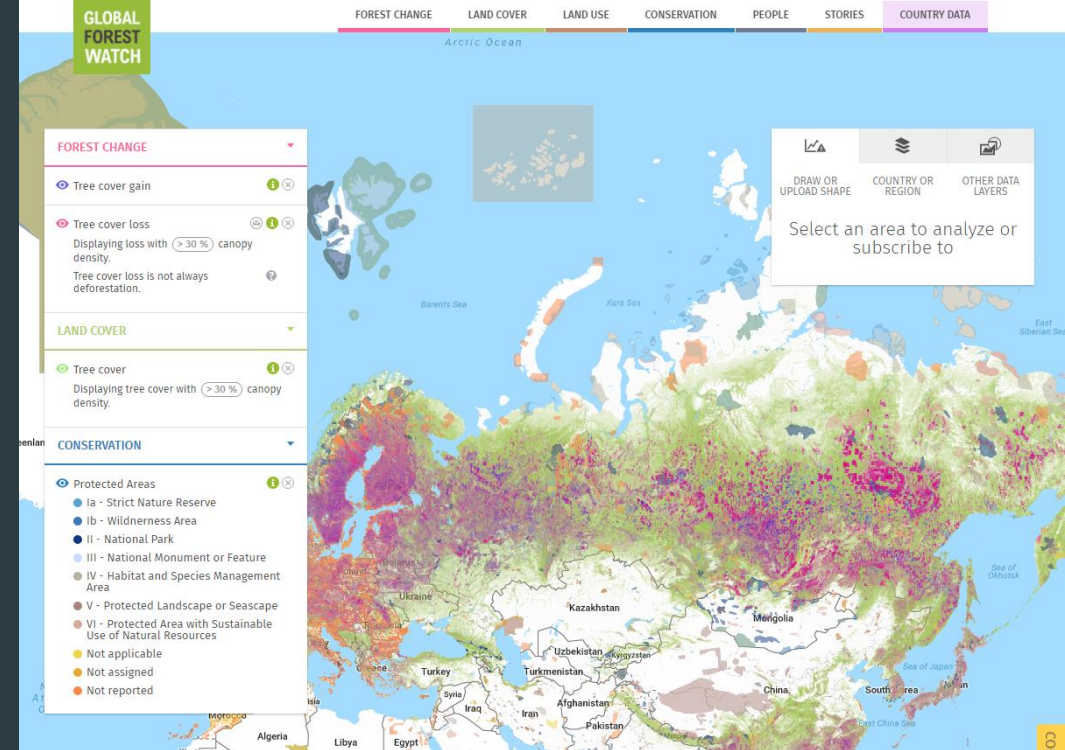
<https://scihub.copernicus.eu/> : Copernicus Open Access hub

## Analytical tools(Open Access or Free)

<http://www.qgis.org/en/site/> : QGIS

<https://earthengine.google.com/> : Google Earth Engine(requires CODEING)

<https://www.google.com/earth/> :Google Earth Pro



# Thank you

[aanand2@thegef.org](mailto:aanand2@thegef.org)

