



Independent
Evaluation Office
GLOBAL ENVIRONMENT FACILITY

Geospatial Impact Evaluation and Valuation of Land Degradation Projects

Juha Uitto¹, Geeta Batra¹, Anupam Anand¹, Dan Runfola², Ariel BenYishay² and Jyothy Nagol³

¹Independent Evaluation office, Global Environment Facility

²College of William and Mary

³ Global Land Cover Facility, University of Maryland

Impact of GEF Land degradation interventions?

Factors associated with the environmental outcomes?

Value for Money in terms of Carbon sequestered?

Objectives

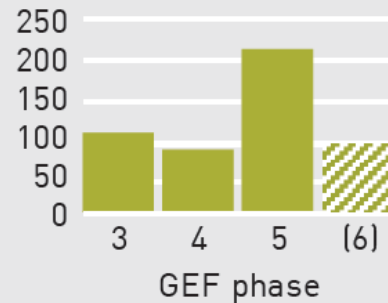
PORTFOLIO HIGHLIGHTS

237
projects

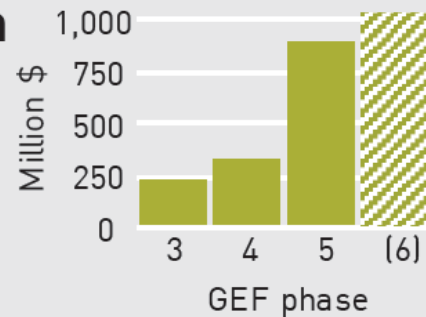
\$630 million
in grant funding

\$2.97 billion
in cofinancing

Number of projects*



Grant amount*



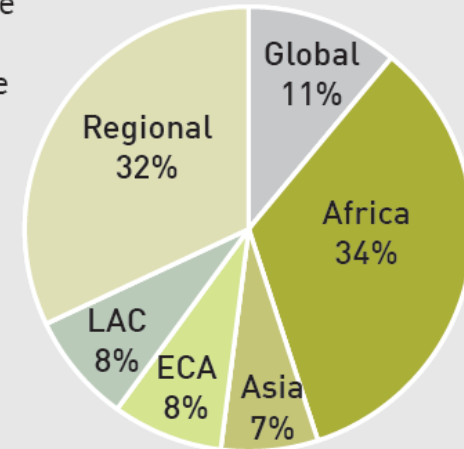
Top 3 agencies*

43% UN Development Programme
17% World Bank Group
17% UN Environment Programme

Regional distribution*

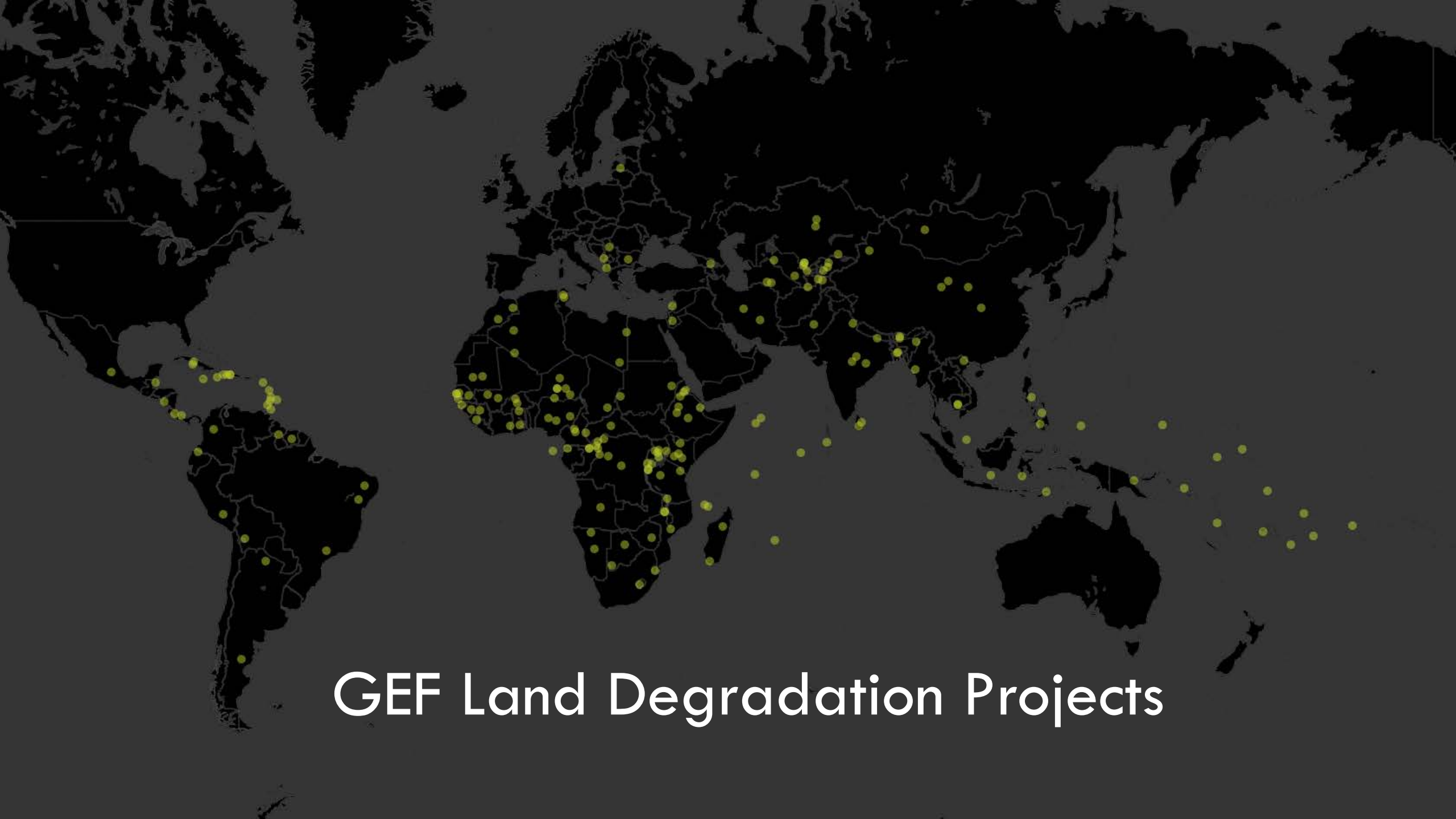
34% Africa
24% Asia
20% Latin America & Caribbean
13% Europe and Central Asia
7% Global
2% Regional

Total GEF funding per region*



*Includes LDFA and multifocal projects.

GEF Land Degradation Focal Area



GEF Land Degradation Projects

Forest Cover(Tier 1)

Vegetation Productivity(Tier 2a)

Carbon Sequestration(Tier 2b)

Forest Fragmentation(Tier 3a)

Framework for Monitoring and Reporting on SDG Target 15.3

Indicator 15.3.1
Proportion of land
that is degraded over
total land area



Sub-Indicators
UNCCD (CBD, UNFCCC)
Reporting Mechanisms

**Land
Productivity**



**Carbon Stocks
above/below ground**



Land Cover and Land Cover Change



**Official Statistics
and Earth Observation**



**Land Use and
Management Practices**



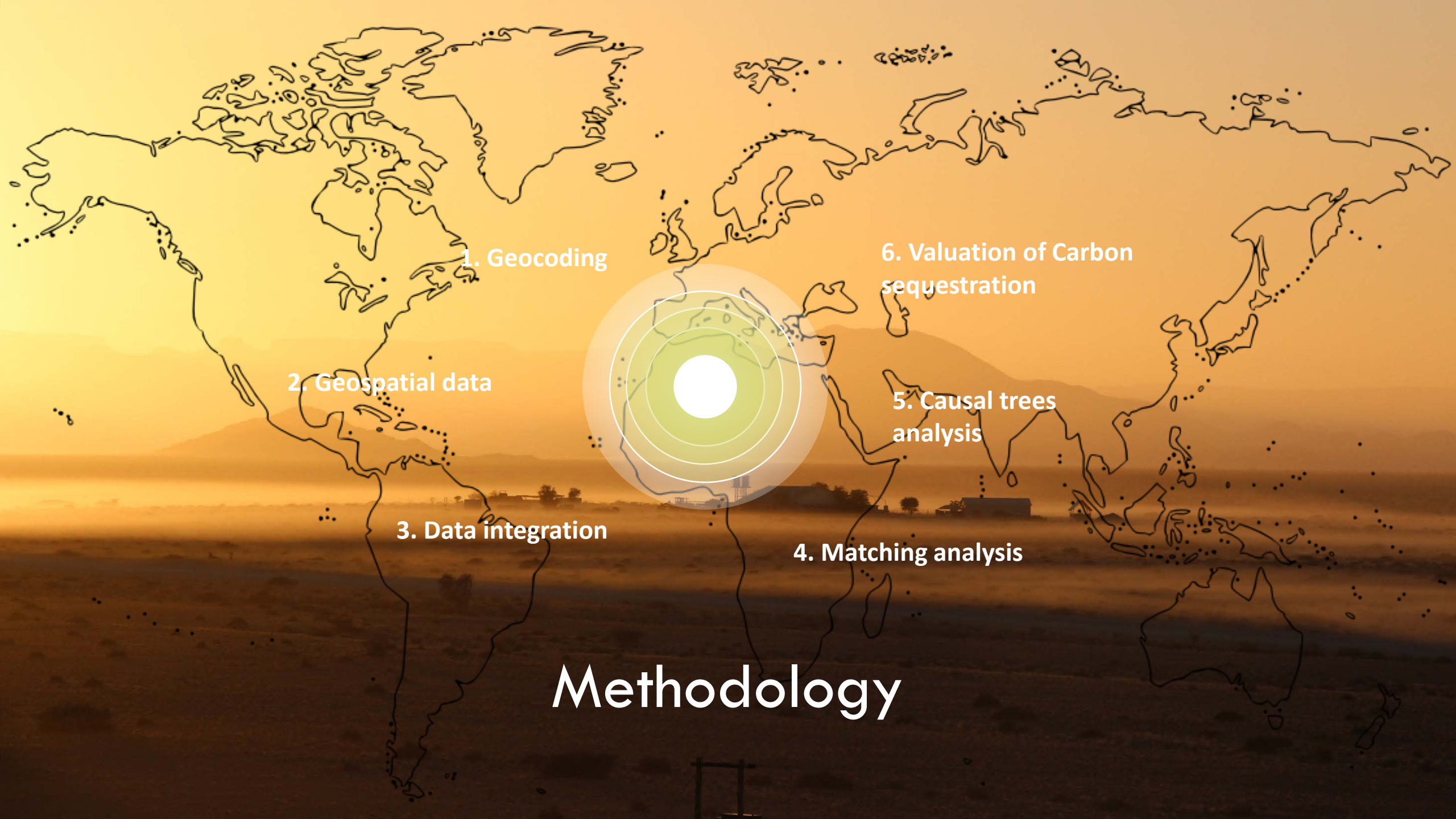
**Surveys, Sampling and
Citizen Sourcing**



**Data from
multiple sources**
FAO, GEF and other
Reporting Mechanisms

Indicators

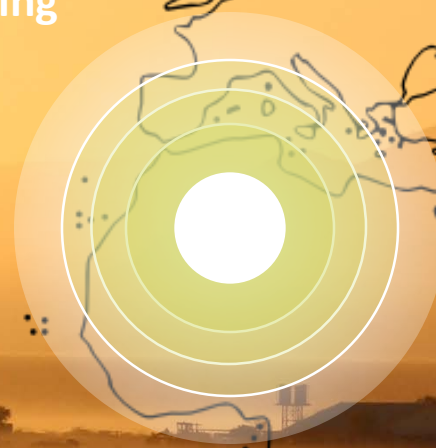




1. Geocoding

2. Geospatial data

3. Data integration



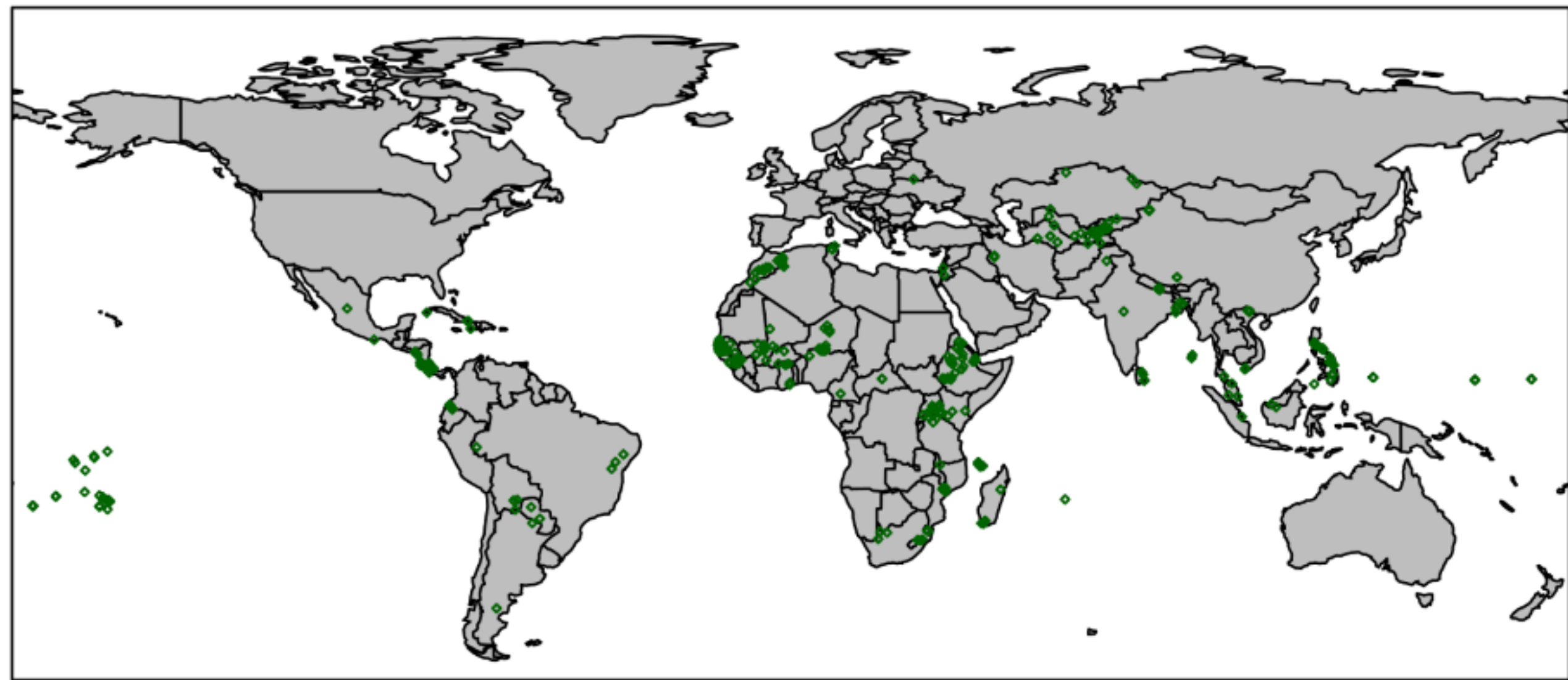
4. Matching analysis

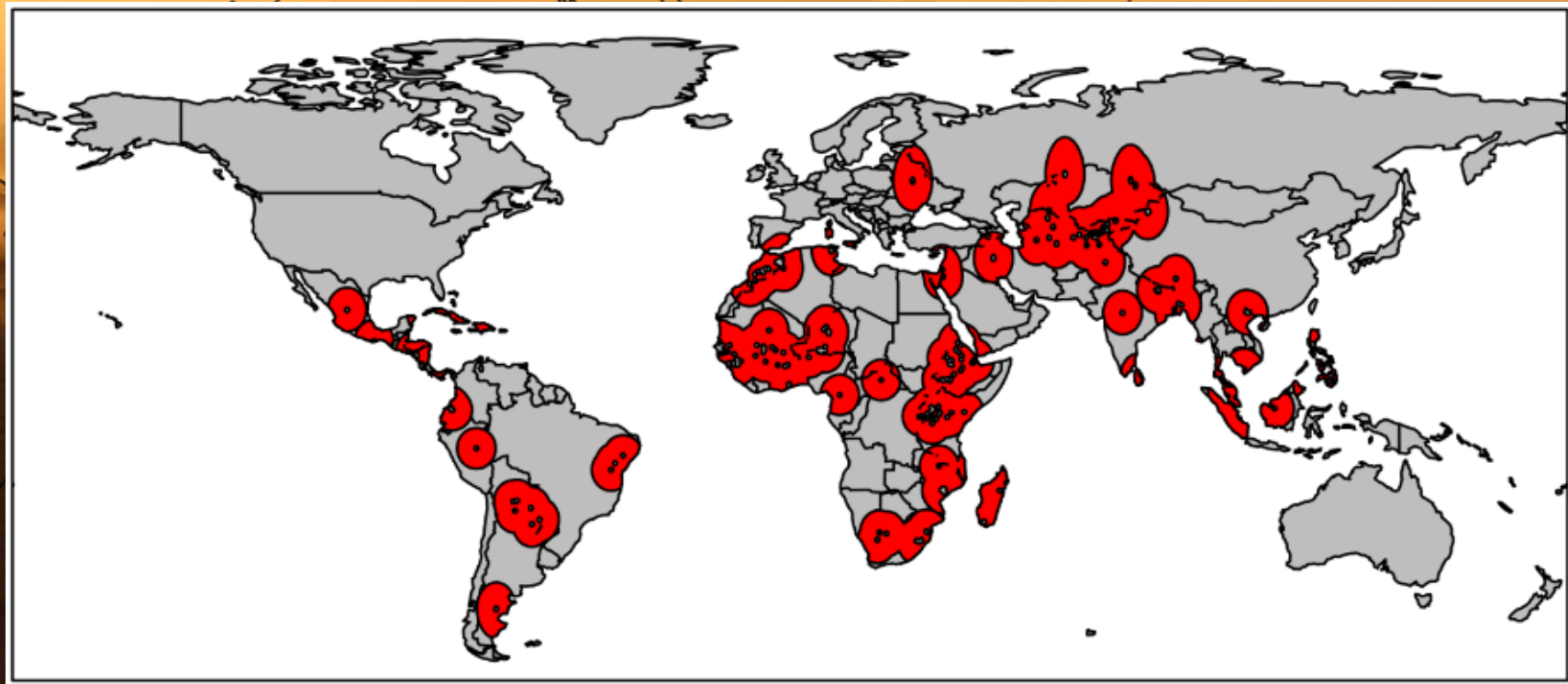
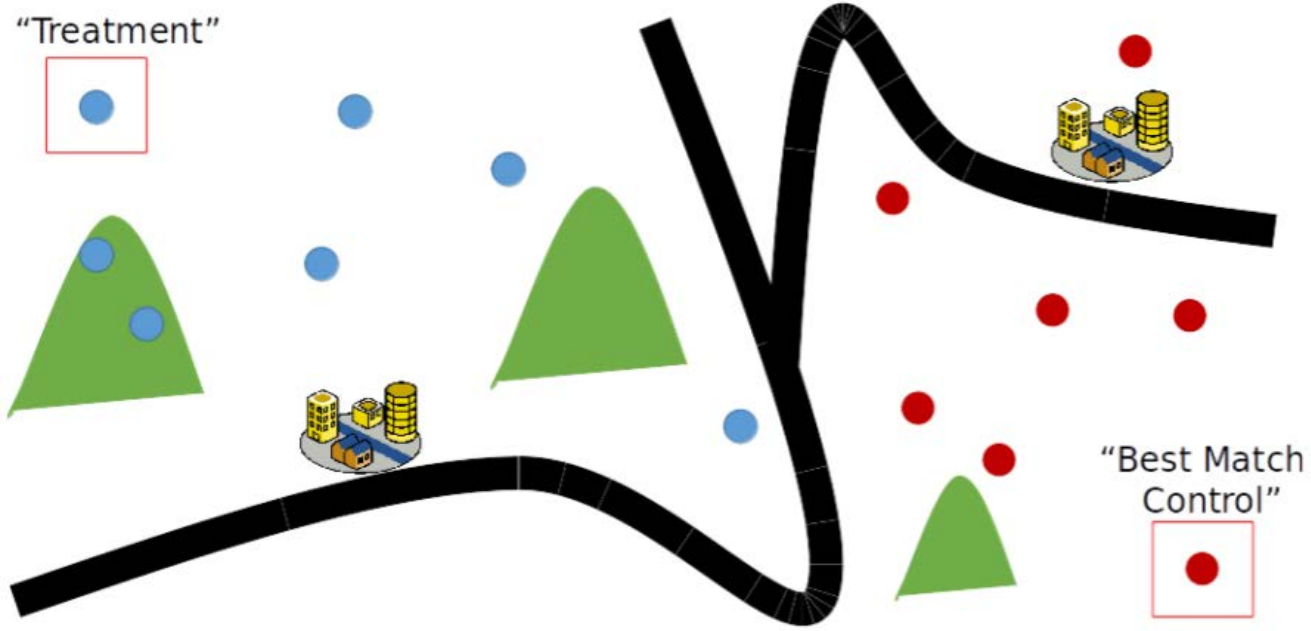
6. Valuation of Carbon
sequestration

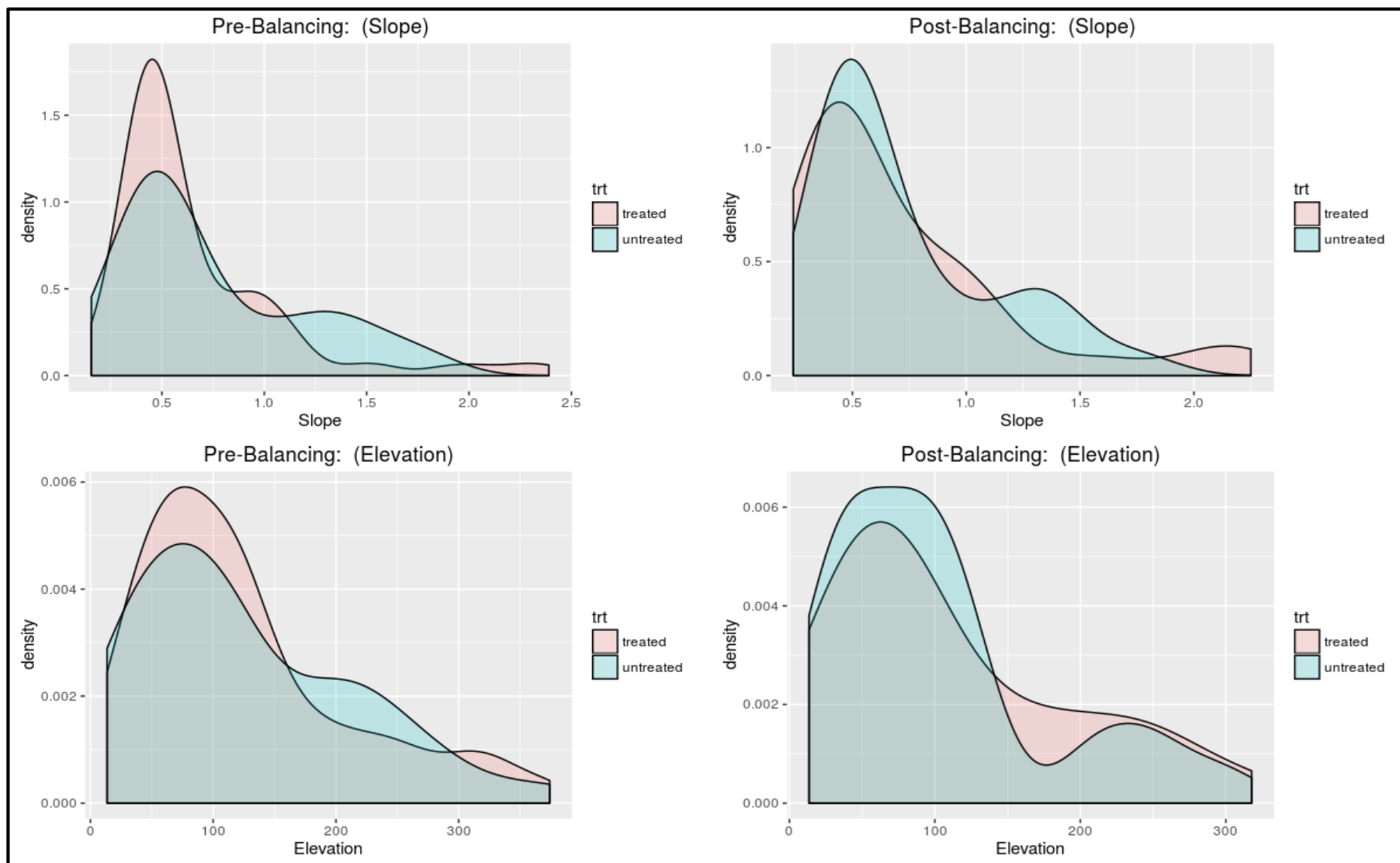
5. Causal trees
analysis

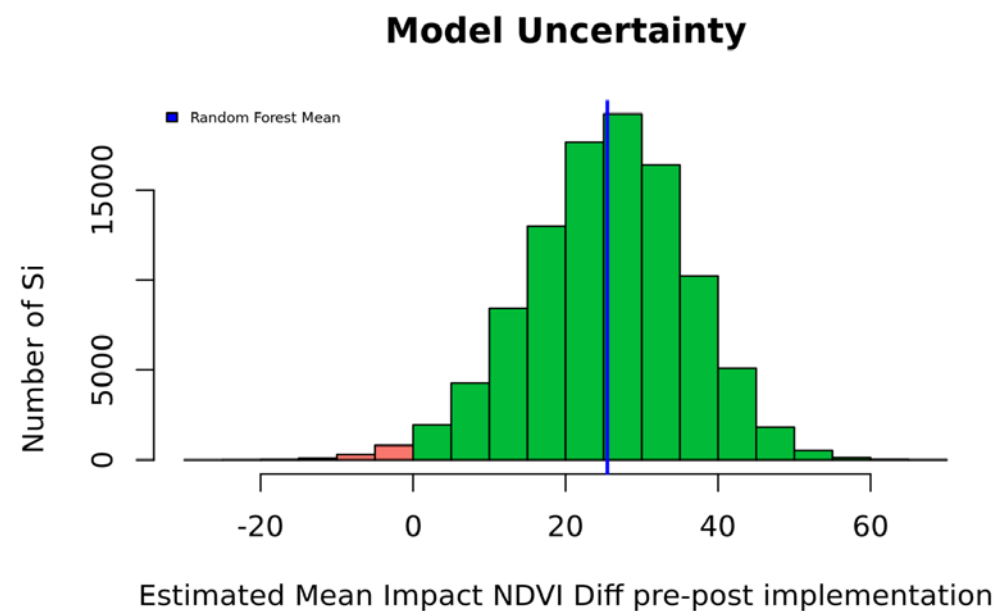
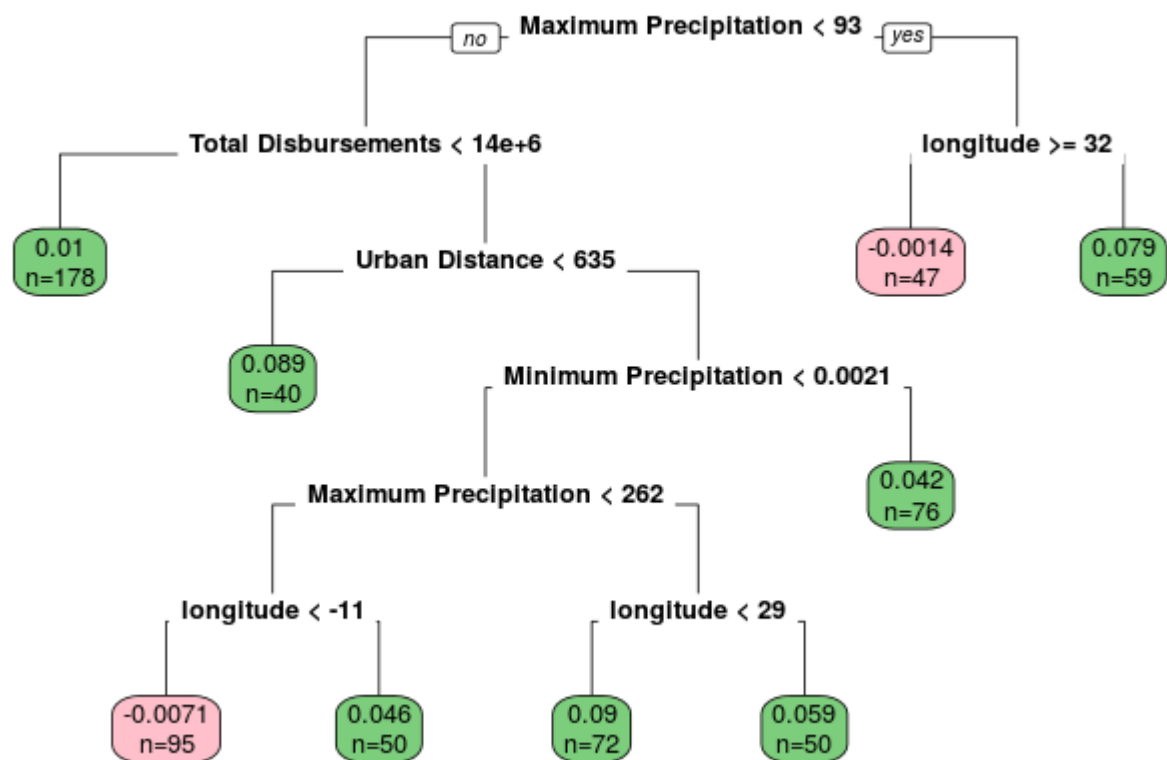
Methodology

Location of GEF Land Degradation Projects Known with a High Degree of Geographic Precision

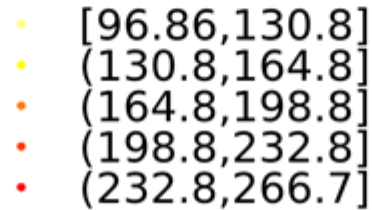
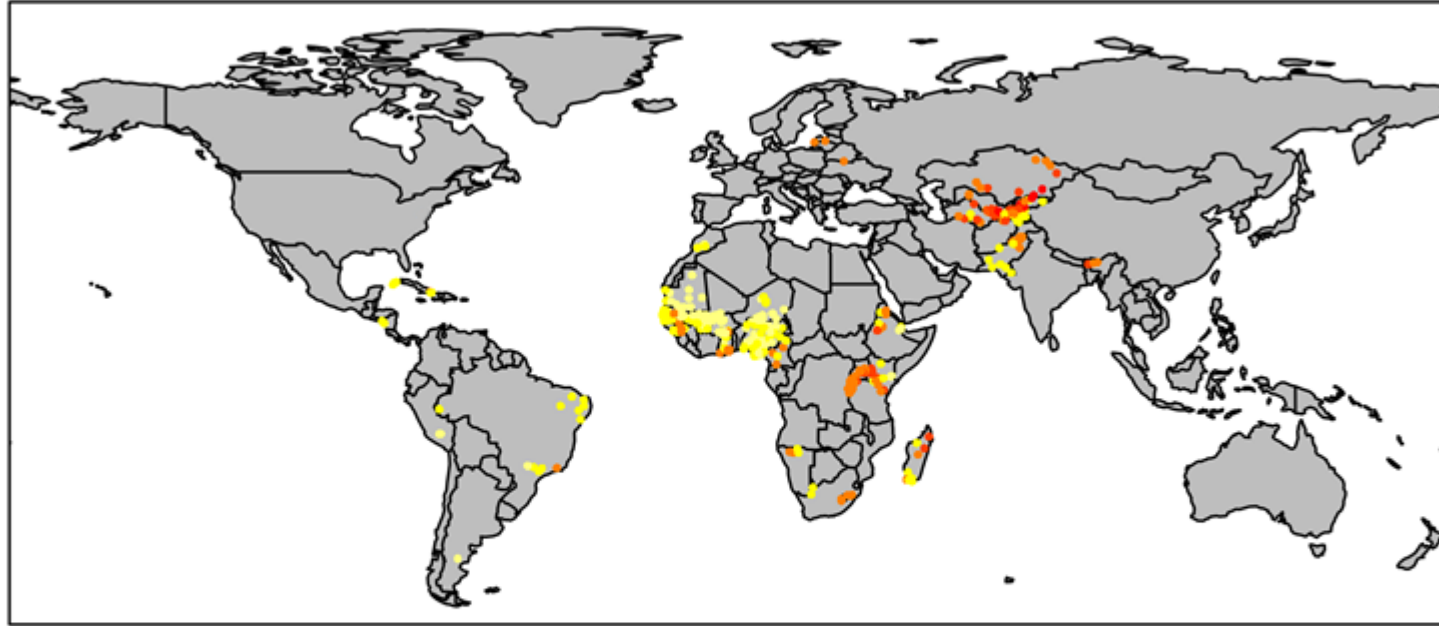








Uncertainty in Estimates (+/- @ 95% Confidence Interval)



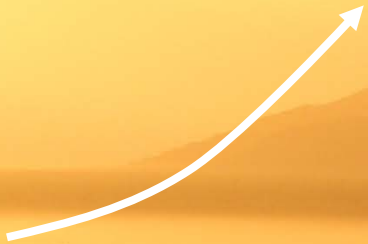
Matched Model: SFA Land (Treated), Null Case Comparisons (Control)

	Dependent variable:	
	NDVI Diff pre-post implementation	
treatment	0.08***	(0.03, 0.14)
Dist. to Rivers (m)	-0.04	(-0.14, 0.07)
Dist. to Roads (m)	0.06*	(-0.01, 0.12)
Elevation (m)	-0.18***	(-0.31, -0.06)
Slope (degrees)	-0.11**	(-0.21, -0.02)
Urb. Dist. (rel)	-0.01	(-0.08, 0.07)
Pop. Density (2000)	0.06	(-0.04, 0.17)
Protected Area %	0.09***	(0.03, 0.14)
Treecover (2000, %)	0.05	(-0.04, 0.13)
Latitude	-0.09*	(-0.18, 0.003)
Longitude	-0.13***	(-0.22, -0.03)
Max Precip. (2002, mm)	-0.42***	(-0.58, -0.27)
Min Precip (2002, mm)	-0.08*	(-0.17, 0.01)
Mean Precip (2002, mm)	0.27***	(0.08, 0.45)
Max Temp (2002, C)	0.004	(-0.33, 0.34)
Min Temp (2002, C)	-0.28	(-0.78, 0.22)
Mean Temp (2002, C)	-0.23	(-0.98, 0.52)
Nighttime Lights (2002, Relative)	-0.02	(-0.10, 0.06)
NDVI (2002, Unitless)	0.01	(-0.07, 0.10)
Urb. Dist. (rel) *Treatment	-0.004	(-0.08, 0.07)
Dist. to Rivers (m) *Treatment	-0.04	(-0.14, 0.07)
Dist. to Roads (m) *Treatment	-0.03	(-0.10, 0.04)
Pop. Density (2000) *Treatment	-0.06	(-0.17, 0.04)
Latitude *Treatment	0.03	(-0.06, 0.12)
Longitude *Treatment	0.08	(-0.02, 0.17)
NDVI (2002, Unitless) *Treatment	0.07*	(-0.01, 0.15)
Elevation (m) *Treatment	0.25***	(0.12, 0.37)
Slope (degrees) *Treatment	-0.12**	(-0.22, -0.02)
Treecover (2000, %) *Treatment	-0.03	(-0.11, 0.06)
Max Temp (2002, C) *Treatment	0.57***	(0.24, 0.90)
Mean Temp (2002, C) *Treatment	-1.05***	(-1.80, -0.31)
Min Temp (2002, C) *Treatment	0.80***	(0.30, 1.30)
Max Precip. (2002, mm) *Treatment	-0.06	(-0.21, 0.10)
Mean Precip (2002, mm) *Treatment	0.06	(-0.12, 0.25)
Min Precip (2002, mm) *Treatment	-0.12***	(-0.20, -0.03)
Nighttime Lights (2002, Relative) *Treatment	0.01	(-0.06, 0.09)
Protected Area % *Treatment	-0.02	(-0.07, 0.04)
Constant	-0.01	(-0.06, 0.05)
Observations	966	
R ²	0.30	
Adjusted R ²	0.27	

Note:

*p<0.1; **p<0.05; ***p<0.01

Findings about location



Positive increase in
NDVI



25 km of
protected area



Low density



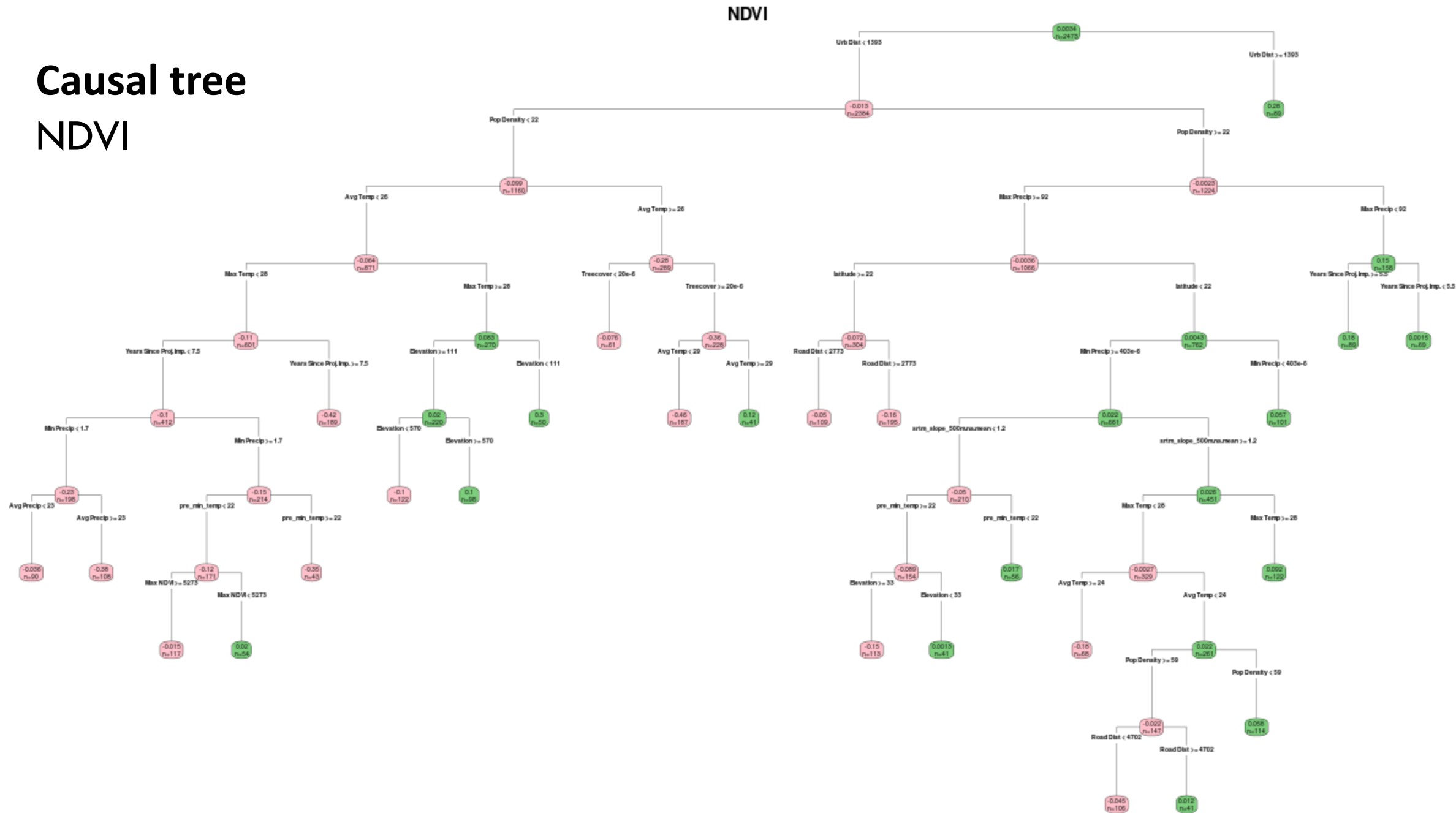
Variable
characteristics

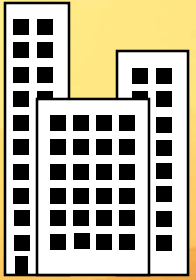


Some without
forest cover

Causal tree

NDVI





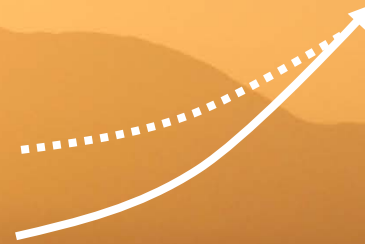
Less effective near
urban areas



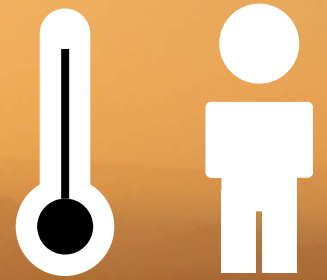
Time
required



Multifocal



Initial conditions



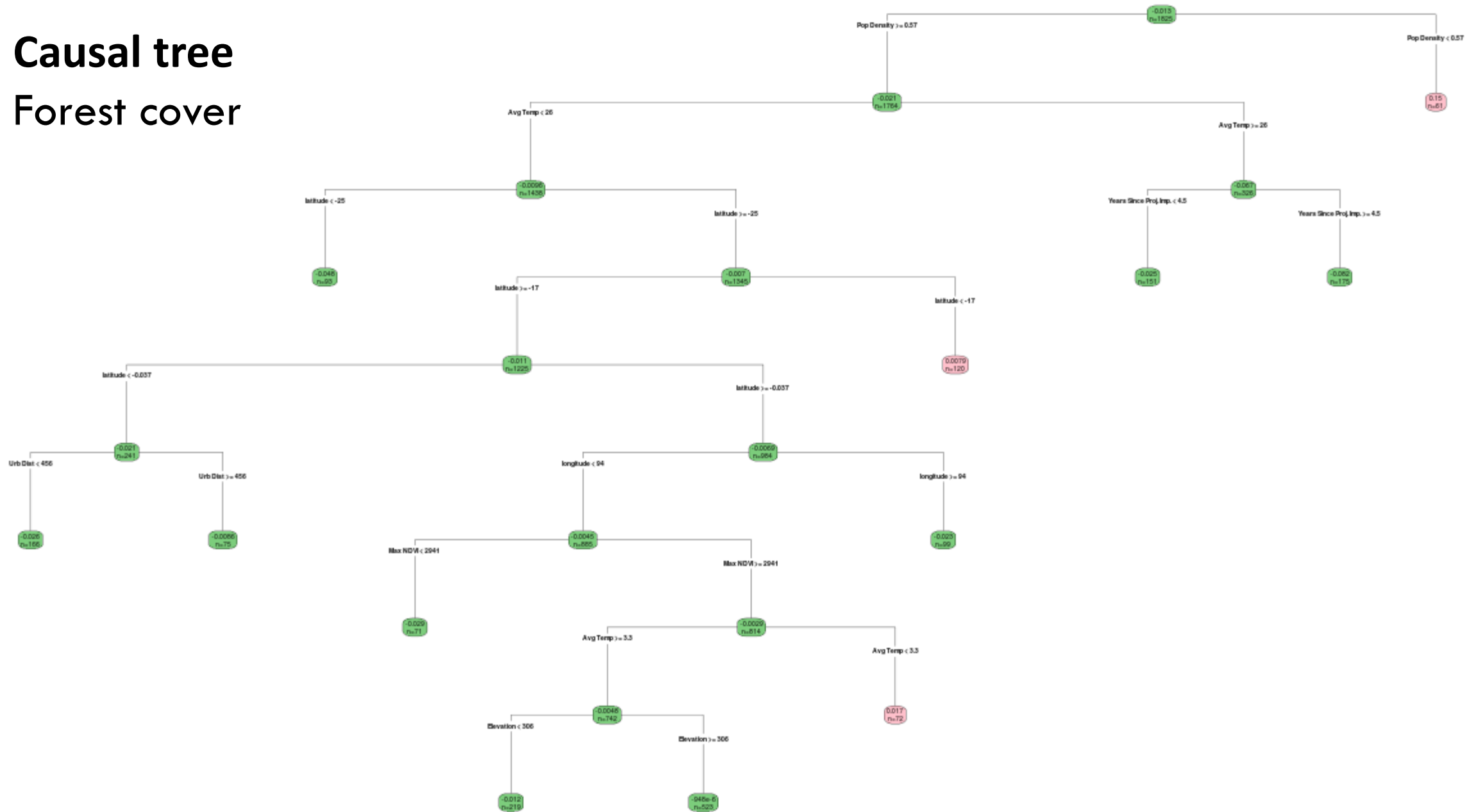
Environmental
and social
characteristics

Findings: NDVI

Causal tree

Forest cover

Forest Landcover

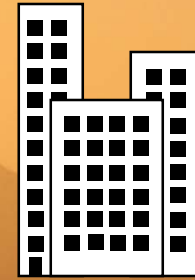




4.5 years after

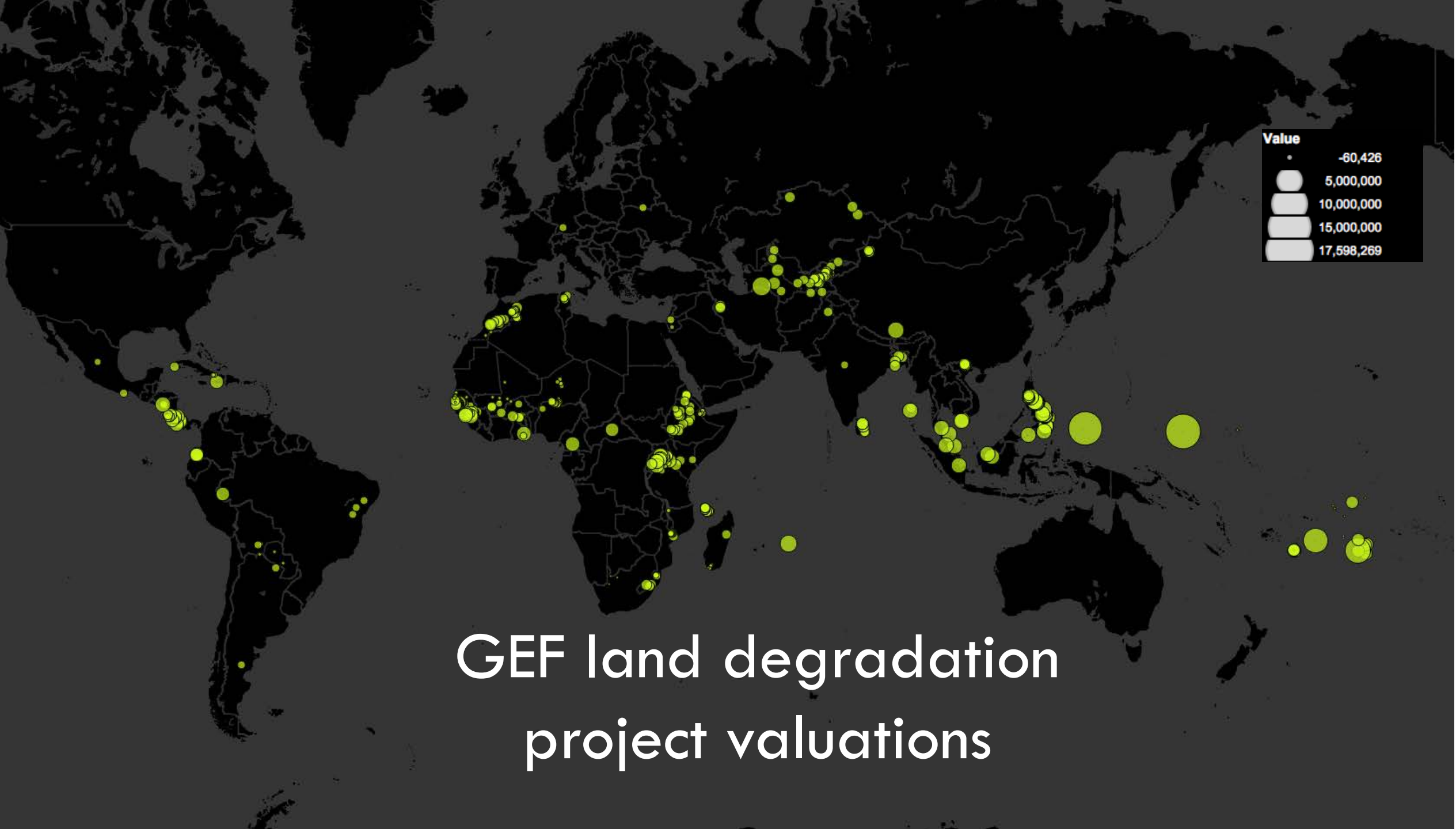


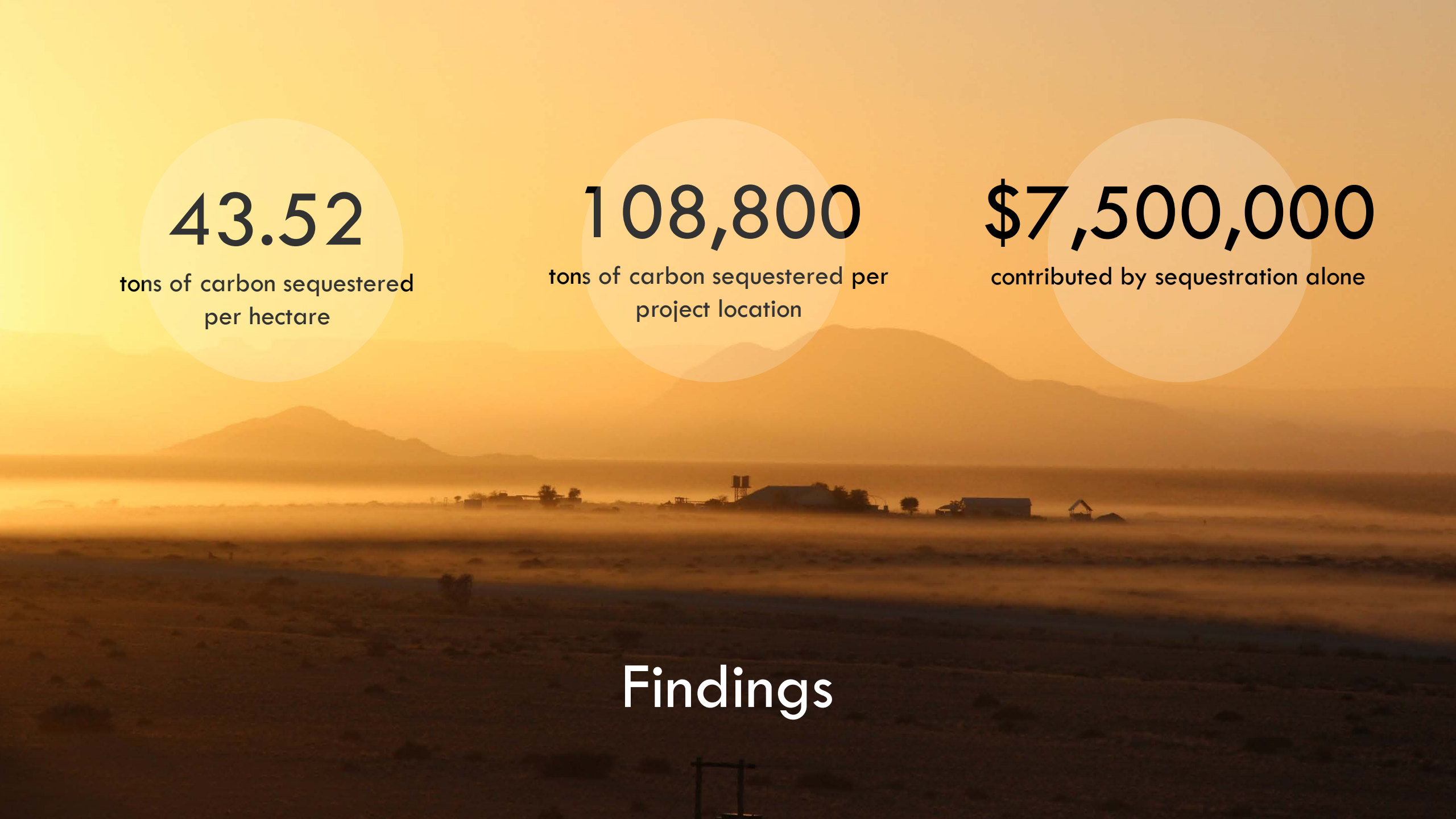
Population
density



More effective
near urban areas

Findings: Forest cover





43.52

tons of carbon sequestered
per hectare

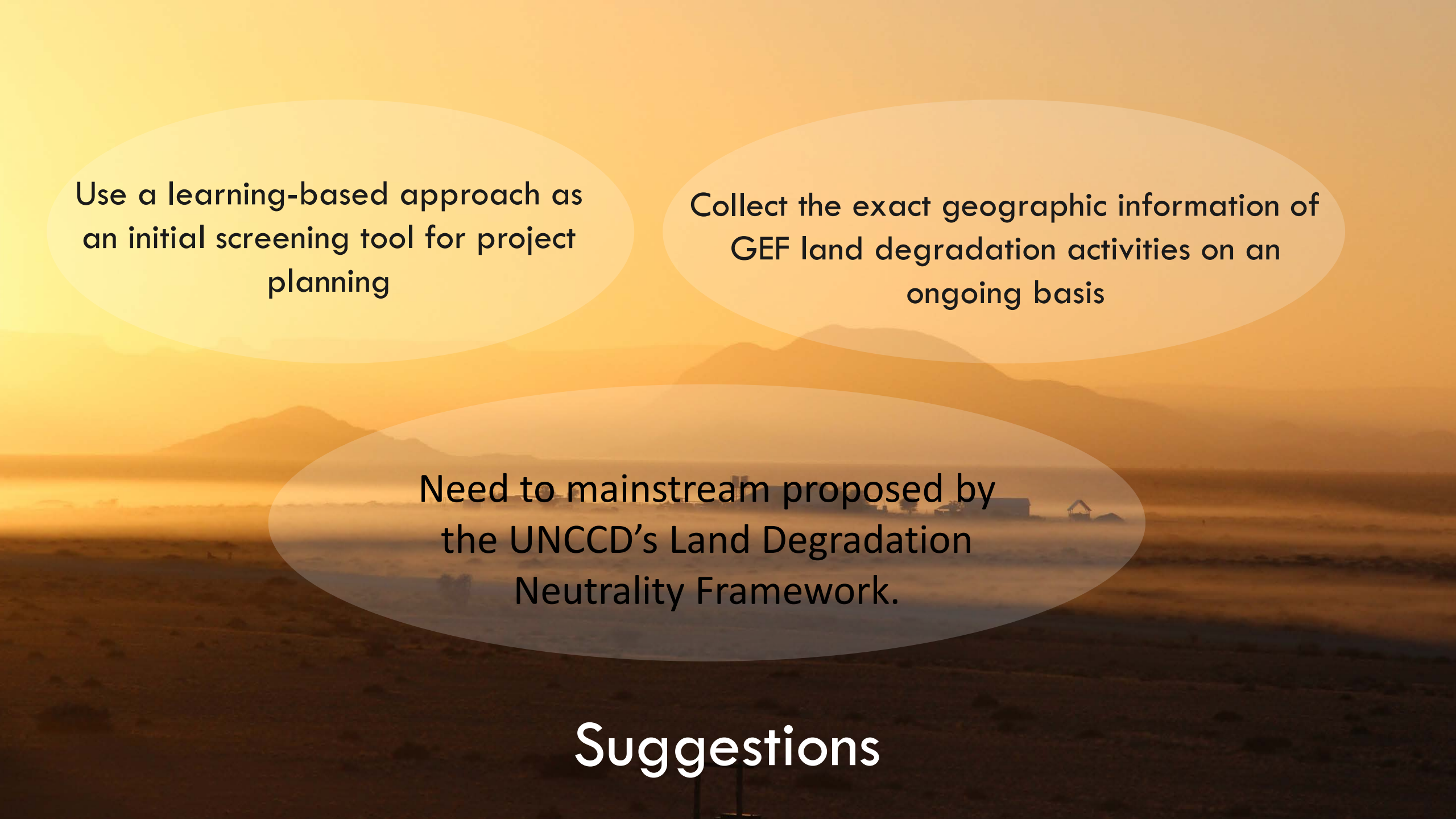
108,800

tons of carbon sequestered per
project location

\$7,500,000

contributed by sequestration alone

Findings



Use a learning-based approach as
an initial screening tool for project
planning

Collect the exact geographic information of
GEF land degradation activities on an
ongoing basis

Need to mainstream proposed by
the UNCCD's Land Degradation
Neutrality Framework.

Suggestions



Thank you