FROM LAND USE & LAND COVER DATA TO THE FIRST ECOSYSTEM NATURAL CAPITAL ACCOUNTING EXPERIMENTATION IN THE REPUBLIC OF GUINEA

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Protecting Our World, Conquering New Frontiers

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CONTEXT & CHALLENGES

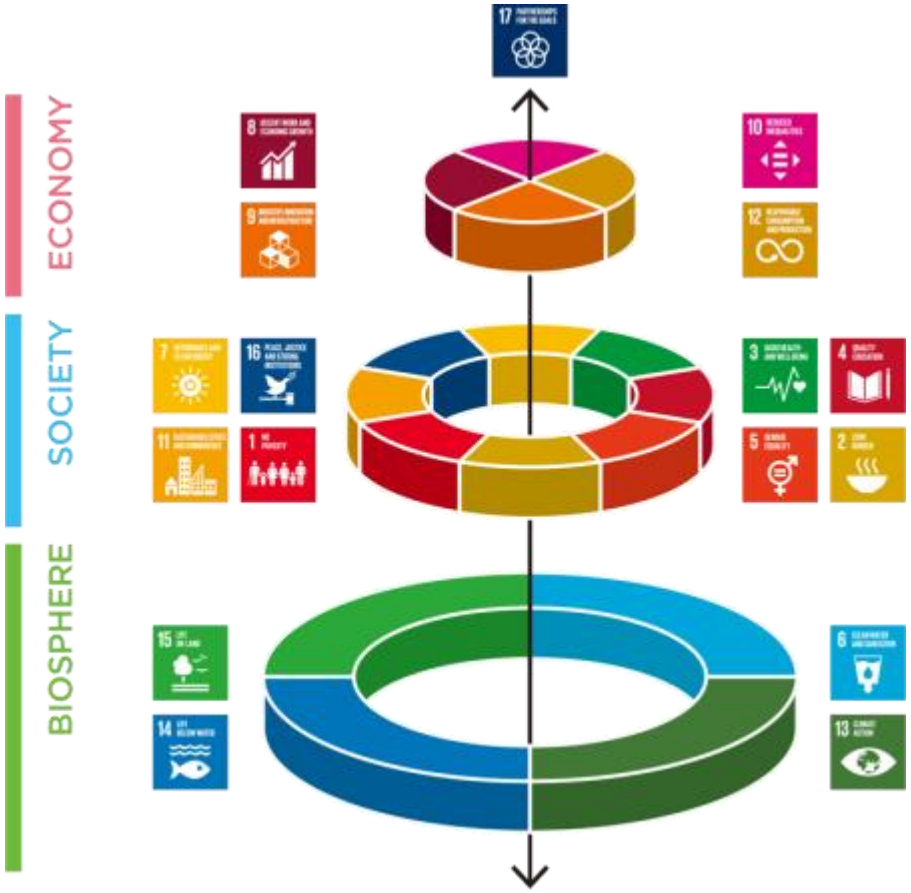
➢ INTERNATIONAL RETROSPECTIVE

- ➢ Alarming decline in biodiversity and climate change reported since the late 20th century
- ➢ Integrating green capital into GDP (taking into account the effects of economic growth on ecosystems/the environment)
- ➢ The "carbon" accounting/approach is gradually being implemented by the IPCC (Kyoto Protocol) **but does not take ecosystems into account.**
- ➢ The Ecosystemic Natural Capital Accounting (ENCA) model developed in Europe by Weber J-L (WEBER, 2014) allows to:

- *Diagnose the state of health of ecosystems on a national scale (decision support tool)*
- *Monitoring the evolution of ecosystems over time*
- *Integration of biodiversity / carbon / water parameters*

CONTEXT & CHALLENGES

- MEETING THE SUSTAINABLE DEVELOPMENT GOALS - SDGS



- 15.9. Integrate ecosystem and biodiversity protection into national planning and accounting

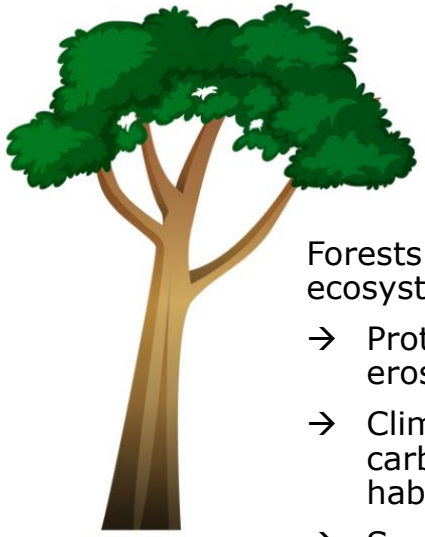
- 17.19 By 2030, build on existing initiatives to develop indicators of progress in sustainable development that would complement GDP, and support statistical capacity building in developing countries

SUSTAINABLE DEVELOPMENT GOALS

WHAT IS NATURAL CAPITAL?

➢ BRIEF DEFINITION

- Refers to natural resources, ecosystems and natural processes that provide ecosystem services
- It is often considered an unlimited resource, but its overexploitation and degradation have negative consequences on the quality of life of human beings and on the environment.
- Preserving and protecting it is therefore essential for the sustainability and resilience of ecosystems.



Forests provide many ecosystem services such as

→ Protection against soil erosion

→ Climate regulation, carbon storage, wildlife habitat, O_2

→ Supply of wood and forest products

Water is an important natural resource that provides services such as

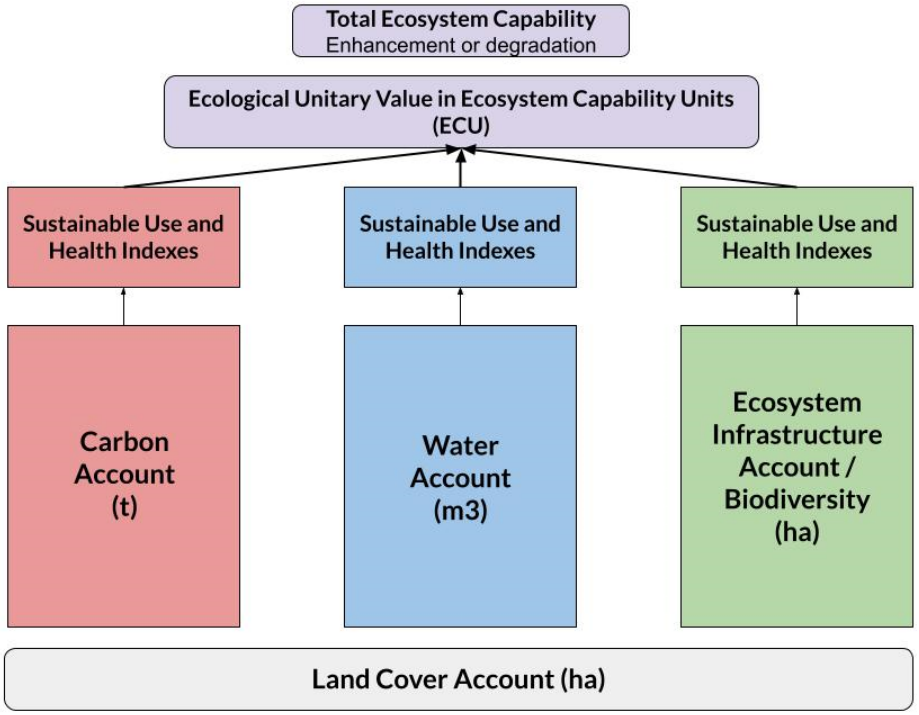
→ Drinking water, crop irrigation, food production

→ Flood controls...

→ Energy production: Hydroelectric dam, industry

DEFINITION OF ENCA

- INTEGRATIVE ACCOUNTING



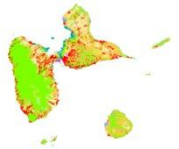
OVERVIEW OF THE ECOSYSTEM NATURAL CAPITAL ACCOUNTING (ENCA) FRAMEWORK

- Method for integrating and synthesising accounts on the sustainability of all socio-ecological systems in a country
- The ecosystem capital capability of a given area is calculated at a given date, based on 3 accounts

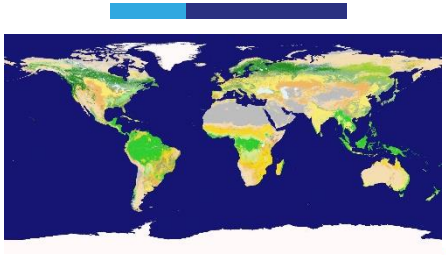
STRUCTURING DATA OF ENCA

- LAND COVER AT MULTIPLES SCALES

National level



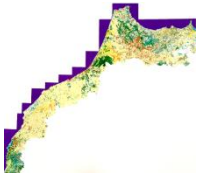
Guadeloupe



NASA Global Land Cover

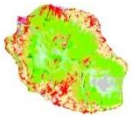
Tunisia

Colombia: Rio Magdalena



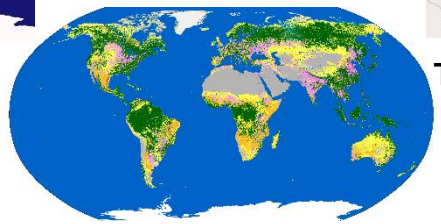
Morocco

Burkina Faso



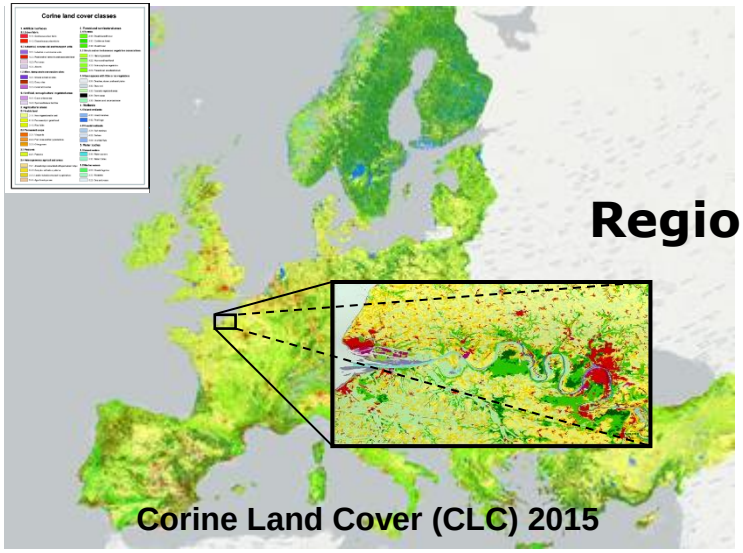
La Réunion

Global level

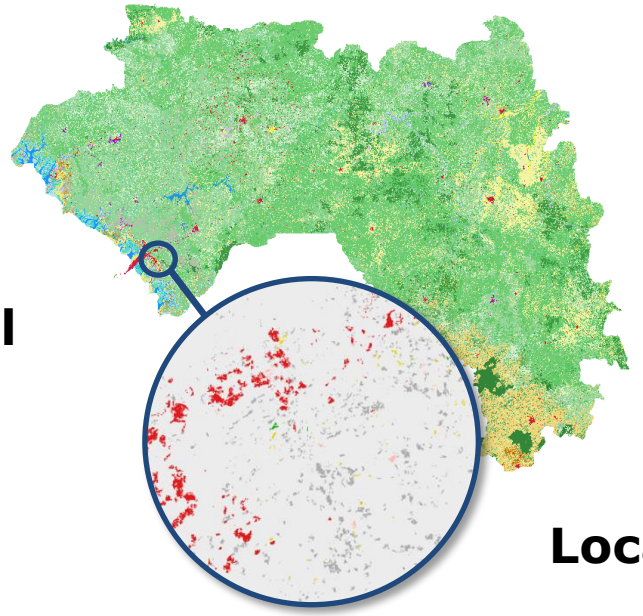


ESA WorldCover 2020

Regional level



Corine Land Cover (CLC) 2015



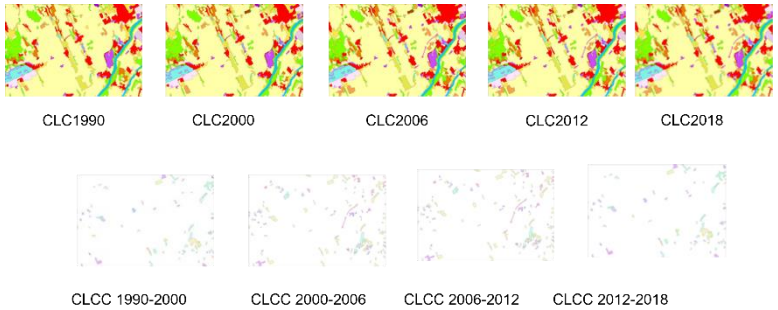
Local level

Guinean land Cover and land cover changes 2015-2020

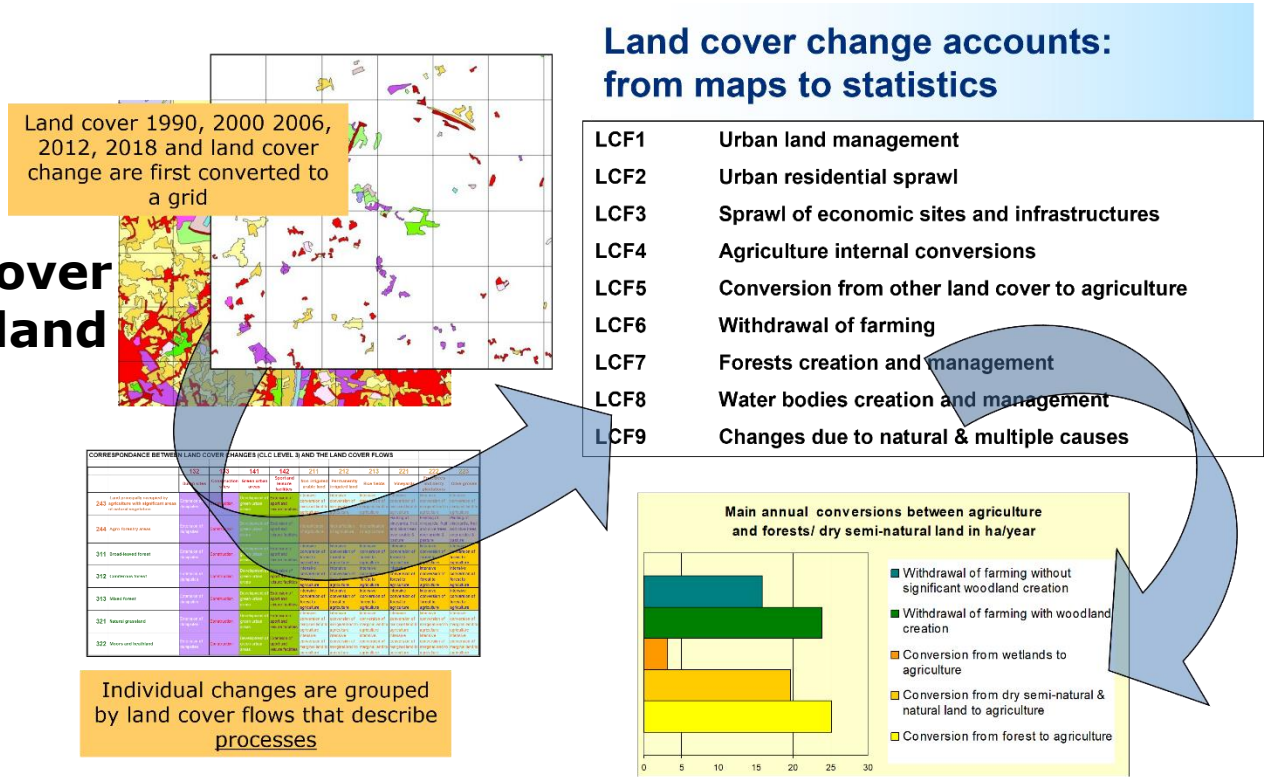
STRUCTURING DATA OF ENCA

- CHANGES AND FLOWS BASED ON LAND COVER MAPS

Corine land cover changes

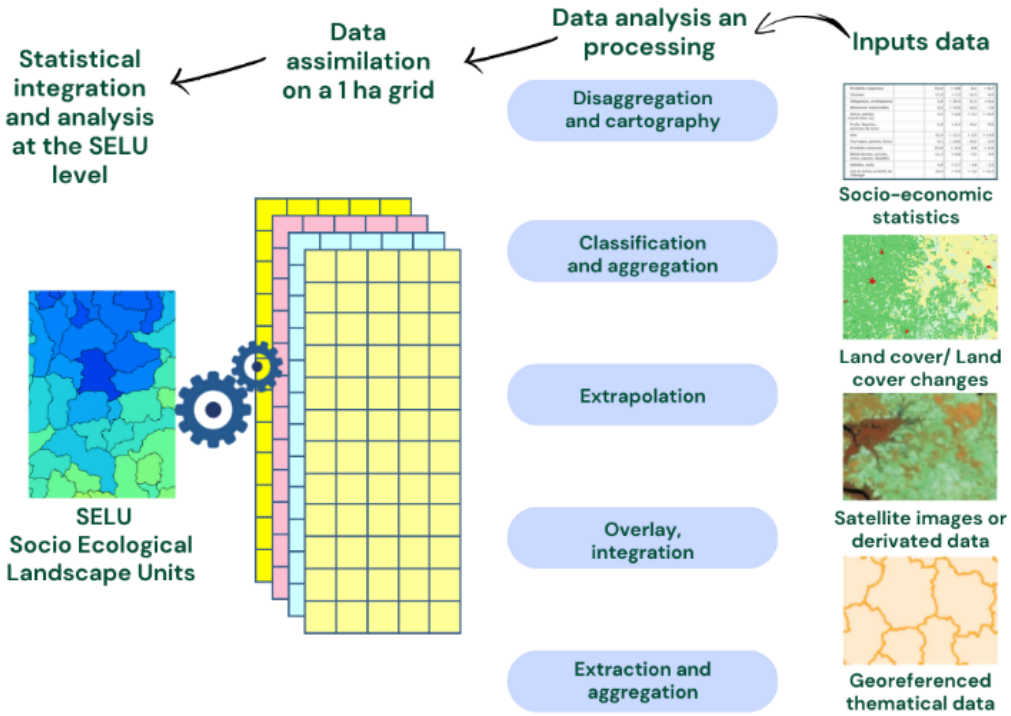


From land cover changes to land account



BRIEF METHODOLOGICAL DESCRIPTION

- INTEGRATION OF A LOT OF OPEN ACCESS DATA



Examples of data:

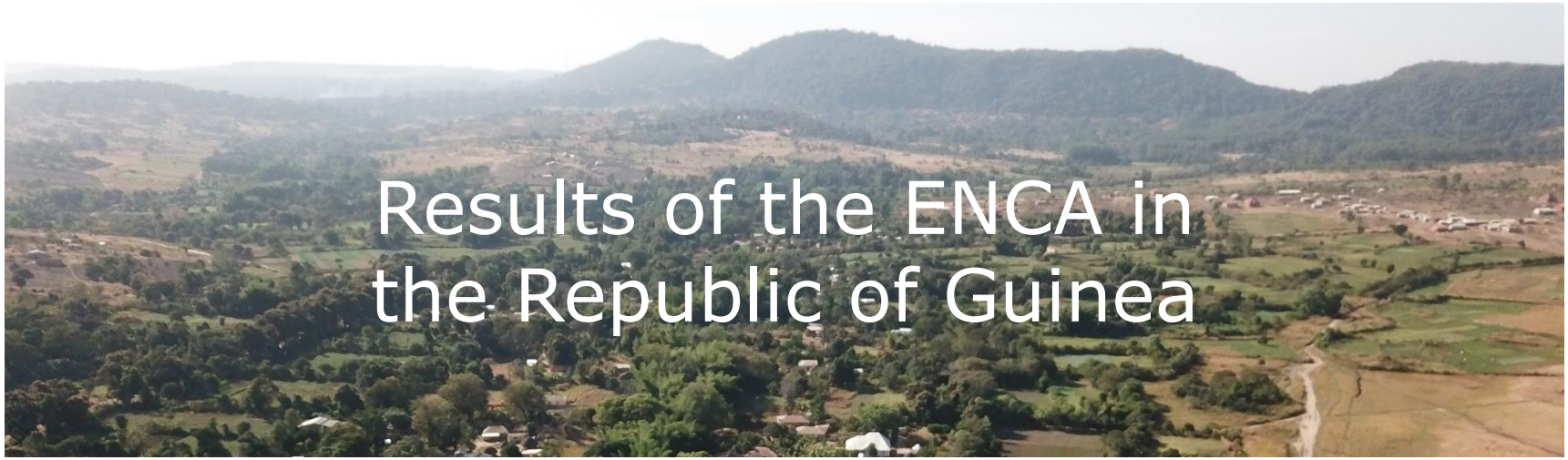
Tree biomass and forest density
→ ESACCI:
https://climate.esa.int/en/projects/biomass/data/
→ Global Tree Cover :
https://glad.umd.edu/dataset/global-2010-tree-cover-30-m

Agricultural crops
→ FAO statistics
https://www.fao.org/faostat/en/#home

Forest fires
→ Global fire data
https://www.globalfiredata.org/

Rivers, catchments and lakes
→ HydroSHEDS
→ HydroLAKES
HydroLAKES (hydrosheds.org)

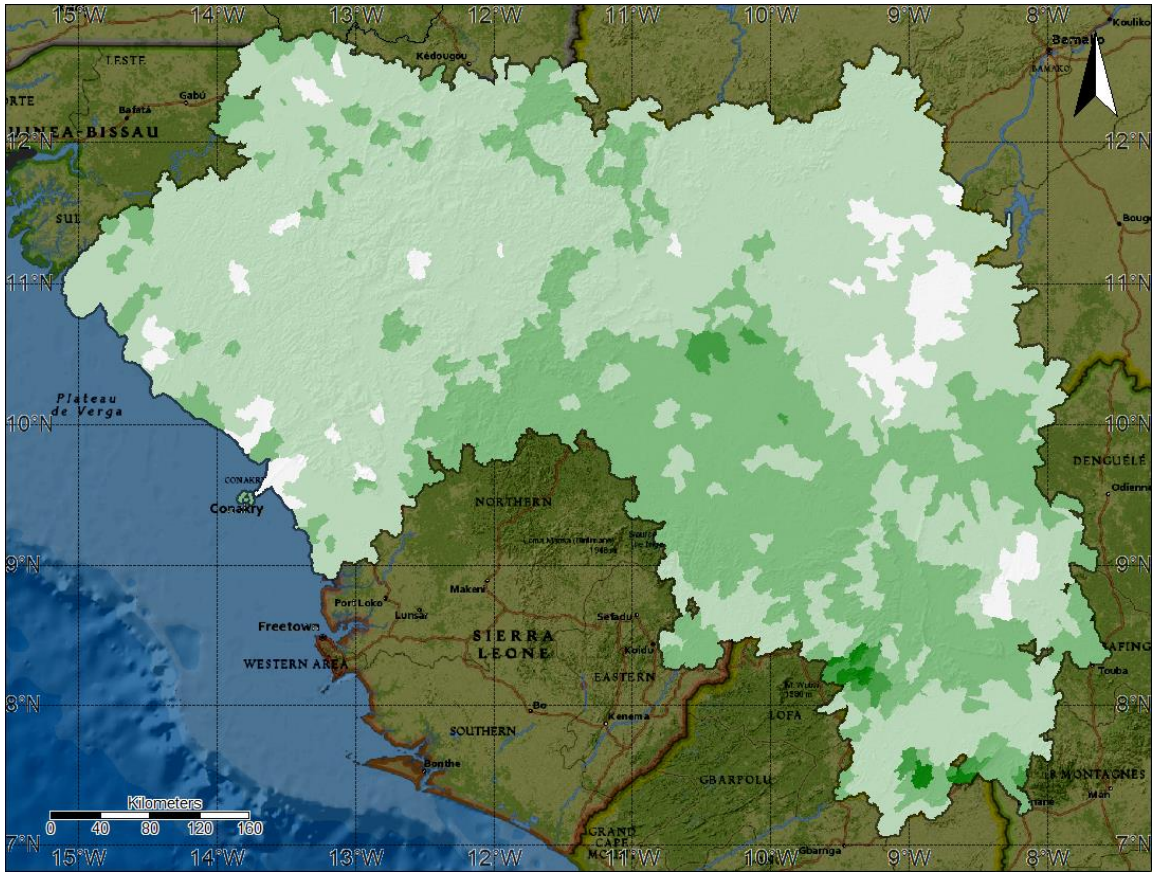
More than thirty data used in ENCA.

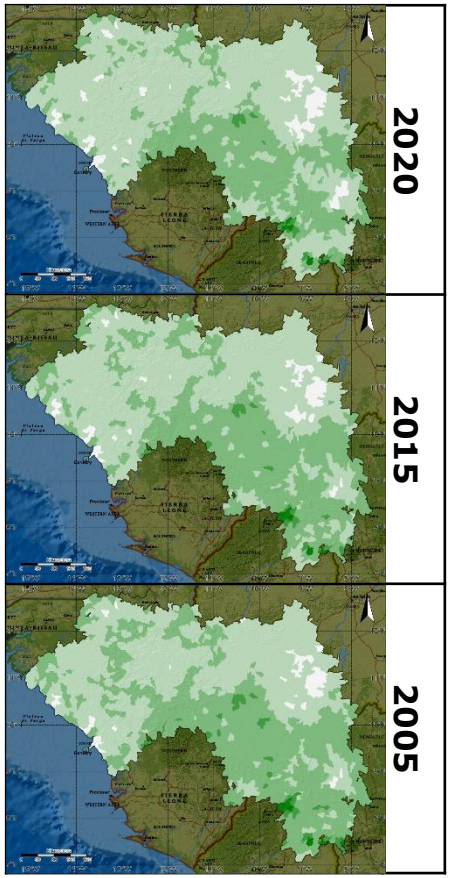


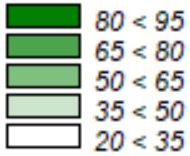
Results of the ENCA in the Republic of Guinea

SOME EXAMPLES OF INDICATORS

- GREEN BACKGROUND LANDSCAPE INDEX (GBLI) AVERAGE PER SELU (SOCIO-ECOLOGICAL LANDSCAPE UNIT)



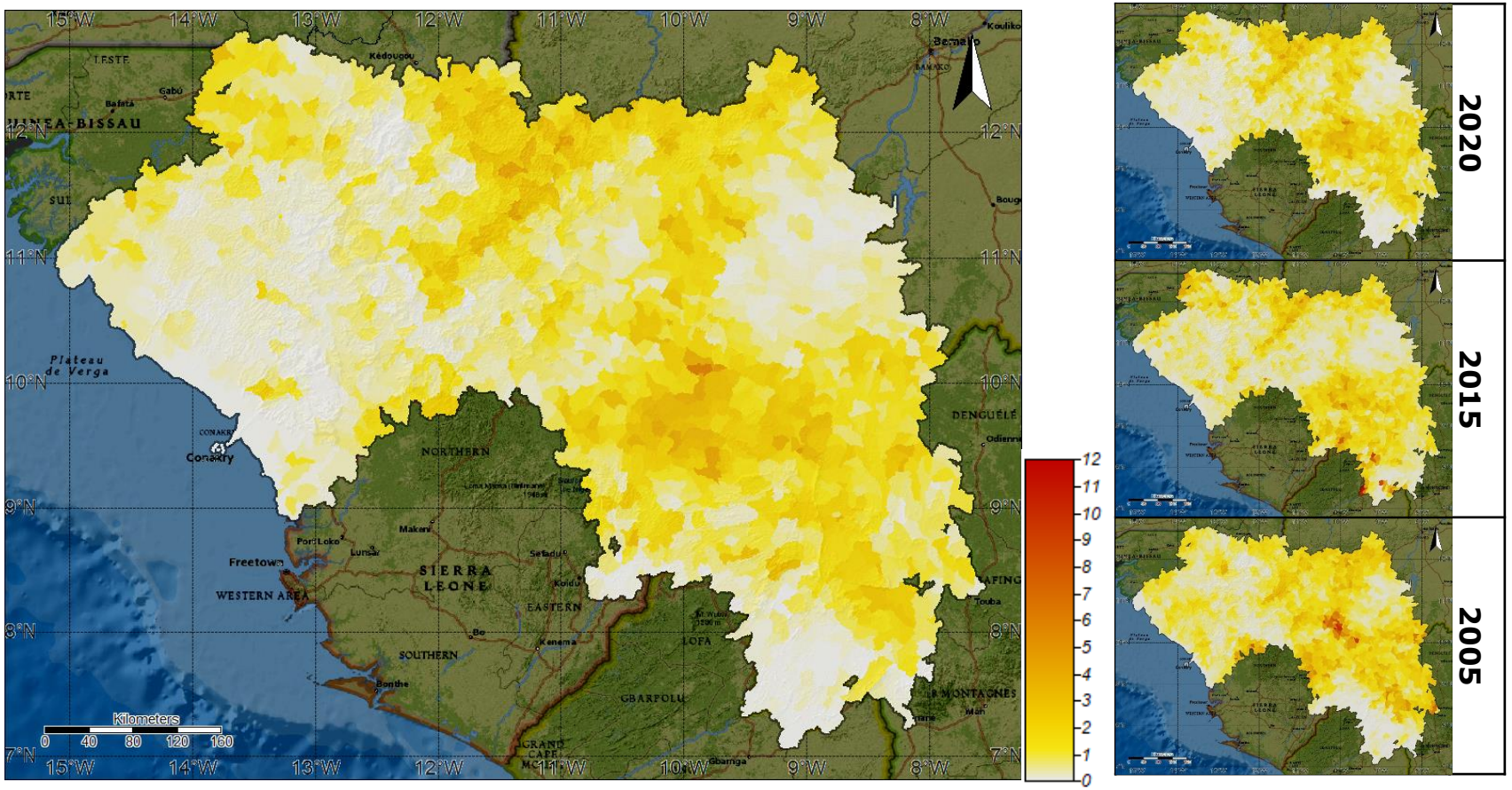




- Estimation of the naturally sustainable biomass of various land cover types.
- Combined with a forest density index → better representation of natural landscapes
- Decrease of the GBLI between 2005-2015 and 2015-2020

SOME EXAMPLES OF INDICATORS

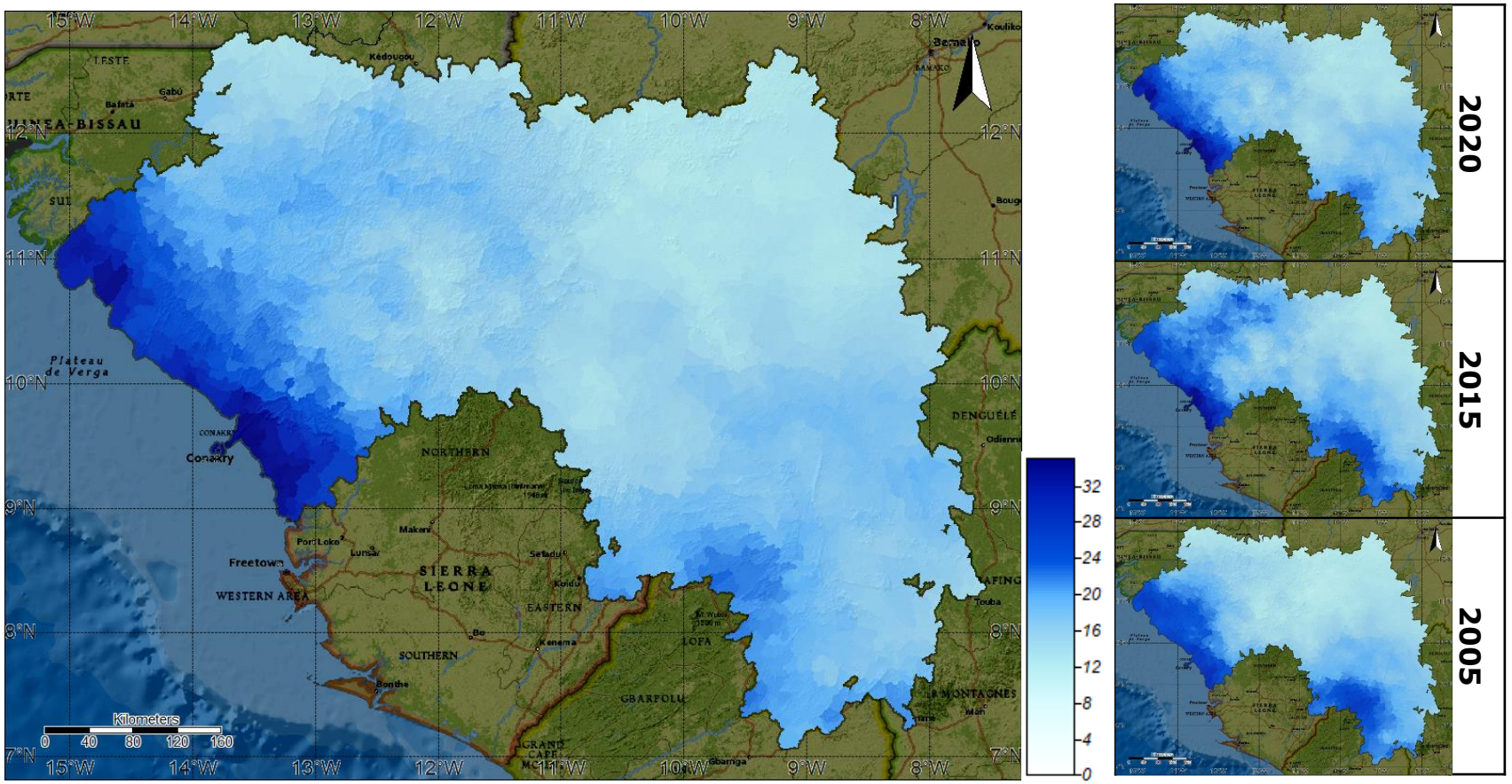
- CARBON LOSS FROM FOREST FIRES IN TONNES PER HECTARE



- Mainly open woodland and or tree -woody savannah formations that are affected by fire.
- Lower fire frequencies in the natural region of Guinea Maritime, in the southern zone of Guinea Forestière and in the agricultural zones of the north-east of the country.

SOME EXAMPLES OF INDICATORS

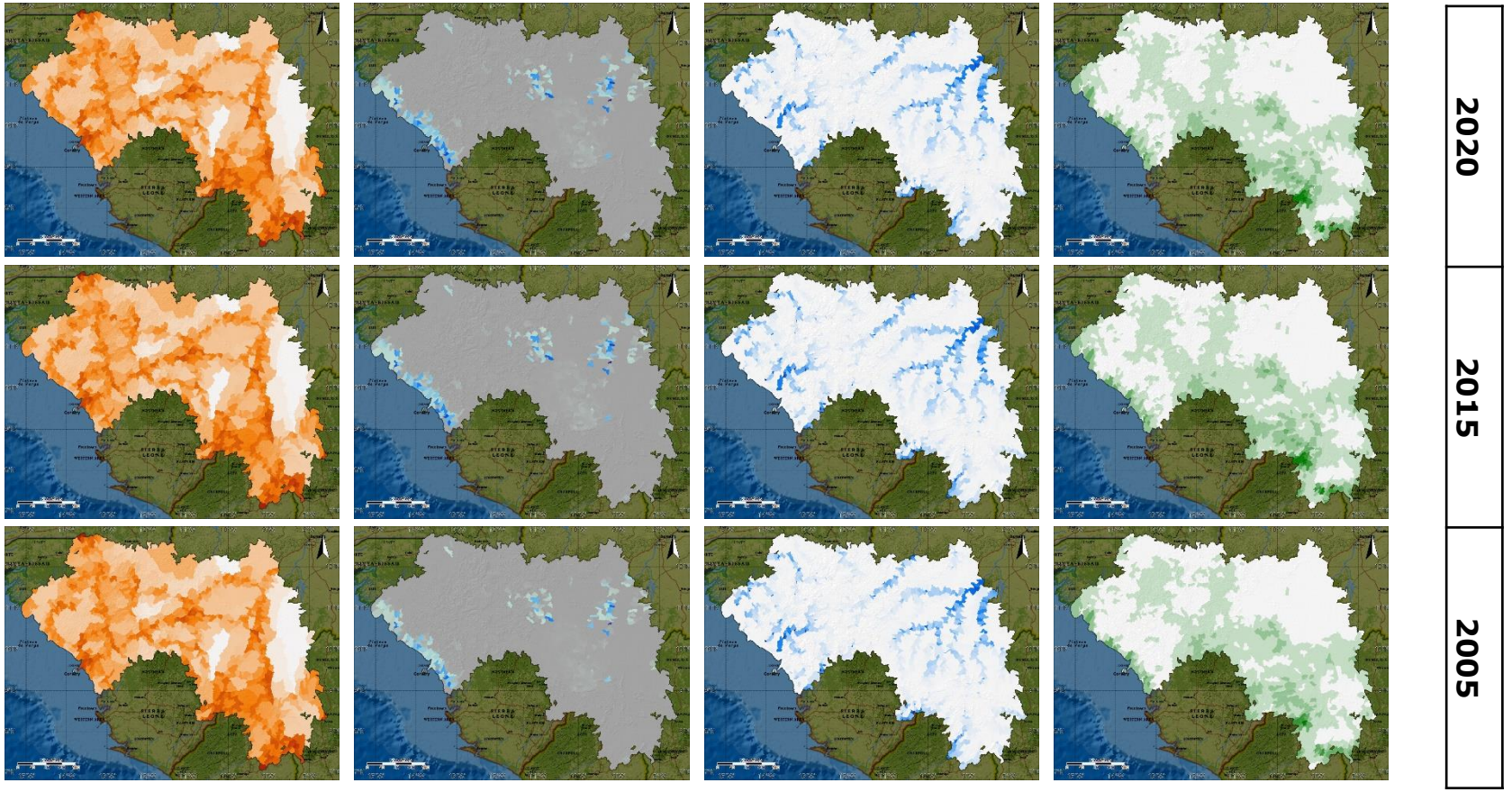
- AVERAGE ANNUAL PRECIPITATION (1000 m /ha) [3]



- Precipitation is the main inflow of water resources to the territory.
- The distribution of rainfall is not homogeneous.
- 2015 was a particularly rainy year with 7% more rainfall than in 2005 and 5% more than in 2020.

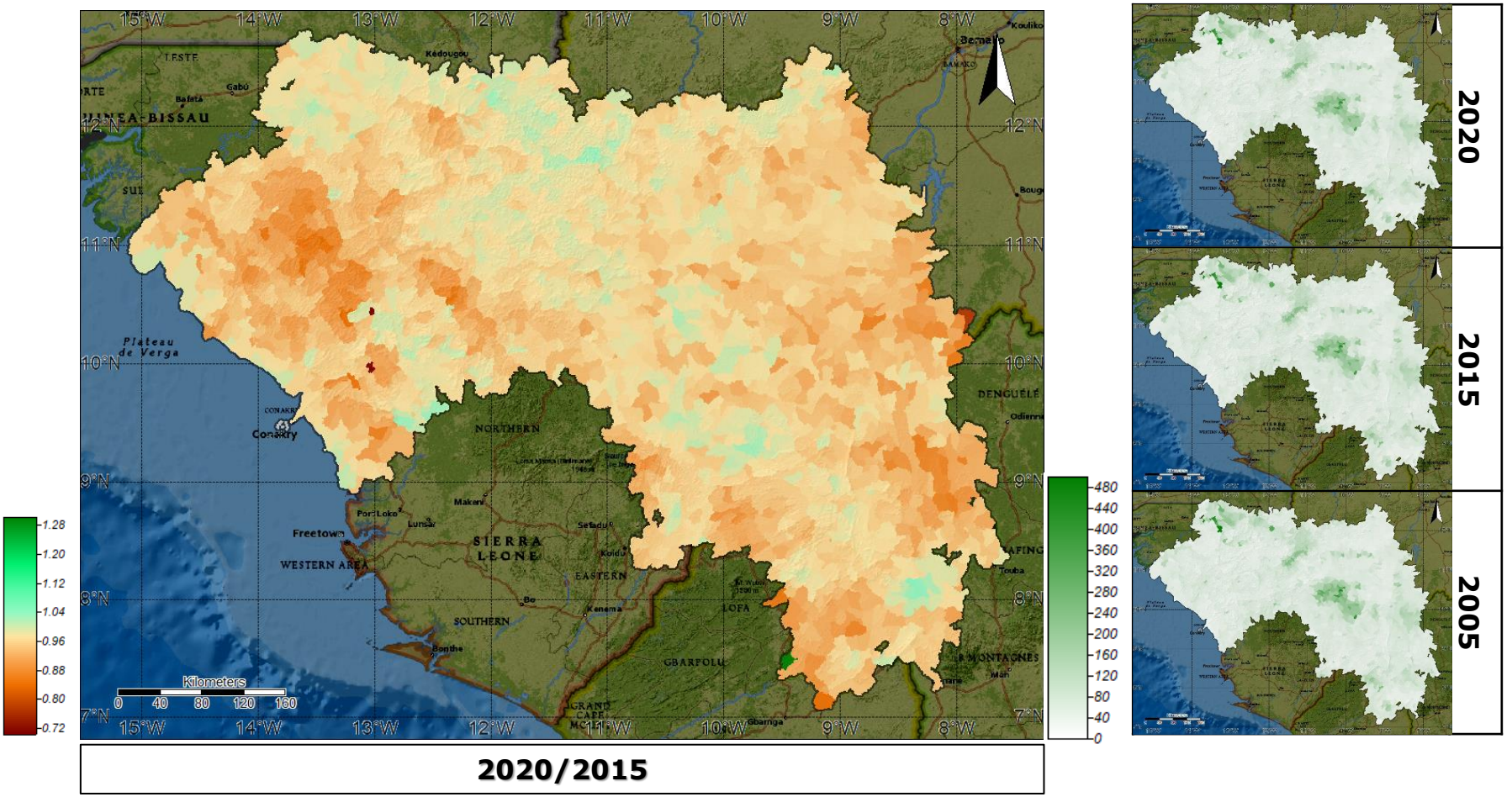
SOME EXAMPLES OF INDICATORS

- MANY OTHER INDICATORS CALCULATED



SUMMARY

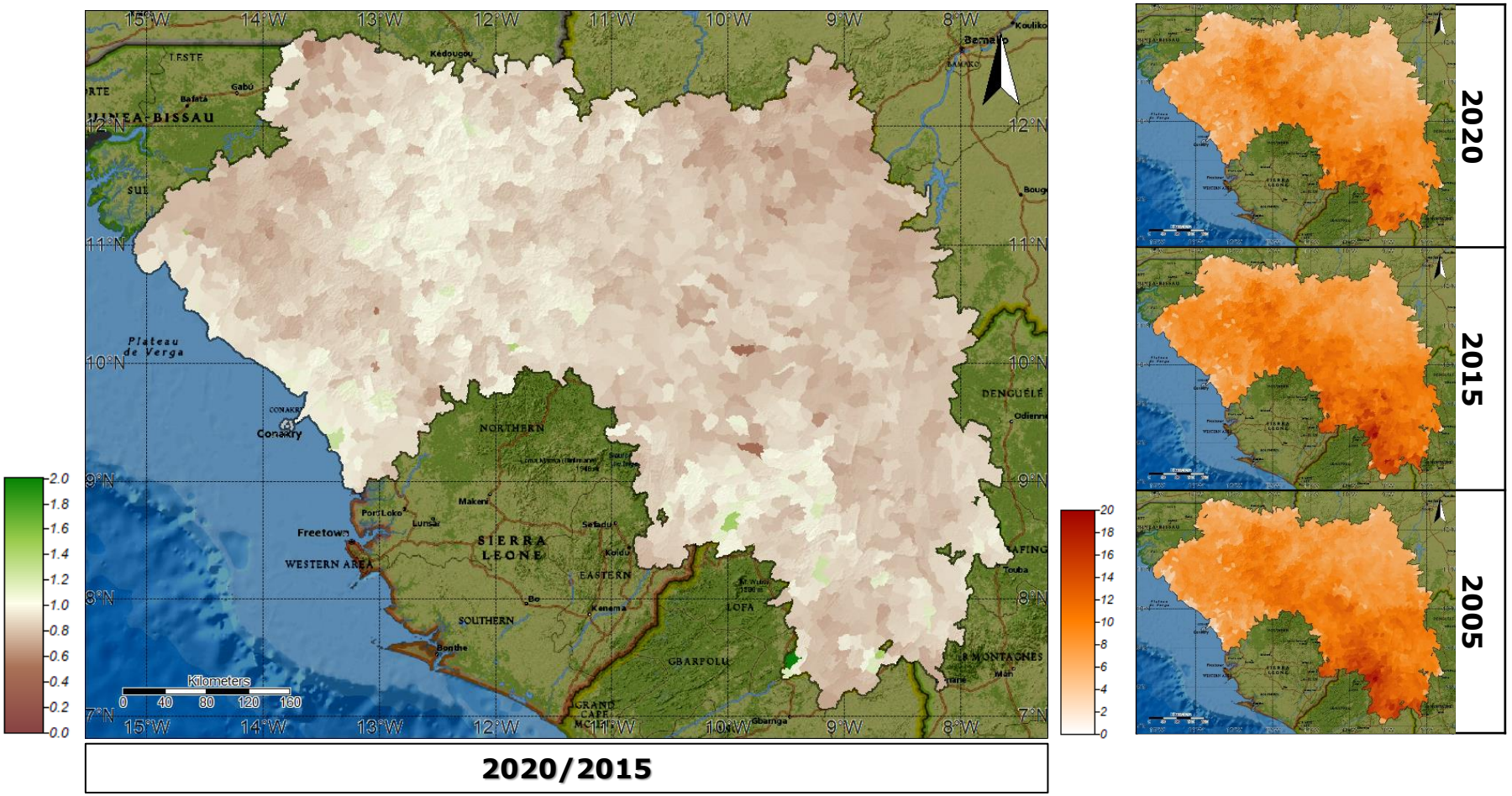
- TOTAL ECOSYSTEM INFRASTRUCTURE CAPABILITY (EI_EC)



- Trend towards an overall decrease of EI_EC since 2005.
- Related to the increase in landscape fragmentation due to artificialization and the degradation of natural formations.

SUMMARY

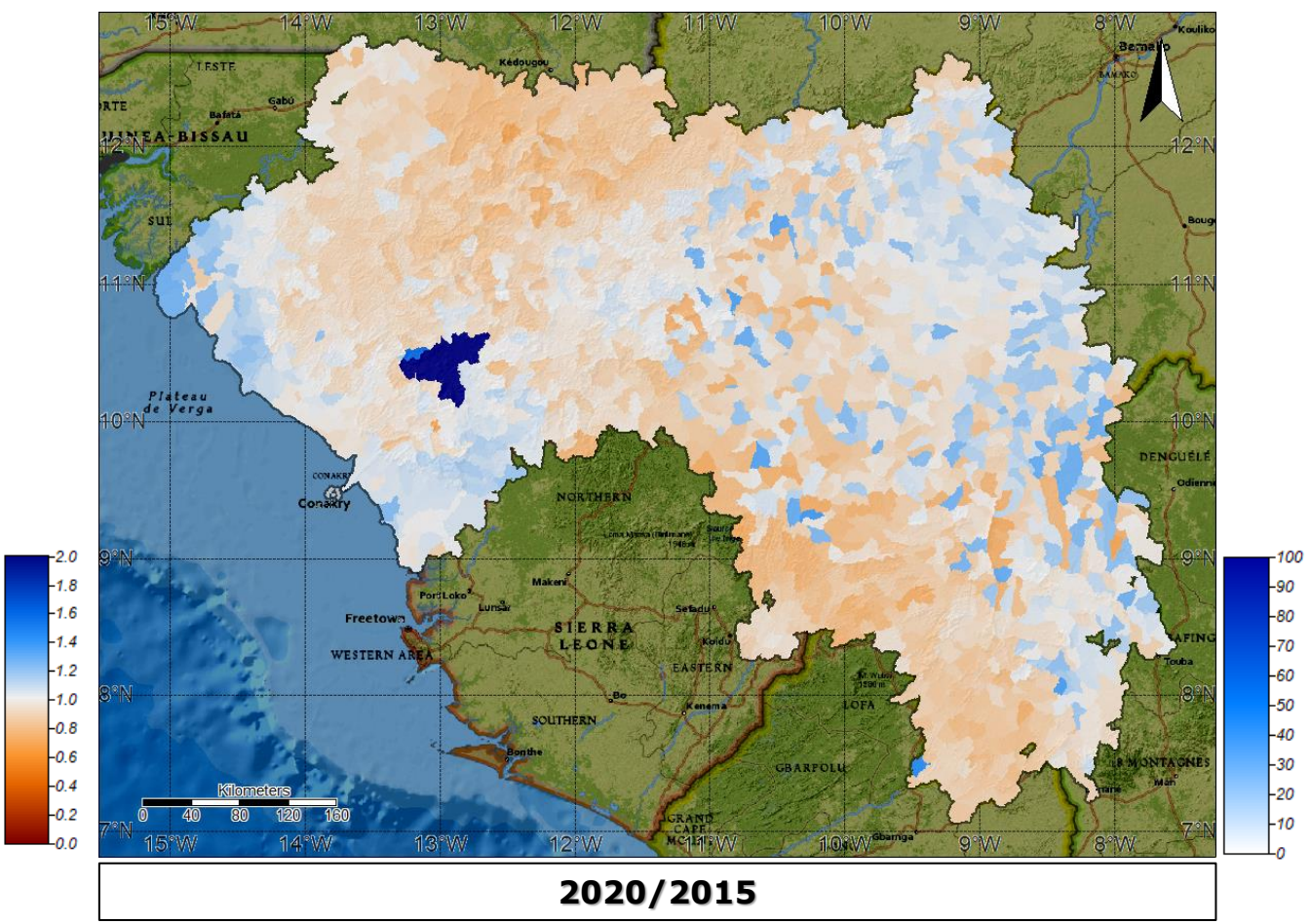
- TOTAL ECOSYSTEM CARBON CAPABILITY (C_EC)

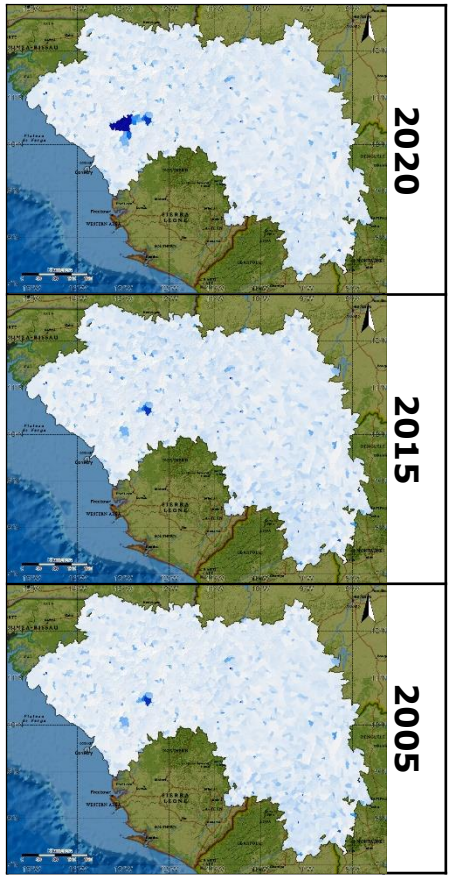


- Trend towards an overall decrease in the C_EC since 2005.
- Linked to the degradation of natural formations.

SUMMARY

- TOTAL WATER ECOSYSTEM CAPABILITY (W_EC)



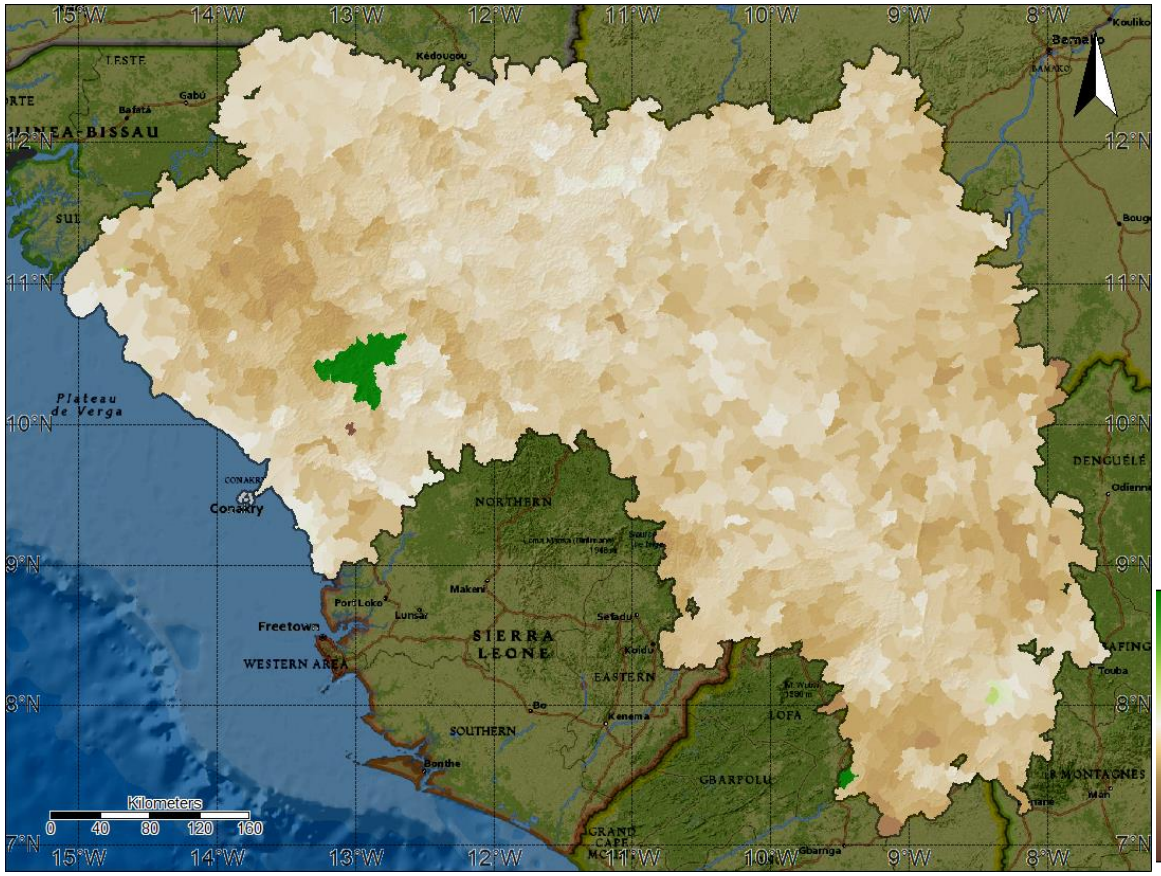


2020/2015

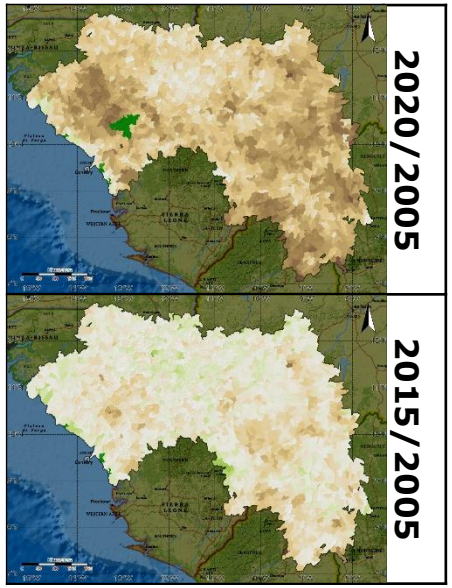
- The total water capability is heterogeneously distributed over the territory.
- The creation of the water reservoir associated with the « Kaléta dam » greatly increases the ETC in this area.

SUMMARY

- TOTAL ECOSYSTEM CAPABILITY (TEC)



2020/2015



- Trend towards an overall decrease of TEC since 2005.
- Linked to the degradation of natural formations.

CONCLUSION

- TOTAL CAPABILITY THROUGHOUT THE REPUBLIC OF GUINEA

	Carbon Capability	Water Capability	Infrastructure Capability	Total Ecosystem Capability (TEC)
2005	$2{,}45.10^{8}$	$1{,}33.10^{8}$	$1{,}64.10^{9}$	**$2{,}02.10^{9}$**
2015	$2{,}47.10^{8}$	$1{,}41.10^{8}$	$1{,}61.10^{9}$	**$2{,}00.10^{9}$**
2020	$2{,}09.10^{8}$	$1{,}77.10^{8}$	$1{,}53.10^{9}$	**$1{,}92.10^{9}$**

- A global declining trend in total ecosystem capability (TEC) from 2005 to 2020
- Protocol is operational but still needs to be improved by integrating national data (For i.e. : Statistic Agricole / biodiversity / surveys, polls...)
- Set up a system of verification / observation in the field
- Decision support tool for Environmental policies in terms of restoration, conservation, compensation areas ...

THANKS FOR YOUR ATTENTION