



# CONGRÈS MONDIAL DE LA NATURE DE L'UICN

PAVILLON DU COMITÉ FRANÇAIS DE L'UICN – A19



3 AU 11 SEPTEMBRE 2021

PARC CHANOT - MARSEILLE

# Quel avenir pour la biodiversité à Madagascar ? Prise en compte des projections scientifiques dans les stratégies de conservation et de développement

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**CONGRÈS MONDIAL DE LA NATURE DE L'UICN**

Pavillon Comité français de l'UICN – 04 Septembre 2021

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# Madagascar context

## Biodiversity :

- Species richness and endemism (~90%)
- 50% of the biodiversity in the forest

## Threats:

- Deforestation (~1%/year) and habitat fragmentation
- Climate change and change of habitat conditions
- Hunting and poaching

## Underlying factors:

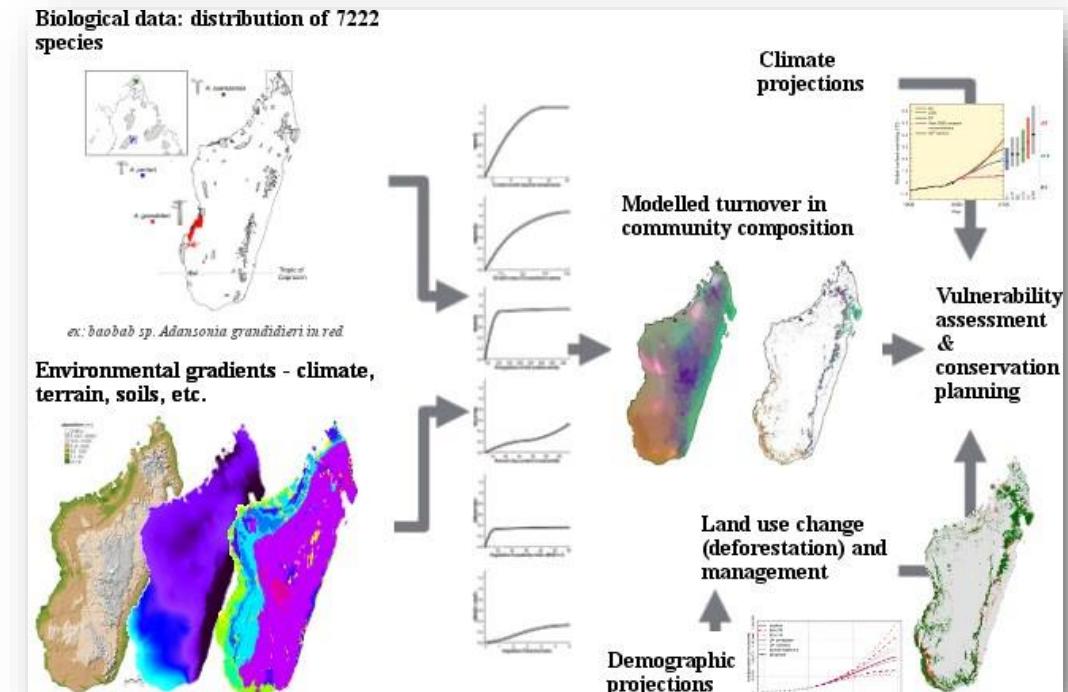
- Demography and poverty
- Dependency on natural resources
- Effects of climate changes on agriculture
- Market for wildlife traffic and cash crop



# Spatial modeling to support protected area management

**Scenarios of biodiversity evolution under the joint effect of climate change and deforestation in Madagascar to :**

- 1) Anticipate possible biodiversity scenarios (risks/opportunities)
- 2) Build decision support tools (figures, computer tools, maps)
- 3) Propose management solutions: protected areas + REDD mechanism (Paris Agreement)

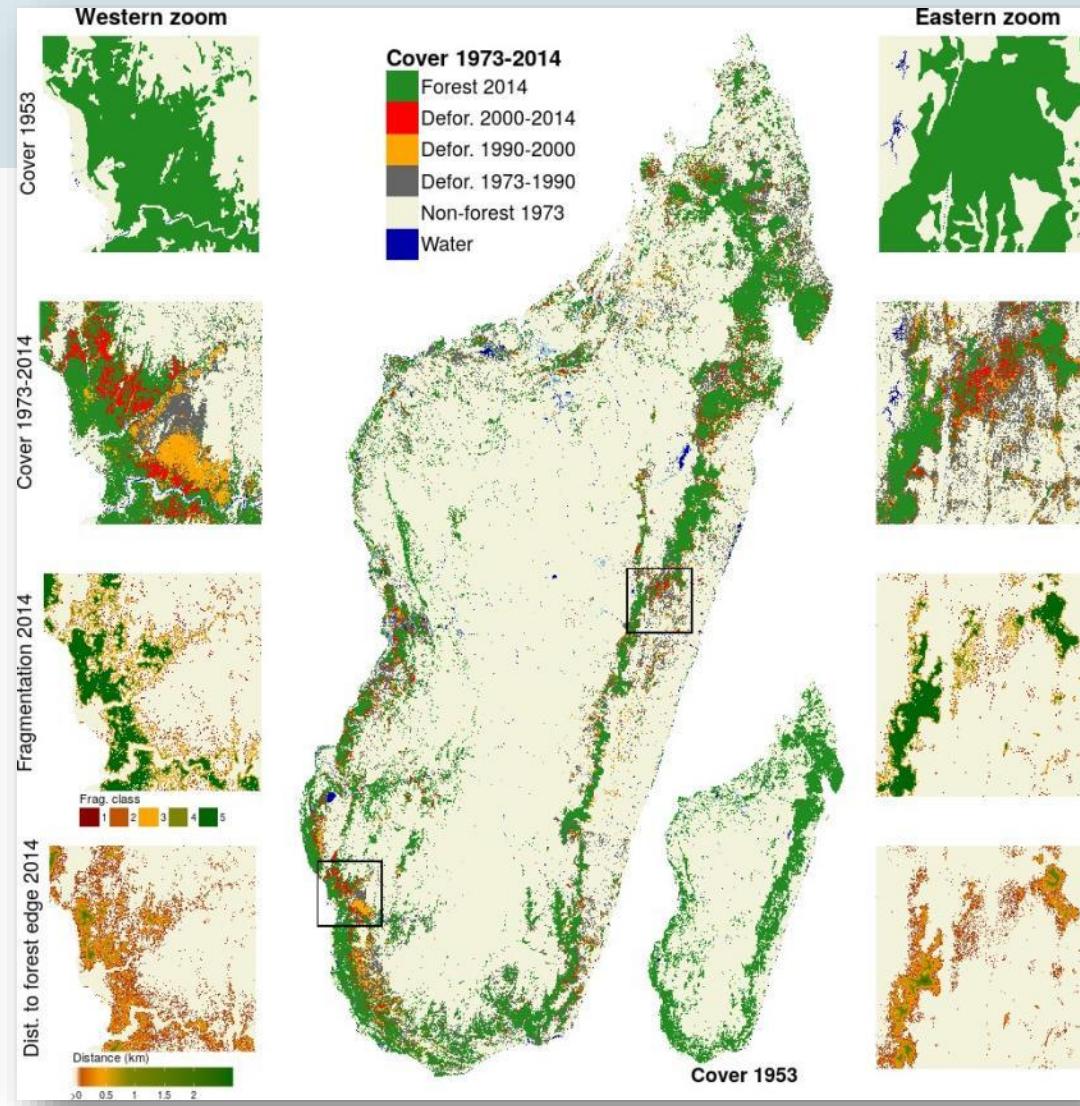


<https://bioscenemada.cirad.fr>

# Deforestation in the past

44% loss in 60 years (1953-2014)

Fragmentation of forest habitats

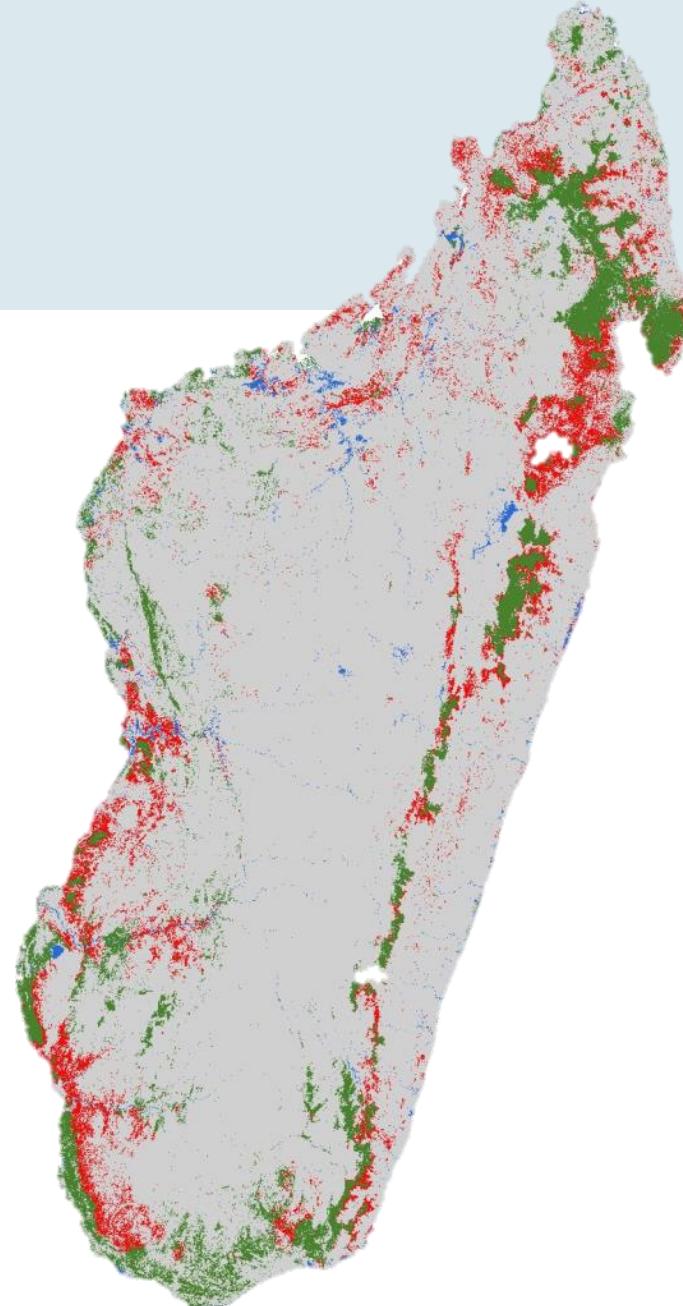


Vieilledent et al. 2018, *Biological Conservation*

# Deforestation in the future

Business-as-usual scenario: 100,000 ha/yr  
4 Mha deforested over 2010-2050 (for 9.3 Mha in 2010)

Red: deforestation 2010-2050  
Green: remaining forest in 2050

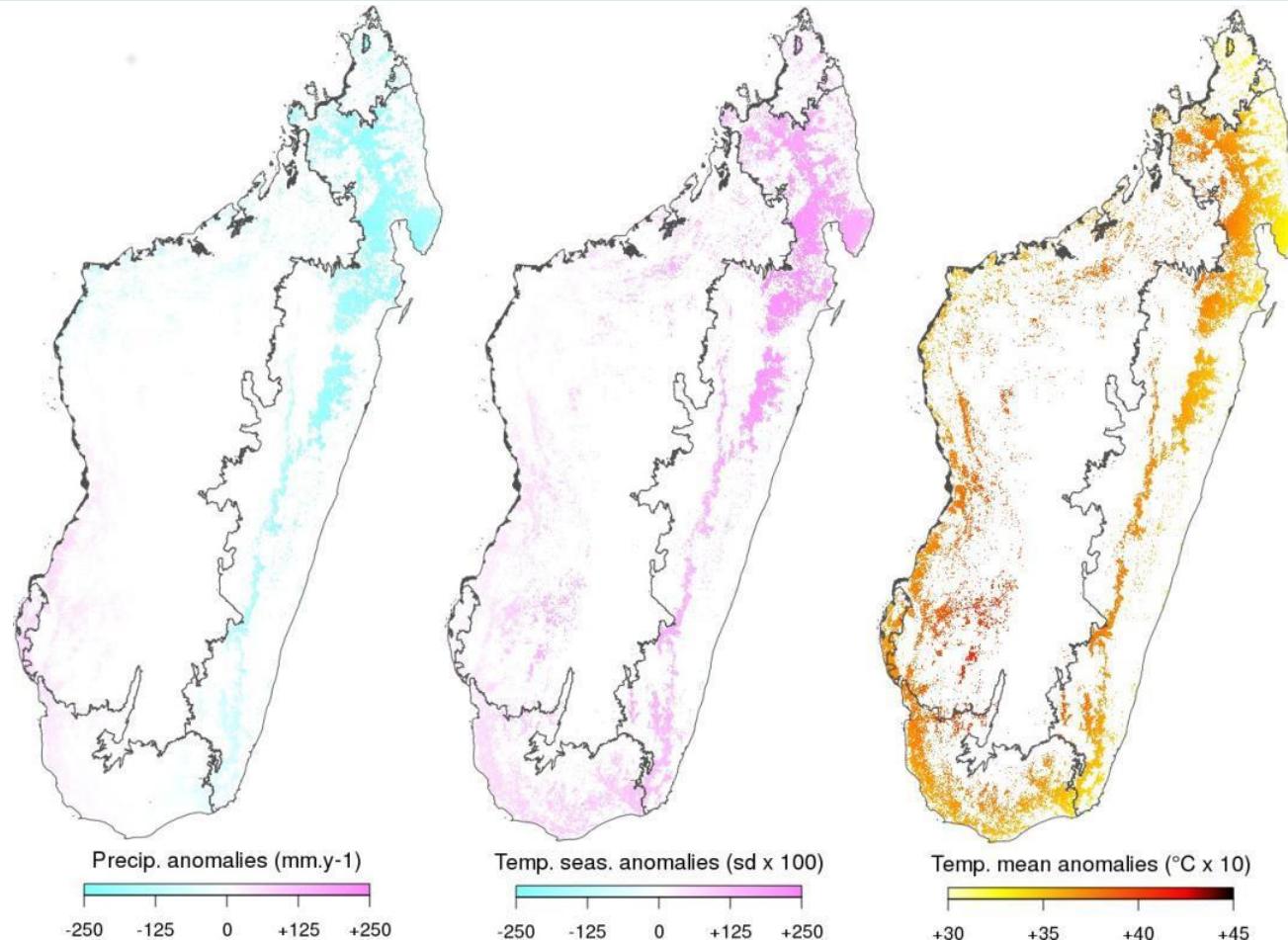


# Climate change

Present-2080

RCP 8.5,

average of 7 global  
climate models



# Climate change vulnerable areas

≥ 25% change → vulnerable areas  
< 25% change → stable areas

Orange: vulnerable areas  
Green: stable areas (biodiversity refuge)



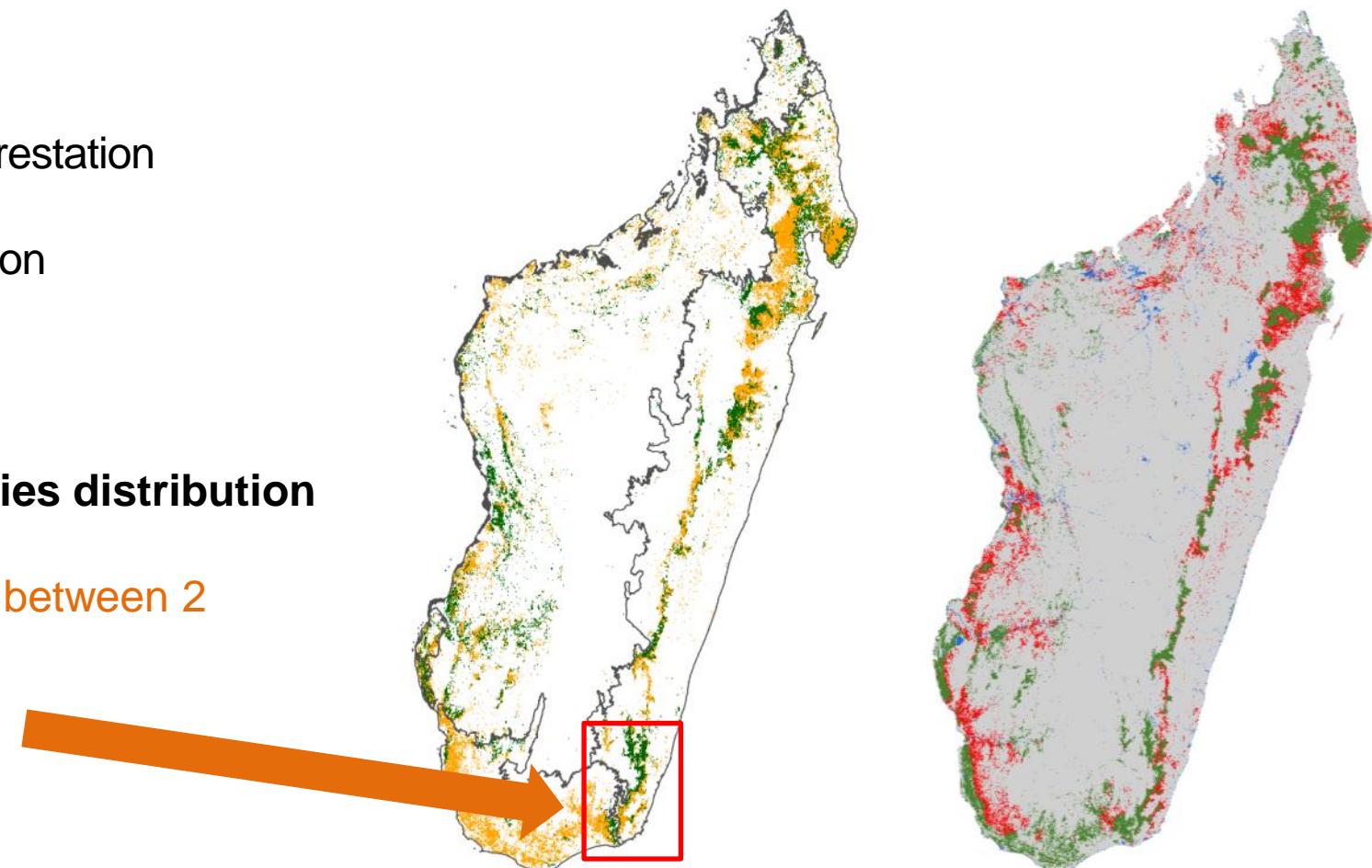
# Decision support for PA management

Refuge areas + Areas at high risk of deforestation

= Priority areas for biodiversity conservation

+ Integration of future potential species distribution

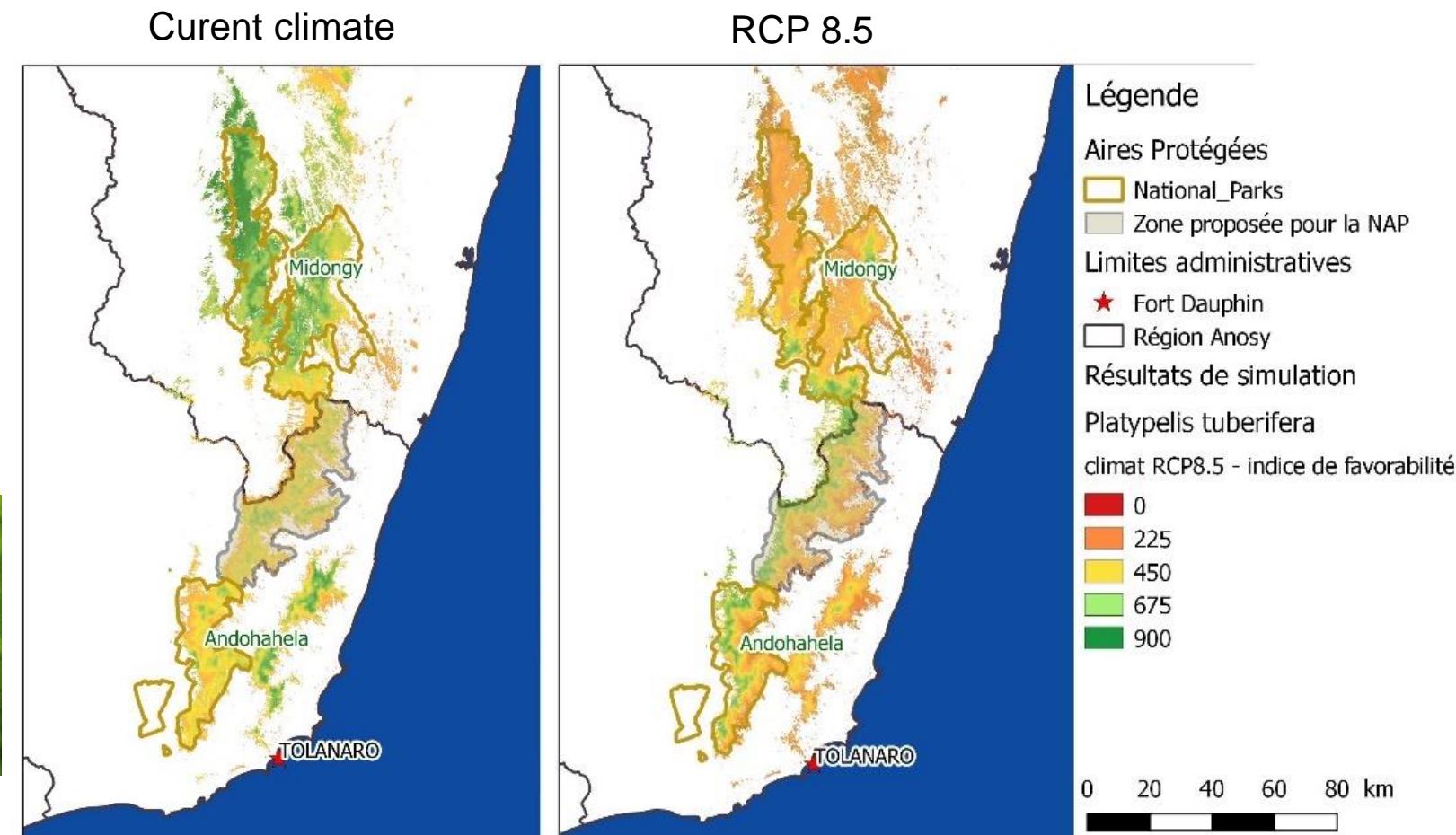
Example in a south-east forest corridor between 2 national parks



# Anticipating the displacement of species

- Species that are able to do so will move in altitude or toward the poles (i.e. toward the South in Madagascar)
- Most of species are dependant of an ecosystem that need to be continuous along the move path

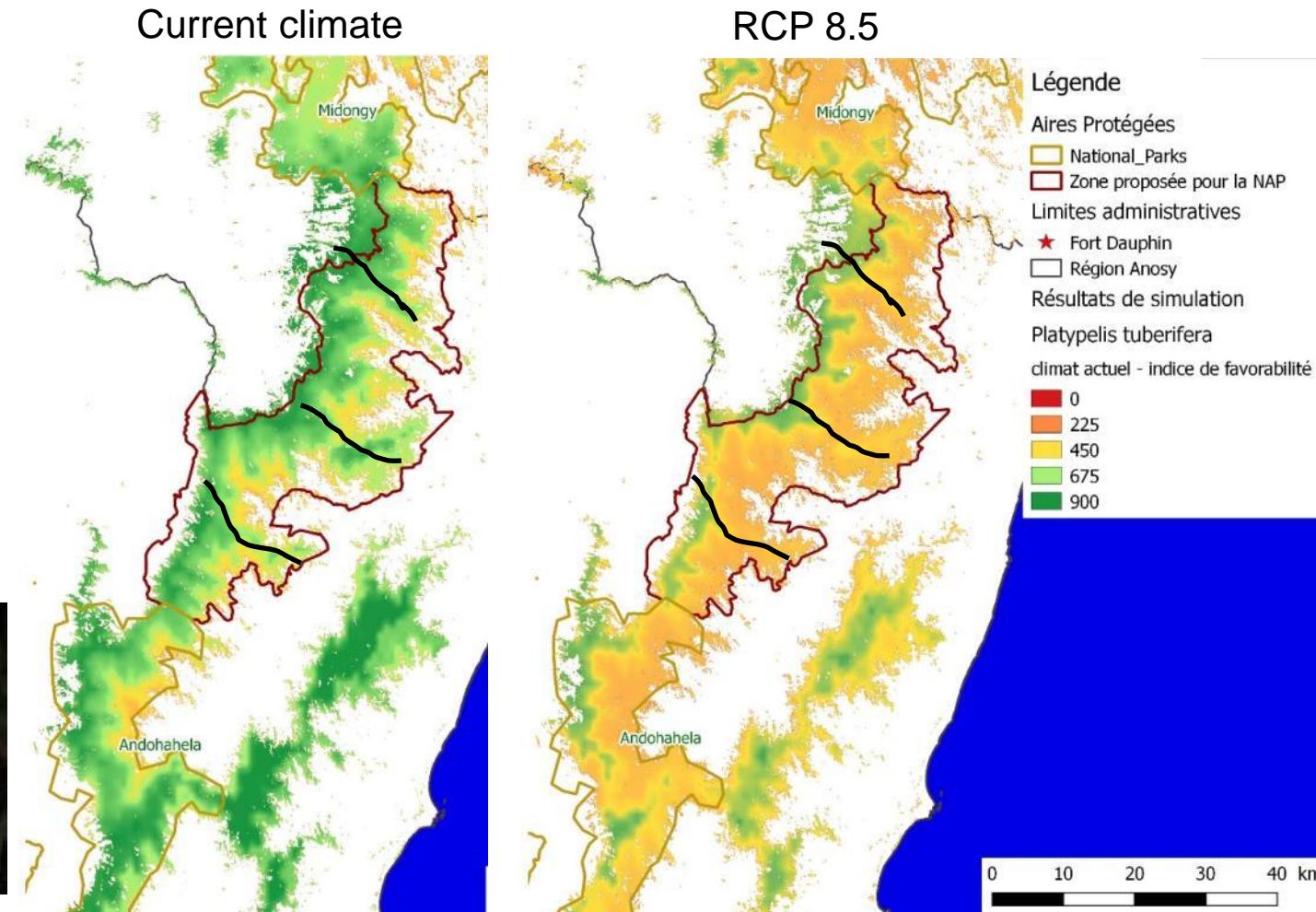
Example: suitable areas for *Platypelis tuberifera* under climate change scenarios



# Adapting the monitoring of biodiversity

- Inventories and biodiversity monitoring should be done along altitudinal or climate gradients, potential climate refuges for target species
- Intensified monitoring in target areas enable to anticipate the apparition of species coming from the North (in Madagascar) or local disappearance

*Daubentonia madagascarensis:*  
 Example of results of species distributions models (suitability index) under climate change scenarios



# Anticipating or limitating the loss of habitat

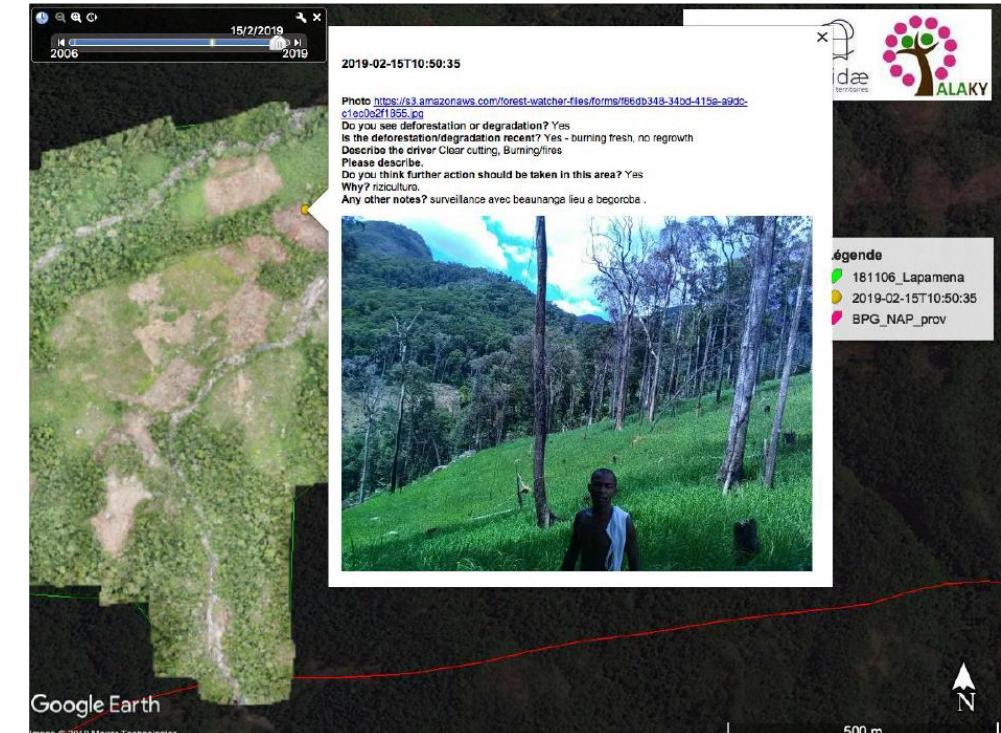
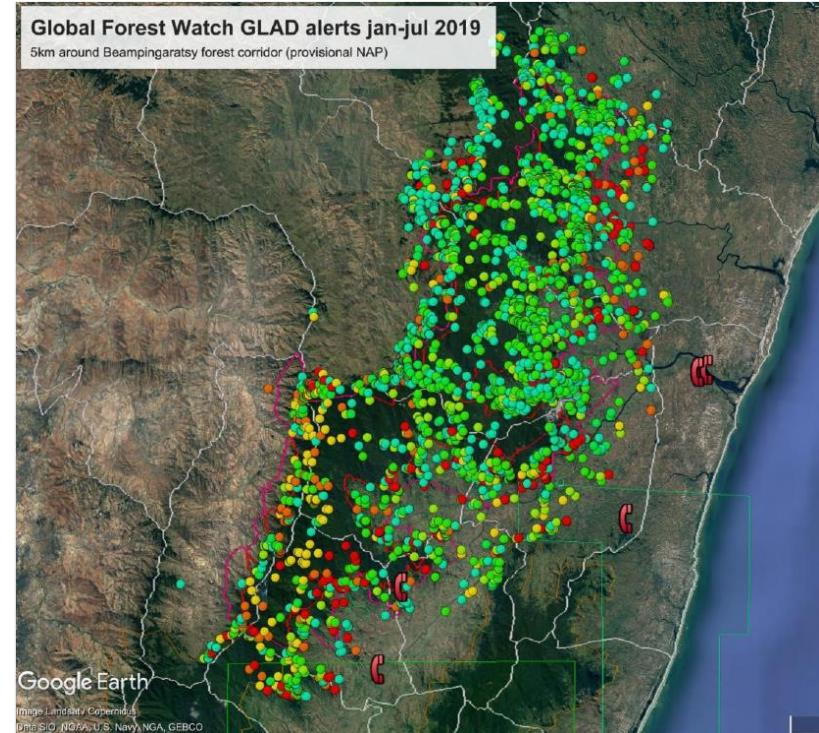
- Reduction of deforestation is a way to both protect biodiversity and also to mitigate climate change
- Protected areas are efficient and early warning system can help to guide action on the field

**Tree loss alerts on smartphones**



**Forest watcher system**

**Forest Watcher**



# Take home messages

- Spatial analysis and modeling provide important knowledge for enhancing protected area management (target climate refuges areas, improve biodiversity monitoring to anticipate loss or gain of species, early actions on main threatened areas)
- Reduction of habitat due to slash and burn agriculture remains the main threat to biodiversity loss and requires to work with local community and farmers : diagnosis of agricultural dynamics of a territory, identify farmers trajectories to support sustainable food production system, develop economically interesting cash crop value chains with contract farming, control and clarification of land tenure, land use planning at community scale.
- In the south-east region of Madagascar, importance of conserving the forest corridor (ex Beampingaratsy forest) between national parks of Midongy and Andohahela (south east of the country)





**Thanks for your attention**

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**More info on Talaky project :**  
<https://www.nitidae.org/actions/talaky-conservation-et-valorisation-des-forets-intensification-et-diversification-ecologique-de-l-agriculture-amenagement-concerne-durable>

