



# Understanding climate change and social drivers of human-wildlife conflict

Thursday, March 14, 2024



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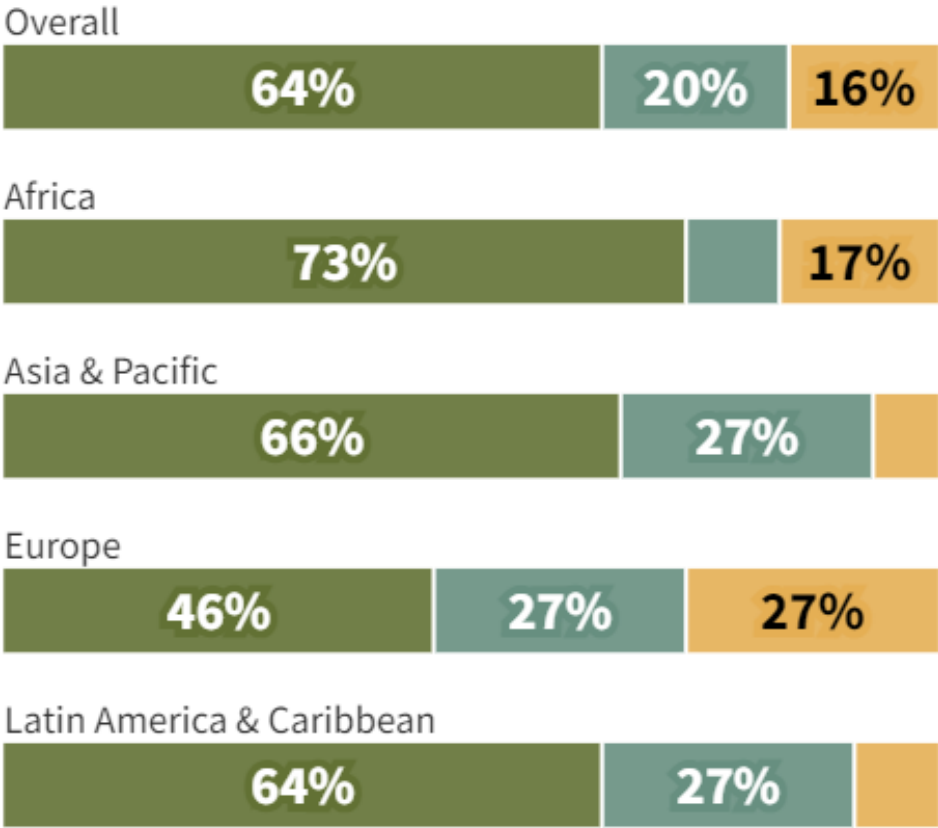


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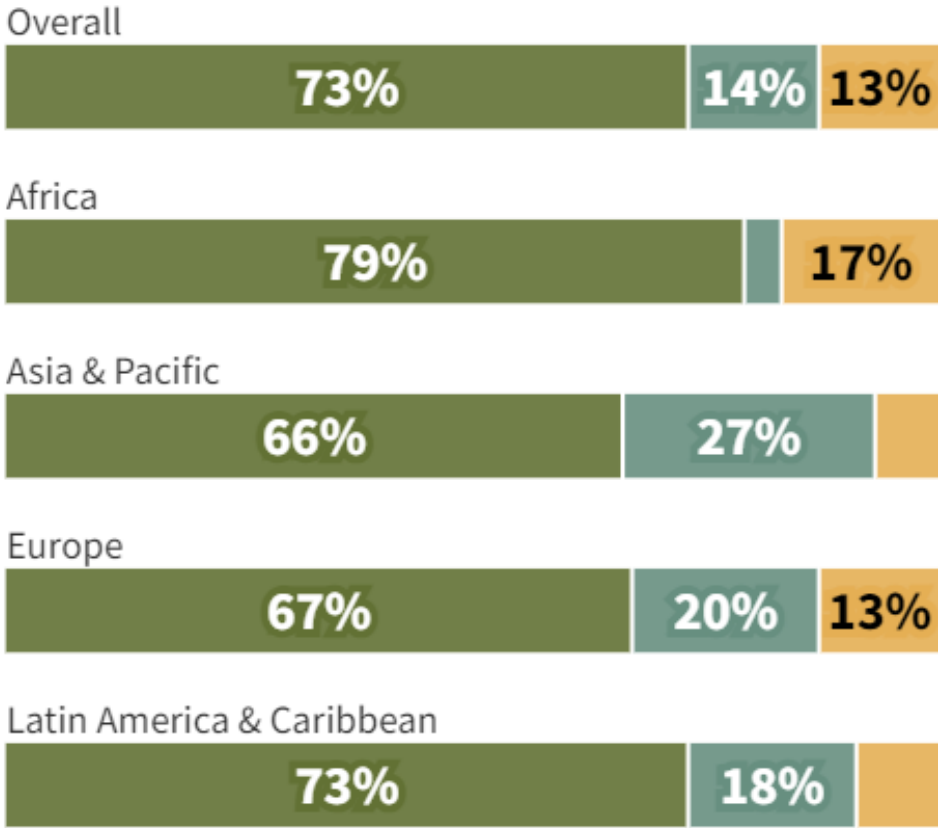


# Government perceptions of human-wildlife conflict

Human-wildlife conflict is currently a **major and serious concern** in our country



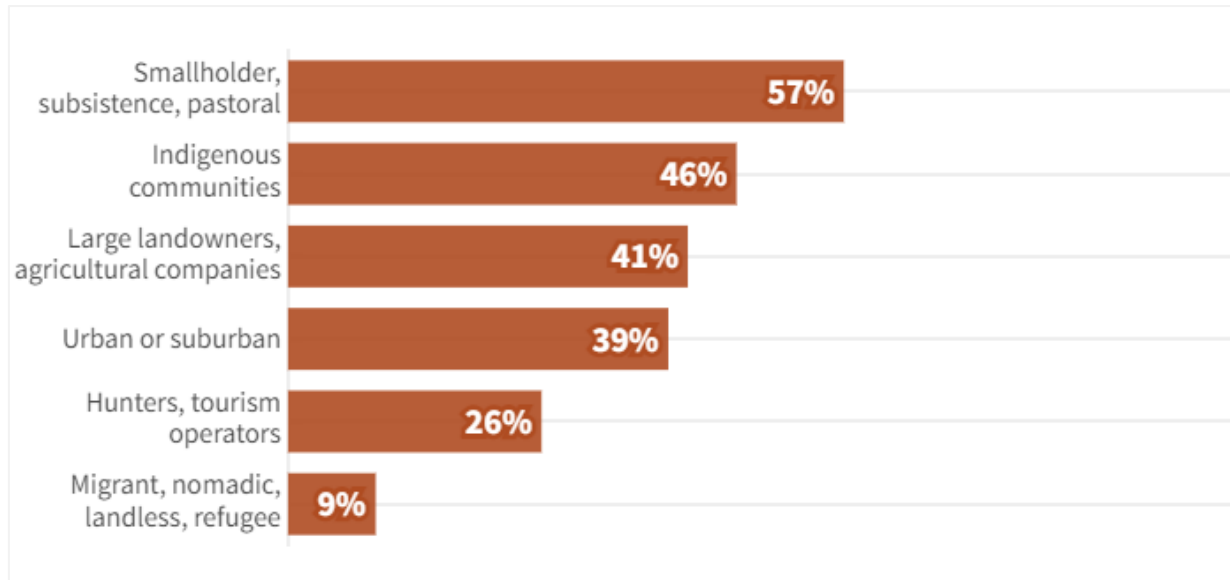
Human-wildlife conflict is **increasing** or becoming more prominent in our country



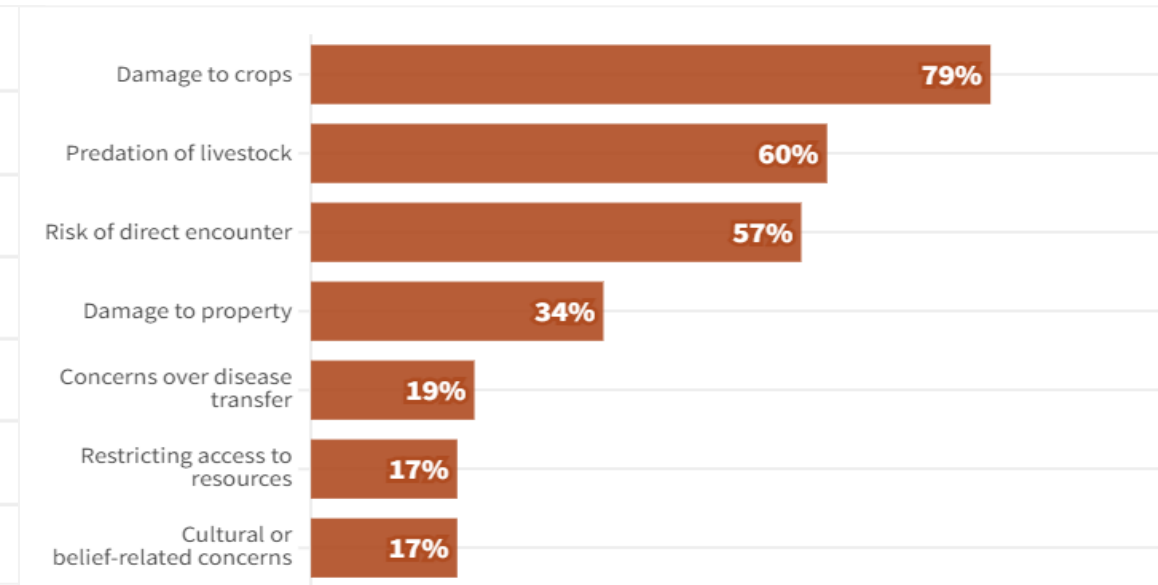
Strongly Agree + Agree    Unsure    Strongly Disagree + Disagree

# Which stakeholders are being impacted?

Type of **stakeholders** for whom human-wildlife conflict is of primary concern



Types of wildlife-related **impacts** of most concern





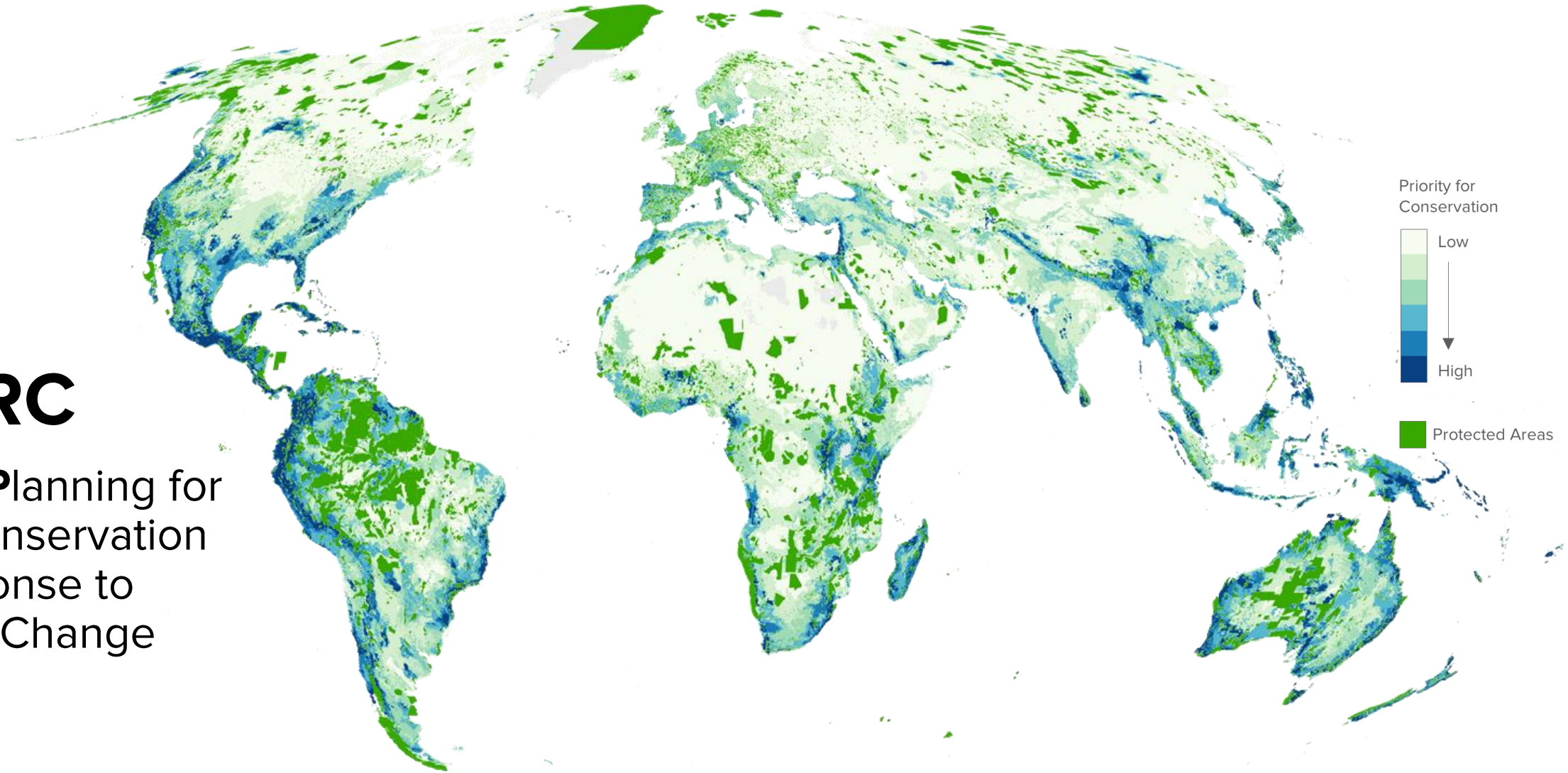
## Patrick R. Roehrdanz

Director - Climate Change and Biodiversity  
Moore Center for Science, Conservation International

# Prioritizing conservation of species and ecosystems in a changing climate

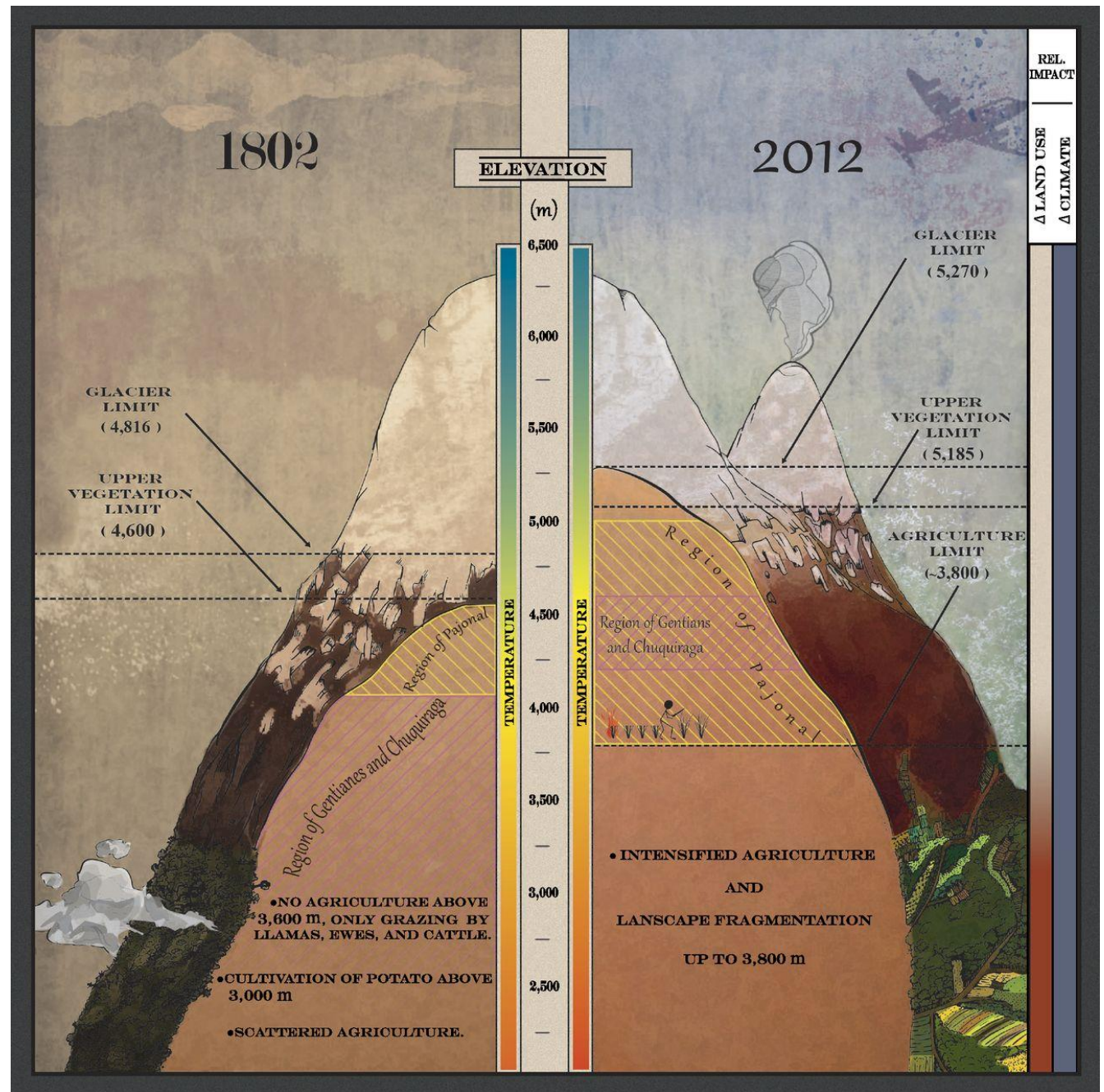
## SPARC

Spatial Planning for  
Area Conservation  
in Response to  
Climate Change



# Illustration of impacts of climate and land use change drivers on vegetation and average glacier limit in Chimborazo, Ecuador

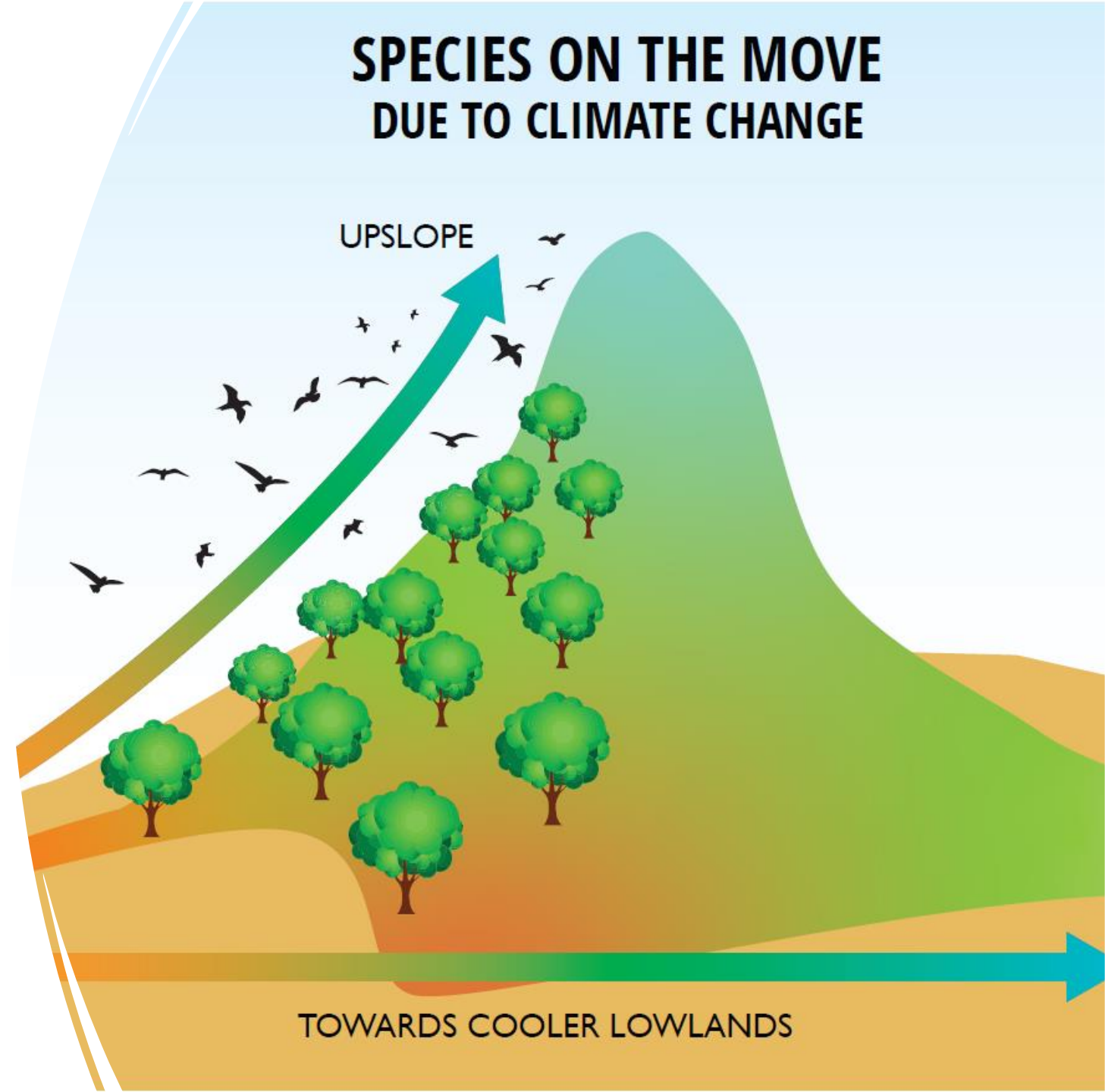
## Evidence of long-long term climate-induced redistribution of species and ecosystems



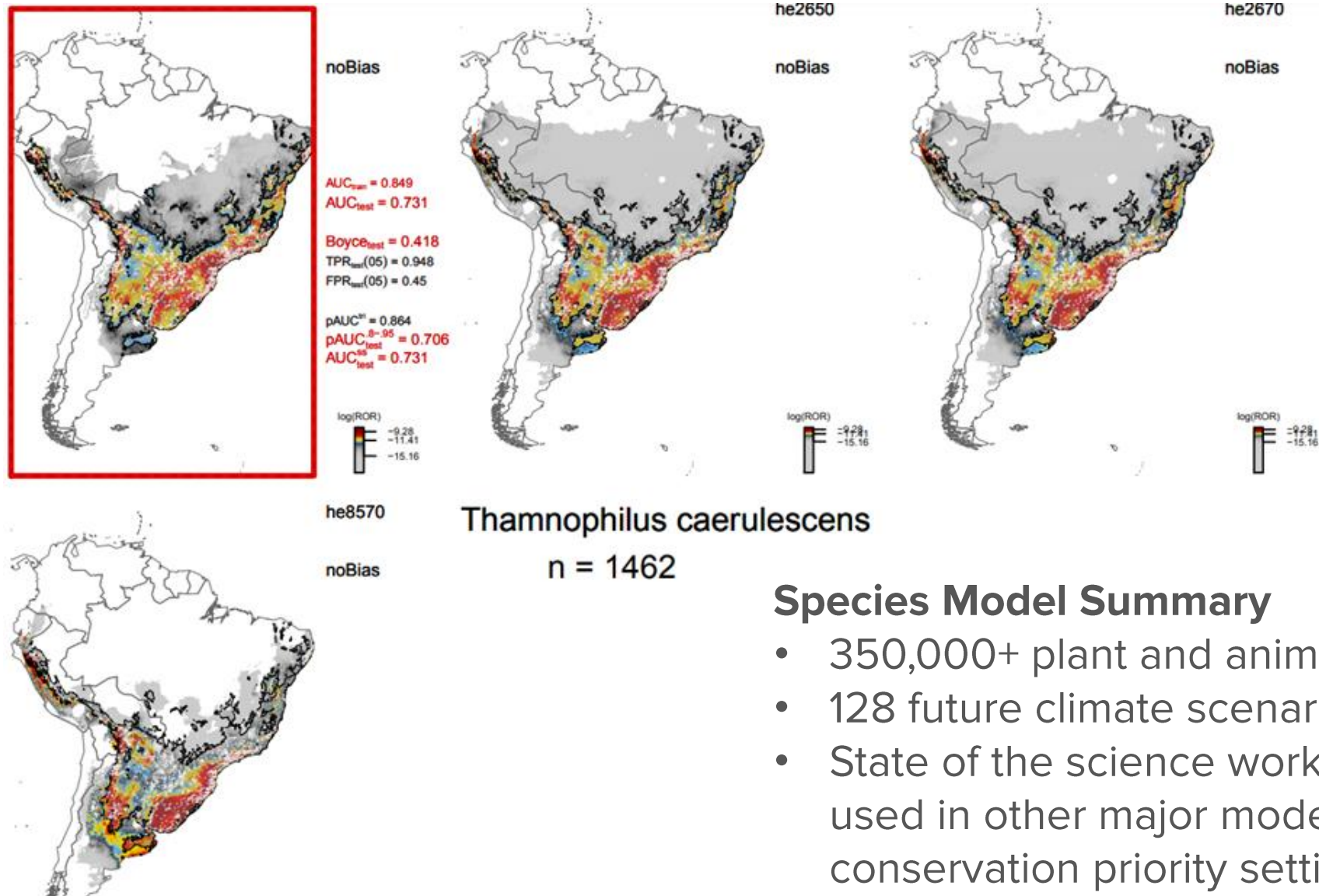
# Key Messages

To achieve our climate goals and halt biodiversity loss **we need to ensure all new conservation areas are climate resilient.**

This is the science that shows **where conservation is most effective** at representing all species and ecosystems as climate changes.



# Species Range Modeling can help Prioritize Areas for Climate Refugia and/or Climate Dispersal Corridors





## 30% land conservation and climate action reduces tropical extinction risk by more than 50%

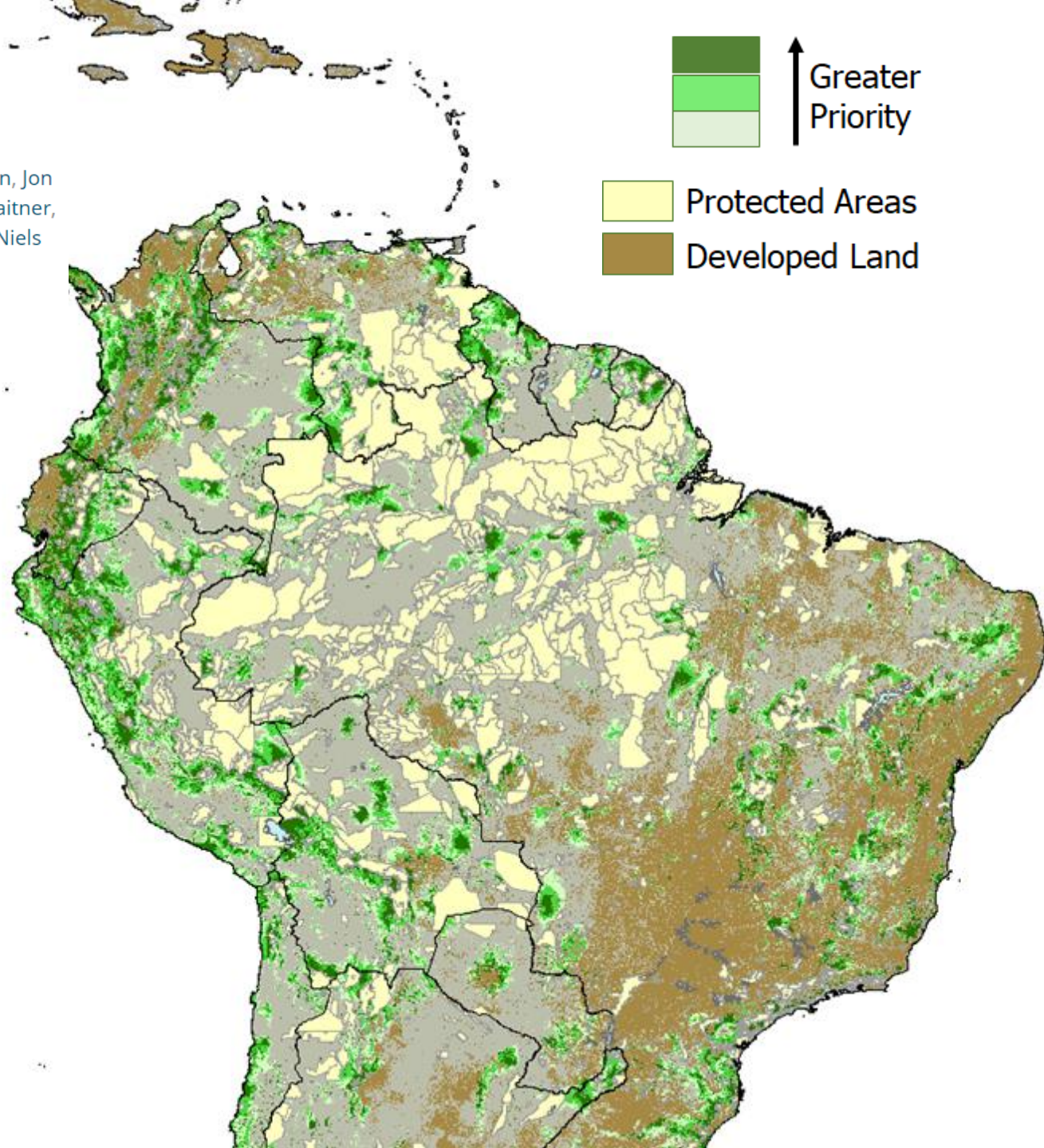
Lee Hannah, Patrick R. Roehrdanz✉, Pablo A. Marquet, Brian J. Enquist, Guy Midgley, Wendy Foden, Jon C. Lovett, Richard T. Corlett, Derek Corcoran, Stuart H. M. Butchart, Brad Boyle, Xiao Feng, Brian Maitner, Javier Fajardo, Brian J. McGill, Cory Merow, Naia Morueta-Holme, Erica A. Newman, Daniel S. Park, Niels Raes, Jens-Christian Svenning

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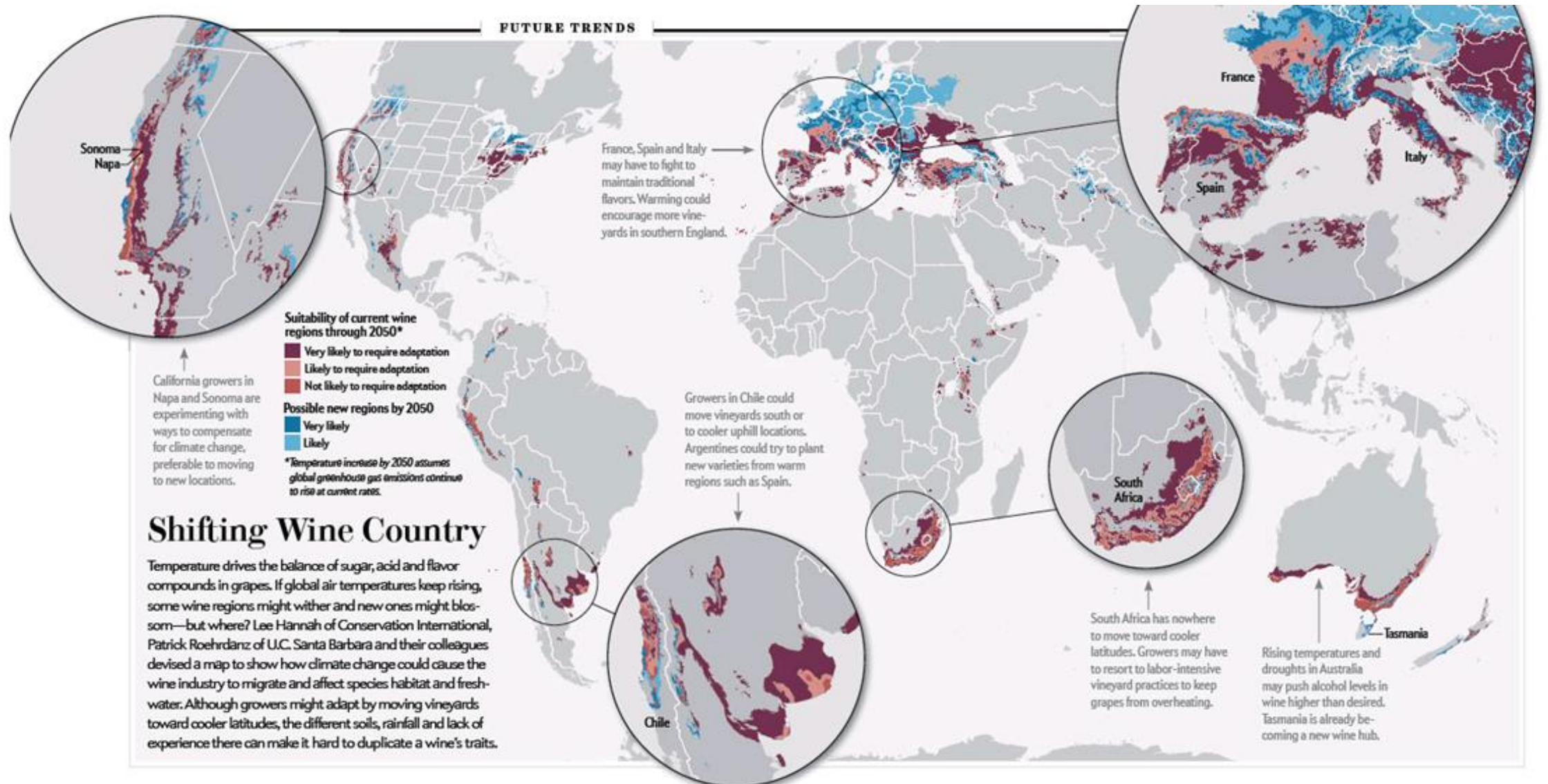
# Spatial Prioritization for Climate Change Priority Areas

Priority areas represent where it is most effective to conserve all species in:

1. present range
2. projected future range
3. overlap between present and future



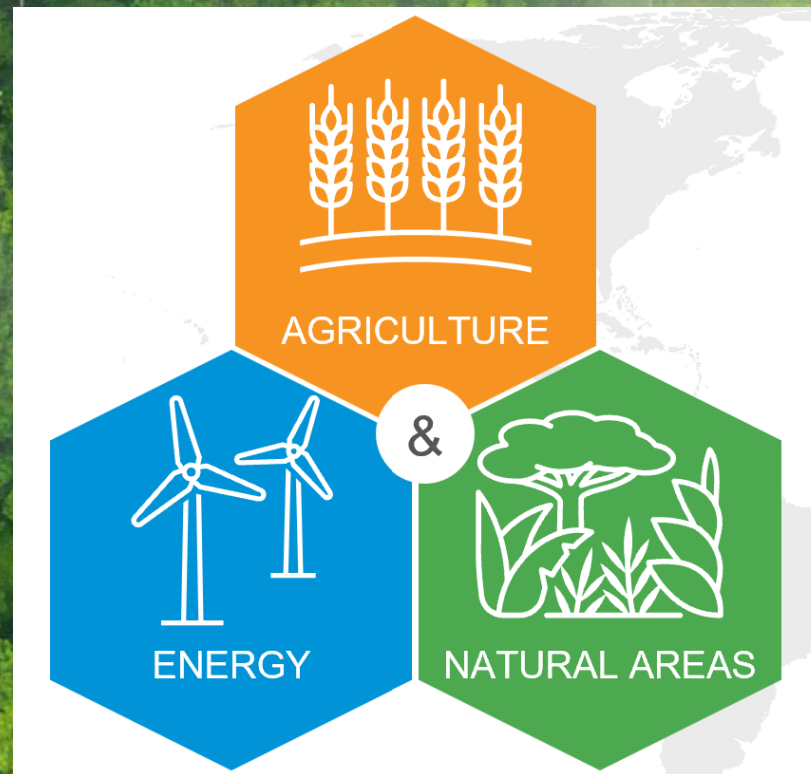
# Climate change also has impact on agriculture distribution: for example, on global wine growing suitability



# Holistic planning for climate change also needs to include production landscapes



# SPATIAL PLANNING FOR CLIMATE CHANGE LAND USE FOR CONSERVATION, AGRICULTURE, AND ENERGY





## Mia Guarnieri

Wildlife biologist and environmental scientist, Bren School of Environmental Science and Management

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# Effects of climate, land use, and human population change on human–elephant conflict risk in Africa and Asia

Mia Guarnieri, Grace Kumaishi, Cameryn Brock, Mayukh Chatterjee, Ezequiel Fabiano ,  
Roshni Katrak-Adefowora, Ashley Larsen, Taylor M. Lockmann, Patrick R. Roehrdanz



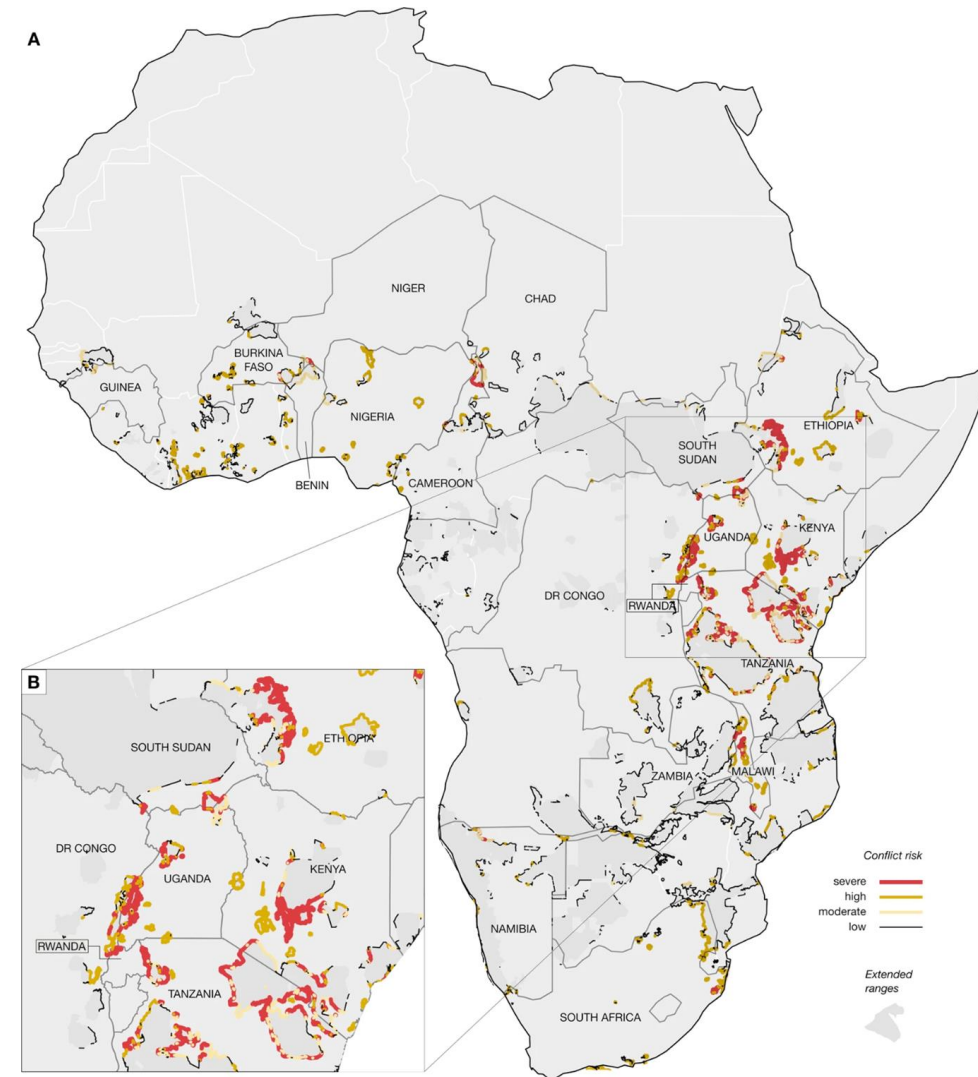


# Study Background and Goals

- **Question:** How does climate change affect conflict risk with elephants within their current range?
- **Species**
  - African savanna elephant (*Loxodonta africana*)
  - Asian elephant (*Elephas maximus*)
- **Continent-wide analyses**
  - Conflict risk
  - Climatic suitability
- **Projection scenarios**
  - SSP1 - RCP 2.6: Sustainability - low challenges to mitigation and adaptation, low emissions
  - SSP3 - RCP 7.0: Regional Rivalry - high challenges to mitigation and adaptation, high emissions

# Conflict Risk Assessment

- Methodology from Di Minin et al. 2021, “A pan-African spatial assessment of human conflicts with lions and elephants”
- **2 components:** cropland density and human population density
- High values indicate risk
- Present-day and 2050



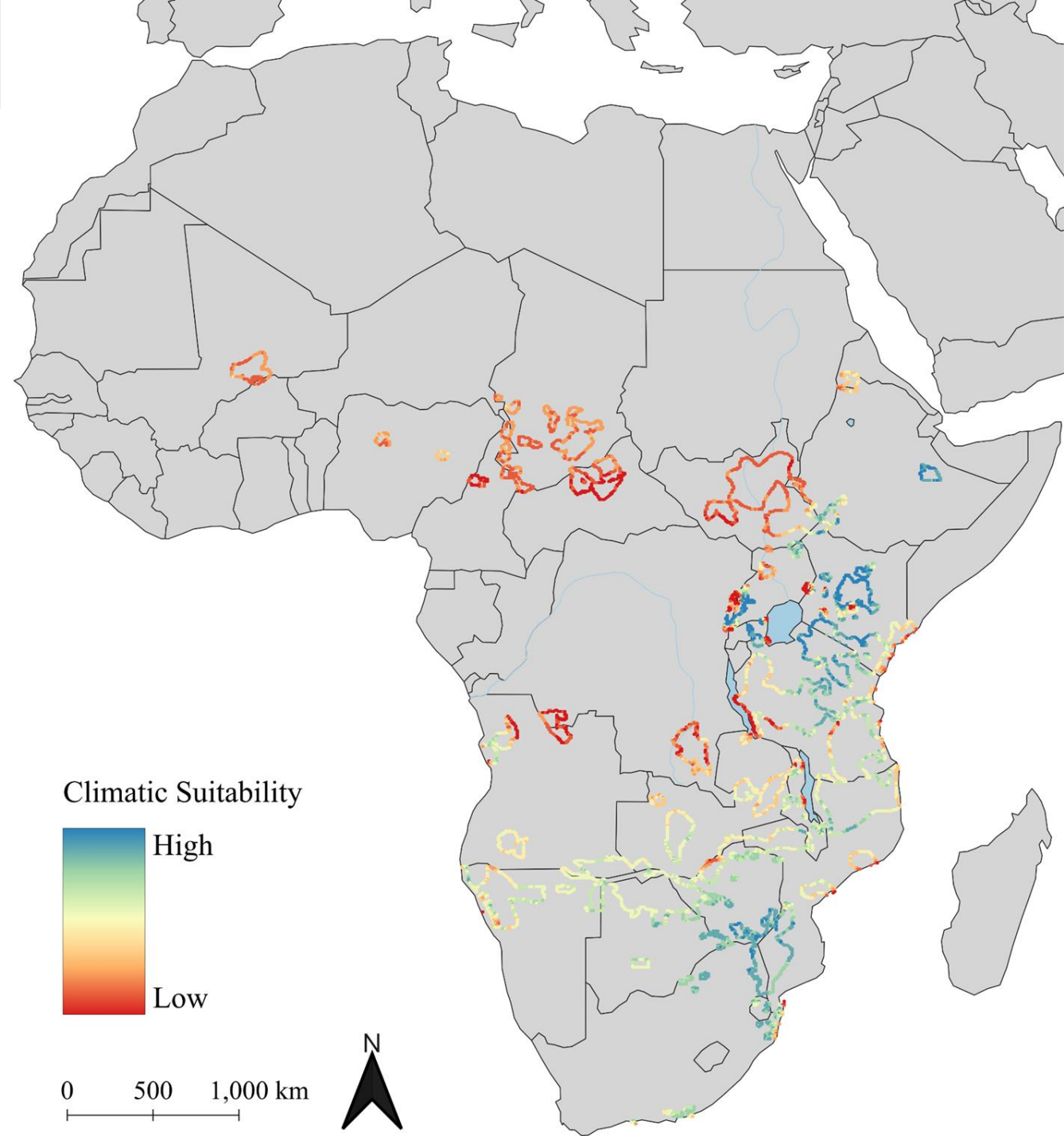
Di Minin et al., 2021





## Climatic Suitability

- Climate variables for the African and Asian elephants were chosen based on individual species ecology
- Used Maxent species distribution modeling algorithm
- Present day and 2050

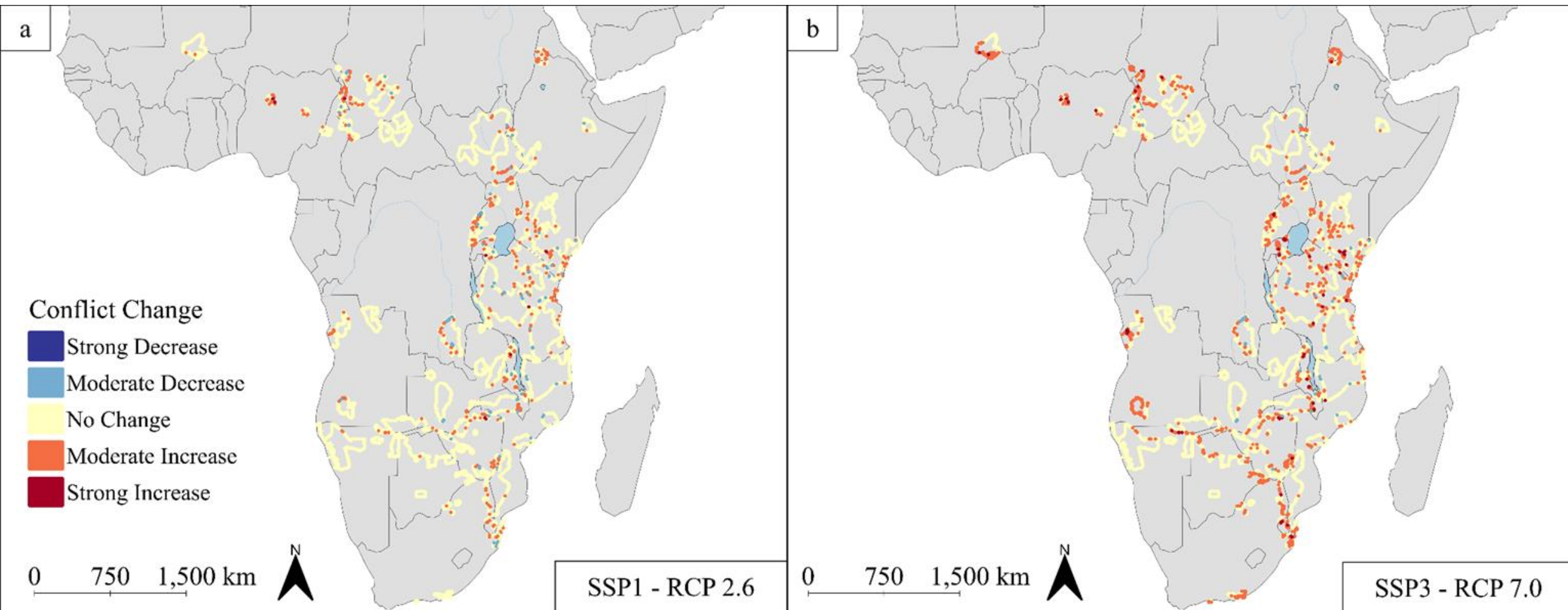




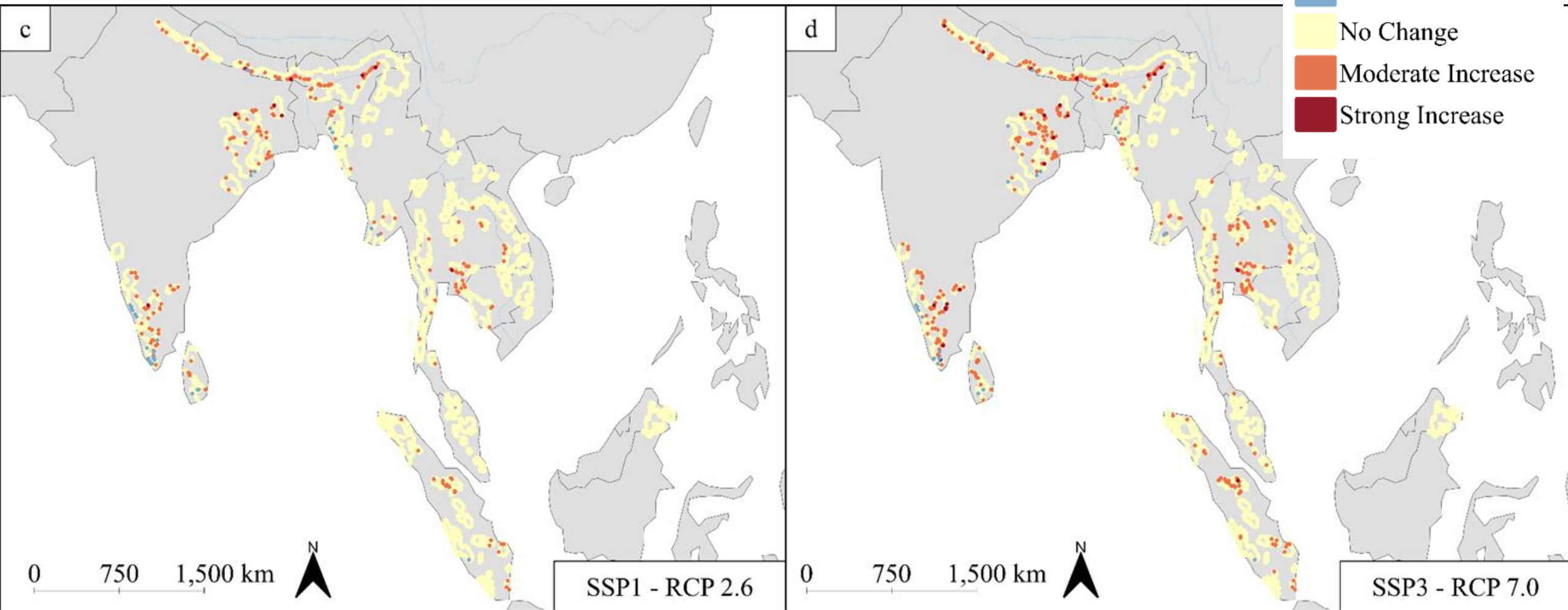
## Major Findings

- Human-elephant conflict risk is projected to increase across both Africa and Asia
- More emissions, more barriers to conservation = larger increase
- Net decrease in climatic suitability
  - Overlap with increasing conflict risk

# Changing Hotspots - Africa



# Changing Hotspots - Asia



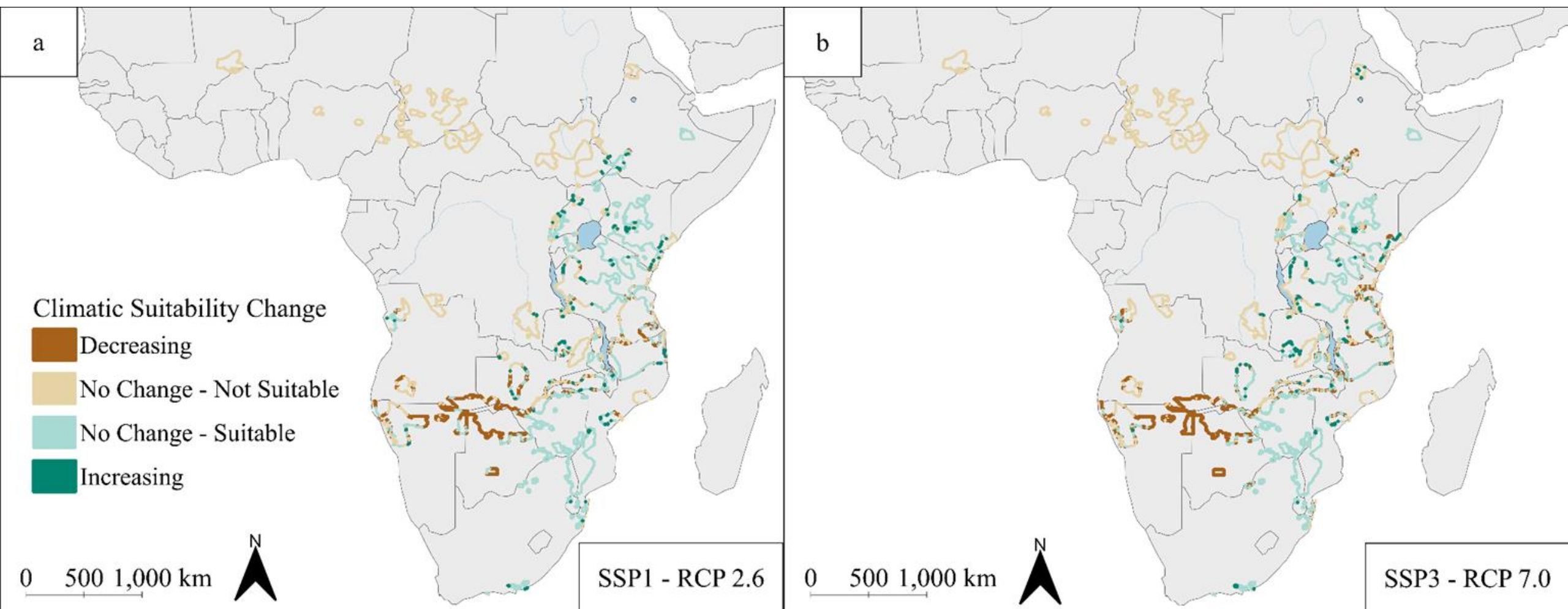
# Conflict Risk Change



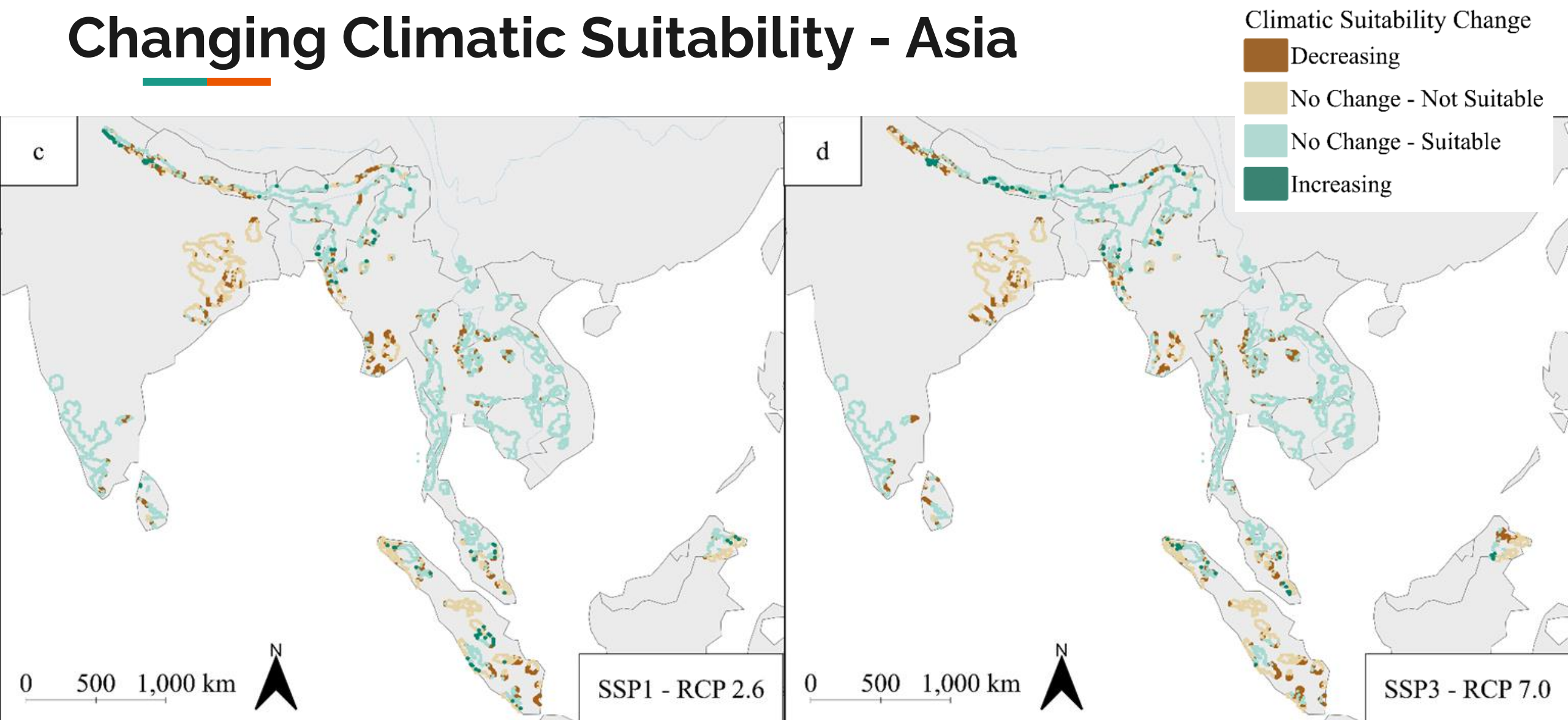
**Table 1. Percentage of the extended range boundaries for the African savanna elephant (*Loxodonta africana*) and the Asian elephant (*Elephas maximus*) within each conflict change category under SSP126 and SSP370 climate projections in the year 2050**

Conflict change	African elephant		Asian elephant	
	SSP 1 - RCP 2.6	SSP 3 - RCP 7.0	SSP 1 - RCP 2.6	SSP 3 - RCP 7.0
Strong decrease	0.00	0.00	0.00	0.02
Moderate decrease	1.38	0.58	0.67	0.45
No change	92.00	82.43	94.84	91.20
Moderate increase	6.45	15.94	4.29	7.83
Strong increase	0.17	1.05	0.19	0.50

# Changing Climatic Suitability - Africa



# Changing Climatic Suitability - Asia



# Conflict Risk and Climatic Suitability Overlap



**Table 3. The percentage of the extended range boundary area within each climatic suitability change category and conflict risk change category for the African savanna elephant (*Loxodonta africana*) and the Asian elephant (*Elephas maximus*) under SSP126 and SSP370 climate projections in the year 2050, under the GFDL-ESM4 GCM**

Suitability change	Conflict risk												
	African elephant						Asian elephant						
	SSP1 - RCP 2.6			SSP3 - RCP 7.0			SSP1 - RCP 2.6			SSP3 - RCP 7.0			
	Mod. Dec.	Mod. Inc.	Strong Inc.	Mod. Dec.	Mod. Inc.	Strong Inc.	Mod. Dec.	Mod. Inc.	Strong Inc.	Strong Dec.	Mod. Dec.	Mod. Inc.	Strong Inc.
Decreasing	0.02	0.38	0.00	0.03	1.93	0.12	0.11	0.39	0.00	0.02	0.07	0.93	0.02
Increasing	0.05	0.1	0.00	0.00	0.22	0.02	0.04	0.00	0.00	0.00	0.04	0.26	0.02

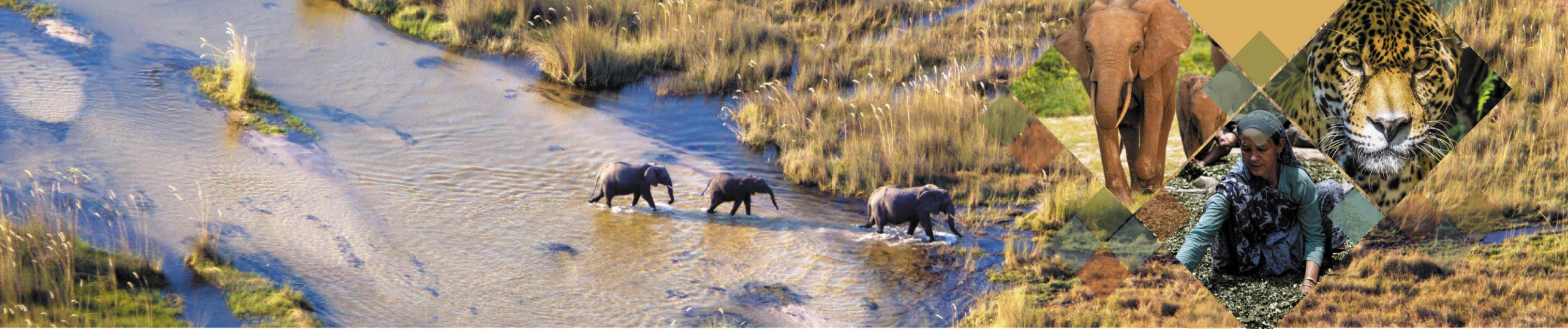
"No Change" conflict risk categories have been omitted. Abbreviations: Mod. = moderate, Dec. = decrease, Inc. = increase. Columns show the direction of change.





## Next Steps

- **Regional and local analyses**
  - Consideration of cultural and economic nuance
  - Practical on-the-ground action
- **Finer-scale conflict risk assessment**
  - Crop types
  - Seasonality
- **Examining implications of suitability change**



## Ezequiel Fabiano

Senior Lecturer, University of Namibia



## Alexandra Zimmermann

Chair of the IUCN SSC Human-Wildlife Conflict and Coexistence Specialist Group



## **Yudis Cerquera Vega**

Treasurer of the community action board,  
Yarí Peasant Business Association,  
Sustainable Amazon for Peace Project,  
Colombia

# 1. Location

**Region:** Amazonia, southern Colombia

**Department:** Caquetá

**Municipality:** San Vicente del Caguán

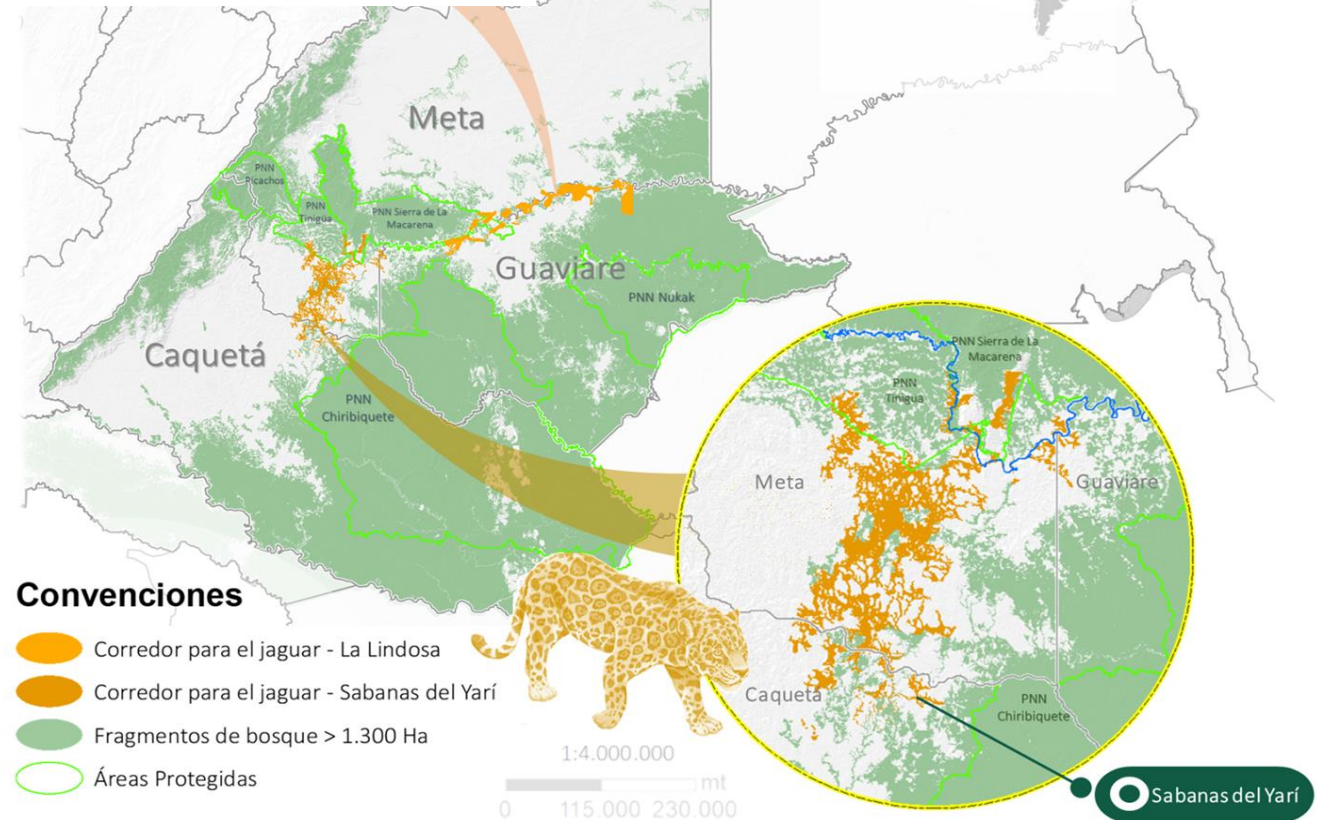
**Ecosystems:** Natural savannahs and tropical rainforest

**Ecological importance:** corridor between the Amazon and the Orinoquia with large natural savannahs

**Economy:** livestock



# Yari Savannahs



## 2. Causes of human-jaguar conflict

1. Fear
2. Livestock
3. Hunting: Hunting jaguar prey, including this species.



# 3. What is the community doing to mitigate the conflict?

1. **Peasant promotion school** to break myths. For example: that the jaguar ate people.
2. **Livestock:** designing pilot farms to implement jaguar coexistence tools
3. **Jaguar food:** stop hunting jaguar prey to allow this species to live in peace.



# 3. What is the community doing to mitigate the conflict?

The most vulnerable animals should be close to the house; priority is given to paddocks.

Agro-family aqueducts are implemented (House and livestock).

Current fences to prevent jaguar entry into pastures



**ASL** Programa Paisajes Sostenibles de la Amazonia





# 3. What is the community doing to mitigate the conflict?

4. Intergenerational Agreement for the conservation of the jaguar.

5. Jaguar seal: jaguar recommended products

6. Jaguar Festival



Colombian Minister of Environment signs the Intergenerational Agreement



Seal: product recommended by jaguars





# 4. What should be done to improve coexistence?

Reinforce respect for the life of this species.

Training farmers to ensure that their farms are well adapted to prevent attacks.

Today we all know that the forest is the home of the jaguar.

To be able to effectively attend to the farms that still have attacks





# Thank you!

Website: <https://www.worldbank.org/en/programs/global-wildlife-program>.

Email: [gwp-info@worldbank.org](mailto:gwp-info@worldbank.org)



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