



Biodiversity intactness, ecosystem health,  
food production and security:

An assessment of the impacts of major  
infrastructure projects in South Africa



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# Outline:

1. The global challenge – Matthias Jonas
2. The African challenge – Phoebe Barnard
3. The study– Lavinia Perumal

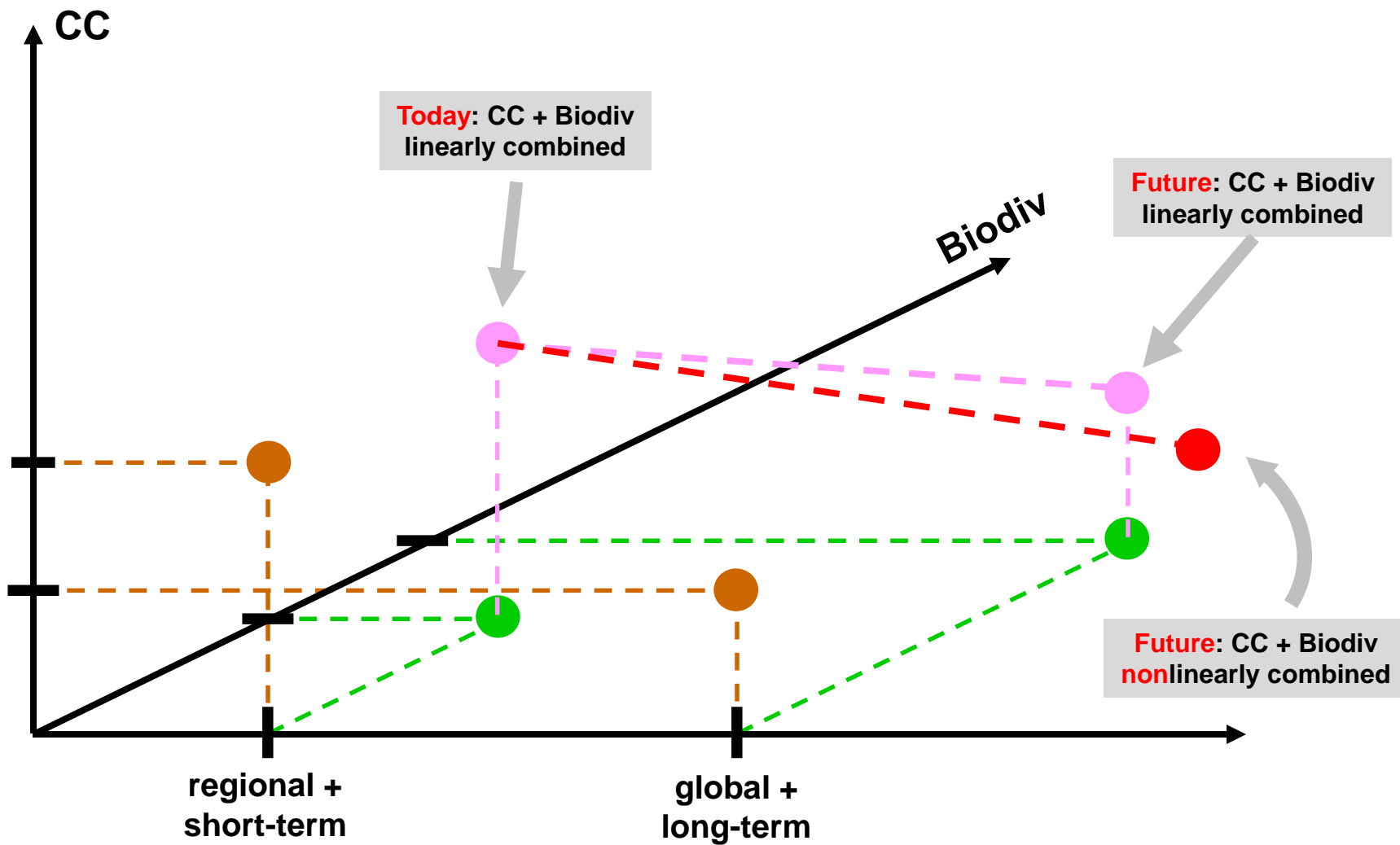
# The global challenge:

The **Sustainable Development Goals (SDGs)** are a new, universal set of goals, targets and indicators that UN member states will be expected to use to frame their agendas and political policies over the next 15 years.

# WORLD DEVELOPMENT WITHIN PLANETARY BOUNDARIES

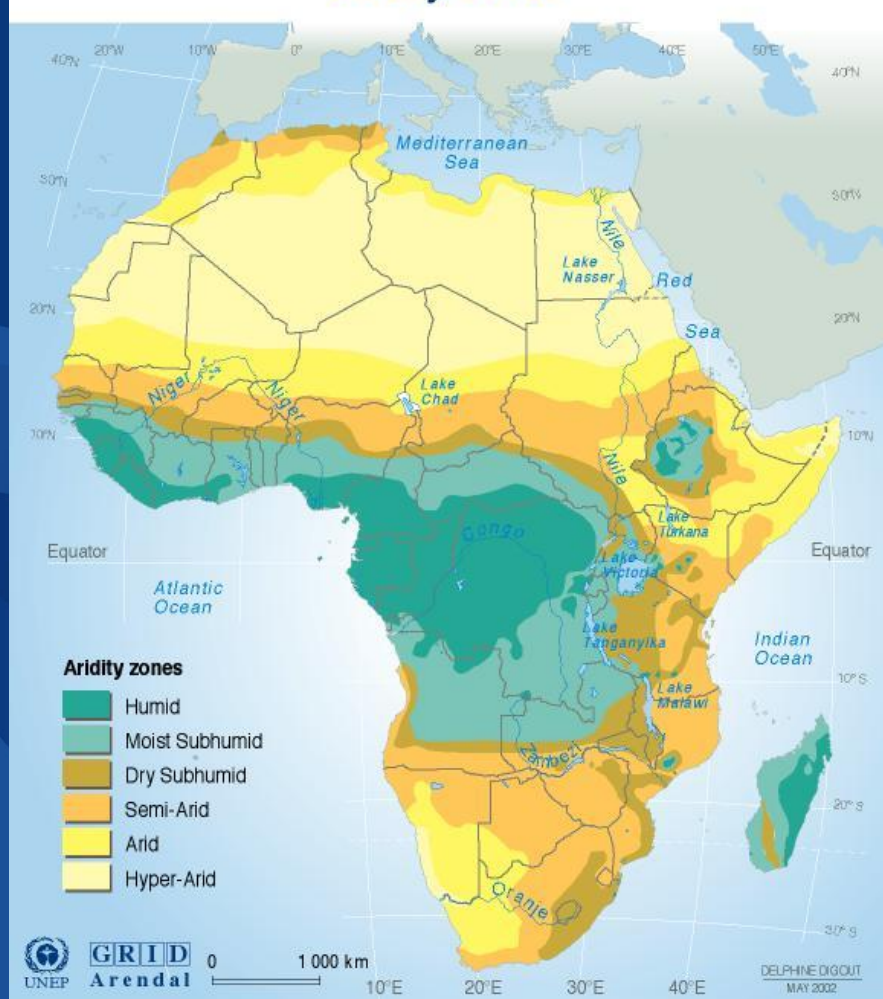


## The global challenge:



# South Africa and Africa

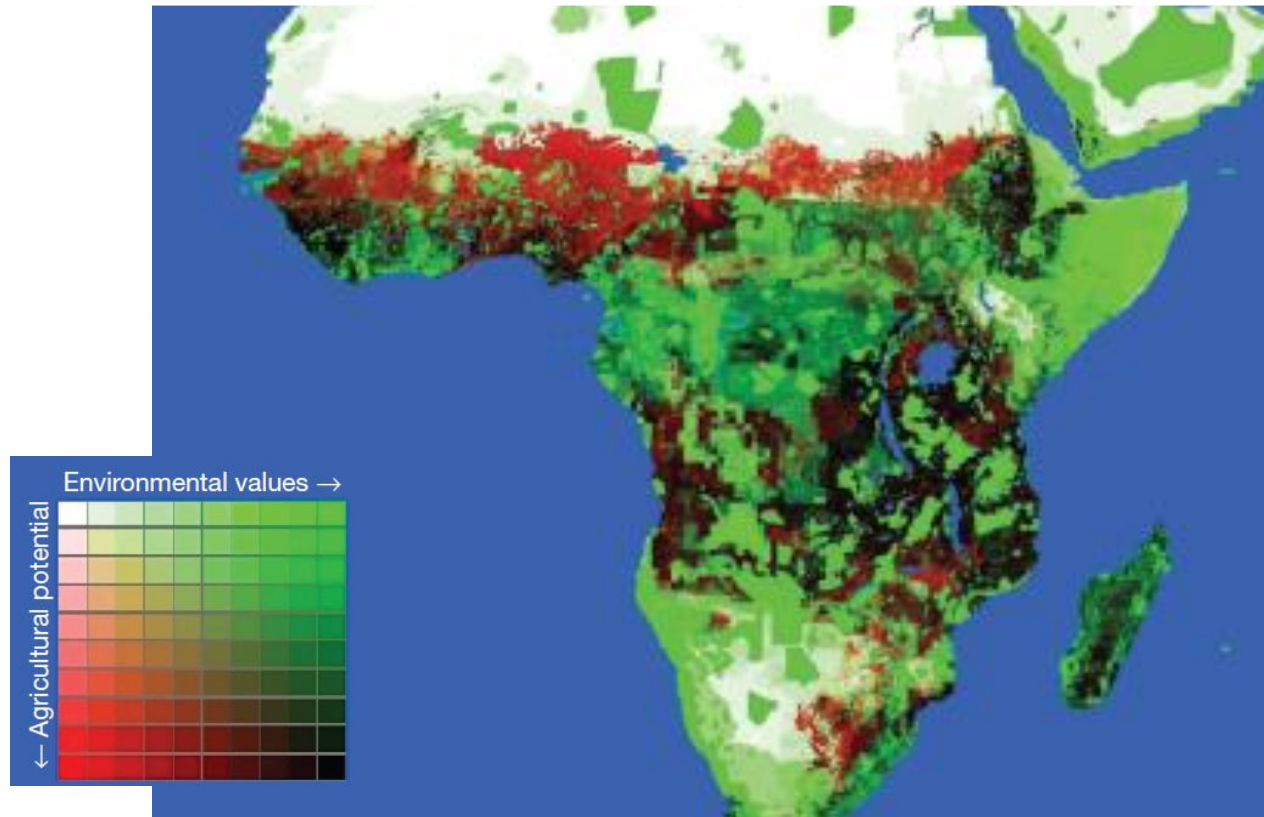
## Aridity Zones





# A global strategy for road building

William F. Laurance<sup>1</sup>, Gopalasamy Reuben Clements<sup>1,2</sup>, Sean Sloan<sup>1</sup>, Christine S. O'Connell<sup>3</sup>, Nathan D. Mueller<sup>4</sup>, Miriam Goose Oscar Venter<sup>1</sup>, David P. Edwards<sup>5</sup>, Ben Phalan<sup>6</sup>, Andrew Balmford<sup>6</sup>, Rodney Van Der Ree<sup>7</sup> & Irene Burgues Arrea<sup>8</sup>

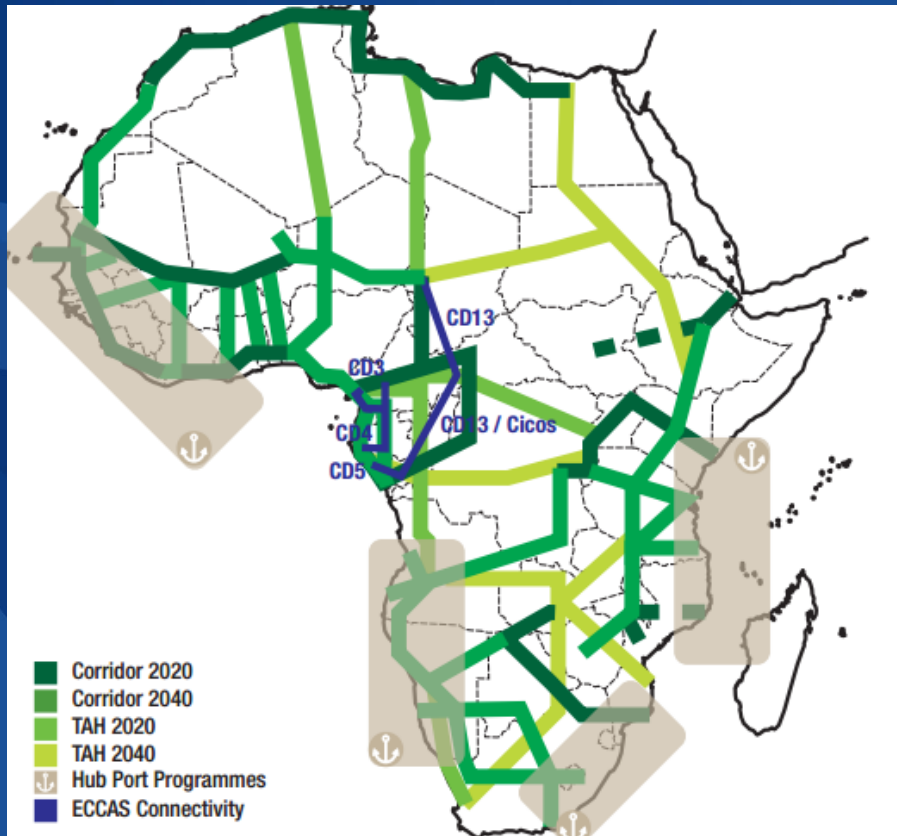


**Figure 3 | A global roadmap.** Shown are priority road-free areas (green shades), priority agricultural areas (red shades), conflict areas (dark shades), and lower-priority areas (light shades). Values of the environmental-values and

# PhD overview

Systems approach to quantify and understand natural capital impact of roads and railways in African regions.

Road and rail development



Natural capital and biodiversity intactness

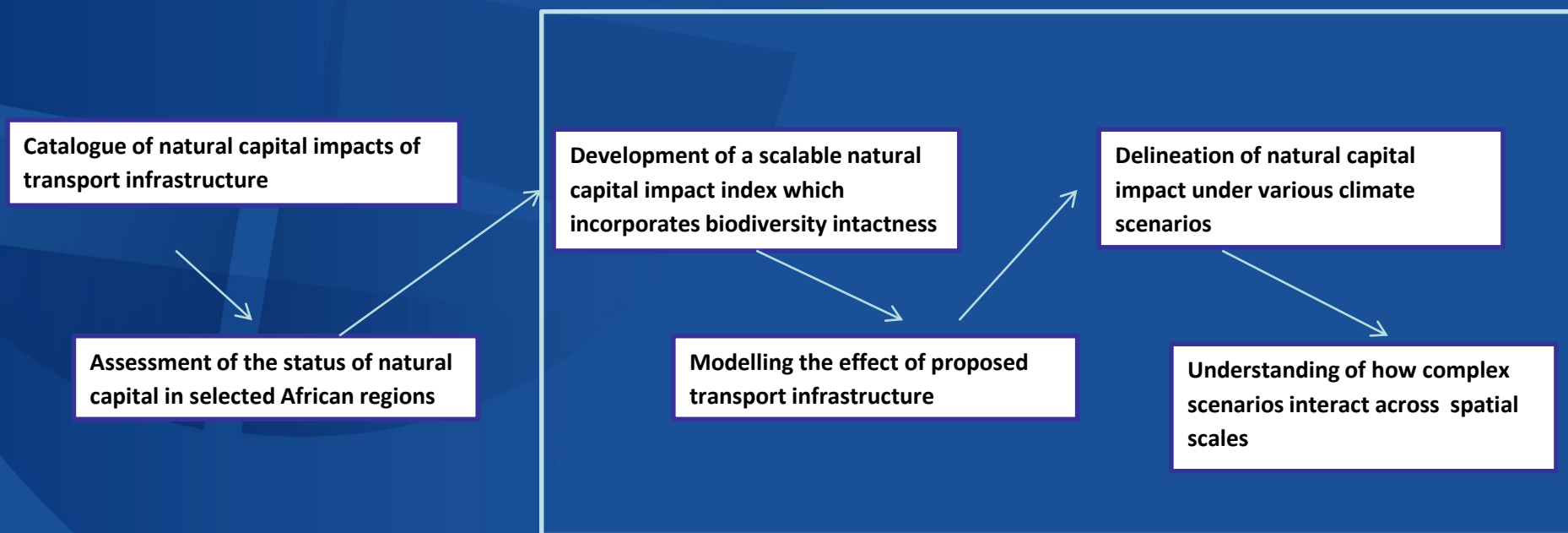


Complex interactions exist between linear infrastructure development and natural capital



# PhD expected outcomes

**Systems approach to quantify and understand natural capital impact of roads and railways in African regions.**

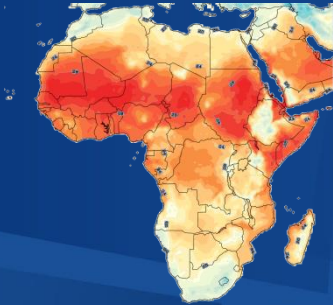


**PhD ~ Austria-SA project**

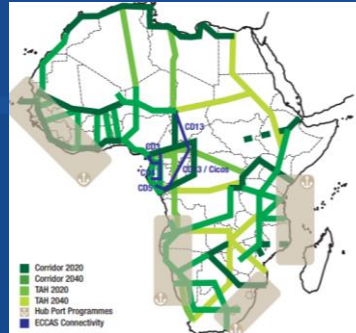
# Research challenges

- Using **available ecological data** to answer research questions
- Determining appropriate natural capital and biodiversity intactness **indices**
- **Quantifying the magnitude** of infrastructure impact in natural capital
- How fragmentation of habitats through infrastructure development undermines biodiversity intactness and natural capital at different **spatial scales**

# Take home messages



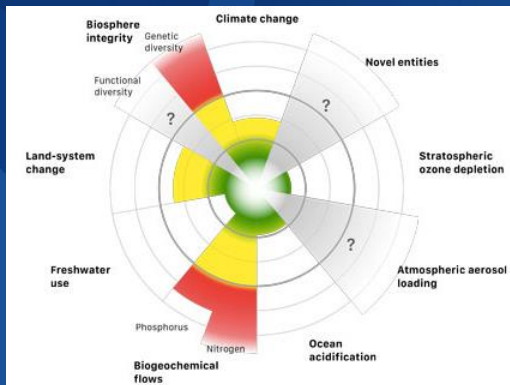
There are existing biodiversity and climate concerns



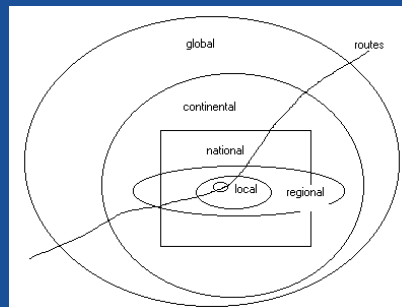
Proposed transport infrastructure development in ecologically sensitive areas providing natural capital and high in biodiversity



There is a complex issue - infrastructure development and ecological sustainability



There are existing planetary boundaries and thresholds to consider



Impacts vary with spatial scale



Large impacts on natural capital, biodiversity and eventually food security

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