

# Future scenario analysis

Welfare implications of ecosystem  
service and management change in the  
Greater Serengeti-Mara Ecosystem

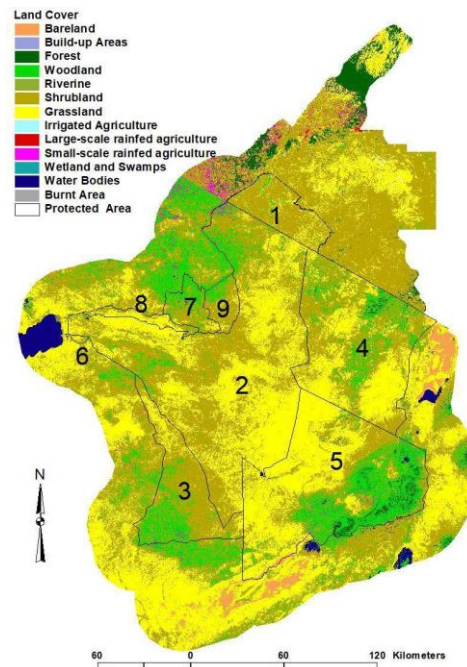
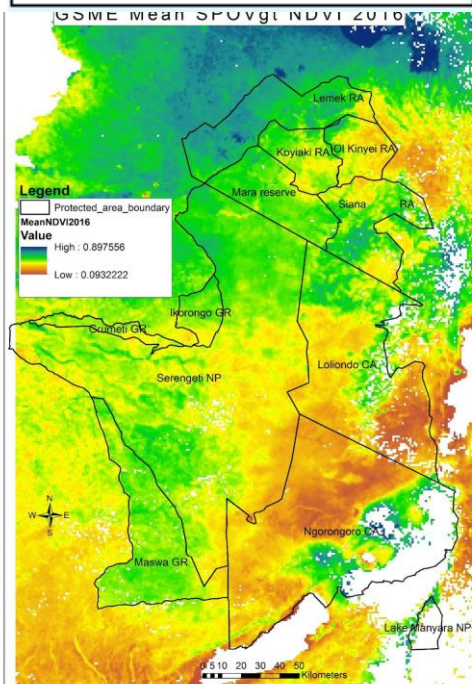
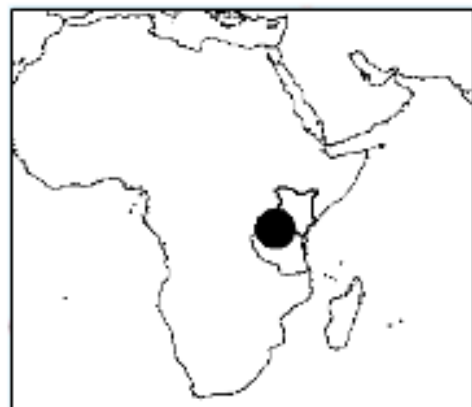
Martin Reinhardt Nielsen and Roel May

Institute of Food and Resource Economics

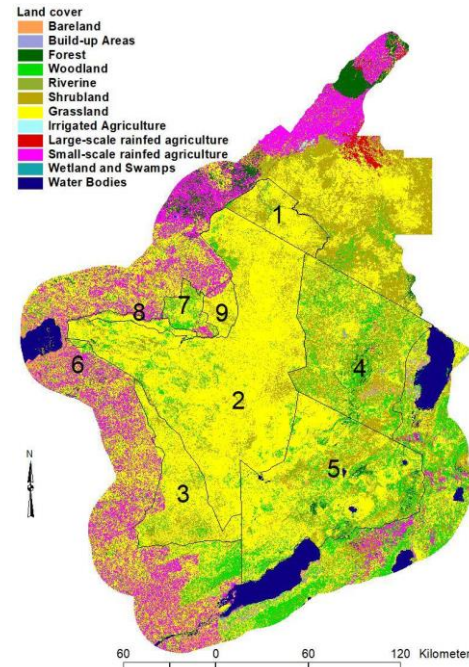
KØBENHAVNS UNIVERSITET



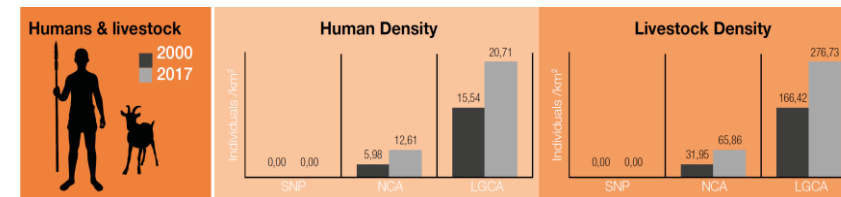
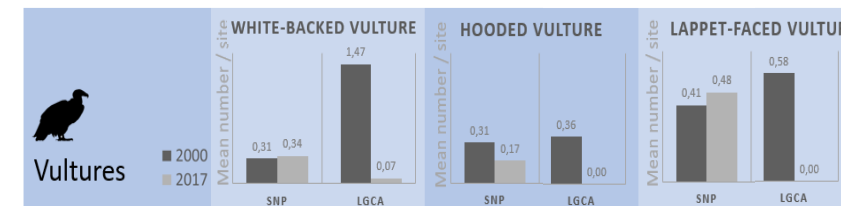
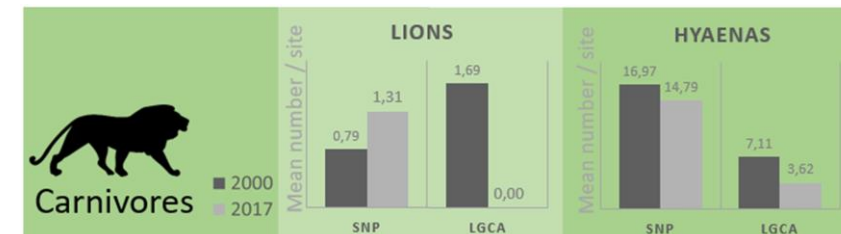
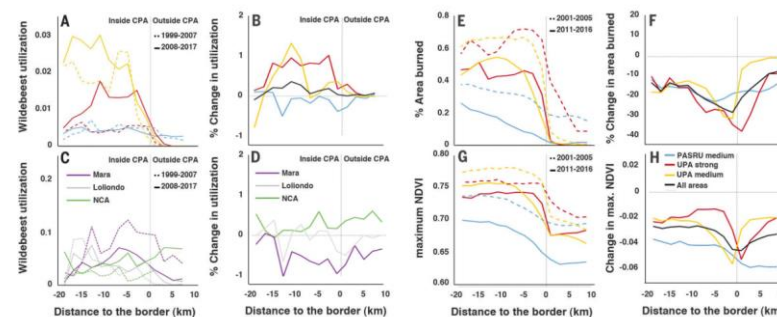
# The Greater Serengeti-Mara Ecosystem



1975

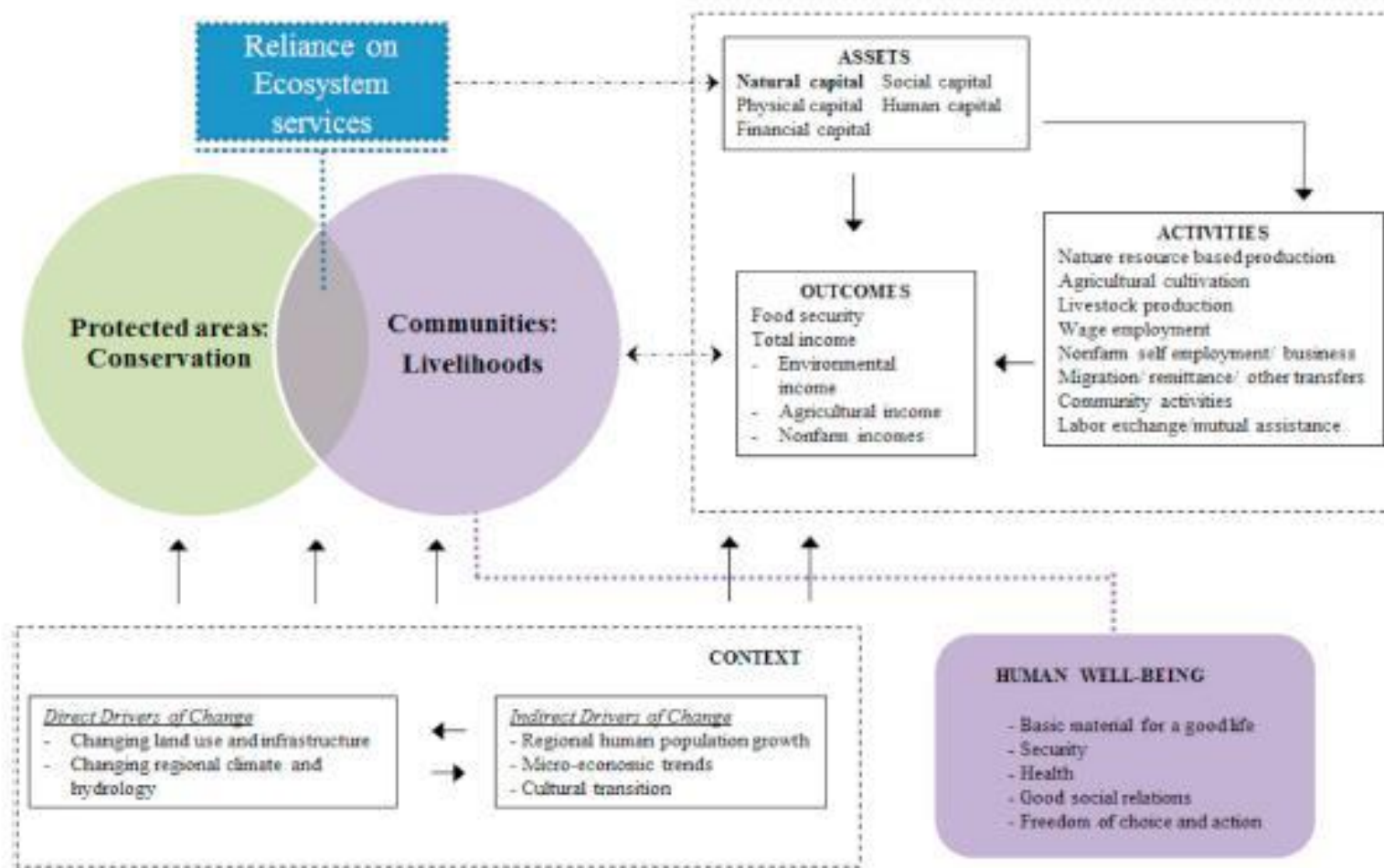


2015



Red: strongly protected park border  
 Blue: Medium protected border Kenya  
 Orange: Medium protected border Tanzania

# The Greater Serengeti-Mara Society



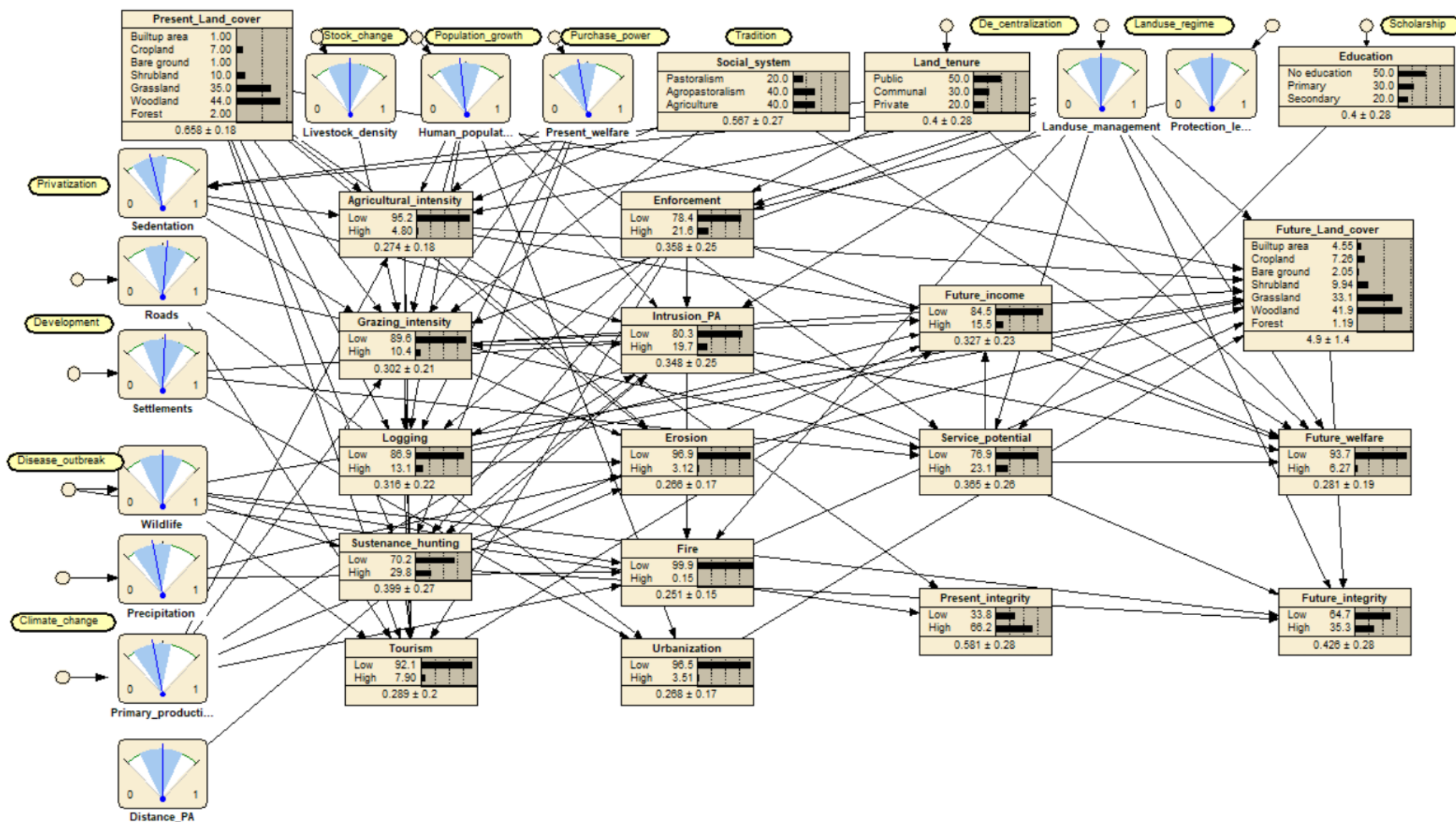
Local communities depend on the land for their livelihood: grazing lands for their livestock, fertile soils for agriculture and direct harvesting of environmental goods

A survey of 985 households in 25 villages in the GSME found that on average 20% of total household income originated directly from environmental goods and services harvested inside PA's while average total ecosystem derived income reliance was 75%

Fig. 1. Theoretical framework integrating the Millennium Ecosystem Assessment and the Sustainable Livelihoods Framework (adapted from Ellis, 2000; MA, 2003; Scoones, 1998; Winters et al., 2001).



# The Bayesian Belief Network model



# Future scenarios

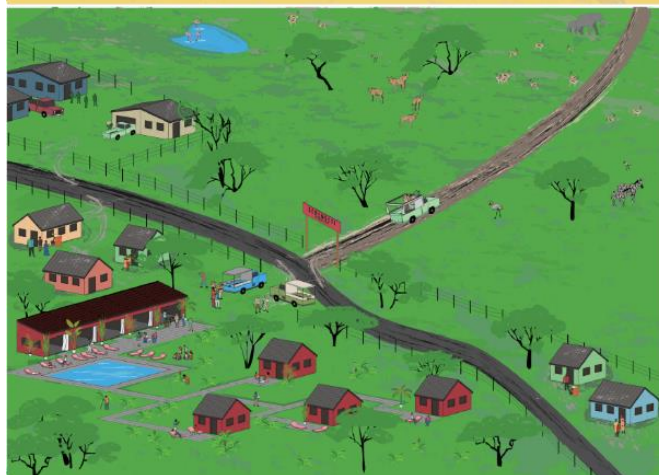
## Downward Spiral

In this scenario, lack of governance structures leads to eroded agricultural and pastoral production and lack of tourism income, in turn causing reduced welfare of communities and pressure on the environment through increased illegal activities.



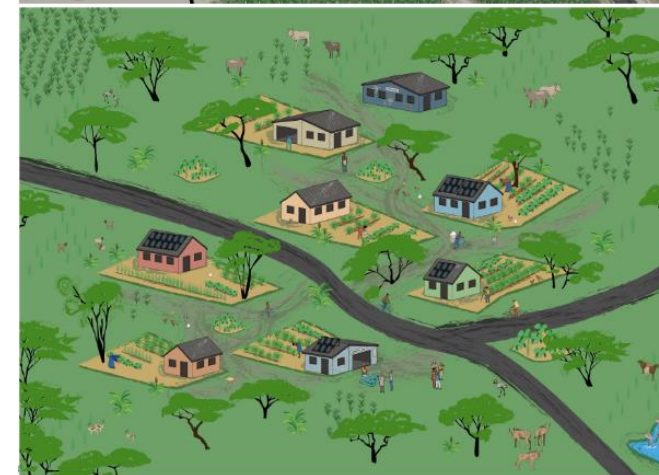
## Green Haven

In this scenario, top-down conservation-driven governance ensures the services and livelihood of few communities obtaining revenues from ecotourism, and strict preservation of wildlife and their habitats.



## Globalization

In this scenario, national governance structure provides good infrastructure and service provision for communities, who through intensification of land-use have good access to markets and trade at the cost of natural and cultural heritage.



## Local communities

In this scenario, local governance of communities enables stable and self-sustainable livelihoods through agropastoral sustenance opportunities from natural resource use, while conserving natural and cultural heritage.

# <https://africanbioservices.shinyapps.io/LandScape/>

## The Serengeti LandScape

### Settings

Step 1. Which development scenario would you like to visualize?

Business As Usual

Step 2. Would you like to visualize land cover change?

☒ No ☐ Yes (go to Step 3)

Step 3. Choose your development scenario for comparison:

Business As Usual



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Programme funded by EU - grant agreement No 641918

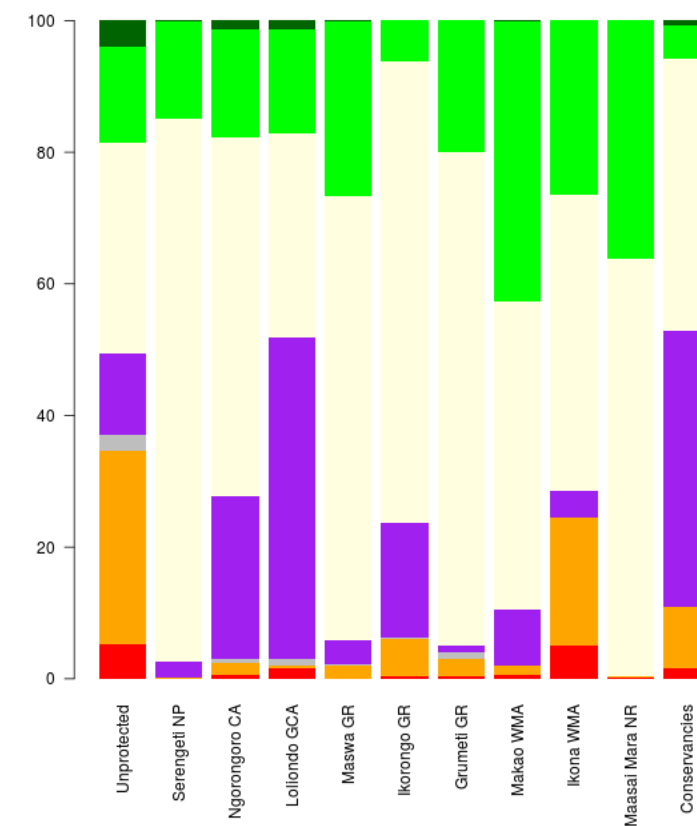
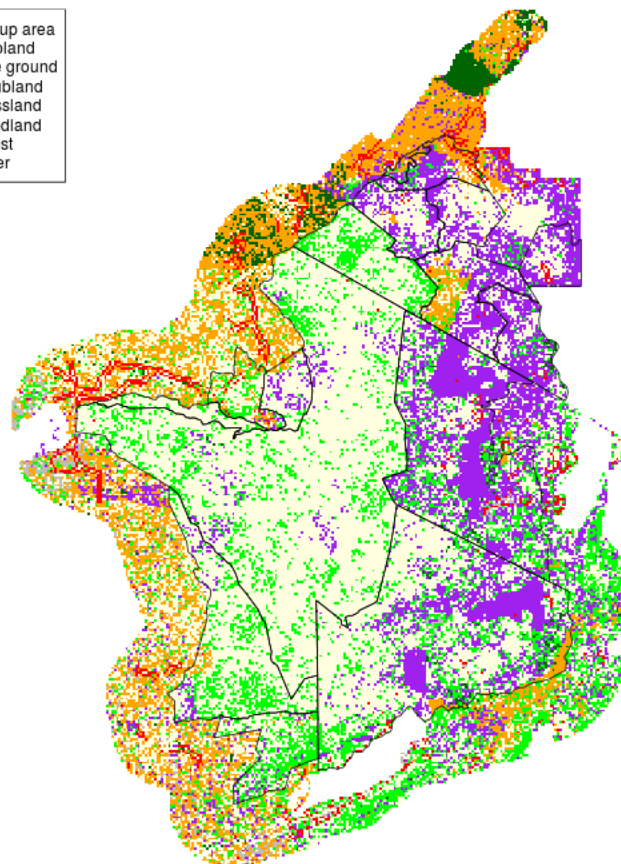
Information

Land cover

Welfare

Integrity

Future land cover distribution for Business As Usual





# Business As Usual vs Downward Spiral

## The Serengeti LandScape

### Settings

Step 1. Which development scenario would you like to visualize?

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☐ No ☒ Yes (go to Step 3)

Step 3. Choose your development scenario for comparison:

Downward Spiral

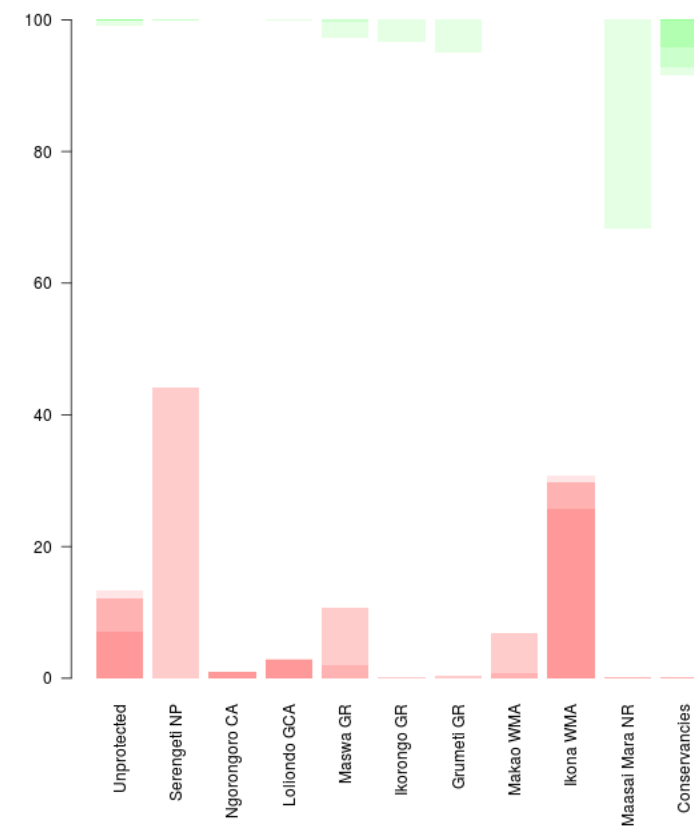
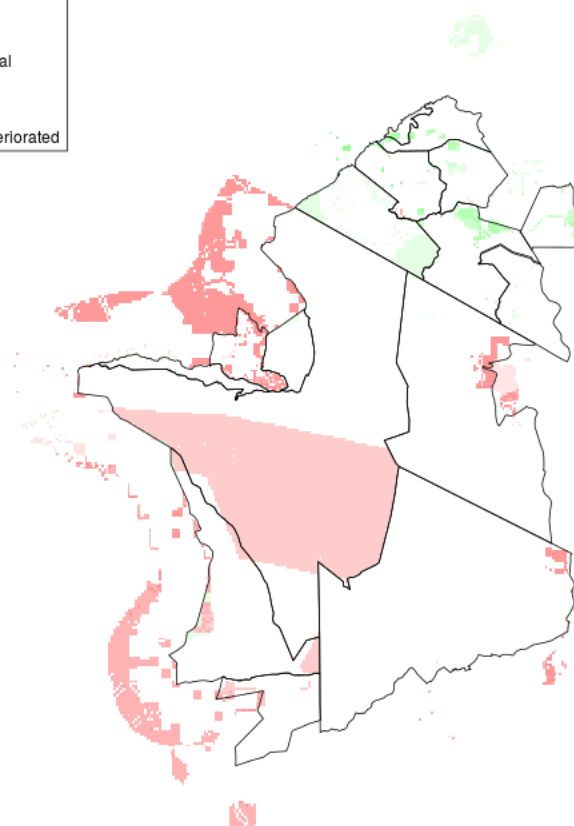
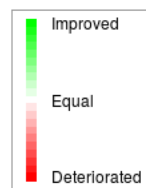


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Information Land cover Welfare Integrity

Change in future welfare between Business As Usual and Downward Spiral



# Business As Usual vs Globalisation

## The Serengeti LandScape

### Settings

Step 1. Which development scenario would you like to visualize?

Business As Usual

Step 2. Would you like to visualize land cover change?

☐ No ☒ Yes (go to Step 3)

Step 3. Choose your development scenario for comparison:

Globalization

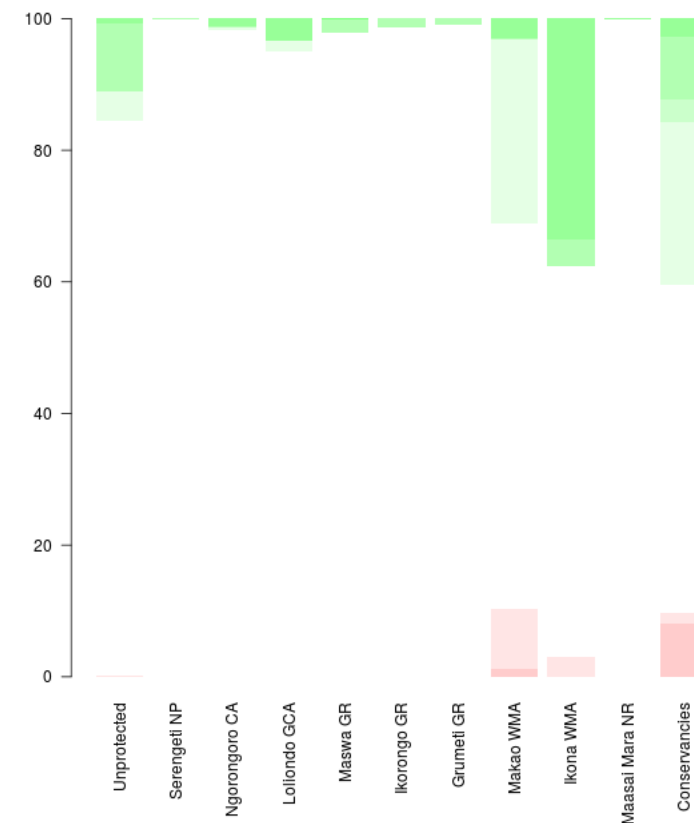
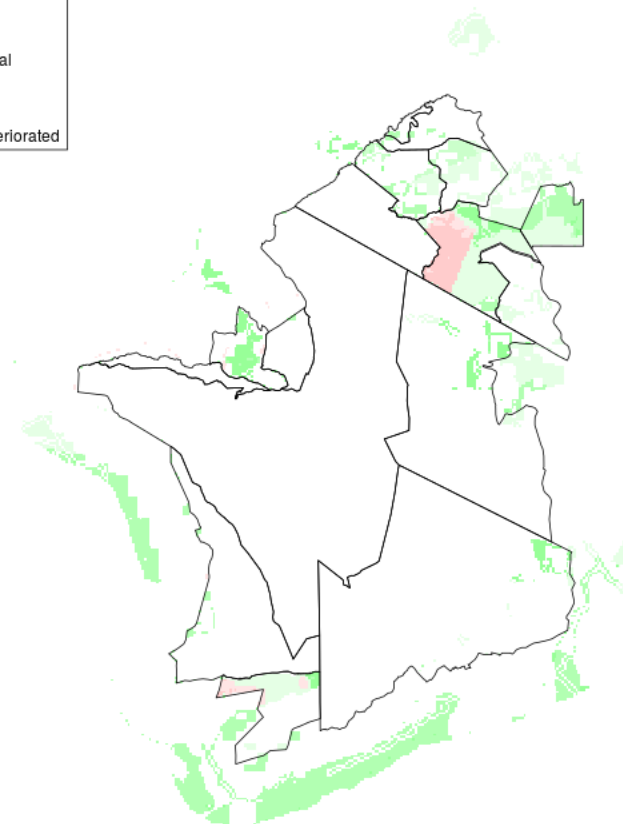
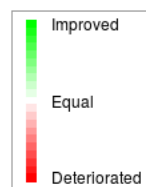


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Information Land cover Welfare Integrity

Change in future welfare between Business As Usual and Globalization





# Business As Usual vs Green Haven

## The Serengeti LandScape

### Settings

Step 1. Which development scenario would you like to visualize?

Business As Usual

Step 2. Would you like to visualize land cover change?

☐ No ☒ Yes (go to Step 3)

Step 3. Choose your development scenario for comparison:

Green Haven

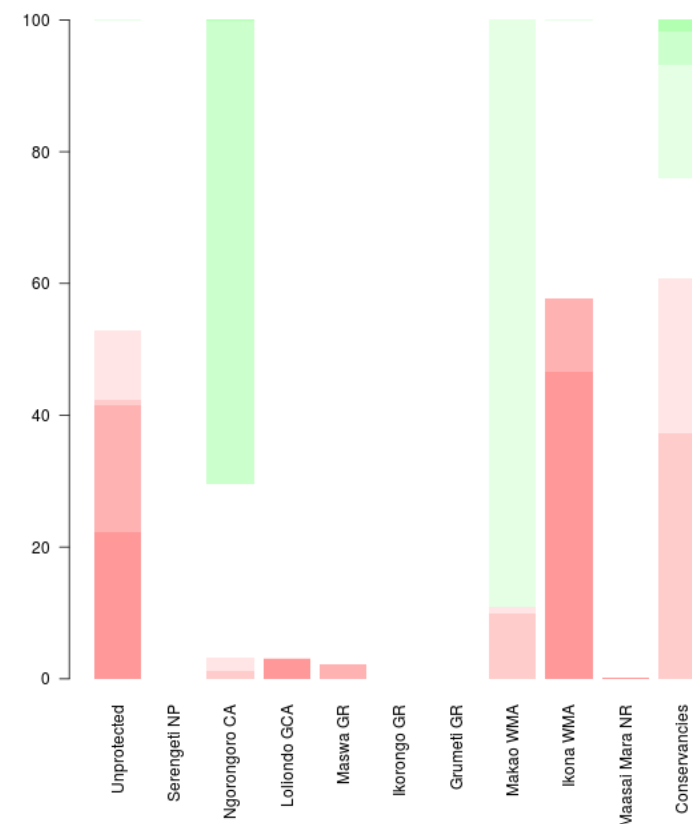
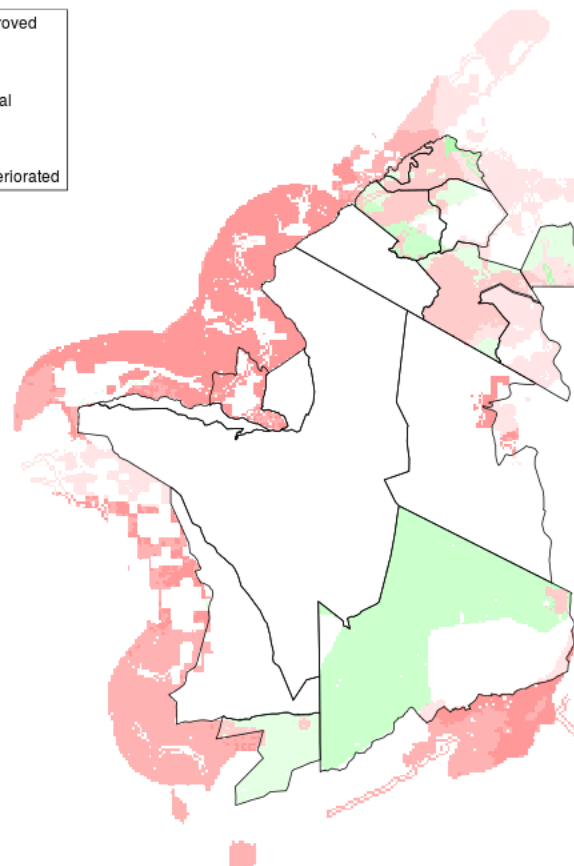
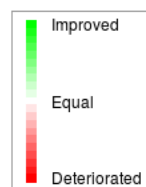


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Information Land cover Welfare Integrity

Change in future welfare between Business As Usual and Green Haven



# Business As Usual vs Local Communities

## The Serengeti LandScape

### Settings

Step 1. Which development scenario would you like to visualize?

Business As Usual ▼

Step 2. Would you like to visualize land cover change?

☐ No ☒ Yes (go to Step 3)

Step 3. Choose your development scenario for comparison:

Local Communities ▼



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Information Land cover Welfare Integrity

Change in future welfare between Business As Usual and Local Communities

