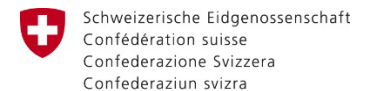


# Woody Weeds and Woody Weeds *Plus*

Urs Schaffner (CABI) and Albrecht Ehrensperger (CDE)



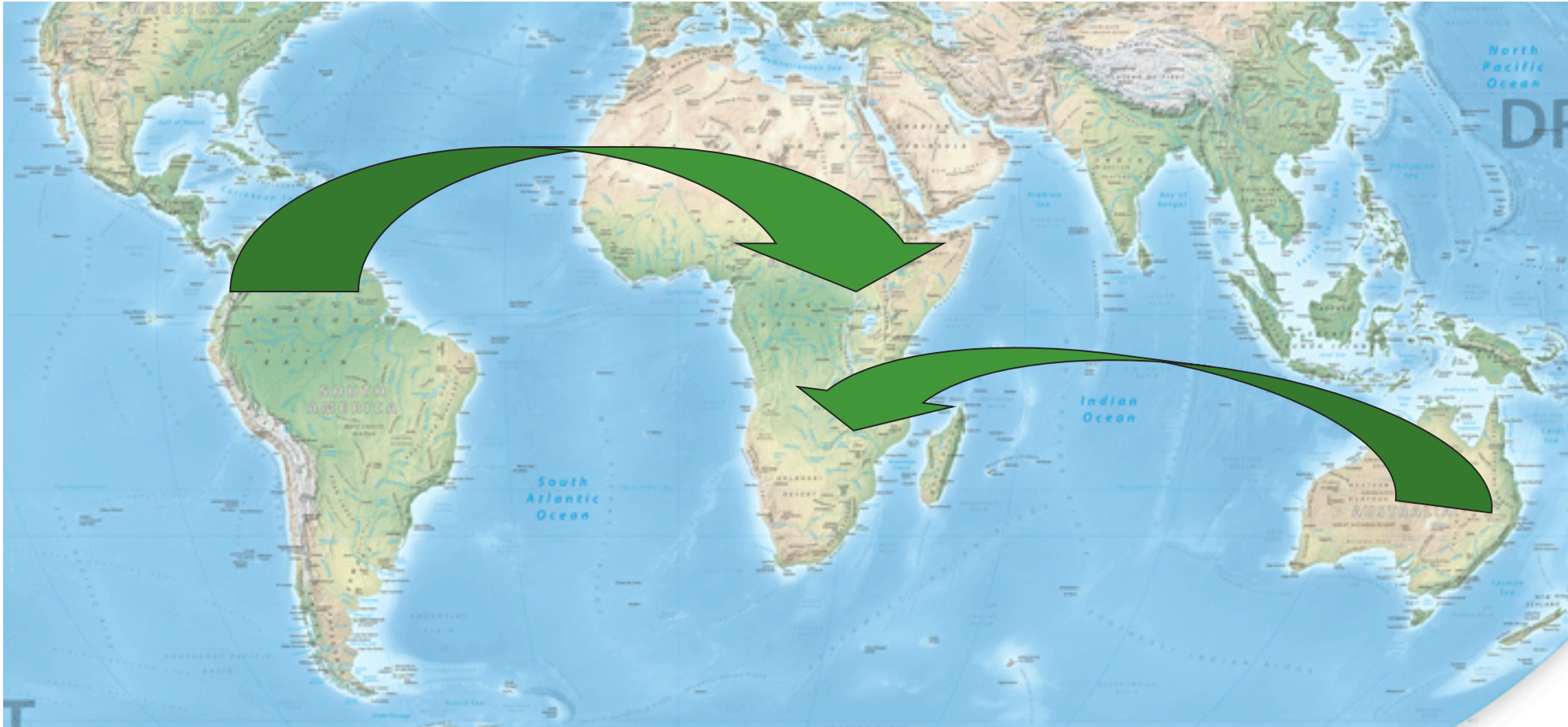
Funded by:



Swiss Agency for Development  
and Cooperation SDC



# Invasive non-native plant species



- More than 2,000 trees and shrubs have been introduced into Africa
- Some 200 of these species are considered to be invasive in Africa



# Invasive non-native plant species



*Prosopis juliflora*

non-native, invasive

---



*Opuntia* spp.



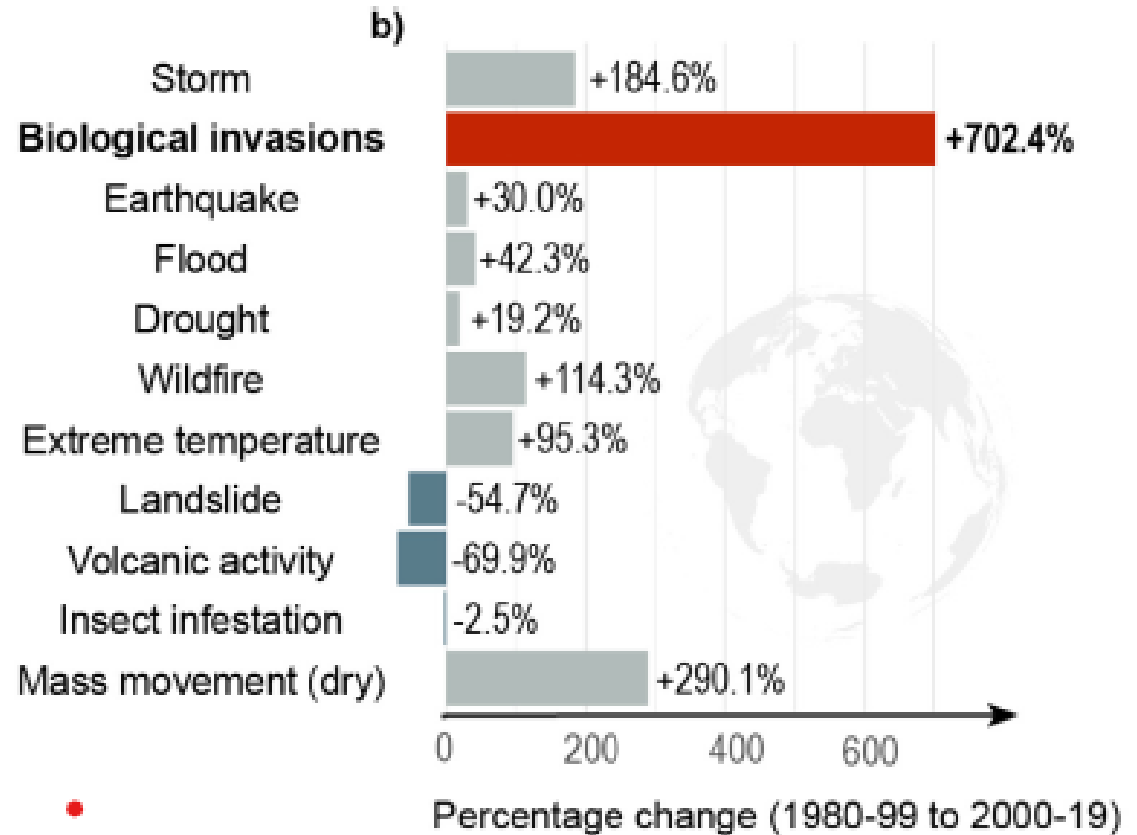
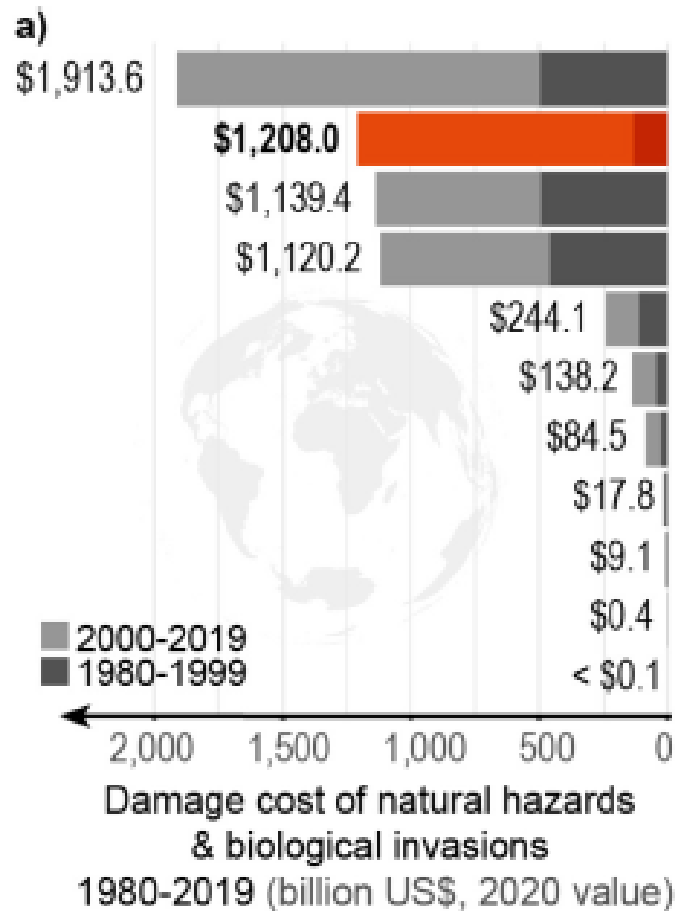
*Acacia reficiens*

Native, problematic

---



# Costs of invasive non-native species





# Woody invasive alien species in Eastern Africa

Assessing and mitigating their impacts on ecosystems and rural livelihoods

## The *Woody Weeds* project

Understanding the social-ecological impacts of invasive alien trees in eastern Africa to inform management



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## *Prosopis juliflora*

Also known as: *Mathenge, Mrasha, Biscuit Mjinga*

- Native to Latin America
- Different *Prosopis* spp. introduced in eastern Africa in the 1960s
- Purpose: regreening degraded land, source of charcoal & firewood, fodder for livestock
- Evergreen
- *Prosopis juliflora* has become invasive throughout eastern Africa. To date it has invaded approximately 10 million ha of land

CABI

u<sup>b</sup>  
UNIVERSITÄT  
BERN

PARAMAYA UNIVERSITY  
WATER & LAND RESOURCE CENTRE

University of Idaho  
MICHIGAN STATE UNIVERSITY



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KEFRI

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C·I·B  
DST-NRF Centre of Excellence for Invasion Biology

TANZANIA FORESTRY RESEARCH INSTITUTE  
TAFORI  
SOKOINE UNIVERSITY OF AGRICULTURE  
1984  
AROH NI HAZINA

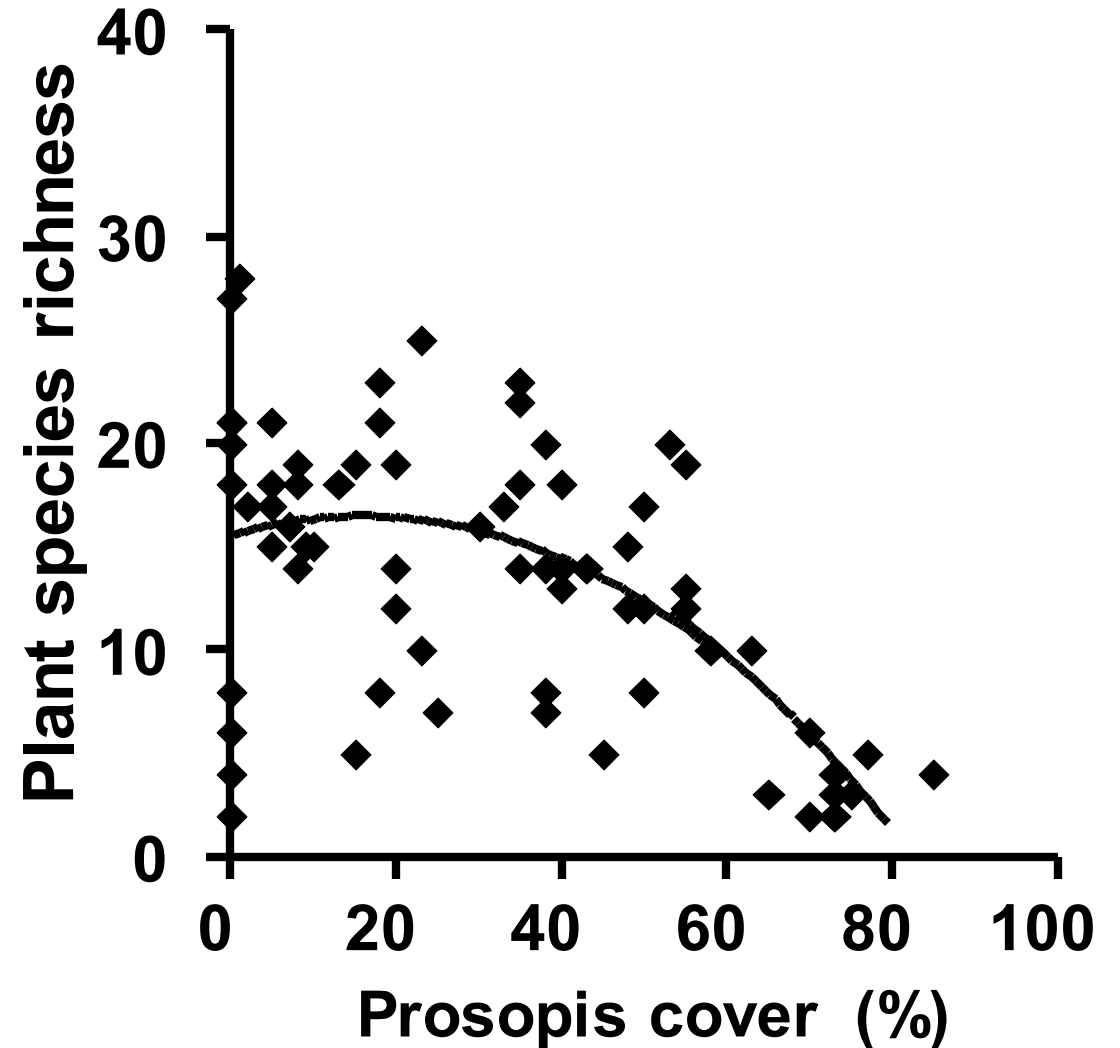


# WW Key Finding 1: Impacts on biodiversity

- *Prosopis* directly reduces biodiversity and herbaceous biomass
- It indirectly affects other parts of the environment, including insects and soil
- *Prosopis* increases densities of insects transmitting human diseases



Linders et al., J Ecol. 2019





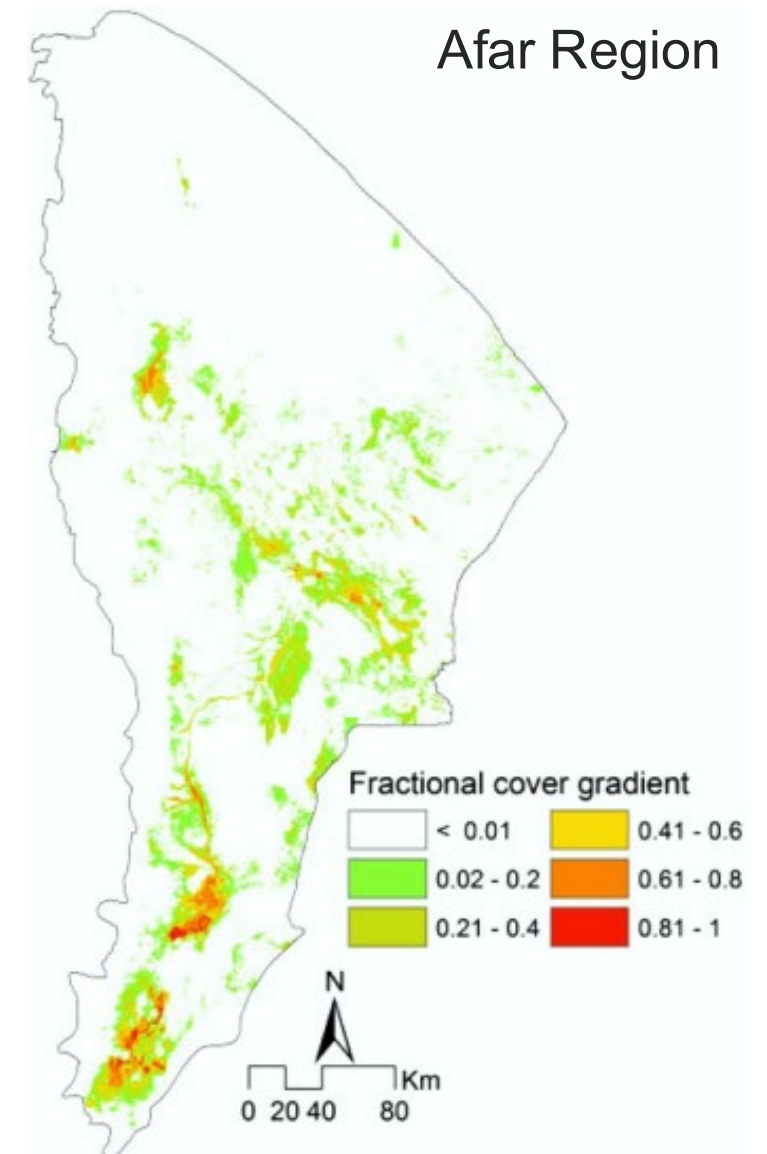


## WW Key Finding 2: Water Consumption

- In Afar, approx. 1.2 million ha were invaded by *Prosopis* within 35 years (14% of region)
- *Prosopis* trees consume up to 36 l / day
- Current water consumption by *Prosopis*: ~ 3 billion m<sup>3</sup>/year (~ 50% of annual rainfall)



Shiferaw et al., Sci. Reports 2019; 2021



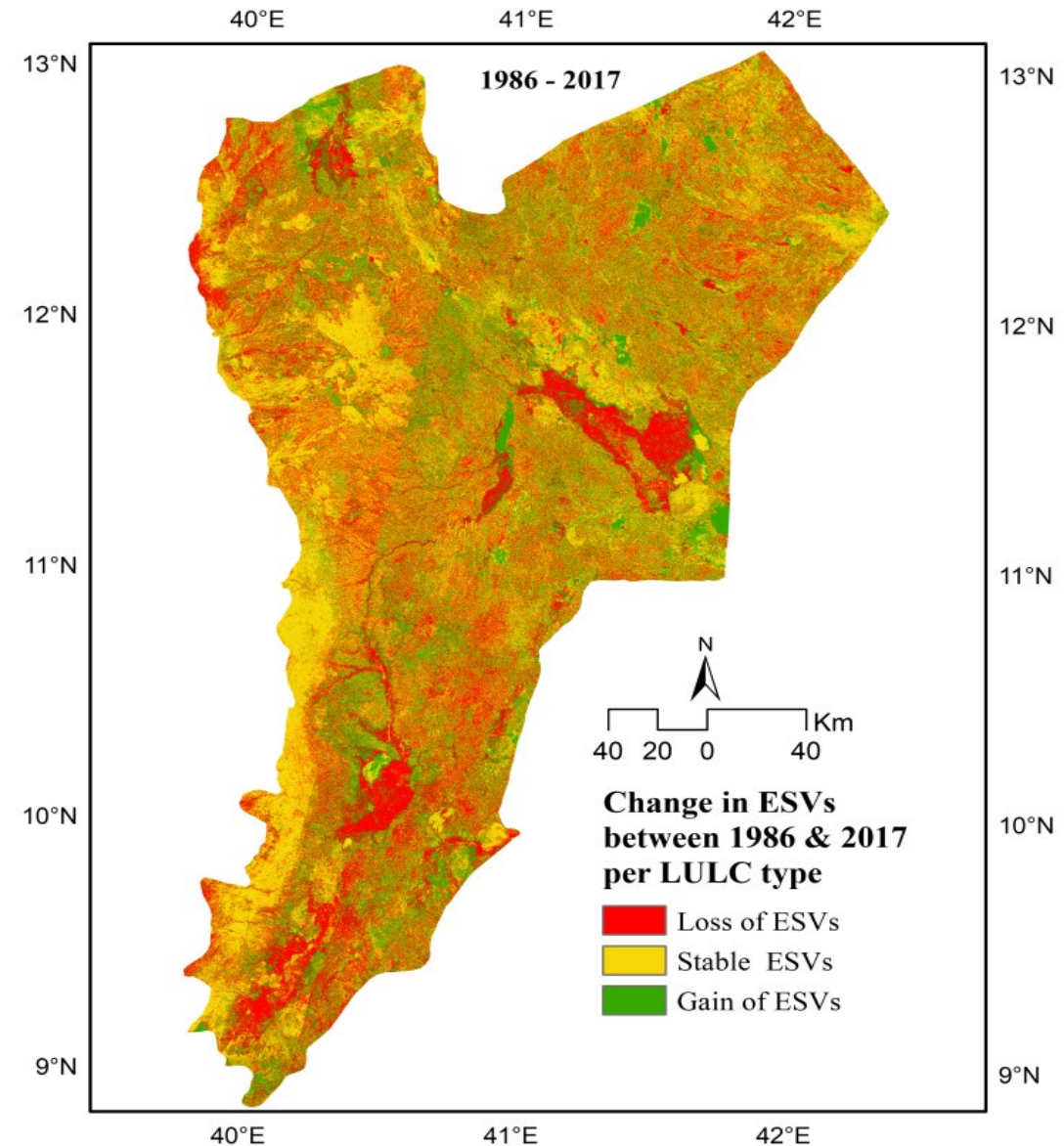


# WW Key Finding 3: Impacts on Ecosystem services

- In the last 30 years, the annual ES values dropped by approx. USD 600 million
- In Afar, 25% of the grasslands have been lost (half of this area is now covered by *Prosopis*)
- The loss of dry-season and drought grazing areas leads to ethnic conflicts



Shiferaw et al., Sci. Tot. Env. 2019





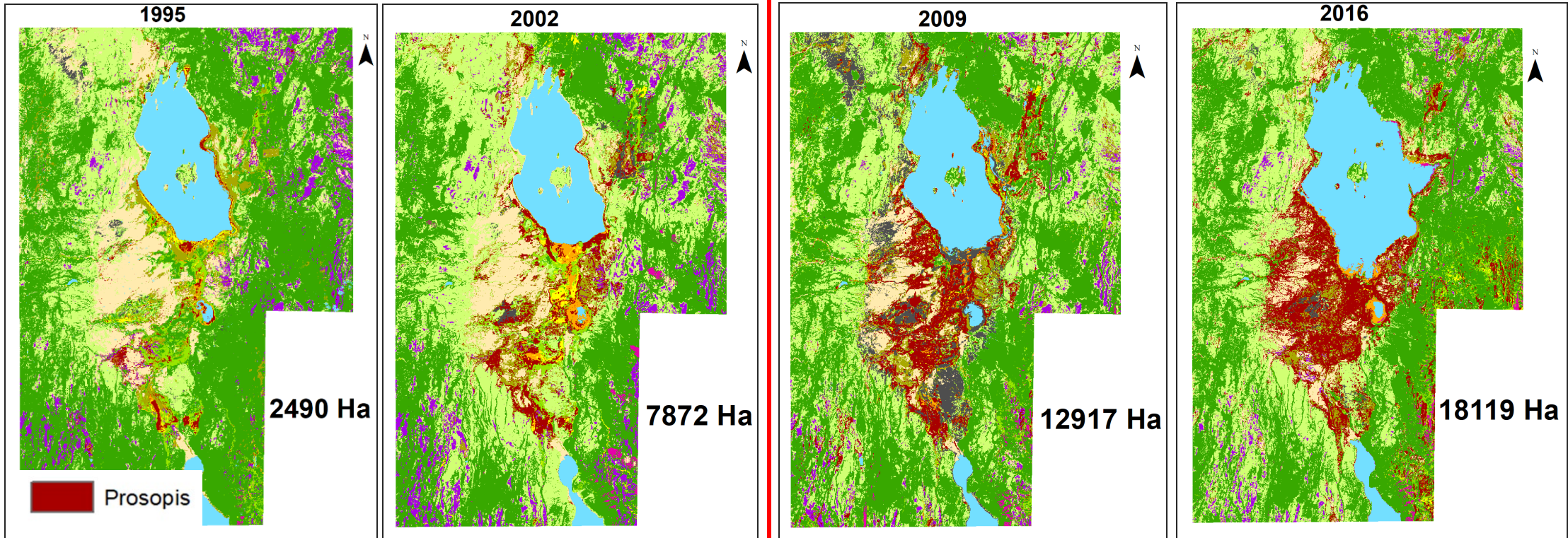
# WW Key Finding 4: Willingness to Manage / Pay

## Average Marginal Willingness-to-Pay

	<b>Afar</b>	<b>Baringo</b>
	USD per year	USD per year
Biodiversity	29.5	22.6
Water	17.1	20.7
Microclimate	5.3	3.8
Mobility	6.0	1.7
Tourism	3.0	-----
<b>Willingness to pay</b> (per household)	<b>49.9</b>	<b>36.9</b>
<b>Annual investment</b> (per region)	<b>6.3 million</b>	<b>4.2 million</b>



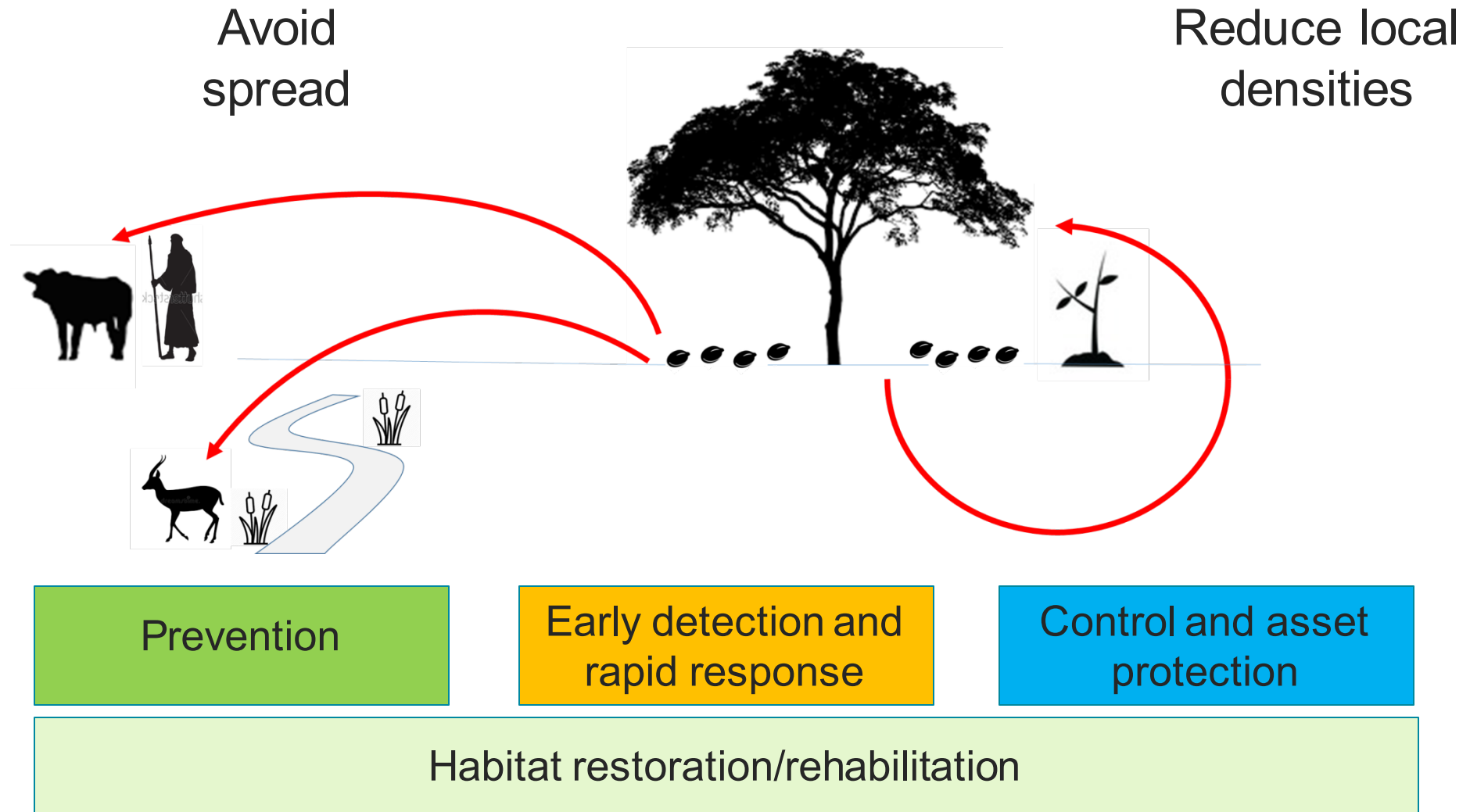
# WW Key Finding 5: Spatial Patterns of Spread



Mbaabu et al., Remote Sens., 2019



# WW Key Finding 6: Adequate Management Objectives

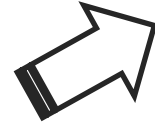




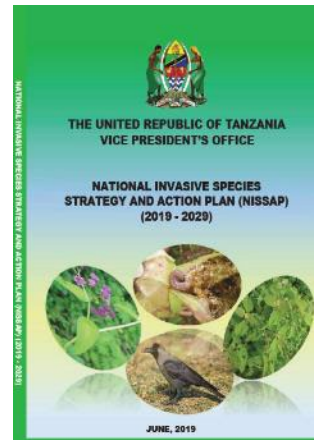
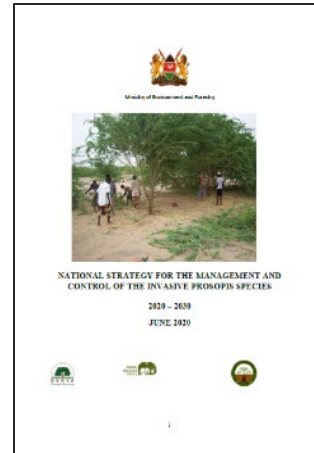
# When Research Findings lead to Policy Response

**Woody Weeds**  
project  
(SNSF, SDC)

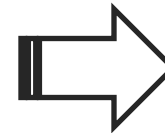
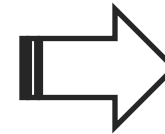
- Impacts of Prosopis on nature and people
- Management options



**National Prosopis Strategy in Kenya**



**National Invasive Species Strategy and Action Plan (NISSAP), Tanzania**



**Woody Weeds +**  
project  
(SDC)

Support Kenyan and Tanzanian institutions in implementing their national strategies.

**Lake Natron**  
project  
(Darwin Initiative)



# Woody Weeds +

## *The Woody Weeds **Plus** Project*

Supporting Kenyan Institutions in implementing the new  
National Prosopis Strategy



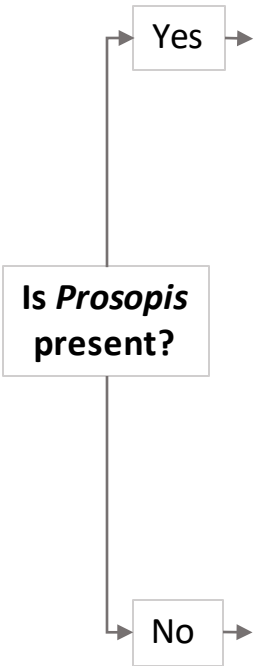


# Spatial logic of *Prosopis* Management

Spatial decision criteria

Objectives

Costs



Control always with density reduction

EDRR always with local eradication

Prevention

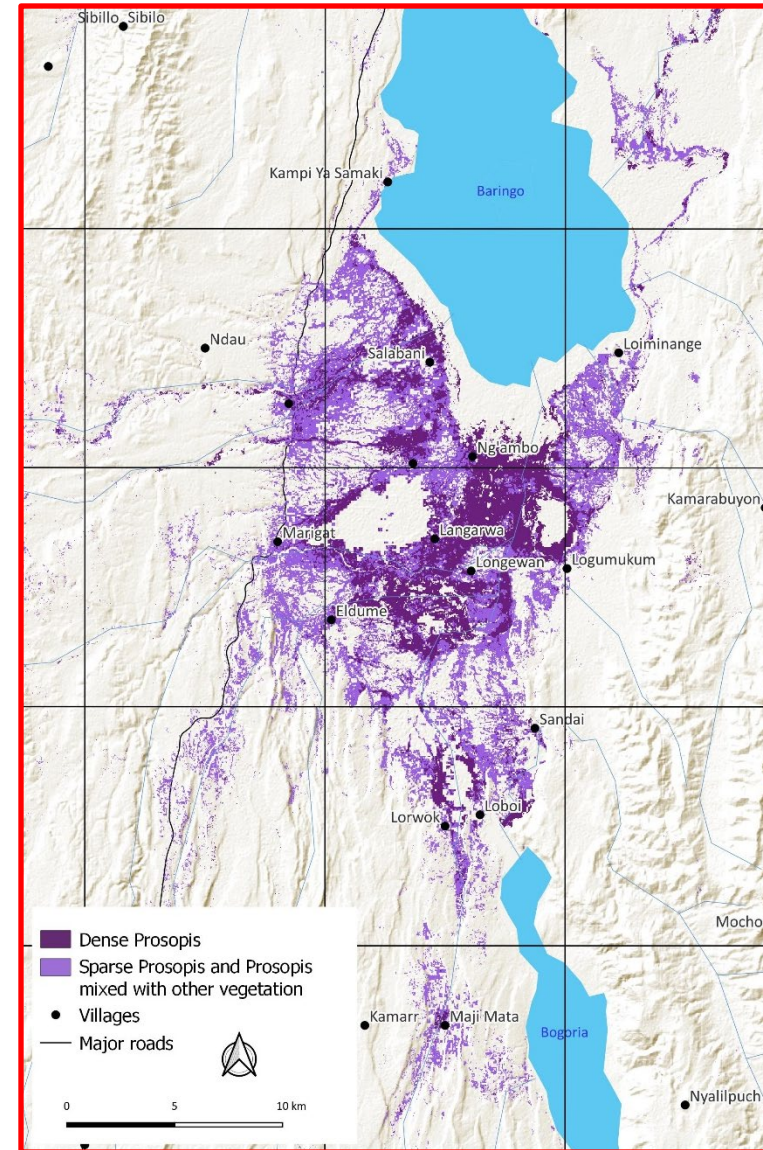
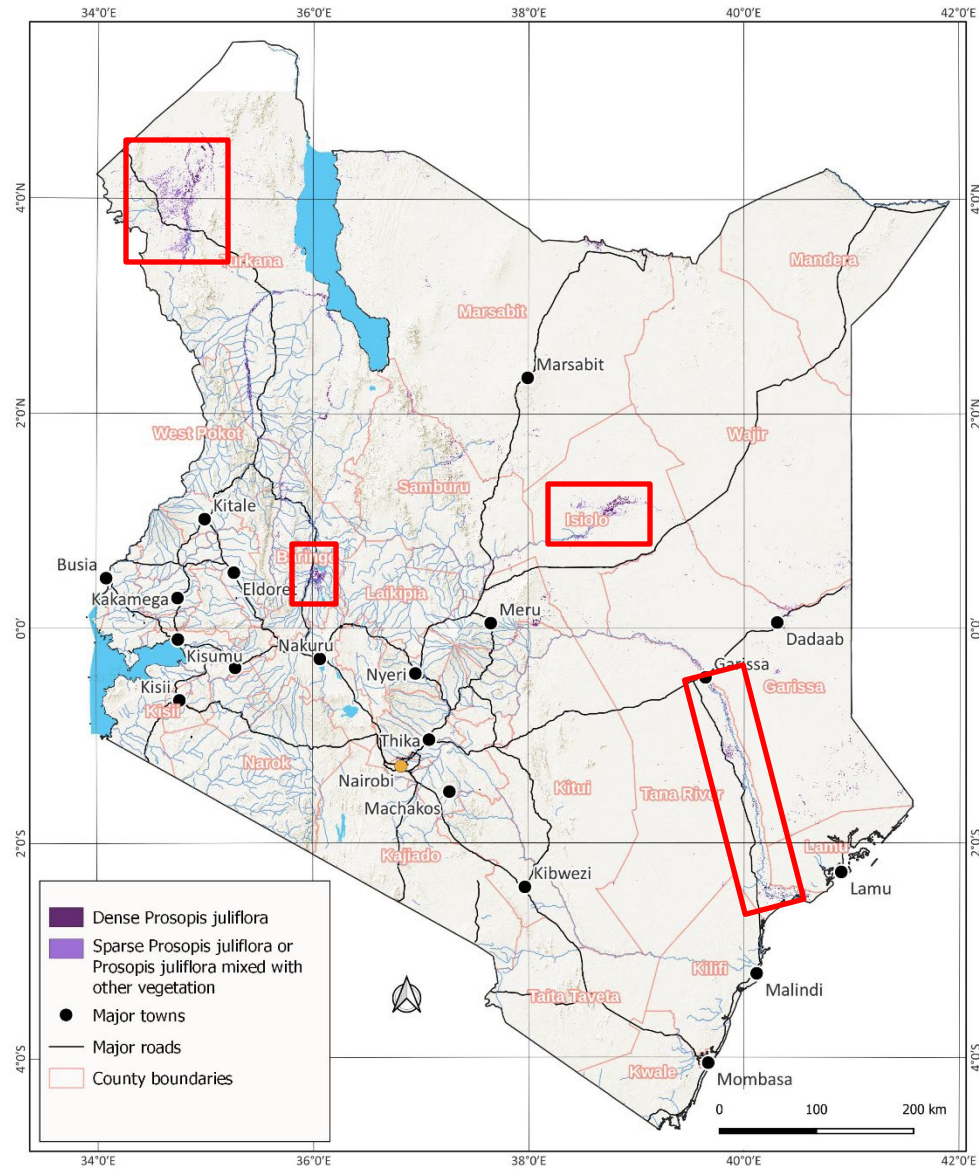
Awareness

Management costs





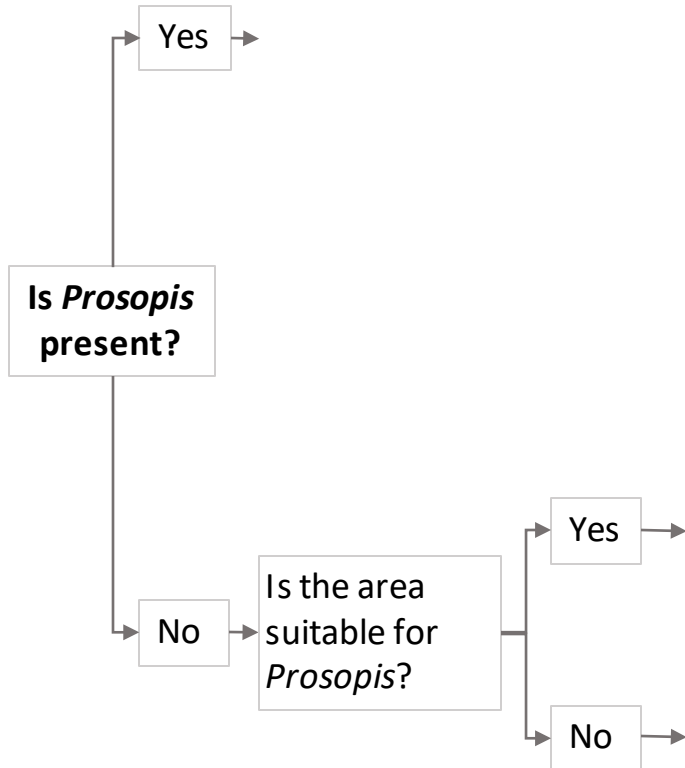
# Occurrence



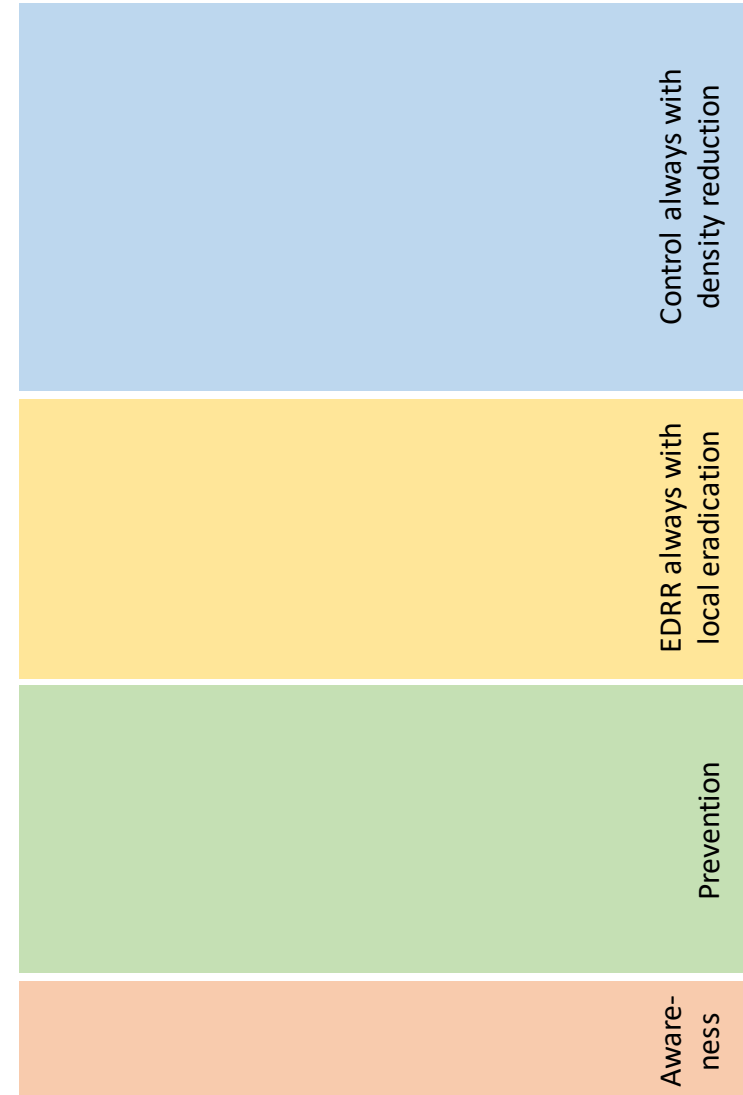


# Spatial logic of *Prosopis* Management

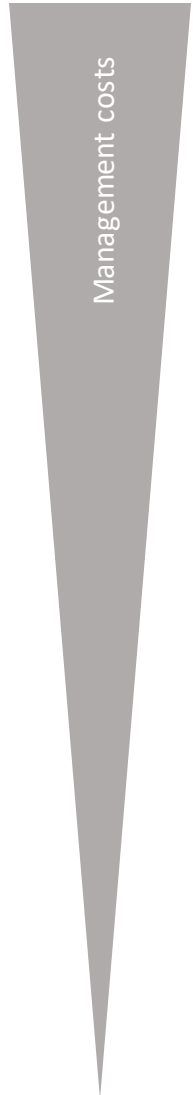
## Spatial decision criteria



## Objectives

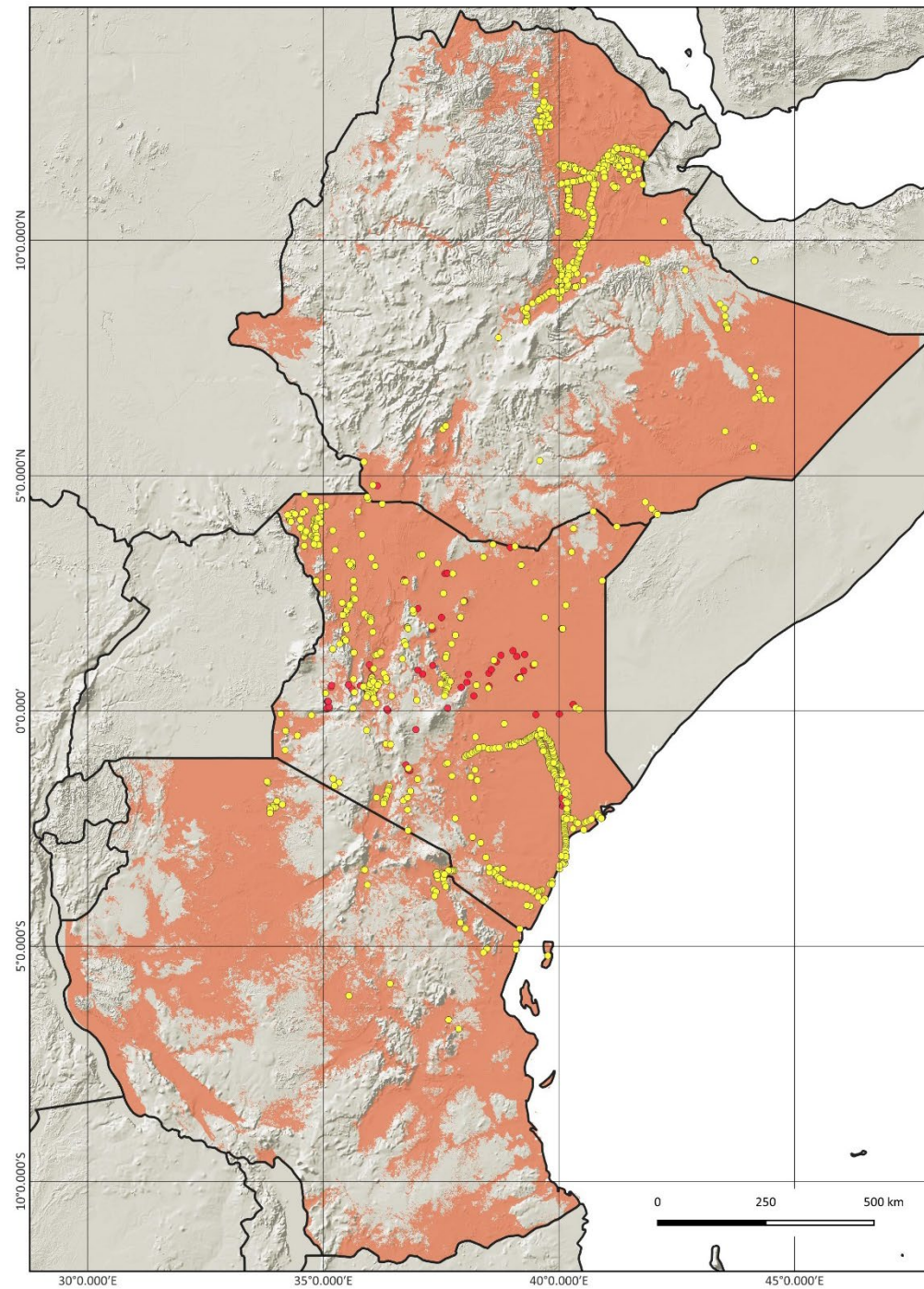


## Costs



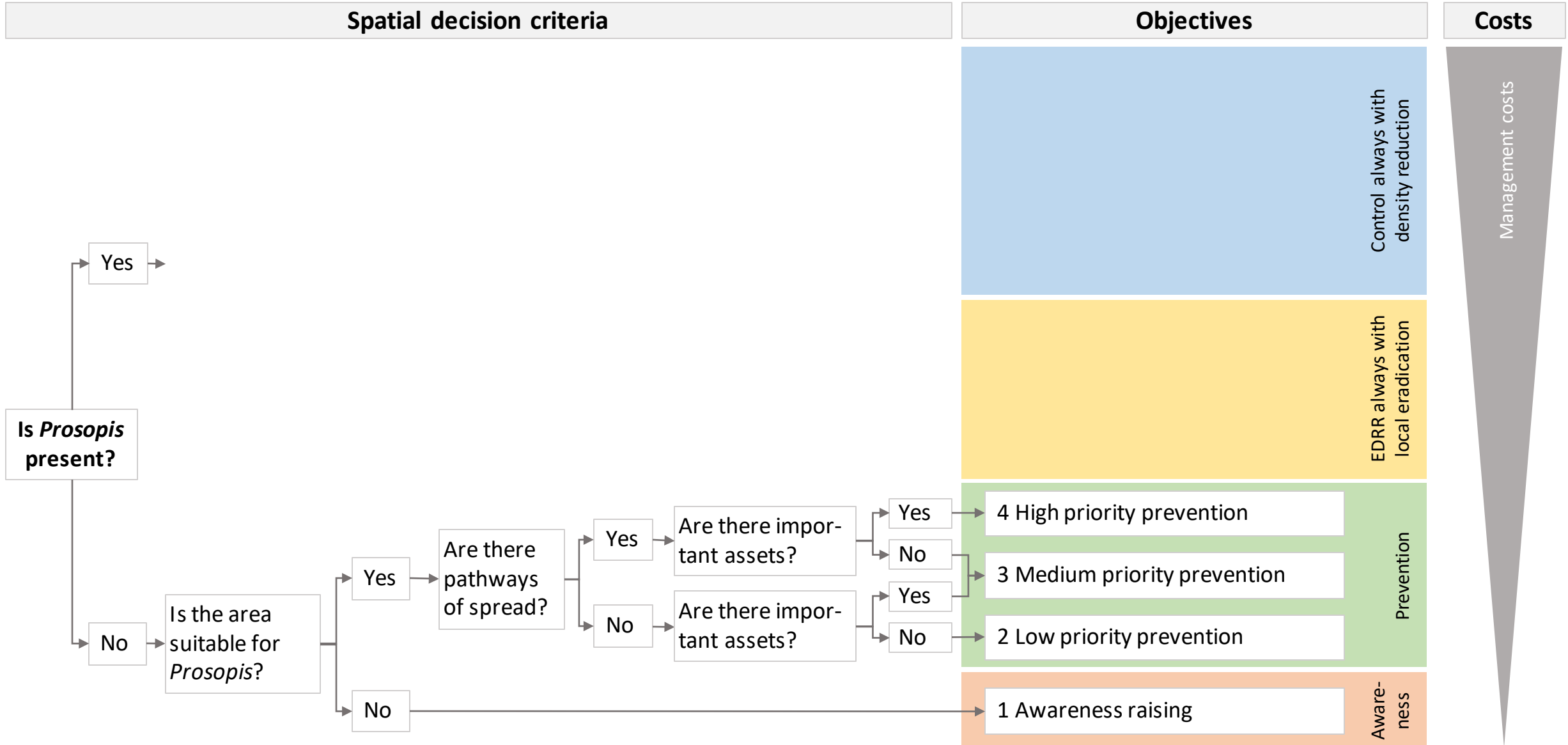


# Suitability





# Spatial logic of *Prosopis* Management



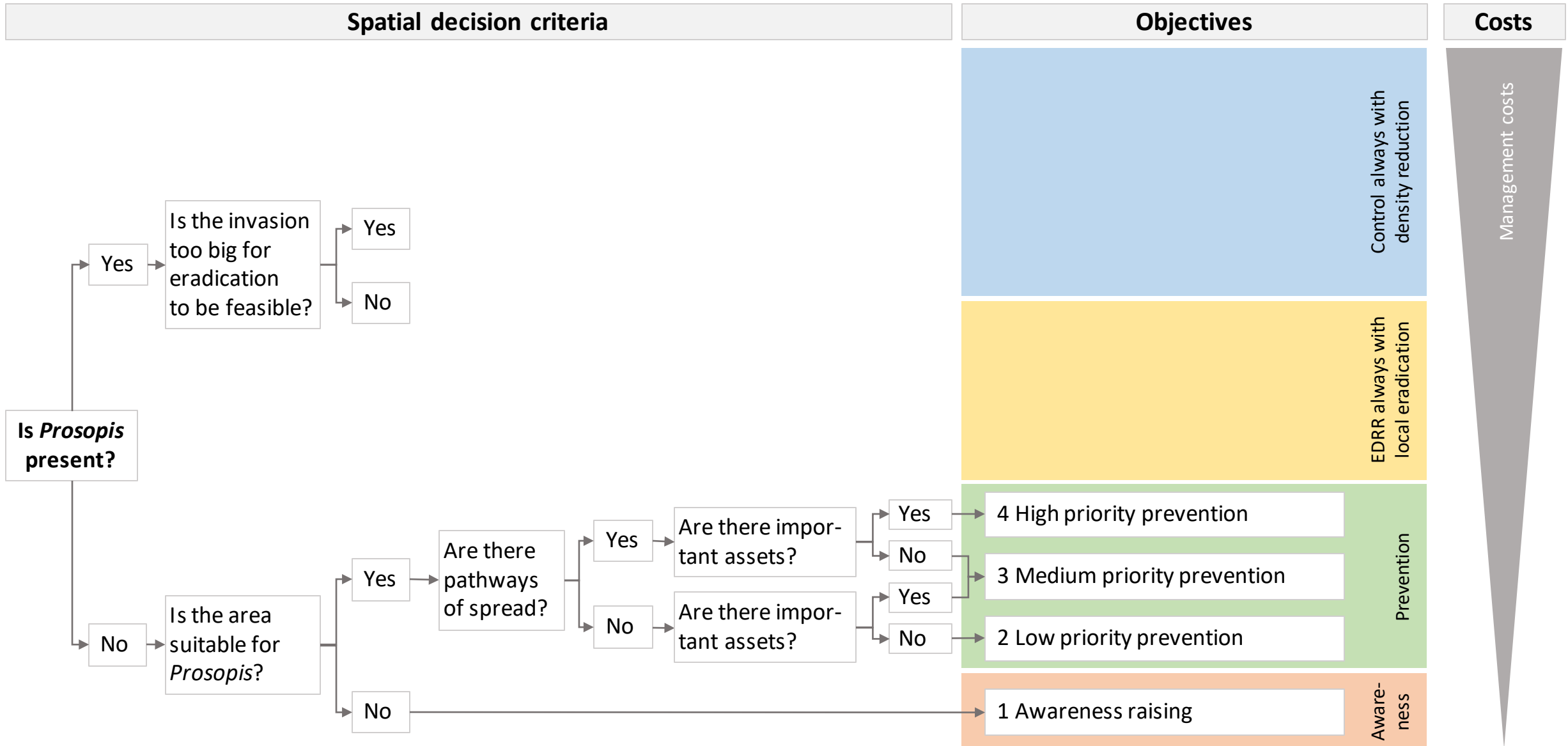


# Pathways of spread Assets





# Spatial logic of *Prosopis* Management



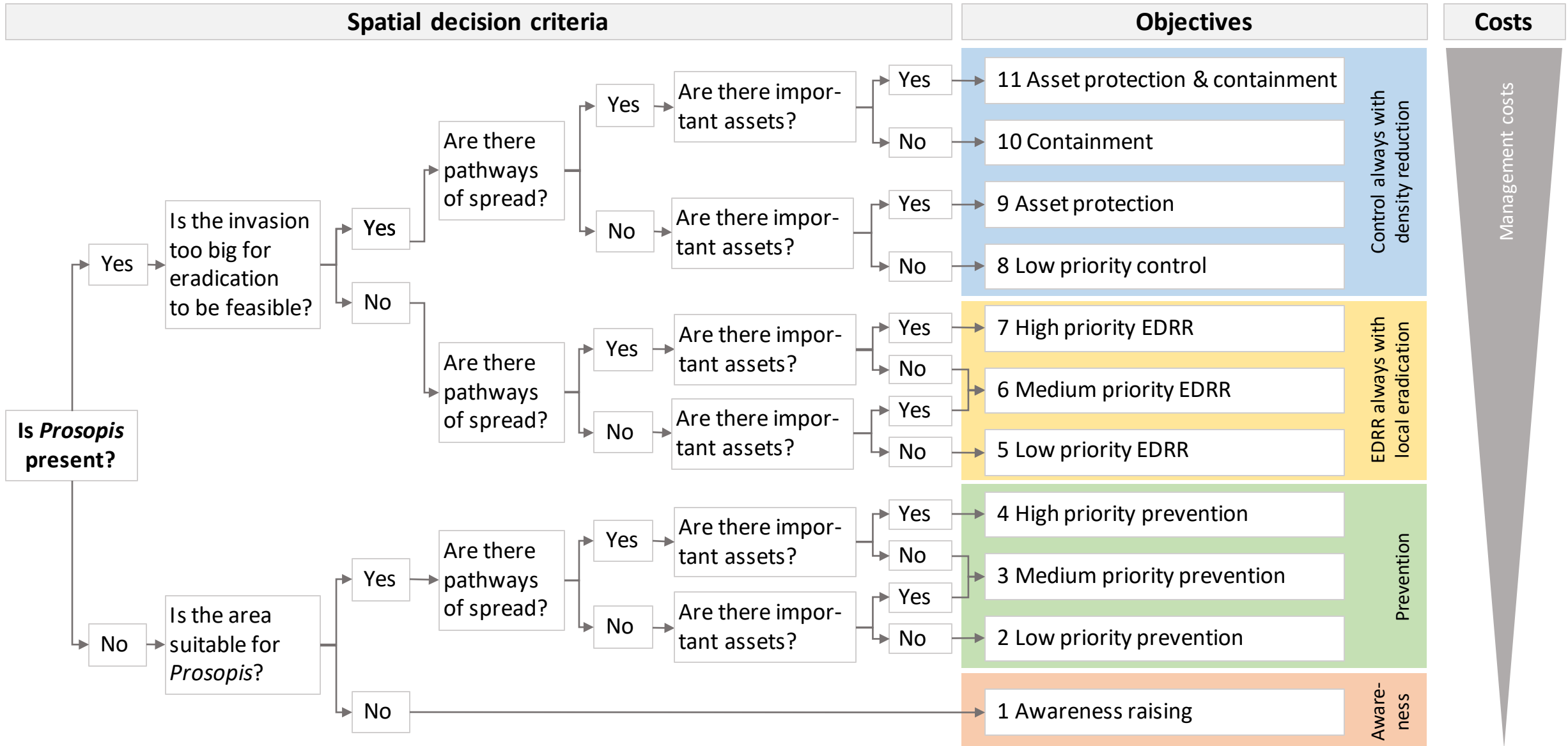


# Extent of invasion





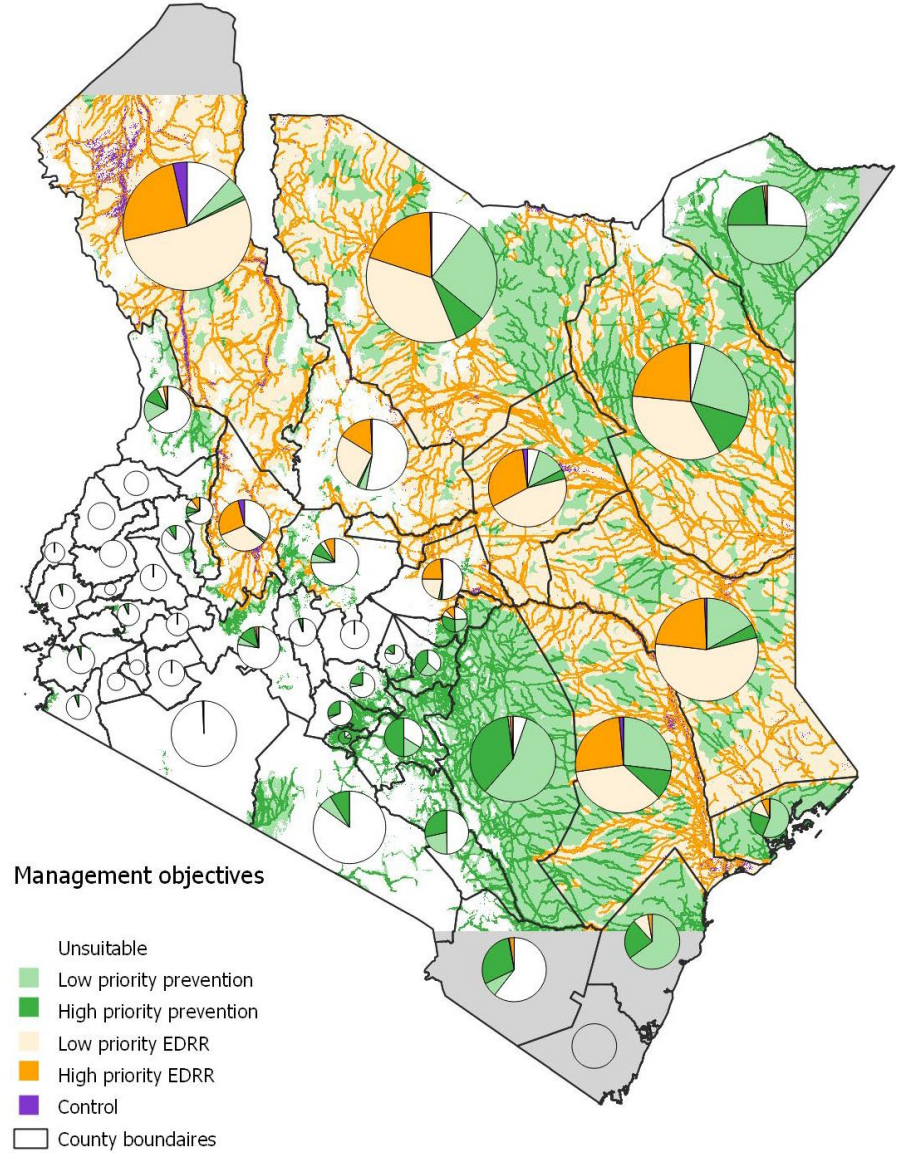
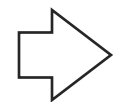
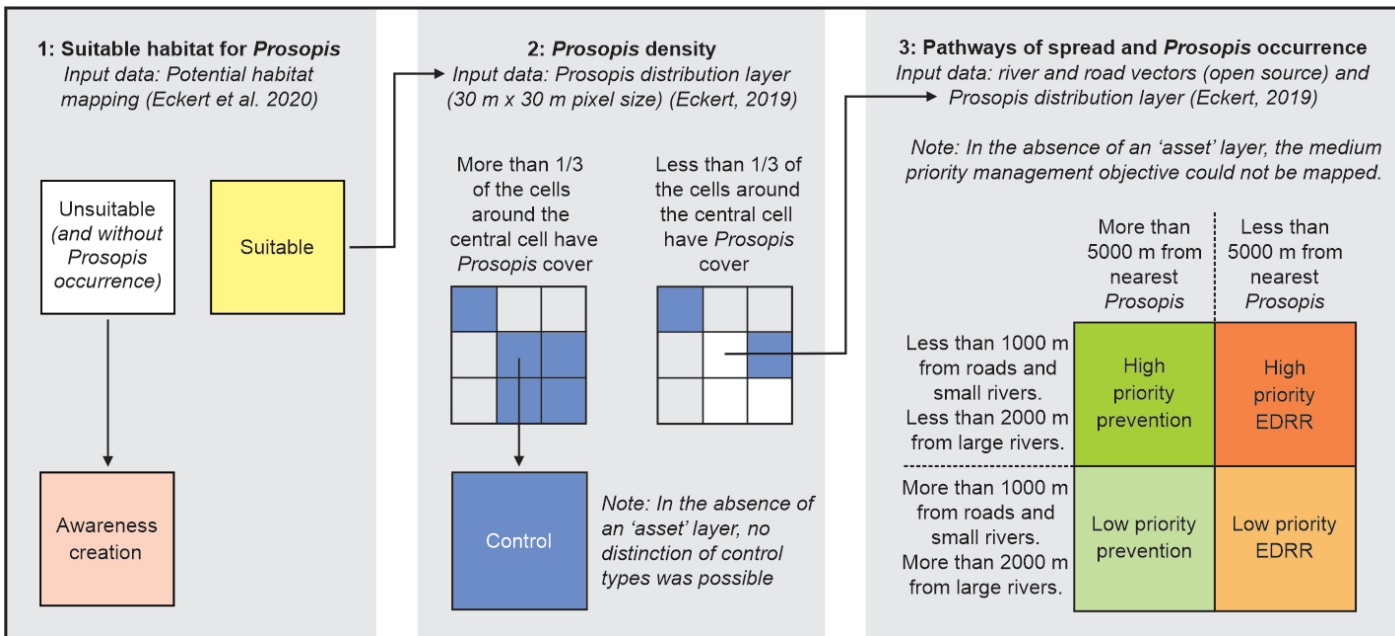
# Spatial logic of *Prosopis* Management



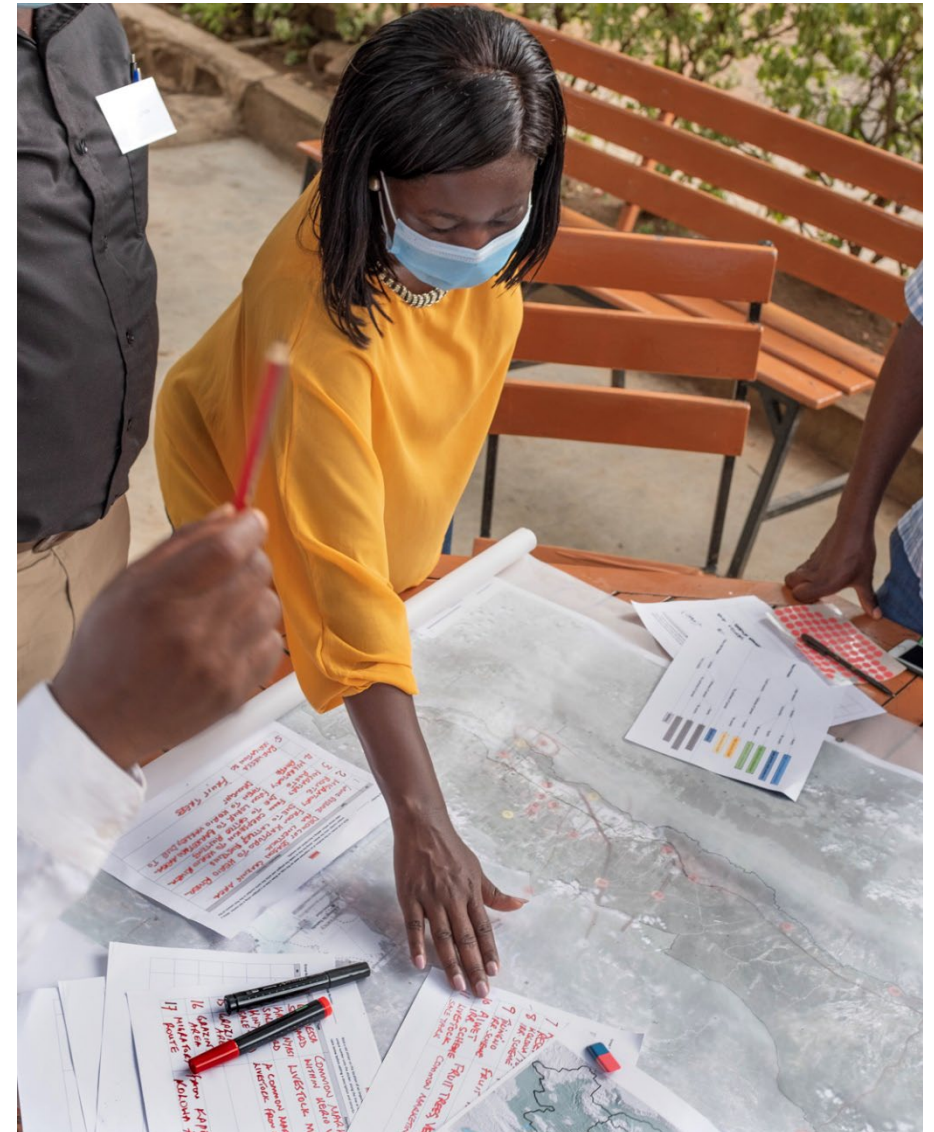


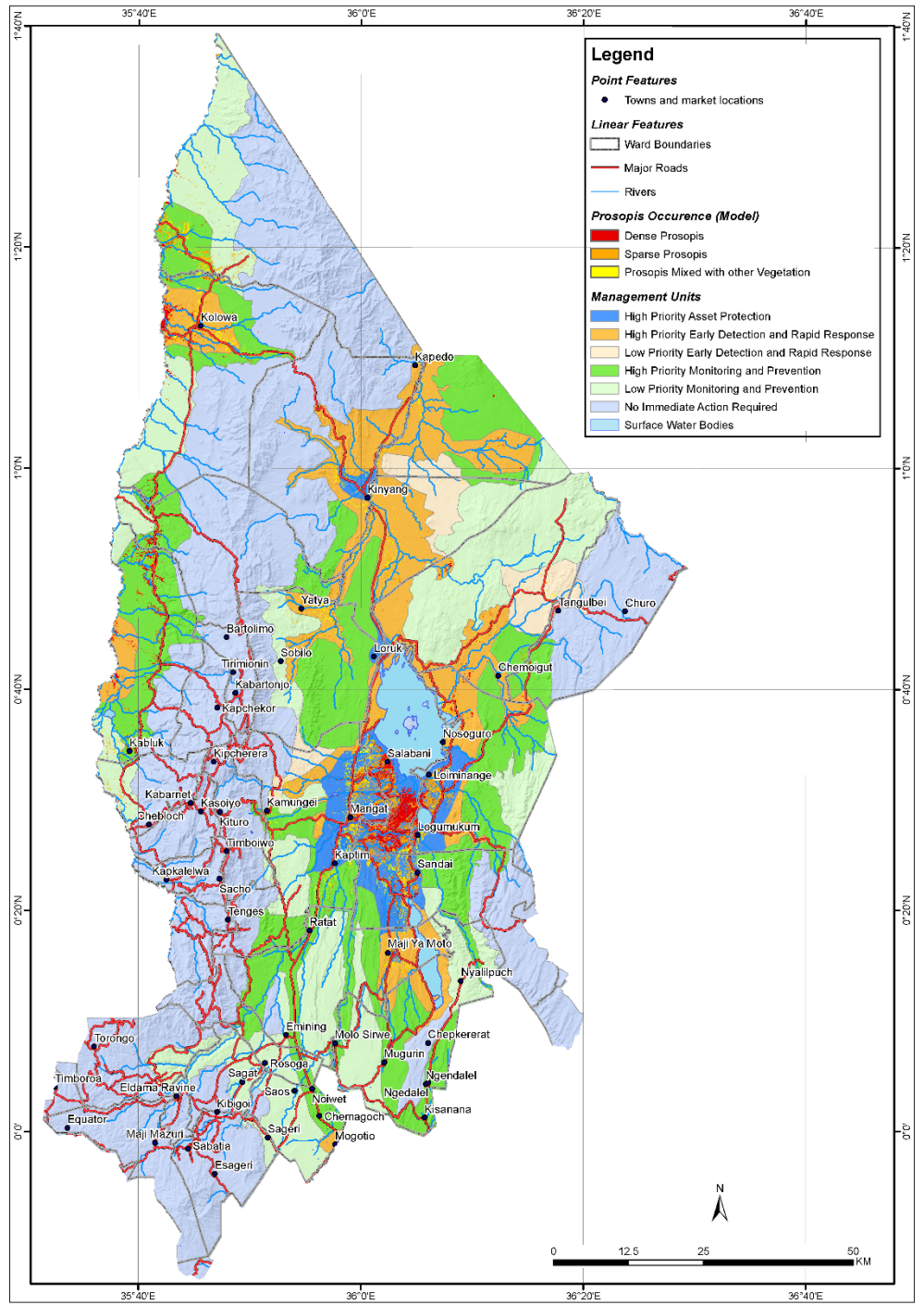


# Automated Elaboration of Management Plan



# Participatory Elaboration of Management Plan

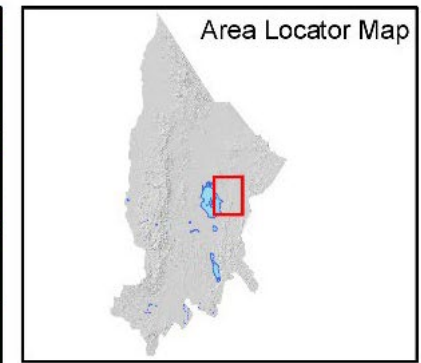
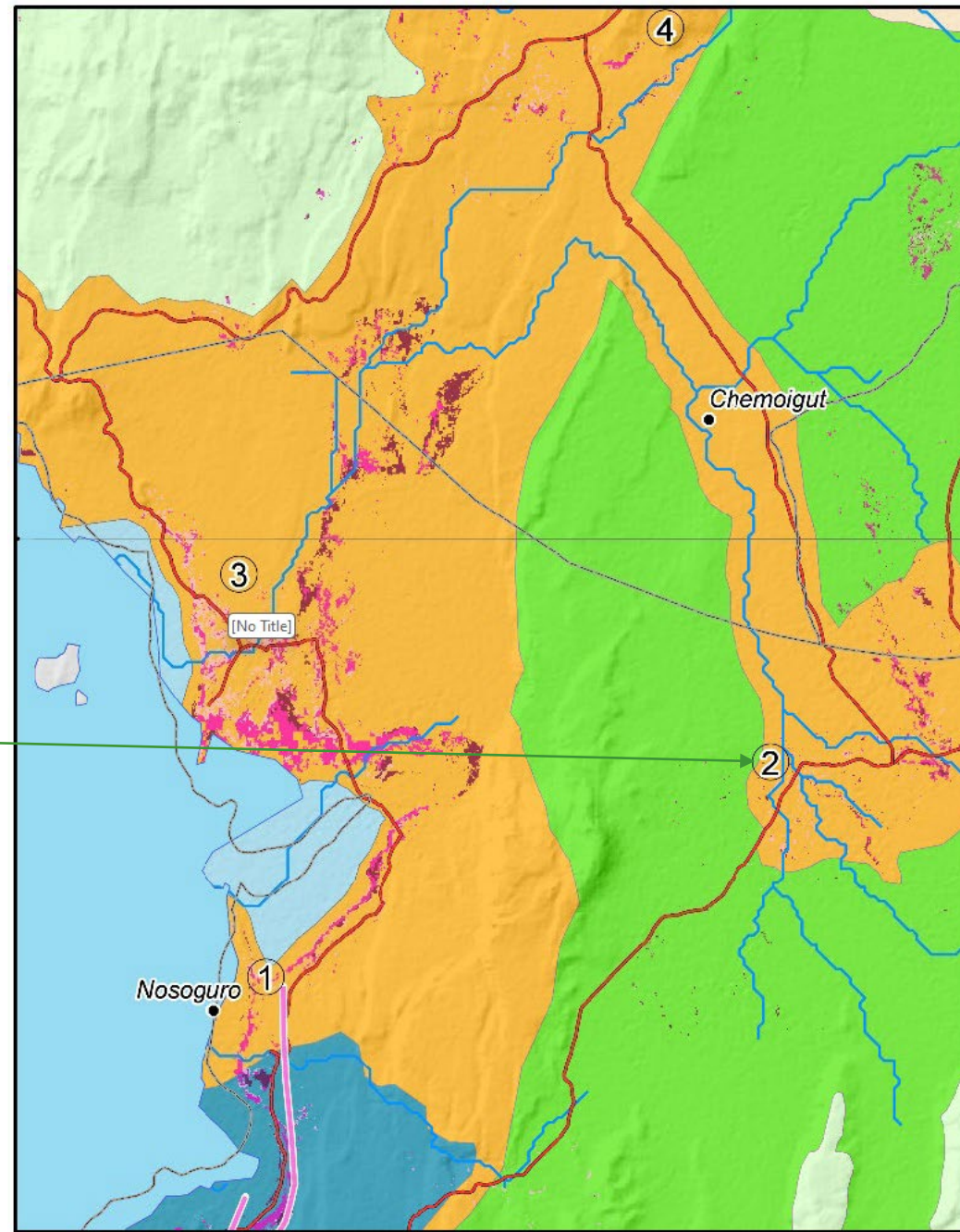




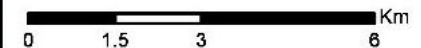
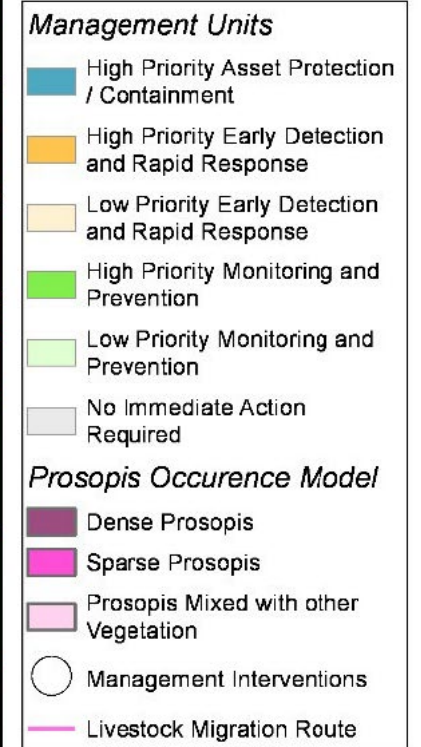


**Table 2:** Proposed activities for the priority area 'Lake Baringo East'.

Nr	Delineation of Priority Areas	Management Objectives	Management Practices and Associated Activities	Detailed Implementation setup (incl. budget estimates)
1.	<u>Noosukuro</u>	High Priority EDRR	<ul style="list-style-type: none"> <li>• Uprooting</li> <li>• Awareness creation</li> <li>• Pasture reseeding</li> <li>• Grazing management</li> </ul>	<ul style="list-style-type: none"> <li>• Continuous surveillance</li> <li>• Human labour</li> <li>• Farm tools</li> <li>• Mobile phone for surveillance</li> </ul>
2.	<u>Mikutani</u>	High Priority EDRR	<ul style="list-style-type: none"> <li>• Uprooting</li> <li>• Awareness creation</li> <li>• Planting indigenous trees</li> </ul>	<ul style="list-style-type: none"> <li>• Continuous surveillance</li> <li>• Human labour</li> </ul>
3.	<u>Rugus</u>	High Priority EDRR	<ul style="list-style-type: none"> <li>• Uprooting</li> <li>• Awareness creation</li> <li>• Pasture reseeding</li> </ul>	<ul style="list-style-type: none"> <li>• Continuous surveillance</li> <li>• Human labour</li> <li>• Farm tools</li> </ul>
4.	<u>Chepkelacha</u>	High Priority EDRR	<ul style="list-style-type: none"> <li>• Uprooting of a small Prosopis invasion at <u>Chepkelacha</u> centre due to new road connecting <u>Mikutani</u> and <u>Chepkelacha</u></li> </ul>	<ul style="list-style-type: none"> <li>• Community, County government, KFS, KWS</li> </ul>



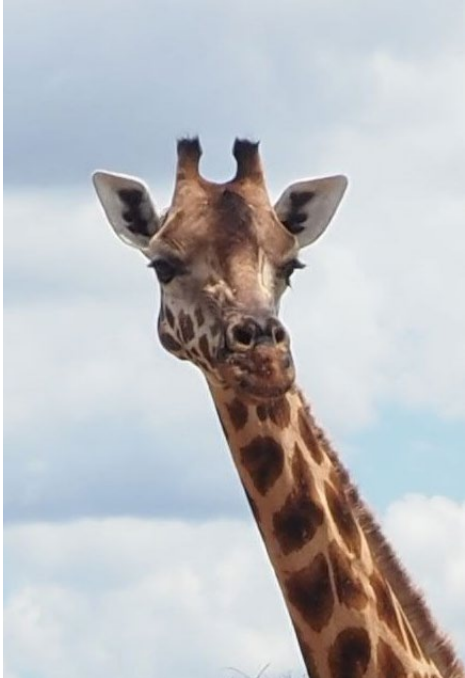
### Lake Baringo East



# Examples of management practices

## RUKO Community Conservancy

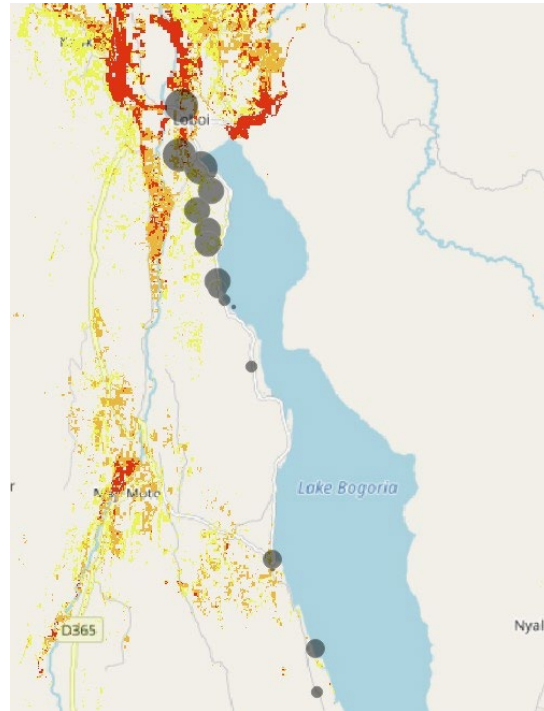
- Board declared *Prosopis* a threat to peace-building process
- Remove established trees and shrubs along shoreline
- Seedlings partly removed using tree poppers



# Examples of management practices

## Lake Bogoria National Reserve

- Close cooperation between CIG members; support from KWS
- Lake Bogoria NR cleared from *Prosopis*
- Surveillance and rapid removal of new invasions





# Thank you

Project website:  
**[www.woodyweeds.org](http://www.woodyweeds.org)**



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