



# Invasive non-native species as drivers of grassland degradation

Urs Schaffner



Leafy spurge in North America

Rich Hansen, USDA APHIS



Gamba grass in Australia

# Invasive plant species in eastern Africa



*Prosopis juliflora*



*Lantana camara*



*Vachellia reficiens*



*Parthenium hysterophorus*



*Opuntia* spp.



*Ipomoea hildebrandtii*

Non-native, alien

Native



*Prosopis juliflora* in Ethiopia

# **Why should we care about invasive species in grasslands?**

# Drivers of global environmental change

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) identified 5 key drivers of biodiversity loss:

- Changes in land use and sea use
- Direct exploitation of natural resources
- Climate change
- Pollution
- Invasion of non-native species



# *Prosopis* changes grassland functioning: Water

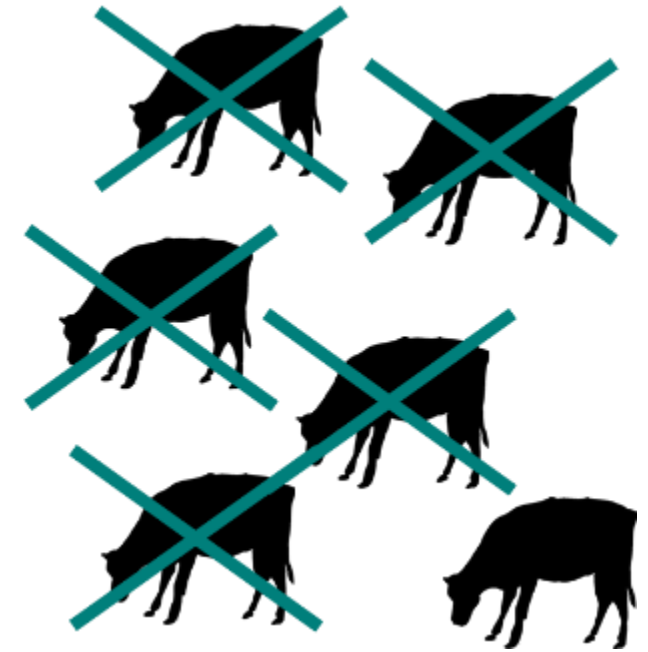
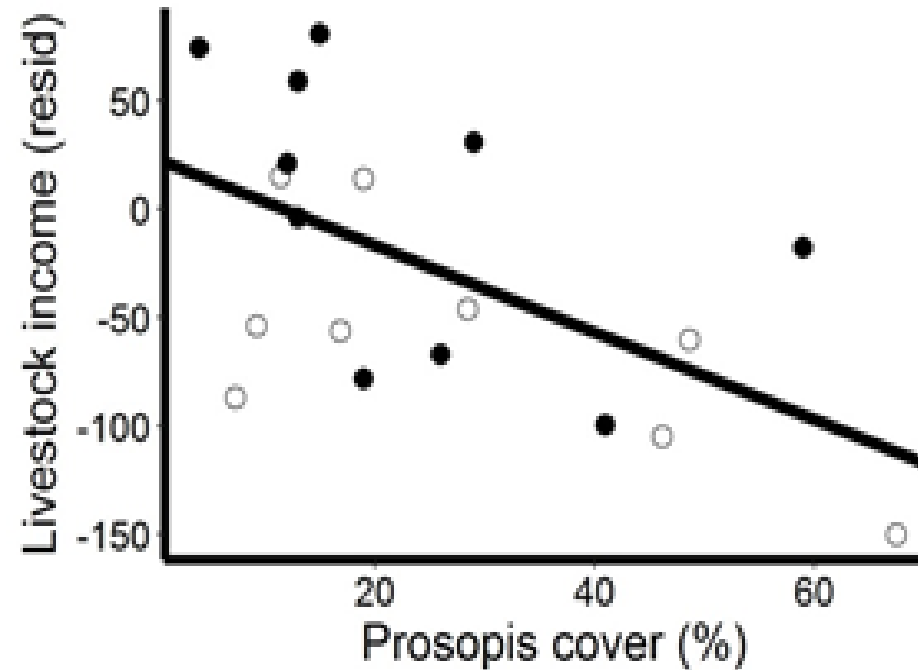
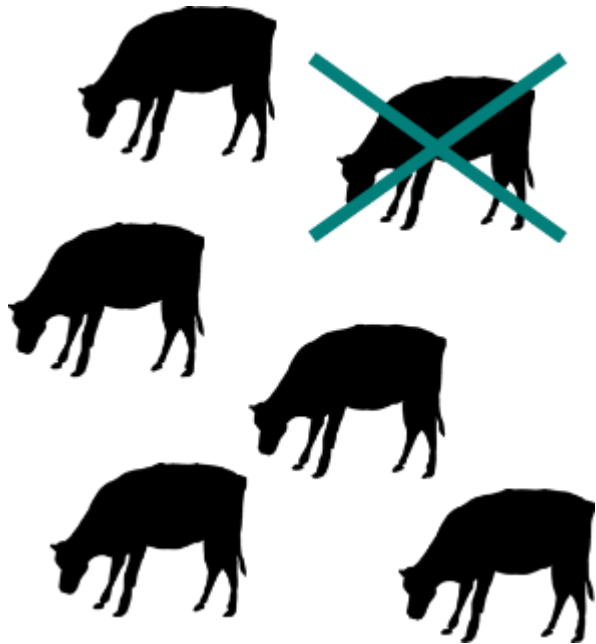
- Water consumption by individual stems: up to 36L per tree per day
- In regions in East Africa with advanced levels of invasion, *Prosopis* consumes 50% of annual rainfall
- *Prosopis* lowers the groundwater table and reduces surface water, and it dries up wetlands
- Thus, *Prosopis* exacerbates the effects of a changing climate



(Shiferaw et al., Sci. Rep. 2021; Tot. Env. 2023)

# *Prosopis* invasion threatens pastoralism

● Baringo County ○ Afar region



- Within 10 years, pastoralists in invaded areas have lost most of their capital
- In densely invaded areas, fodder for livestock lasts for 1-2 months

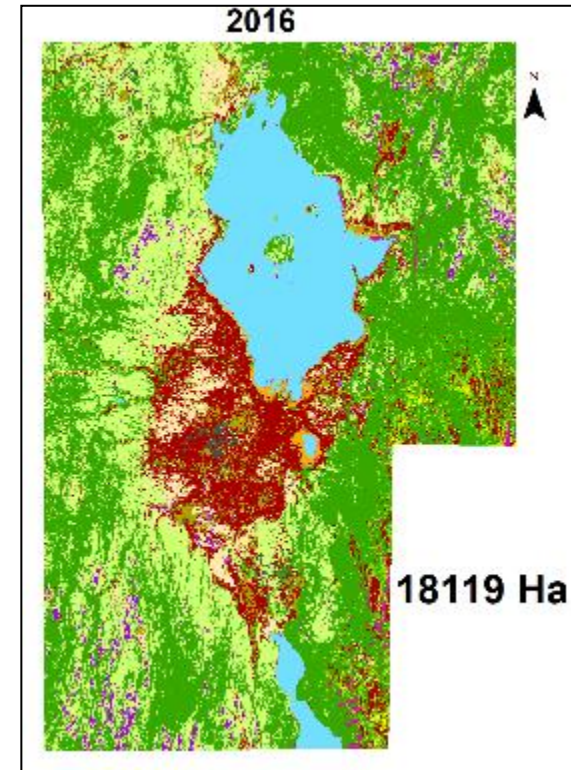
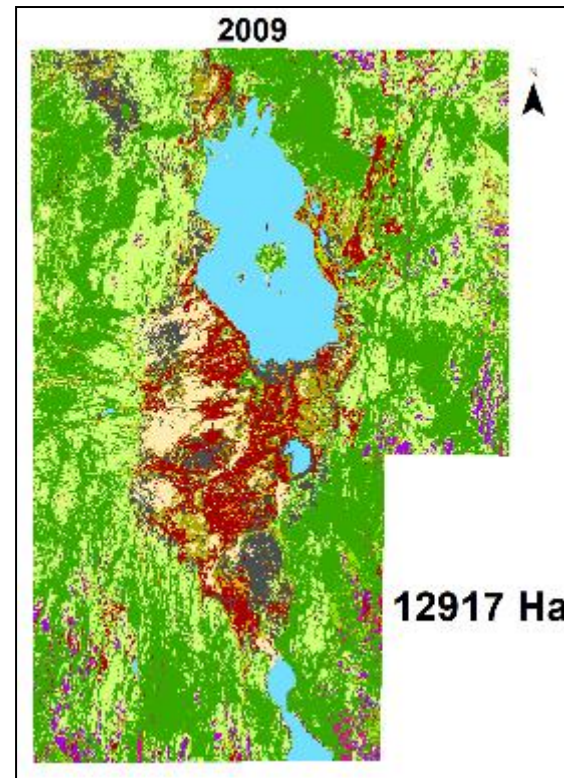
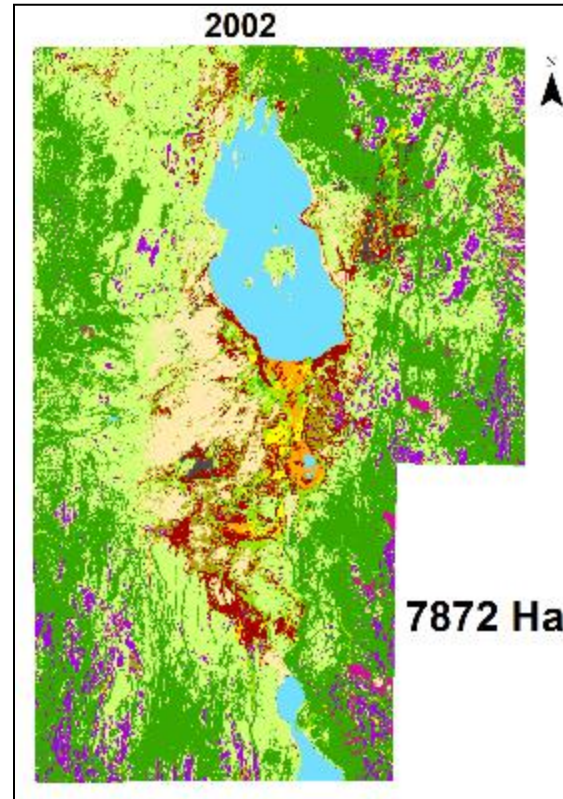
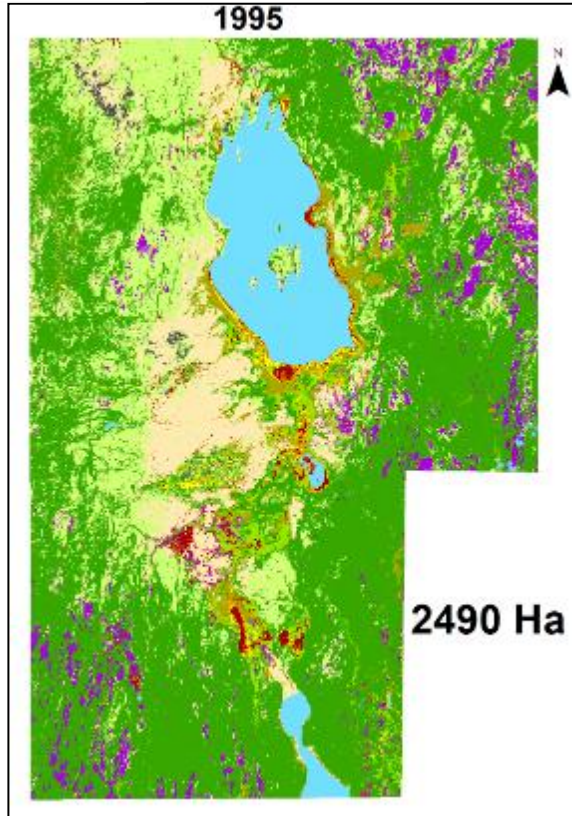



# *Prosopis* puts landscape management at risk



Baringo County,  
Kenya

Control through utilization



 Prosopis

# *Prosopis* puts landscape management at risk

## Baringo County

	Changes
Land cover	1988-2016
<i>Prosopis juliflora</i>	+ 2031.3
Bareland	- 43.3
<i>Vachellia</i> species	- 42.3
Mixed vegetation	- 4.2
<b>Grassland</b>	<b>- 86.5</b>
Rainfed cropland	- 37.3
Irrigated cropland	- 56.6



*Prosopis juliflora*

# *Prosopis* invasion affects human health

Effects on human health:

- Increased densities of malaria-transmitting mosquitoes
- Leshmaniasis outbreaks in invaded wetlands

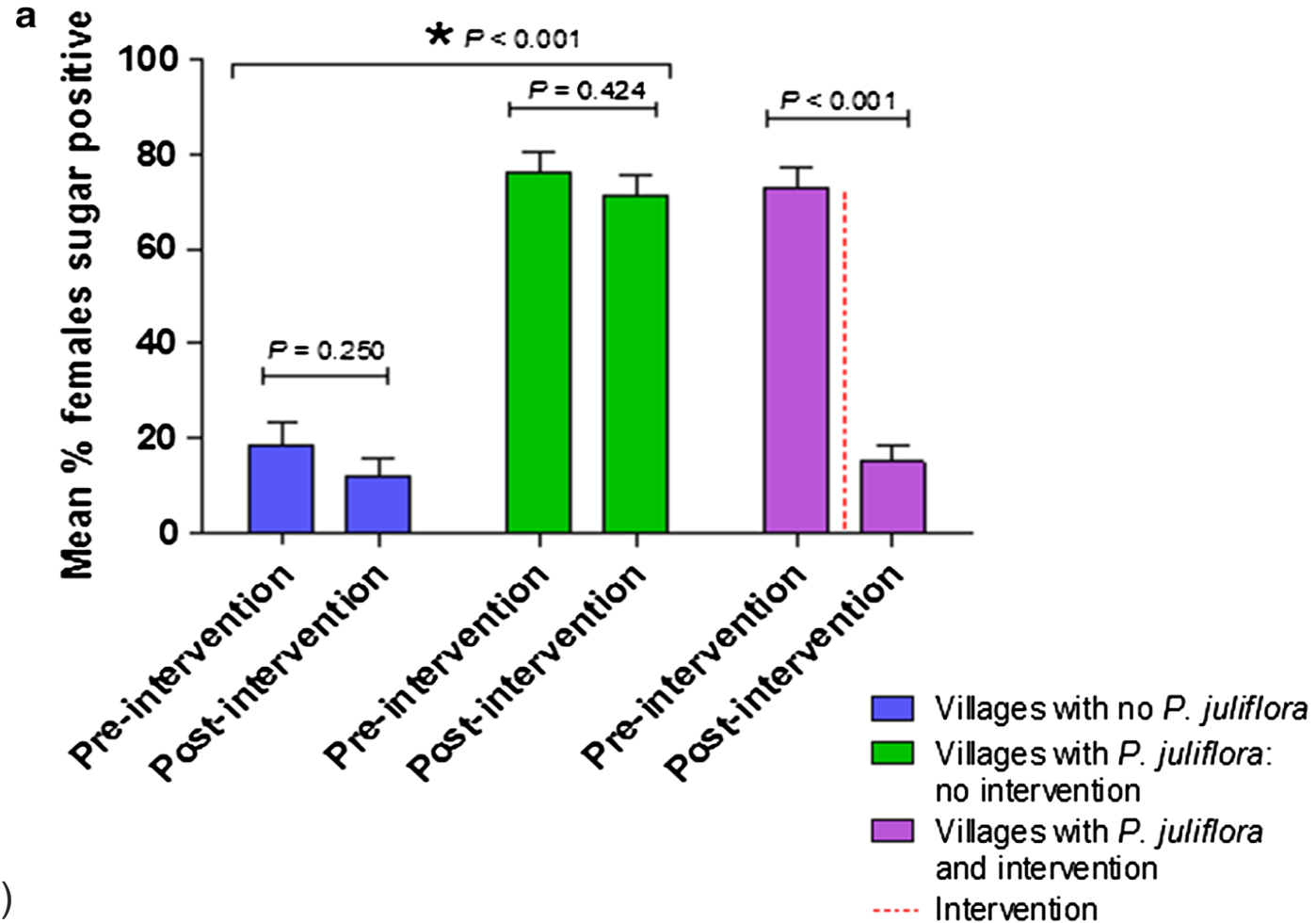


*Mosquitoes*



*Sand flies*

(Muller et al., Malaria J. 2017; Schaffner et al. 2025)



# Invasive species management

# Management practices for each objective

Prevention

Early detection & rapid response

Control and asset protection

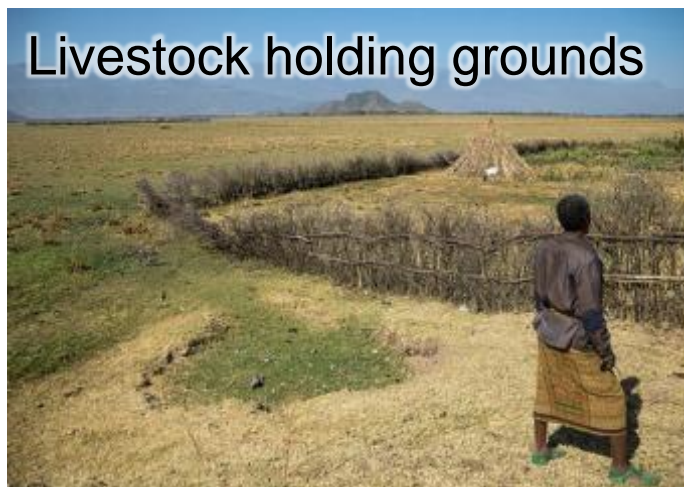
Surveillance



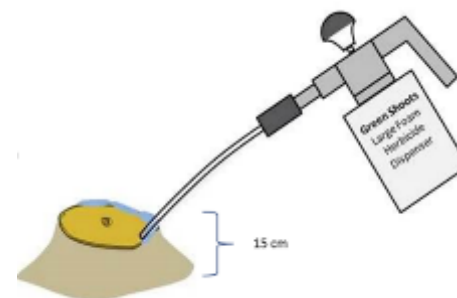
Mechanical control



Livestock holding grounds



Chemical control



Biological control



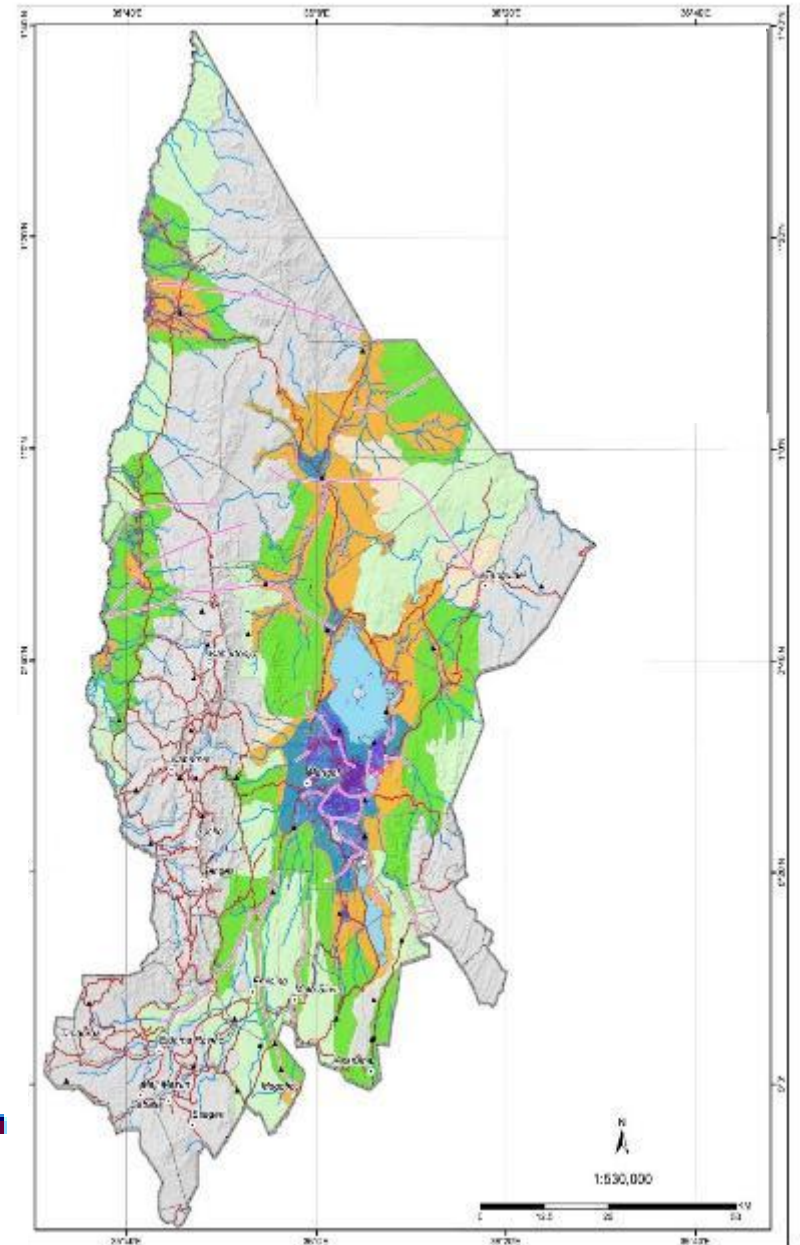


# Baringo County *Prosopis* management plan

- Coordinate *Prosopis* management activities
- Advice projects and organisations aiming to manage *Prosopis*
- Review progress on *Prosopis* management
- Provide recommendations to County Govern.

## Management\_units

- undefined
- High Priority Asset Protection
- High Priority EDRR
- Low Priority EDRR
- High Priority Monitoring\_Prevention
- Medium Priority Monitoring\_Prevention
- Low Priority Monitoring
- Nothing



# ‘Working for Water’ Programme – South Africa



- Of all the management approaches implemented, Classical Biological Control is significantly correlated with reduced increase or retraction of the invaded area

(Henderson and Wilson 2017; Kotze et al. 2025)

# Take-home messages

- Invasive species are a key threat to the biodiversity and functioning of grasslands, and to the people who depend on these grasslands
- Grassland conservation and restoration can only be achieved if invasive species are sustainably managed
- Spatial planning of management is critical, but needs coordination among multiple stakeholders and actors
- Integration of different management options has achieved the best results worldwide, also in Africa
- CBC of weeds is a key management tool for controlling widely established invasive weeds, particularly in low-income countries or on low-yield land

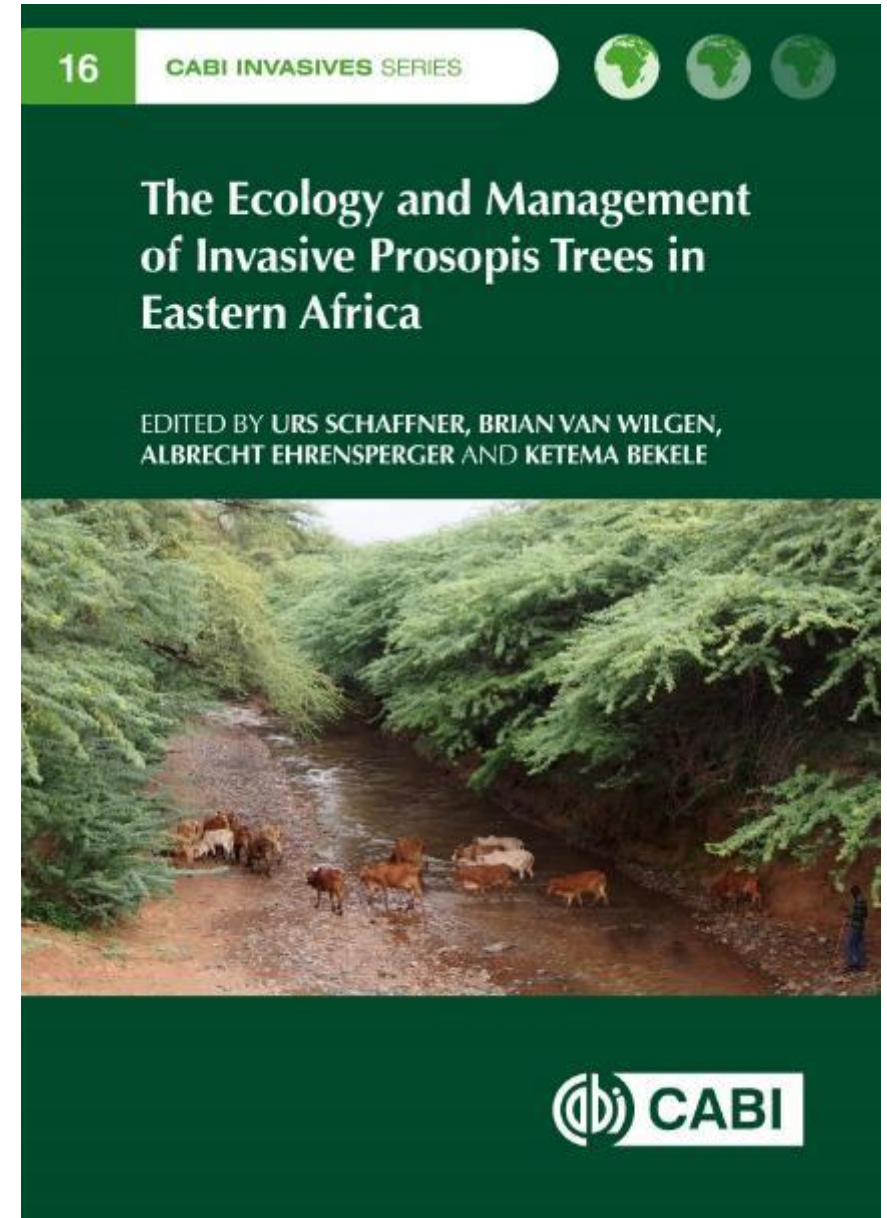
A group of women in traditional African attire are sitting outdoors. The woman in the foreground is wearing a yellow top and a patterned headwrap. She is looking towards the right. Another woman next to her is wearing a red top and a yellow and green patterned headwrap. They are both smiling and appear to be engaged in a conversation. In the background, other women are visible, some wearing headwraps and colorful clothing. The setting is outdoors with a tree trunk and some foliage visible.

# THE CABI LANDSCAPES INITIATIVE

# New book on *Prosopis* trees

- Multi-author book
- Overview of the knowledge about *P. juliflora* in eastern Africa (and elsewhere)
- Overall assessment of the impacts of *Prosopis* trees on people and nature
- Description of the proposed management approach

**Open-access**

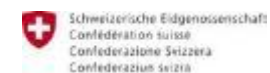




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