Remote sensing technology to capture distribution of prosopis for energy supply in Afar region, Ethiopia

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Outline of the presentation

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Introduction

- *Prosopis juliflora* (***loccaly yewoyane halla/zaf***)

- Ethiopia, it was 1st introduced in the late 1970s in the mid Awash area (EARO 2005).

- It has been expanded at the expense of grasslands, rangelands, water points, croplands (Mehari 2015).

- It is well established in the region and is rapidly invading new areas.

- It is often used for fuelwood,
  - Charcoal
  - Fencing homesteads
  - House construction
  - Carbon sequestration → Reducing the burden on indigenous trees

- Disadvantage

✓ It limits grazing land

✓ Invades irrigated areas

→ which would in turn; affect the ecology and biodiversity and livelihoods.

2 Objectives

- Map the spatial extent of *Prosopis juliflora*
- Estimate its AGB by using RS and GIS techniques.

3. Methodology

3.1 Prosopis mapping

(1)Basic characteristics of P (based on literature and expert knowledge).

- *Prosopis* is extremely drought resistant - evergreen
- Has extensive root system
- Efficiently utilize both surface and ground water.
- Grows quickly after germination (Nuthammachot et al 2018).

- Pasieczniket al(2004), it can grow in a wide range of conditions

✓In any soil type

✓ Areas below 200 to 1500 m asl

✓Rainfall: from 50 to 1500 mm

✓ Temp: withstand & survive temp as high as 50°C (air)

✓*Prosopis* possess allelopathic & allelochemical effects on other plant species (Elfadl and Luukkanen, 2006).

(2) Data

- **Satellite data:** Sentinel-2 level 1-C taken in the dry season

- **Reference data:** Collected from each land use/cover type.

- Waterways, rivers, road network, and built-up areas were identified.

(3) Image classification

- The EO data was classified into vegetative & non-vegetative land.

- The vegetated land was again classified into prosopis & non-prosopis dominated area.

3.2 AGB estimation

- The usual methods for determining AGB of forests are:

✓ *The combination of **forest inventories** with **allometric tree biomass regression models** (Houghton, 2005).*

✓ We developed allometric equation for *Prosopis* from a total of 3034 trees

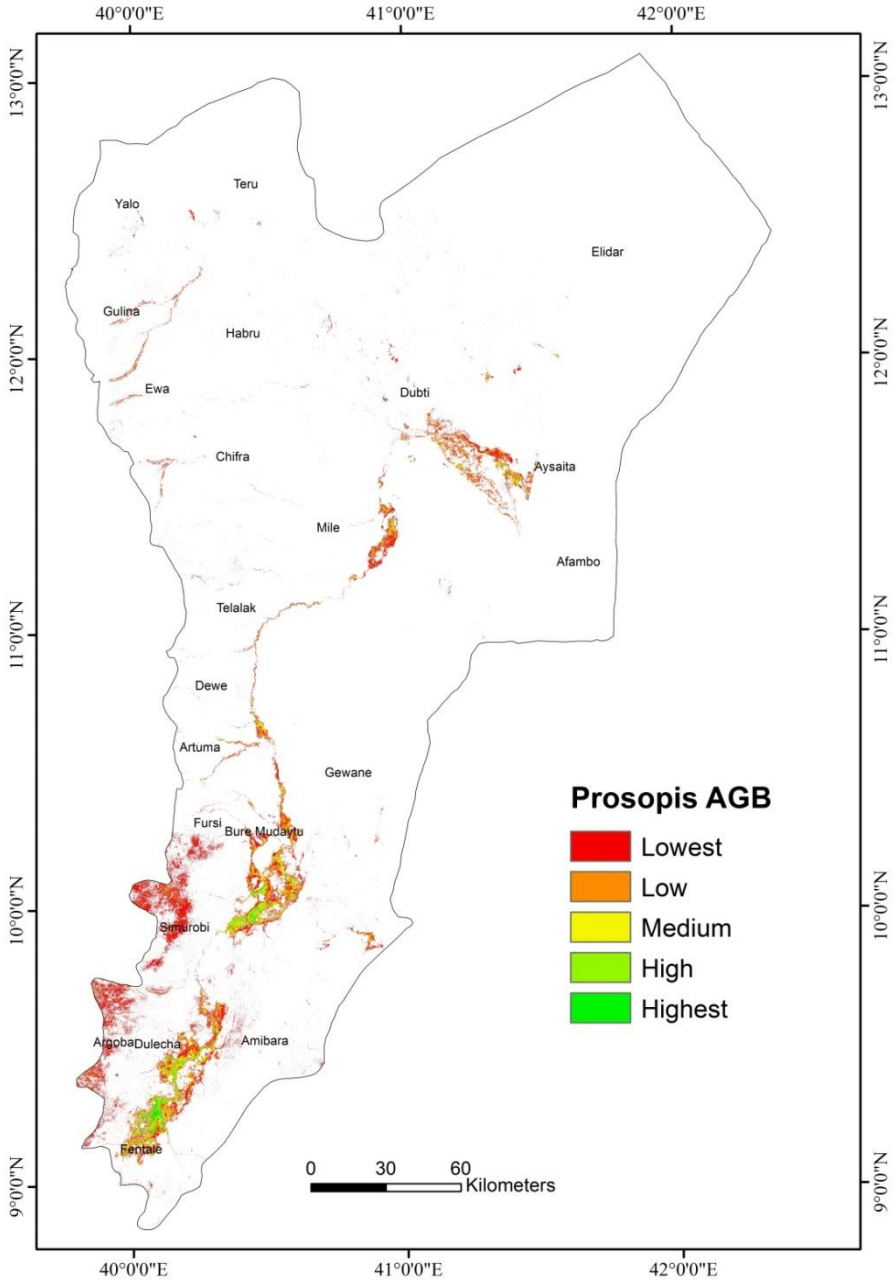
Forest inventories

- DBH and height measurement

Dry mass and wood density estimation

Green weight measurement

4. Results



- It was highly distributed in southern parts of Afar region
- Awash Fentale, Amibara, Gewane have high AGB than the other parts.

4. Dry total biomass

- The dry biomass of each tree was above 2 kg
- The average dry total biomass was 39,057 kgs/ha, 4405-126,778kgs
- The dry total biomass in the study area was 8.7 billion kgs.

Concluding remark

- It is a good source of energy
- Land use planning is required
- In the degraded land, prosopis can be considered as a land reh option, **carbon sequestration and to mitigate climate change**.
- In the fertile land there should be land use conversion
- Prosopis areas should be given for the youth.
- There should be responsible organization to coordinates efforts

Thank you!