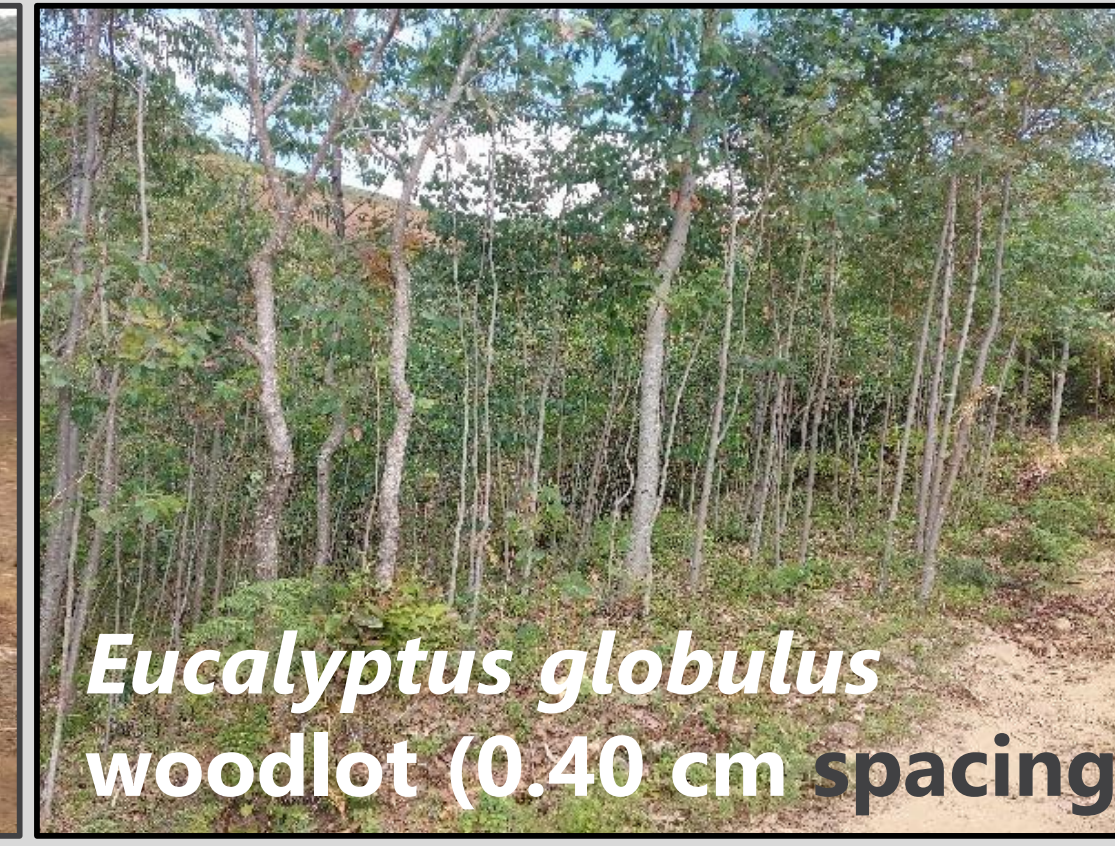
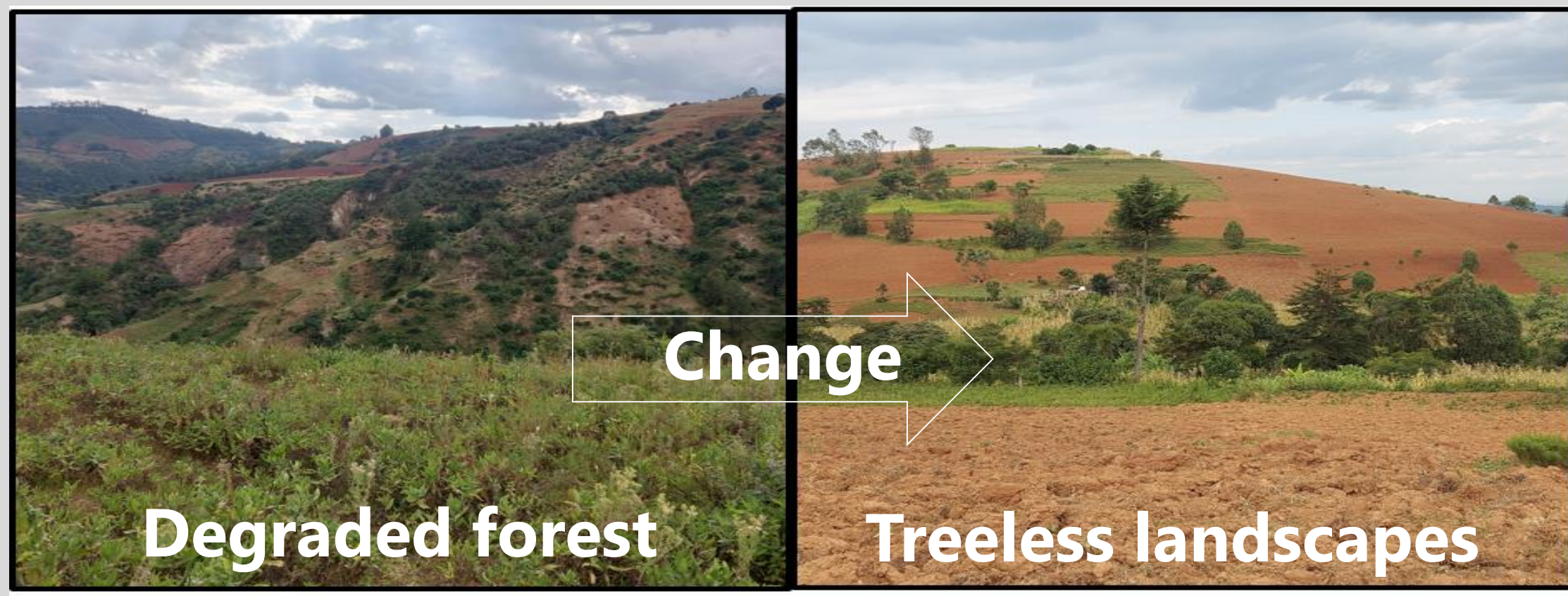




Forest resource base and land use land cover dynamics in the Elgo sub-basin, Southern Ethiopia

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- Farmers rely more on tree biomass (firewood and charcoal) for energy than on other alternatives.
 - Woodlots are a dominant source of wood products.
- Photos by Asmelash Tesfaye, August, 2022, Geressie Southern Ethiopia.

Introduction

- The increasing demand of wood products are strongly affecting the forest resource dynamics.
- The study aimed to investigate the small-holder farmer's dependency on forest products and forest resource base dynamics associated with Land Use Land Cover (LULC) changes between 2000 and 2021.

Materials and Methods

- Elgo sub-catchment is one of the dominant tributary of the Lake Chamo Southern Ethiopia with comparative restoration opportunity.
- Household interviews and focus group discussions were held for socio-economic assessment.
- Landsat 7 - ETM+ and 8 - OLI/TIRS was used for LULC change detection.
- Quantitative and qualitative analysis was employed.
- A hybrid of Land Cover signature and maximum likelihood algorithm was used to classify a total of 6 LULC classes.

Results

- Farmers are highly dependent on forest products, specifically for energy ($X^2 = 57.5$; $P = 1.4e-10$).
- They prefer fast growing tree species, such as *Eucalyptus spp.*, *Cupressus lusitanica* and *Gravilia robusta*.

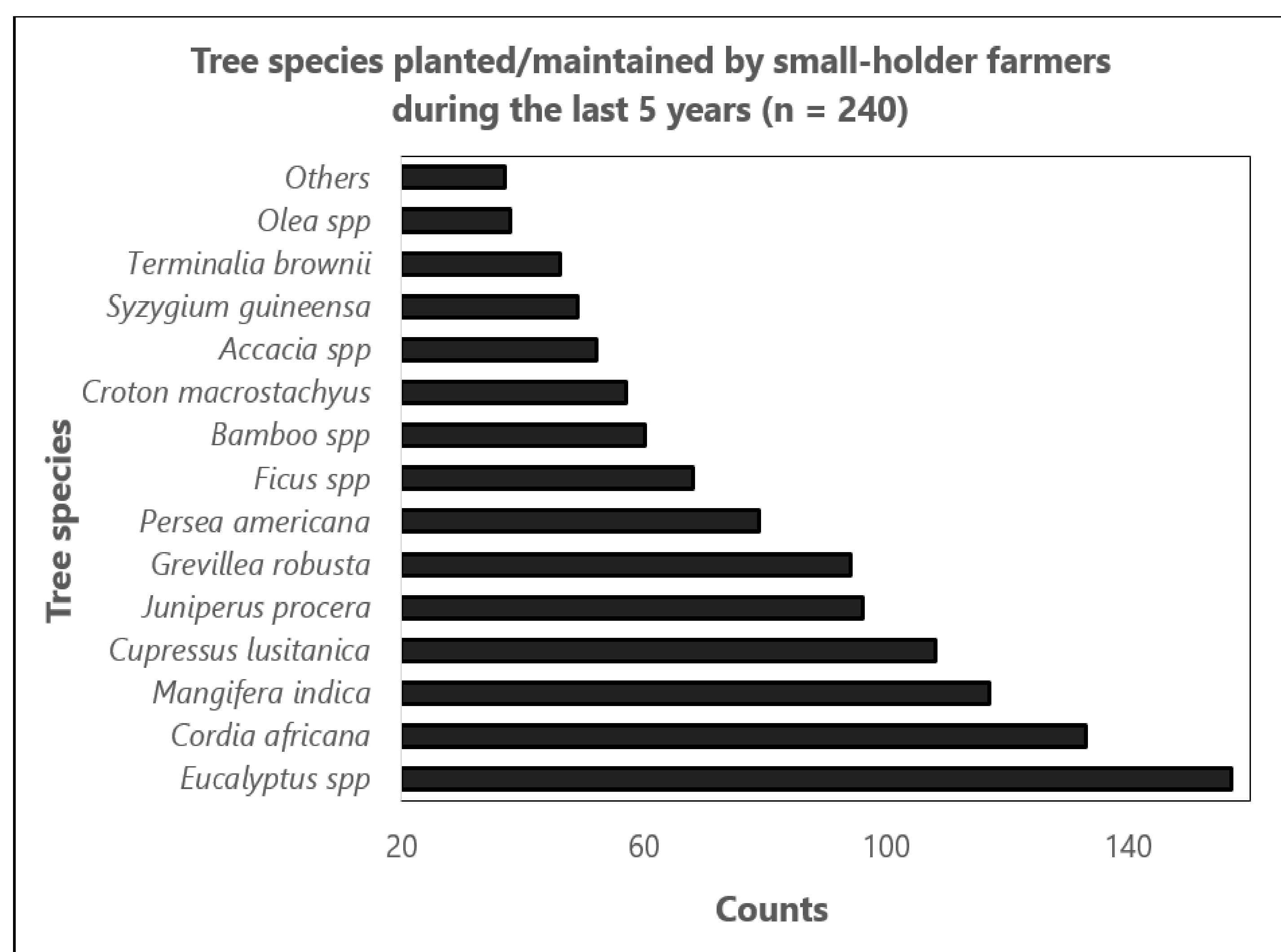


Figure: Tree species planted/maintained by small-holder farmers during the last five years

Results (cont.)

- The type of forest products triggered farmers' tree species choices.
- House construction and fuelwood are the leading purposes ($X^2 = 135.57$; $P = 2.2e-16$).

Purposes of the planted/maintained tree species (n = 240)	Ranking	
	1st	2nd
House construction (poles, posts and logs)	139	33
Food (fruit trees)	34	21
Timber (furniture)	25	45
Fuelwood (cooking and heating)	14	93
Soil fertility enhancements and soil erosion control	11	12
Shade and wind breaks (shade tolerant crops and livestock)	8	17
Forage (Livestock feed)	4	8
Restoring abandoned or degraded land	2	2
Farm land demarcation	1	2
Medicinal purposes	1	1
Other environmental services	1	3

- Farmers collecting forest products from woodlots/boundary planting, natural forests and agroforestry systems in descending order.
- Woodlots and agroforests have a higher tendency of expansion.
- Despite the lower accuracy values – arable lands, water and forests showed an increasing trend.

LULC classes	Year 2000	Year 2021	Change (%) 2000 - 2021
	Area (ha)	Area (ha)	
Grass land	8025	759	-90.5
Bare land	9152	4049	-55.8
Heterogeneous agriculture	5819	4304	-26.0
Arable land	4024	7689	91.1
Water	478	764	59.8
Forest	1018	3010	195.7
Build up		7943	

Conclusion

- The importance of tree-based systems on the provision of wood products are highly noted.
- Integrating tree species in line with the farmers' preference can be a key for wider adoptions of tree-based systems.
- High resolution satellite imageries and hybrid image classification method is advised for the accuracy of the land use land cover map.