

# Ecological Factors Shaping Agroforestry Practices Among Smallholder Farmers in Gorkha District, Nepal

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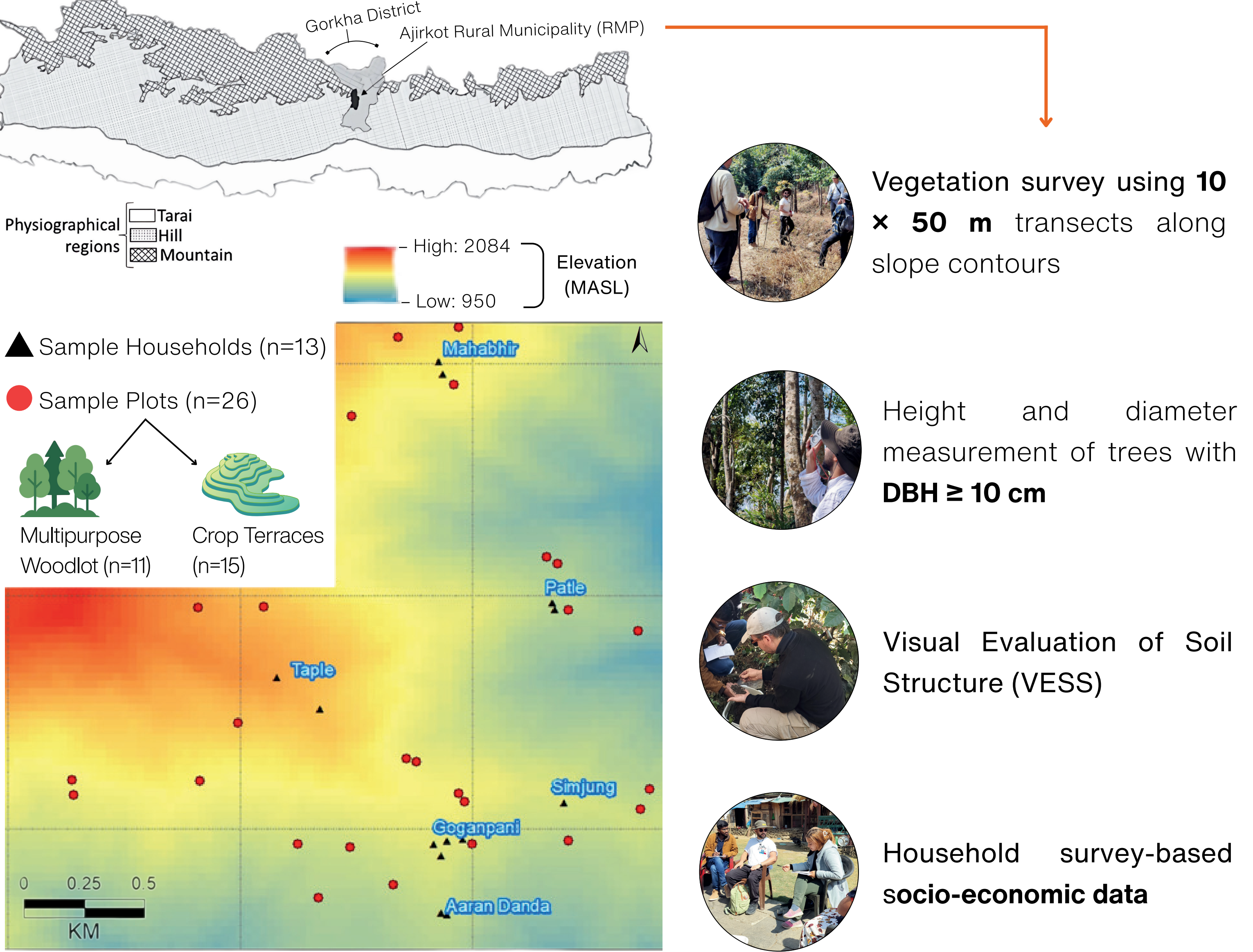
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## Introduction

- Agroforestry (integration of trees/livestock into farming systems) provides ecological and socio-economic benefits while strengthening resilience in disaster-prone areas such as Gorkha District, Nepal.
- Agriculture and forestry contribute **23.9% of Nepal's GDP**, supporting rural livelihoods through timber, fodder, and fuelwood from agrisilviculture and silvopastoral practices.
- Among leasehold users, agroforestry accounts for **~42% of household income**, yet its ecological impacts remain underexplored in the region.



## Materials and Methods



## Results

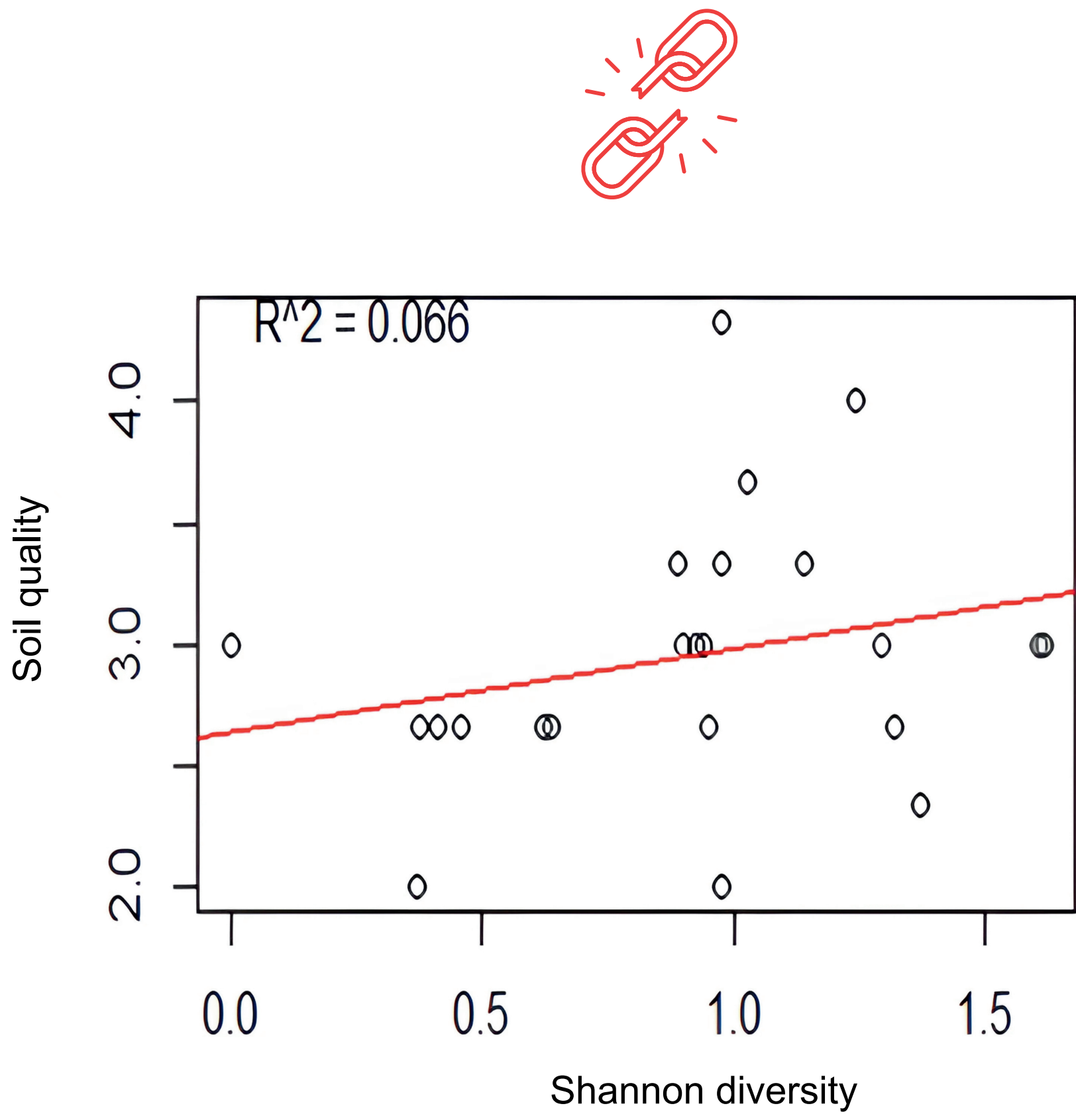
Identified a total of 489 trees in 26 plots belonging to **31 species**.

		Multipurpose	Terrace		
Unit		Mean ± SD	Mean ± SD	TT	WT
Tree abundance	No. of trees per sample	24.5 ± 7.5	8.5 ± 5.3	***	
Tree density	No. of trees per hectare	489.1 ± 150.6	169.3 ± 106.1	***	
Height	m	11.7 ± 2.7	5.6 ± 1.4		***
Basal area	Sq. m per hectare	27 ± 6.0	10.4 ± 0.3	***	
Richness	No. of species per plot	4.8 ± 1.7	3.3 ± 1.4		*
Shannon	H	1.0 ± 4.0	0.9 ± 0.4		
Simpson	1-D	0.5 ± 0.2	0.5 ± 0.2		

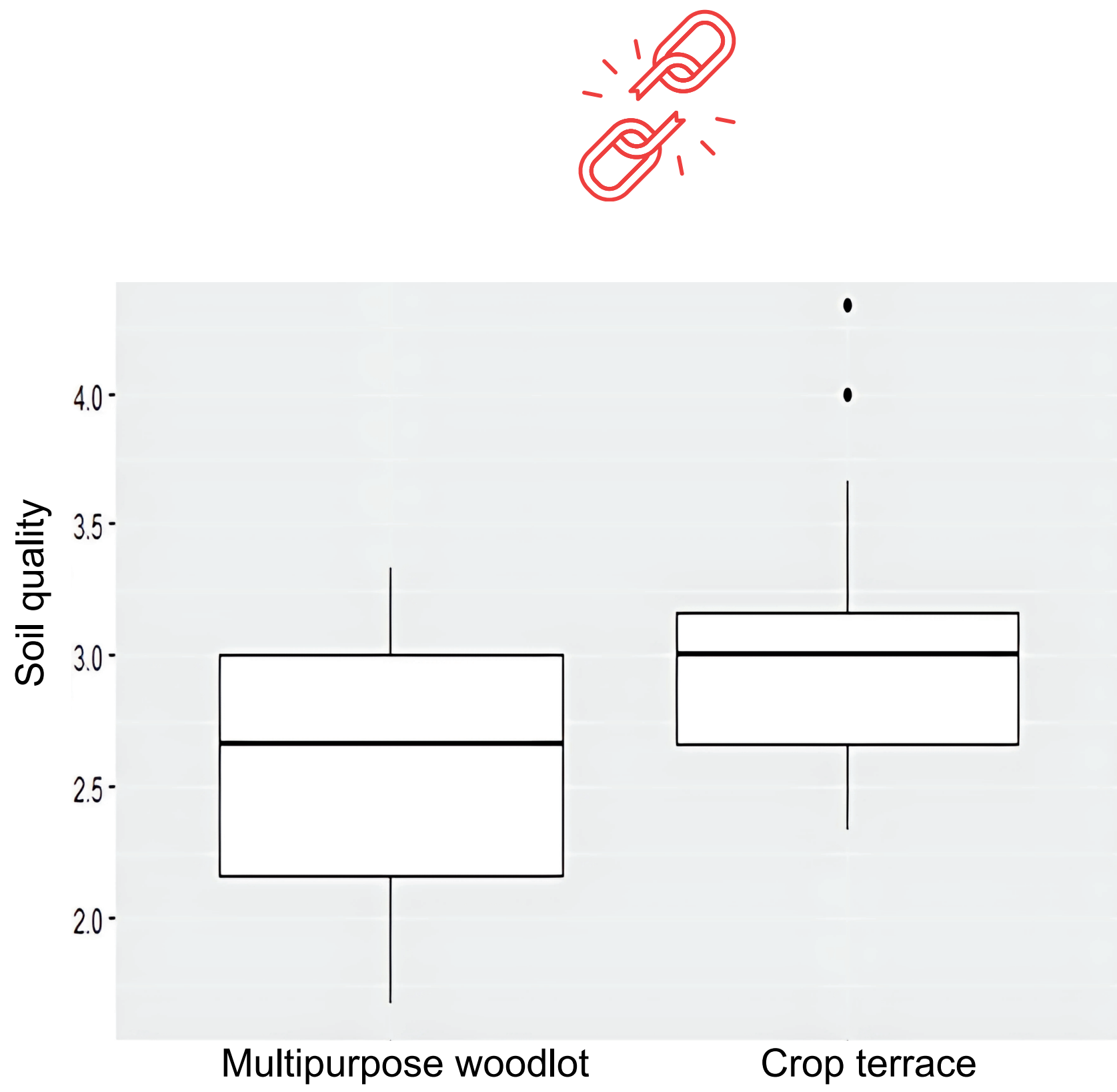
TT - T-test; WT - Wilcoxon Test; Significance stars indicate \*\*\*p<0.01, \*\*p<0.05 and \*p<0.1

Multipurpose Woodlot	Crop Terrace
Basal area	Slope orientation
Tree density	Soil quality
Farming experience	Simpson diversity
Farm size	Shannon diversity
Average height	Slope
Richness	Elevation

No association between soil quality and Shannon/Simpson diversity



No significant difference between soil quality and plot types



## Conclusions

- Multipurpose woodlots in Gorkha thrive with dense, tall trees for shade crops like coffee/cardamom, matching terrace diversity due to *Alnus nepalensis* dominance — balanced sampling needed for clarity.
- Terraces have fewer trees due to slope and sunlight needs, with lower biodiversity at higher elevations, while experience and farm size boost tree growth, requiring further study.
- Agroforestry boosts productivity and biodiversity with species like *Pouzolzia rugulosa* and *Ficus semicordata*, especially in multipurpose plots, though diversity parity persists.
- Location, farm size, and experience** shape practices, with lower elevations aiding biodiversity — more research is key to validating the results.