



Farmer managed natural regeneration (FMNR) for climate resilience and livelihood improvement in drylands of Kenya

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1. Introduction

- ~30% of Kenya's land is degraded, with the greatest impacts in Arid and Semi-Arid Lands (ASALs).
- Mandera County faces erratic rainfall, frequent droughts (every 1-2 years), and 89.1% poverty.
- >84% of the population depends on livestock, increasing vulnerability to drought-related fodder and water shortages.
- Droughts, floods, overgrazing and wood-fuel harvesting accelerate rangeland degradation, livestock losses and poverty.
- Farmer Managed Natural Regeneration (FMNR) was introduced by ADRA and CFGB in 2014 to restore trees through protection, pruning and sustainable management.

2. Materials and methods

Study area: Mandera County, Kenya-Ethiopia-Somalia border; characterized by high temperatures, low rainfall and recurrent droughts.

Households engaged: 1,000 households in Takaba and Dandu sub-divisions, implemented in successive project phases (2014-2021).

Key interventions: Pastoralist groups, early-adopter/community extension training, Pastoralist Field Schools (PFS), FMNR learning sites, peer exchange visits

Complementary activities: kitchen gardens, farm ponds and VSLAs.

Data sources: Baseline and endline project data, complemented by a mixed-methods post-project assessment (2025).

Post-project assessment: Project document review; 5 key informant interviews; and biophysical assessments of 25 FMNR and 5 business-as-usual (BAU) fields, covering vegetation, weather, soil health and biodiversity.

Landscape assessment: Remote sensing analysis complemented field-level assessment of vegetation across FMNR sites.

3. Results

Degraded Land rehabilitation

- 11,000+ acres of rangeland rehabilitated
- Improving pasture availability and dry-season feed reserves

Table 1: Percentage of households with dry-season fodder availability

	Baseline	Endline
< 1 month	87.9%	12.8%
1-2 months	13%	28.5%
2-3 months	0%	52%
> 3 months	0%	6.8%

Vegetation recovery

- 134% increase in FMNR greenness advantage over BAU since 2015
- Satellite evidence validates farmers' observations

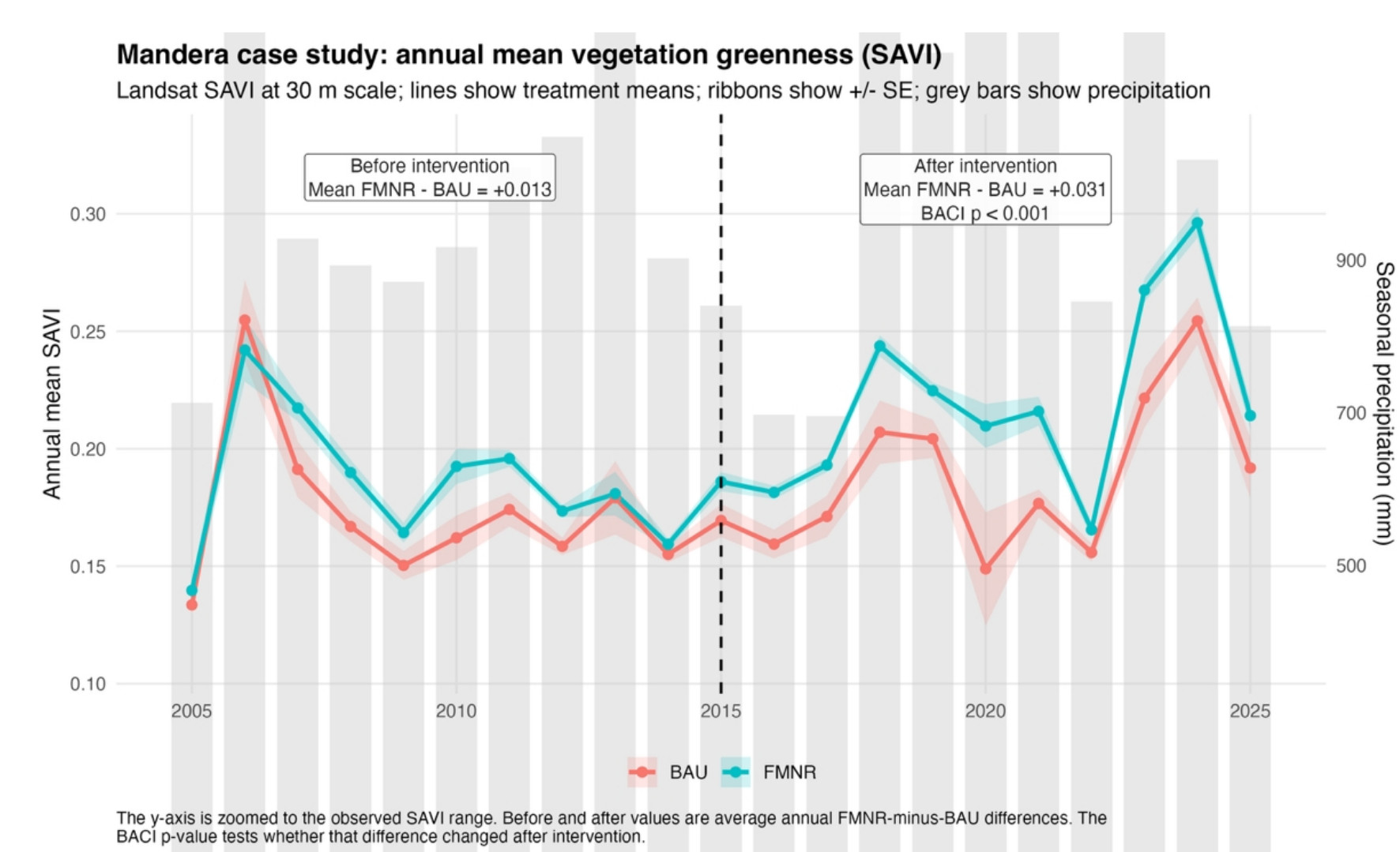


Figure 1: Mean soil adjusted vegetation index (SAVI) on FMNR and BAU plots



Figure 2: BAU plot

Soil Health

- A significant increase in soil organic matter (0.91% over 0.56% in BAU)
- Positive trends in microbial activity and soil penetration.
- No difference in bulk density and a slight decline in aggregate stability.

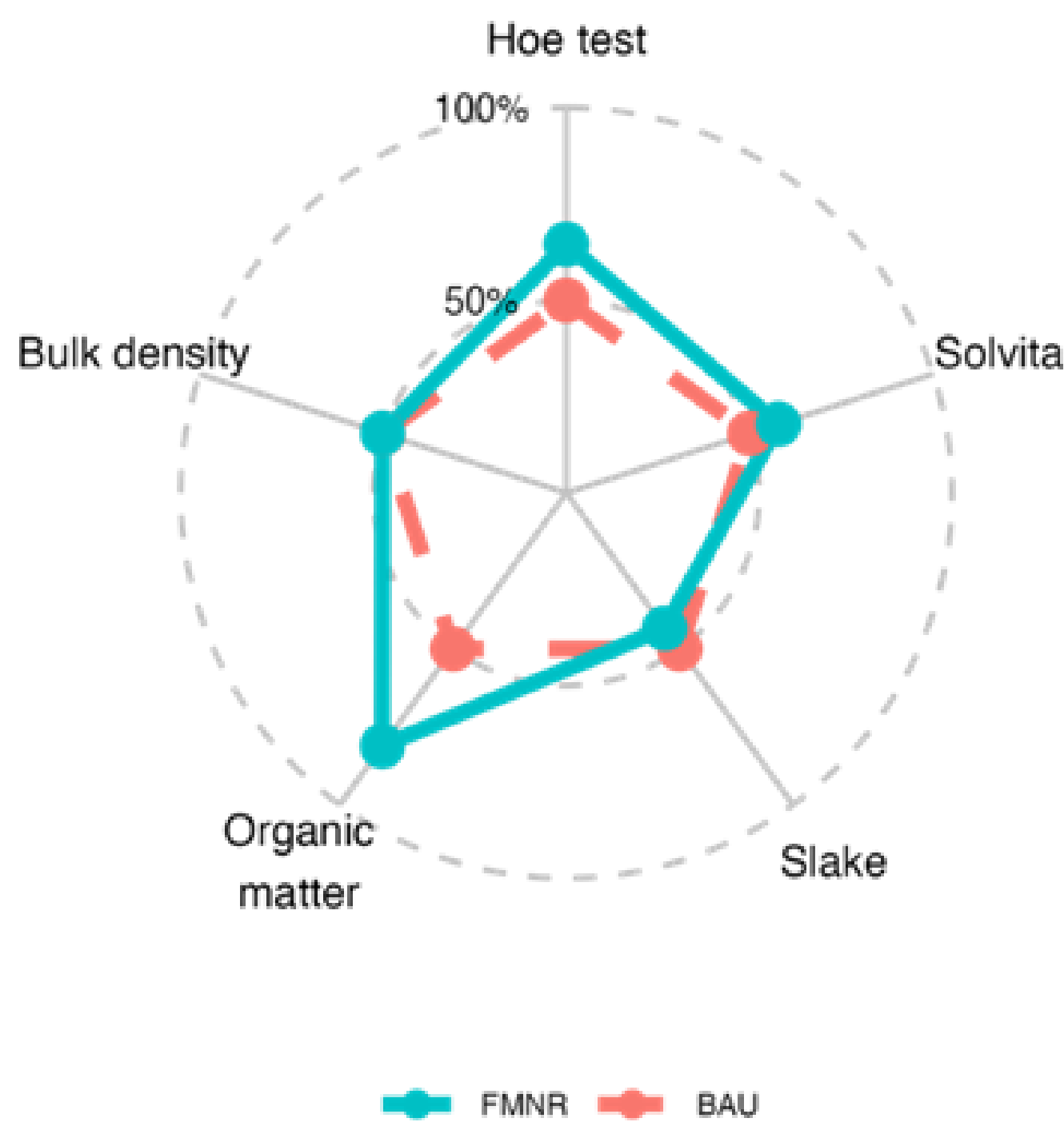


Figure 4: Soil health parameters in BAU and FMNR plots (Results were standardized from 0-100% with BAU being set to 50% for presentation)

Biodiversity

- Higher ground-dwelling insect abundance in FMNR plots (~10 vs. 6 per pitfall trap).
- Greater woody-plant diversity in FMNR plots (~19-21 vs. 16-18 species), though not statistically significant.
- Farmers reported increased species diversity and the return of small fauna.
- Unexpectedly, flying insects were more abundant in BAU plots; trap placement above the canopy may have influenced this result.

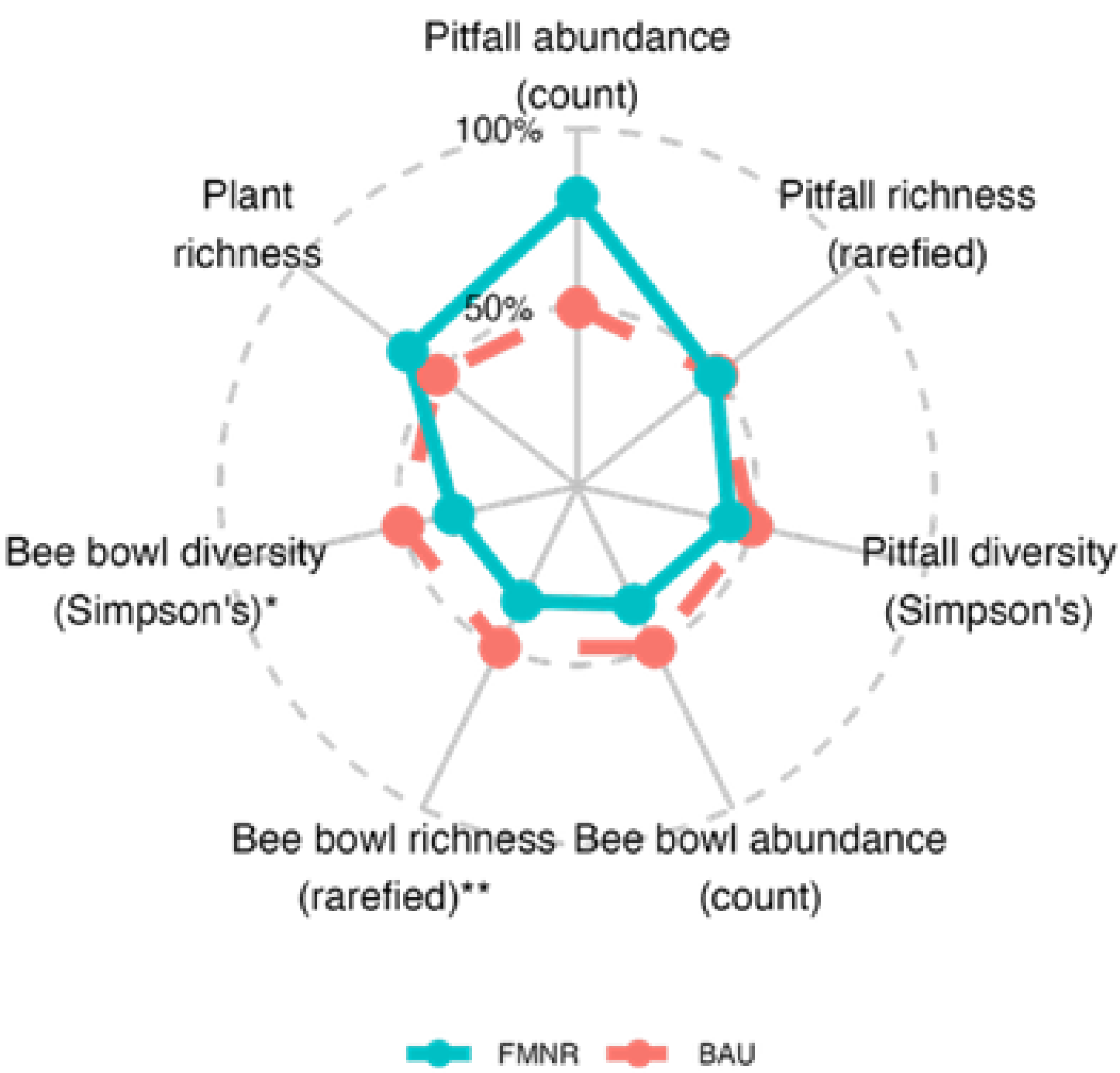


Figure 5: Plant and insect biodiversity across FMNR sites, compared to BAU sites



Figure 3: FMNR plot

Livelihood & resilience

Improvement over baseline

4.5	7	Goats/household
2.9	8.8 L/day	Milk production -normal
0.8	5.8 L/day	Milk production- dry season

- Improved food access through increased livestock production and income.



Figure 6: Farmers report increased fodder and milk production

Livelihood diversification

- Beekeeping emerged as an income option as bee forage increased.
- Gum Arabic harvesting and sale added another livelihood stream.

Climate resilience

- Communities perceived greater resilience through improved dry-season fodder reserves, reduced soil erosion from vegetation cover and better soil-moisture retention.

Impact amplified by complementary activities

- Kitchen gardens and VSLAs provided quick benefits and strengthened community bonds, encouraging sustained engagement in FMNR.

4. Sustainability & scale

~40% of farmers in the project area now practice FMNR—including many who received no direct training.

- Community bylaws and grazing plans helped address land-governance challenges.

5.Challenges

- Land governance and illegal grazing during the dry season.
- Stakeholders felt the project period was short for wider FMNR roll-out
- New pests and wildlife- monkeys, warthogs and snakes...

6. Conclusion

- FMNR is a low-cost approach to restoring degraded land in ASAL counties.
- Evidence points to ecological and livelihood benefits from FMNR.
- Community governance and strong local-government engagement can help address implementation challenges.
- Quick-return complementary activities amplify FMNR's impact and sustain community engagement.

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