

## BACKGROUND & AIM

- *Moringa stenopetala* is a drought-tolerant, fast-growing multipurpose tree with high nutritional value.
- It can contribute to human nutrition, livestock feed, and climate resilience, but evidence-based harvesting frequencies for southern Ethiopia remain limited.

### AIM

Determine how harvesting frequency affects plant growth, biomass yield, and the nutritional quality of *M. stenopetala*.

### METHODS

#### EXPERIMENTAL DESIGN

- Factorial RCBD with 3 replications
- Five harvesting intervals: 15, 30, 45, 60 and 75 days
- Planting spacing: 2 × 2 m; 9 plants per plot

#### STUDY SITE

- Benna-Tsemay District, South Omo Zone, southern Ethiopia
- Altitude: 588 m; mean annual rainfall: 876.3 mm
- Mean temperature: 18.2–37.3 °C

## FIELD EVIDENCE | PLANTING → HARVESTING



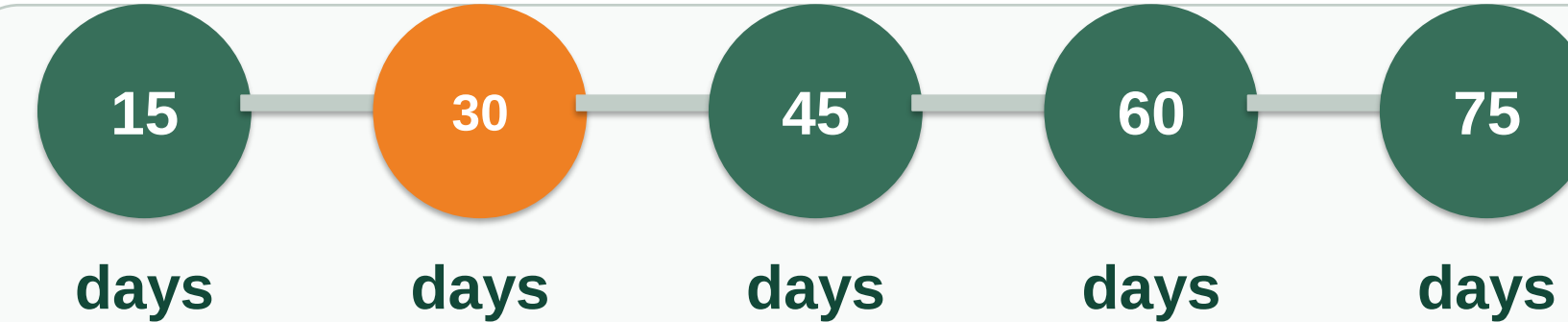
Planting/establishment



Harvesting *M. stenopetala* leaves

## HARVESTING FREQUENCY AS A MANAGEMENT LEVEL

- The experiment compared repeated harvesting at five intervals to identify practical trade-offs between rapid leaf production, plant recovery and longer-term vegetative growth.



### KEY QUESTION

How does harvesting frequency influence biomass productivity without compromising plant vigour and nutritional quality?

### MEASUREMENTS

- Growth: height, root collar diameter, DBH, branches and recovery
- Fresh biomass: g/plant, kg/ha and annualised kg/ha/year
- Proximate composition and vitamins A, D, E and K

## KEY RESULTS

### Annualised fresh biomass productivity



Fig. 1: Shows annualized harvesting to determine which interval provides the highest biomass

### Fresh biomass per harvest

Per-harvest biomass increased strongly with longer intervals, reaching 352.1 g/plant at 75 days.

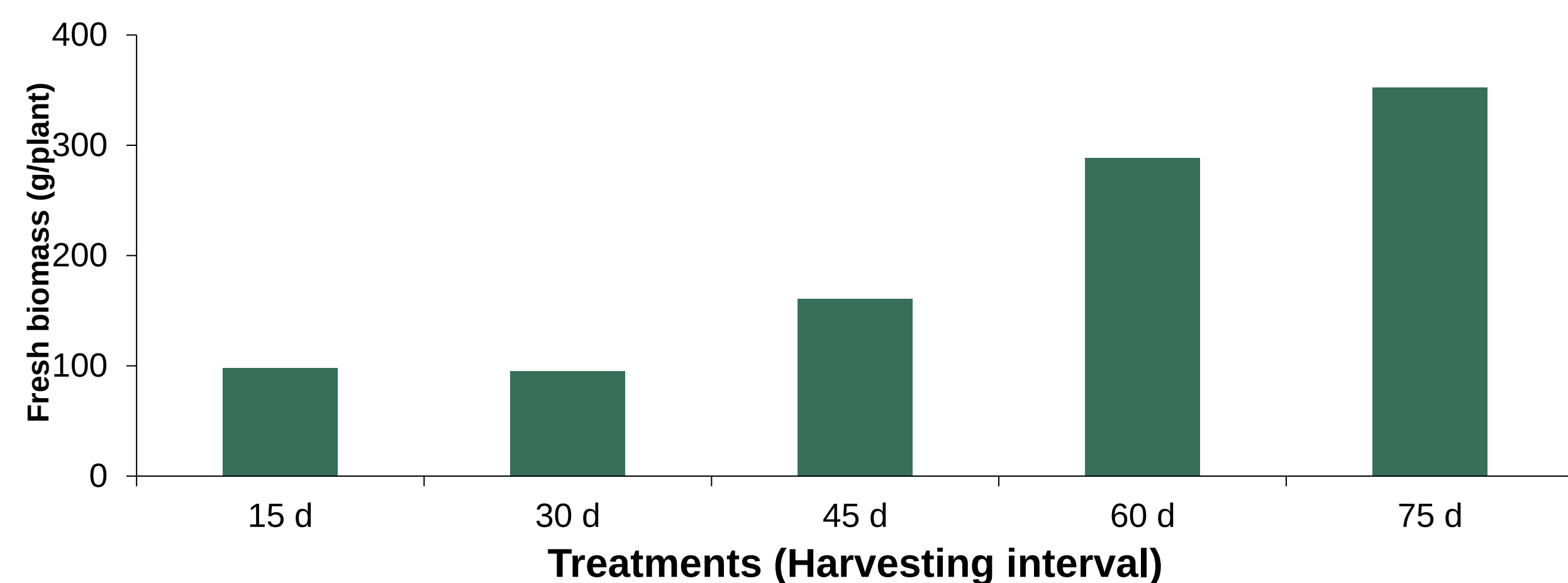


Fig. 2: Shows fresh biomass per harvest to determine which interval provides the highest biomass

## PRACTICAL INTERPRETATION

Short intervals allow more harvest events; longer intervals increase biomass available per harvest.

### WHAT THE RESULTS MEAN

- 15-day harvesting generated the highest annualised fresh biomass productivity because more harvest cycles were possible.
- 60–75-day intervals supported stronger vegetative growth and greater biomass per individual harvest.
- Protein remained high (about 24–27%) across intervals, indicating consistently valuable leaf material.
- The study conclusion recommends early-maturing leaves harvested within 15–30 days without compromising nutritive value.

### Vegetative growth

| Parameter            | Highest value | Interval |
|----------------------|---------------|----------|
| Plant height         | 2.33 m        | 60–75 d  |
| Root collar diameter | 3.53 cm       | 75 d     |
| DBH                  | 3.69 cm       | 60a d    |
| Branch number        | 17.80         | 75 d     |
| Recovery             | 100%          | 60–75 d  |

Fig. 4: Shows vegetation growth and recovery rate

### Nutritional quality

Most proximate components did not differ significantly among intervals; moisture and fat showed significant differences.

|         |                        |        |                  |
|---------|------------------------|--------|------------------|
| Protein | 24–27%                 | Fat    | 2.19–2.50%       |
| Energy  | 275.8–285.6 kcal/100 g | Vit. D | 17.75–36.80 µg/g |

Fig. 5: Shows nutritional quality per harvesting intervals

## RECOMMENDATION FOR SMALLHOLDERS

### 15–30 DAYS

Prioritise frequent harvesting of young leaves when the goal is a regular household food and feed supply.

### For biomass per harvest:

Allow 60–75 days when larger harvestable biomass and vegetative growth are the priority.

Future work should assess amino acids, anti-nutritional factors, root responses and varietal differences.

### KEY TAKEAWAY

Harvesting frequency is a management trade-off: frequent cutting increases annual harvest opportunities, whereas longer intervals increase biomass and vegetative growth per harvest. For smallholder nutrition and regular leaf supply, the study recommends 15–30-day harvesting.

**NUTRITION**  
High protein and micronutrient value

**FOOD**  
Regular leaf availability

**LIVESTOCK**  
Potential feed biomass

**RESILIENCE**  
Drought-tolerant multipurpose tree

