Litterfall Production and Associated Macro and Micro- nutrient Fluxes in Indigenous Agroforestry Systems of the Southeastern Rift Valley Landscapes, Ethiopia

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Summary

➤ Litterfall production and associated nutrient flux of Macro and Micro-nutrients in the studied agroforestry systems were relatively higher compared with other tropical AF systems and forest lands.

➤ Greater nutrient flux might drive to sustainable production of crops, Fruit trees, vegetables and other spices that grow beneath the trees as a result of good nutrient cycling within the system. This could enhance the livelihood of the households and play a great role in addressing food security..
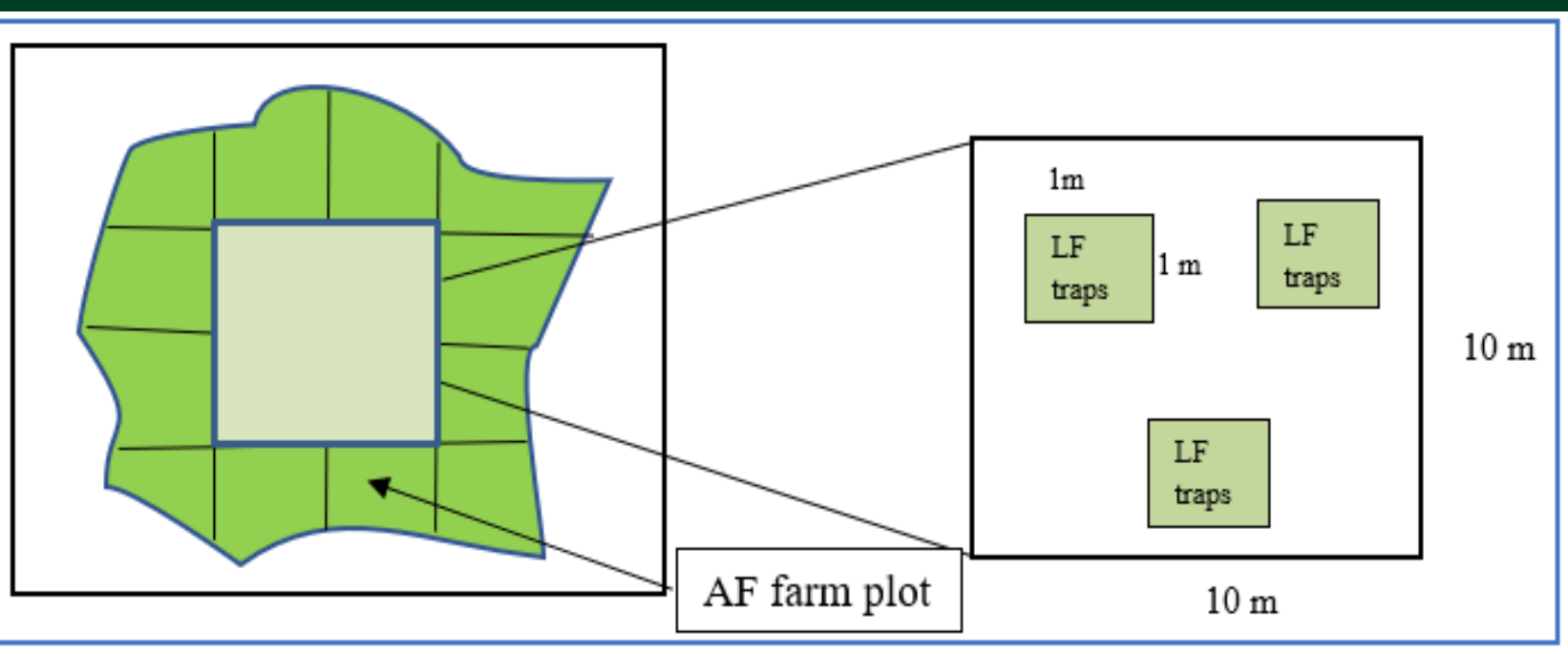
Introduction

➤ Production of litter from standing trees, shrubs, and other herbaceous species in agroforestry (AF) systems contributes significantly to maintaining and enhancing soil fertility.

➤ The study was conducted in enset based, enset-coffee based (E-C) and coffee-fruit tree-enset (C-Ft-E) based AF systems.

Goal

➤ To compare litterfall production and investigate associated macro and micro-nutrients in the 3 AF systems.

Methodology

▷ Litterfall collection was carried out for one year

▷ 540 samples were collected throughout the year

▷ 108 composite litterfall samples analysed

Fig 2. Field sampling layout and laboratory procedure

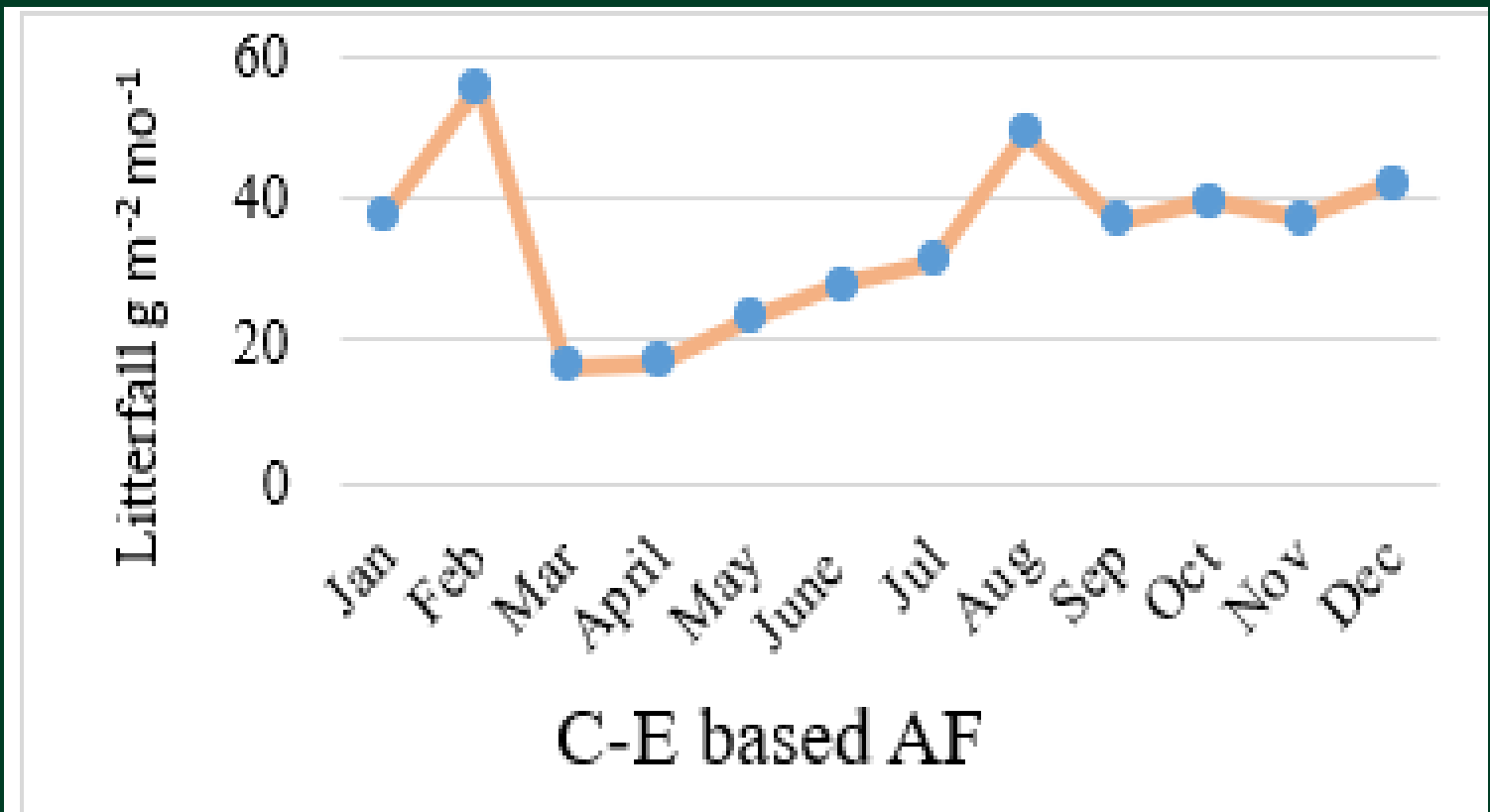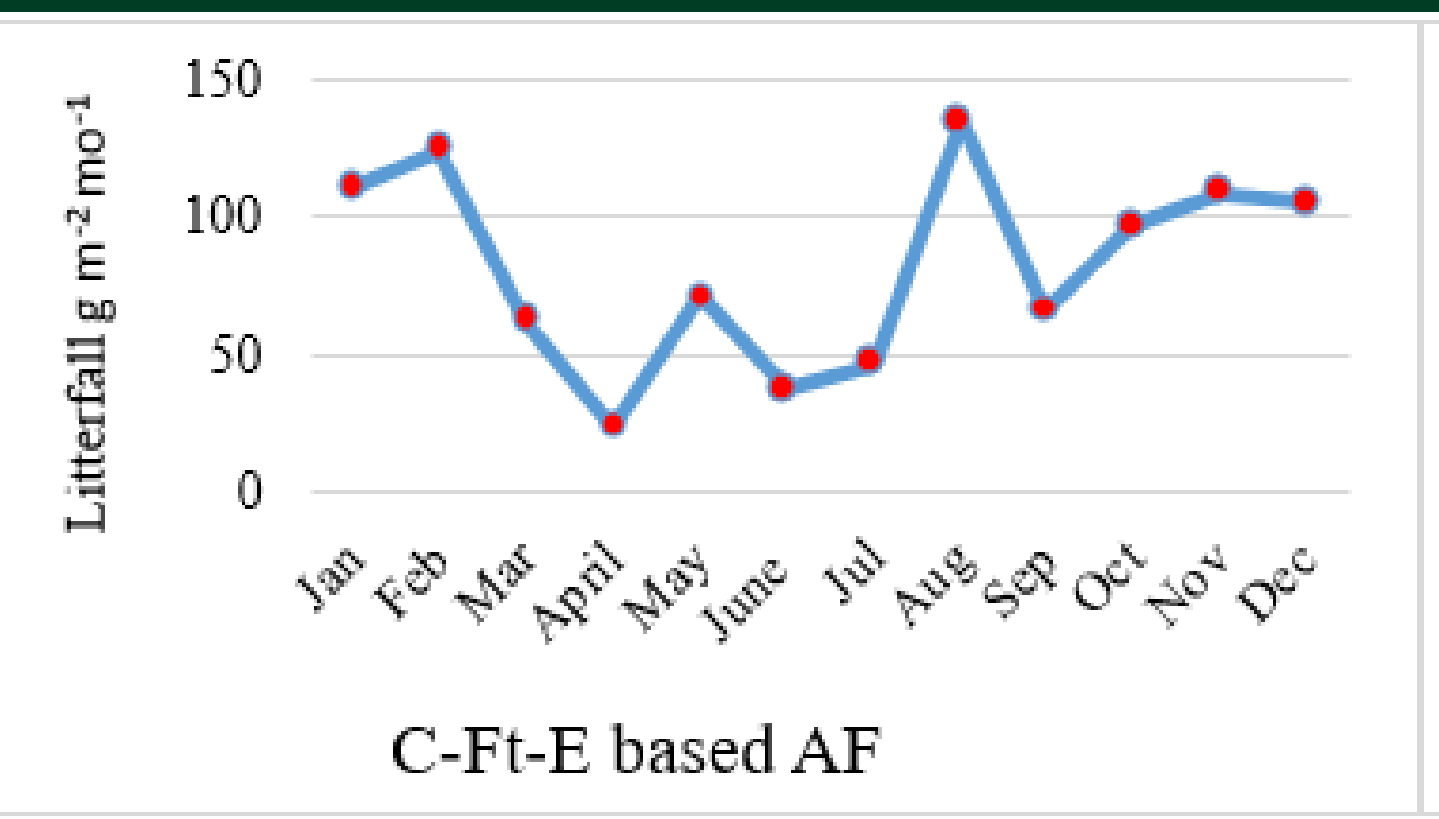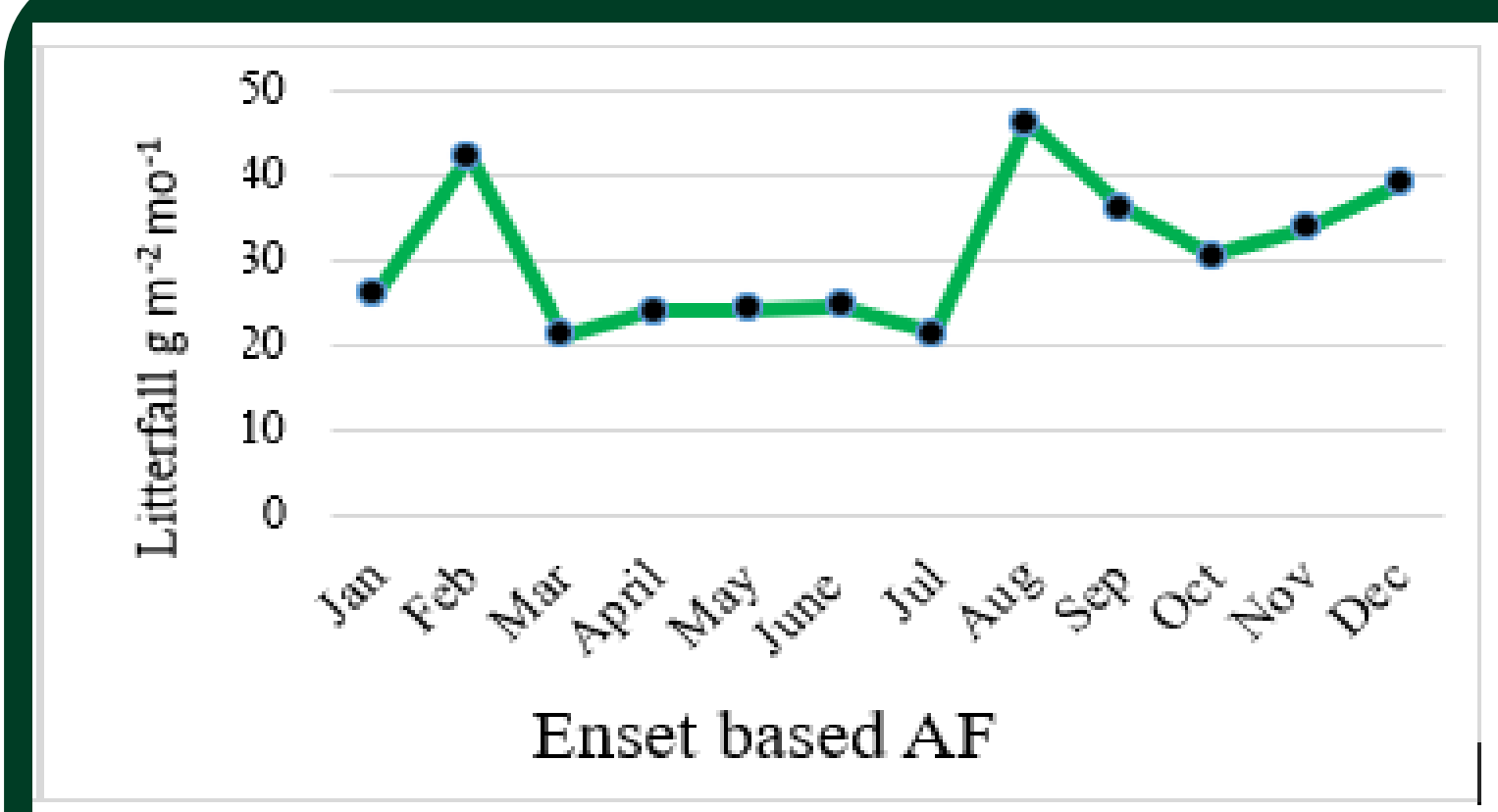## Litterfall production in the three AF systems

Fig 1. Illustration on litterfall collection and nutrient flux in AF systems

➤ C-Ft-E based AF system showed higher mean monthly litterfall (81.8±37.7 g/m2/mo)

➤ lowest in Enset based AF system (30.7±8.6 g/m2/mo)

➤ A fluctuation of litterfall by season and month was observed in all the studied three AF systems

Fig 3. Mean monthly litterfall production across the three AF systems

➤ Higher inter-monthly variation (82%) was observed in C-Ft-E based AF system was higher implying that a wider variation in monthly litterfall per unit area

➤ Annual litterfall of AF systems (9.8 t/ha, i.e C-Ft-E based AF) was considerably higher than reported for some homegardens

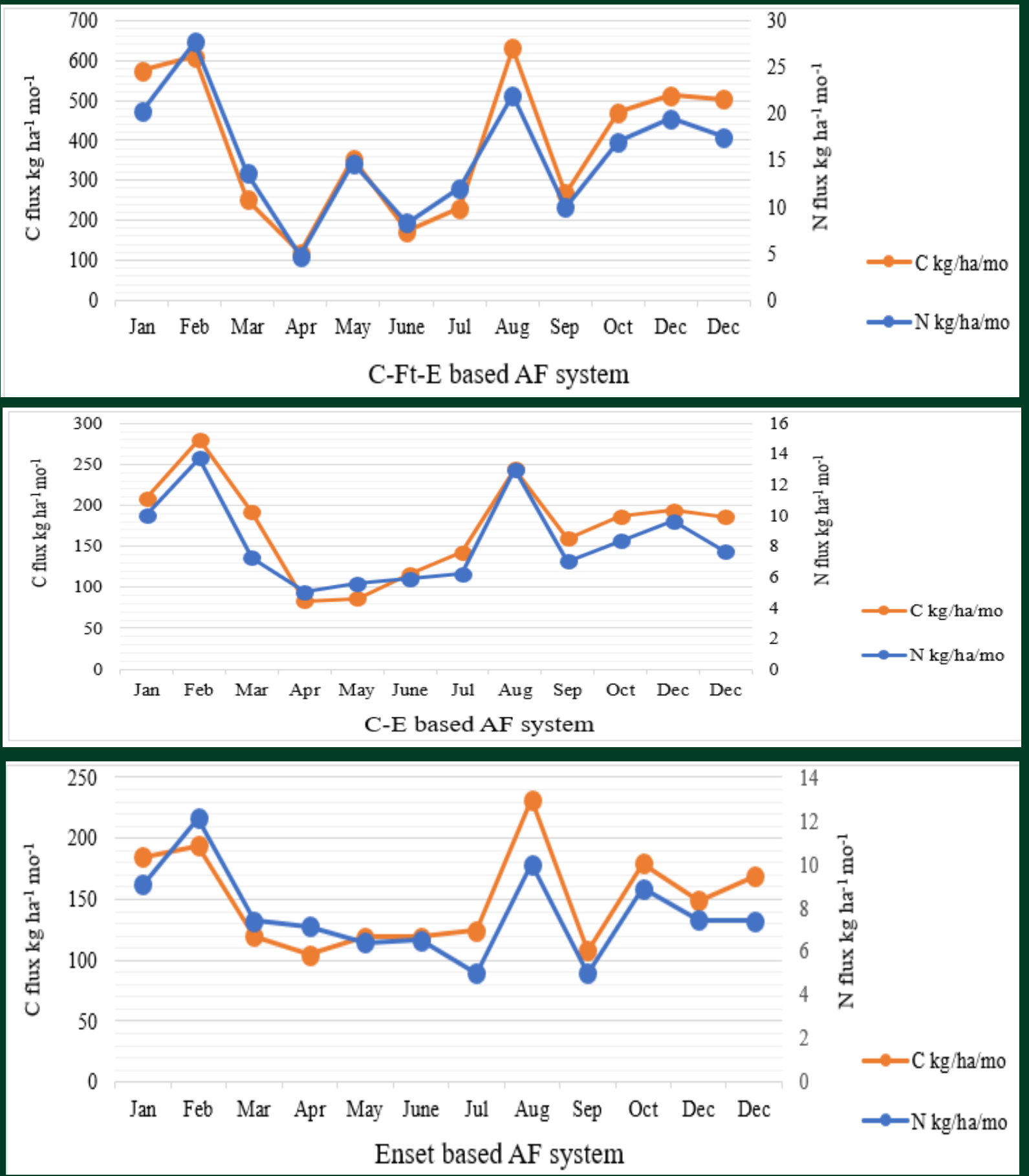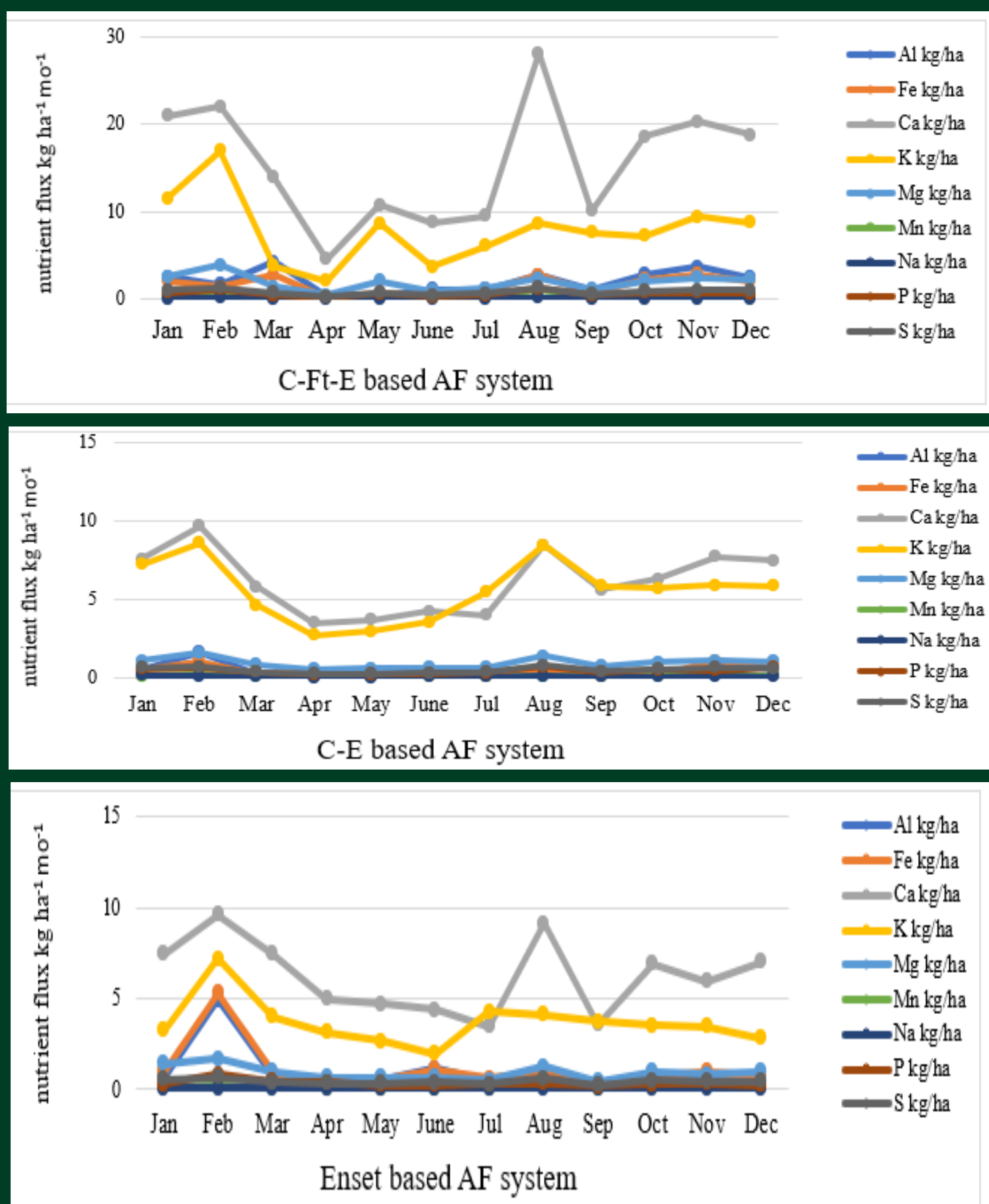## Litterfall Nutrient Fluxes in the AF systems

Fig 4. Mean monthly nutrient flux of each nutrient across AF systems

➤ The annual nutrient flux kg/ha for Ca (74-186), K (44-99) and Mg (11-23) is significantly high.

➤ Difference in nutrient flux of our AF systems from others is most likely related with difference in species composition, climate and soil fertility

➤ N flux from litterfall of our AF systems ranged from 93-187 kg/ha/yr, were considerably higher than reported

➤ N content in the litterfall ranged from 2% - 2.5%. This could be considered as very good in terms of nutrient addition to the system

Way forward

➤ There is a need to conduct a long term study to assess the effect of climatic factors on litterfall production and associated nutrient flux in the AF systems

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