1. Introduction

Cultivation of fruit trees on farms can contribute to household food security especially during non-harvesting seasons and when crops have failed. Fruit tree cultivation provides nutrient-rich foods for increased dietary diversity and also diversifies farm income generation options. However, there is insufficient data on diversity of fruit trees on farms and their contribution to food security in Kenya. This information is needed for designing and implementing suitable, location-specific interventions on increasing production and consumption of fruits.

Objectives of the study:
- Document fruit tree richness and abundance on farms in Western Kenya.
- Assess food security levels on the same farms and identify relationships between food security and fruit tree species richness and abundance (if any).

2. Materials and Methods

- Research area within four agro-ecological zones (AEZs) in Siaya and Kakamega counties, Western Kenya (Fig. 1), ranging from humid to transitional climate.
- 296 households (HHs) were randomly selected from three strata/groups; 103 HHs exposed to a programme promoting fruit cultivation (‘FRUIT’), 90 HHs exposed to a hygiene programme (‘WASH’) and 103 HHs not exposed to any programme (‘CONTROL’).
- Basic socio-economic and farm characteristics as well as fruit tree diversity data were collected through interviews of the HH head.
- Statistics: ANOVAs (detect differences among groups); multivariate linear regression analysis (identify factors influencing household food security).

3. Results and Discussion

3.1 Basic farm and fruit tree species richness and abundance data

- Average farm size was 0.9 ha (total 267 ha) and average HH size 5 members.
- Respondents mentioned 32 fruit tree species (9 indigenous, 23 exotic ones).
- Indigenous fruit trees were rare as 78% of the surveyed farms (Fig. 2) had no single indigenous fruit tree and less than 3% of all documented 8376 fruit tree individuals were indigenous ones (Table 1).
- Most frequently mentioned species were the exotics Mangifera indica (mango, on 80% of the surveyed farms), Persea americana (avocado, 77%), Psidium guajava (guava, 62%), and Carica papaya (pawpaw, 31%) (Fig. 3a-d).
- Highest tree richness and abundance variables were Tamarindus indica (tamarind, on 11% of the surveyed farms) and Syzygium guineense (water berry, 8%; Fig. 4 a-b).

3.2 Mean fruit tree richness and diversity per farm

- 12 farms had no fruit tree species, 8 farms only one single fruit tree individual.
- Mean fruit tree richness was 3.8 species per farm (range 0-10) (Table 1).
- All fruit tree diversity variables showed significant differences across the selected AEZs with generally lower diversity in the Upper Midlands, where the portions of indigenous fruit tree species and individuals were lowest (Table 1).
- Respondents of the ‘CONTROL’ groups mentioned significantly lower numbers of fruit tree individuals on their farms (19 trees) than the FRUIT and the WASH groups (37 and 29 trees, respectively), while species numbers were similar.

3.3 Basic food security data and factors influencing smallholder farm households food security

- 90% of surveyed HHs experienced food insecurity at least in one month of the year with highest levels in April/May, when about 60% of HHs were food insecure (Fig. 5). Mean number of food insecure months was 3.6 (range 0-12).
- While 21% of HHs were rated as severely food insecure (HH hunger scale>7), 52% were moderately food insecure (scale 2-7) and 27% food secure (scale<2).
- Higher scores of the HH hunger scale (HHHS) were significantly influenced by:
  - household’s poverty index (wealthier HHs were less food insecure)
  - ethnicity (Luo community was more food insecure than Luhya community),
  - humidity zones (HHs in drier zones were more food insecure),
  - farm size (HHs with larger farms were less food insecure) (Table 2).
- Fruit tree species richness and abundance on farms had no significant influence on HHHS. However, the overall regression model was only weak (Table 2).

4. Conclusions and Recommendations

1. Fruit tree richness and diversity were rather low.
2. HH food insecurity was moderate to severe and mainly influenced by poverty index and ethnicity.
   - Interventions should be designed and implemented to increase fruit tree cultivation on farms of the poor and the Luo community.
   - Promote fruit tree species, particularly indigenous ones, ready for harvest during the most food insecure months April and May to provide diverse food and income to families.