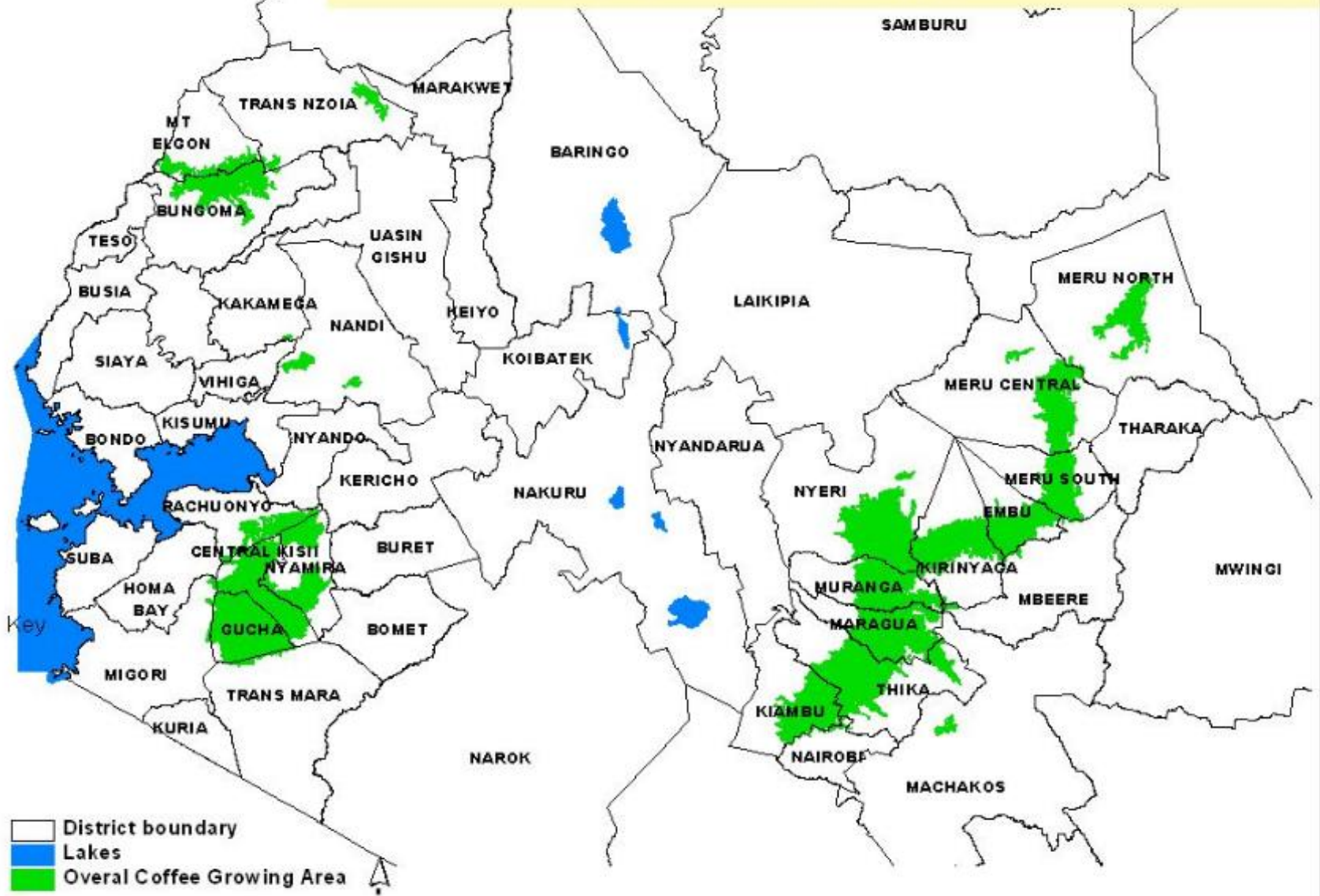


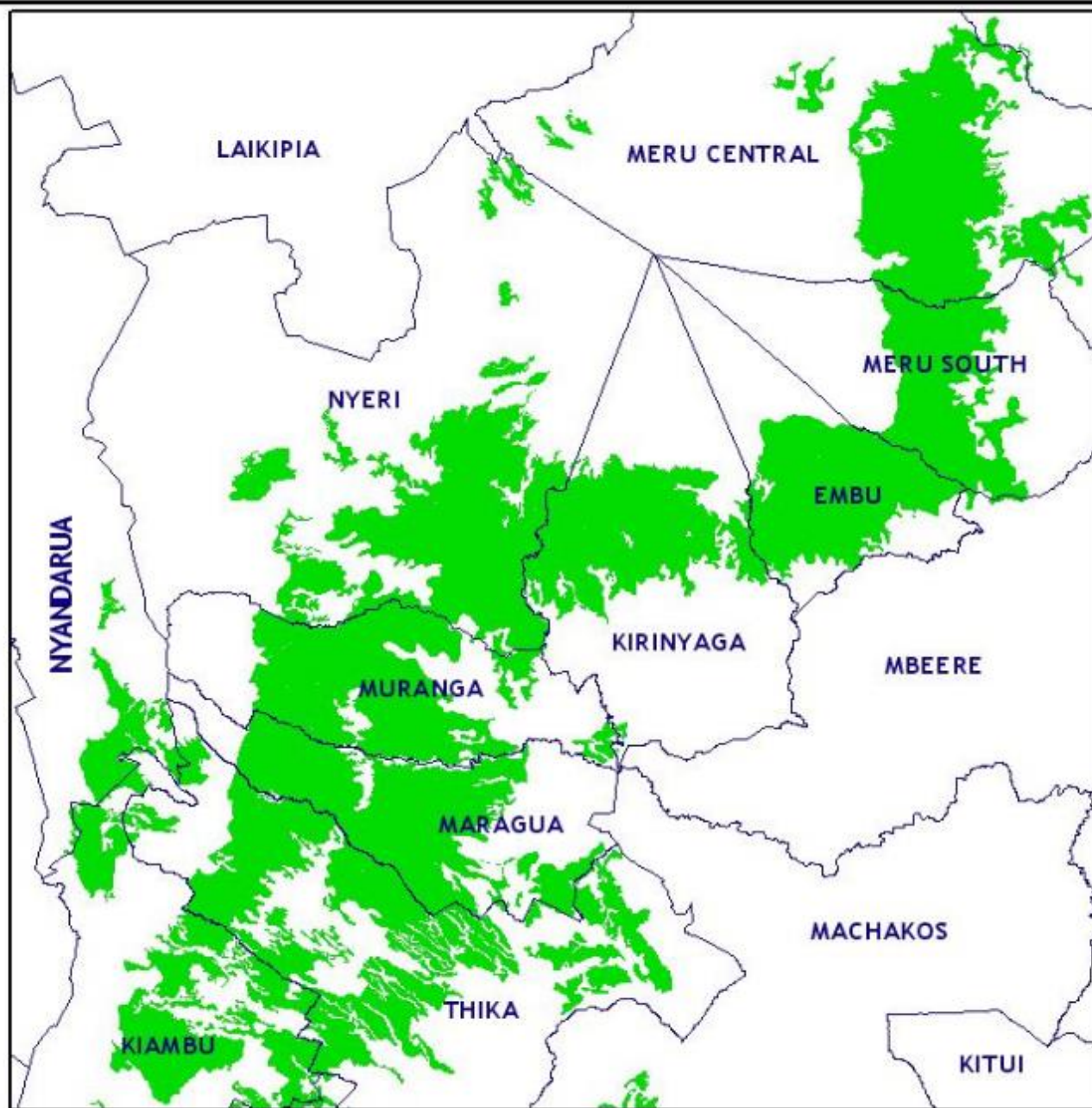


Target Zones and Coffee Farms of Kenya Activities up to October 2013





Kenya: Overall Coffee Growing areas

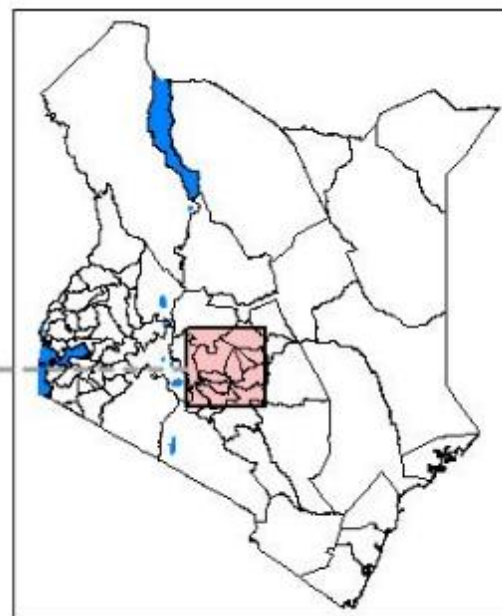




COFFEE GROWING AREAS IN CENTRAL KENYA

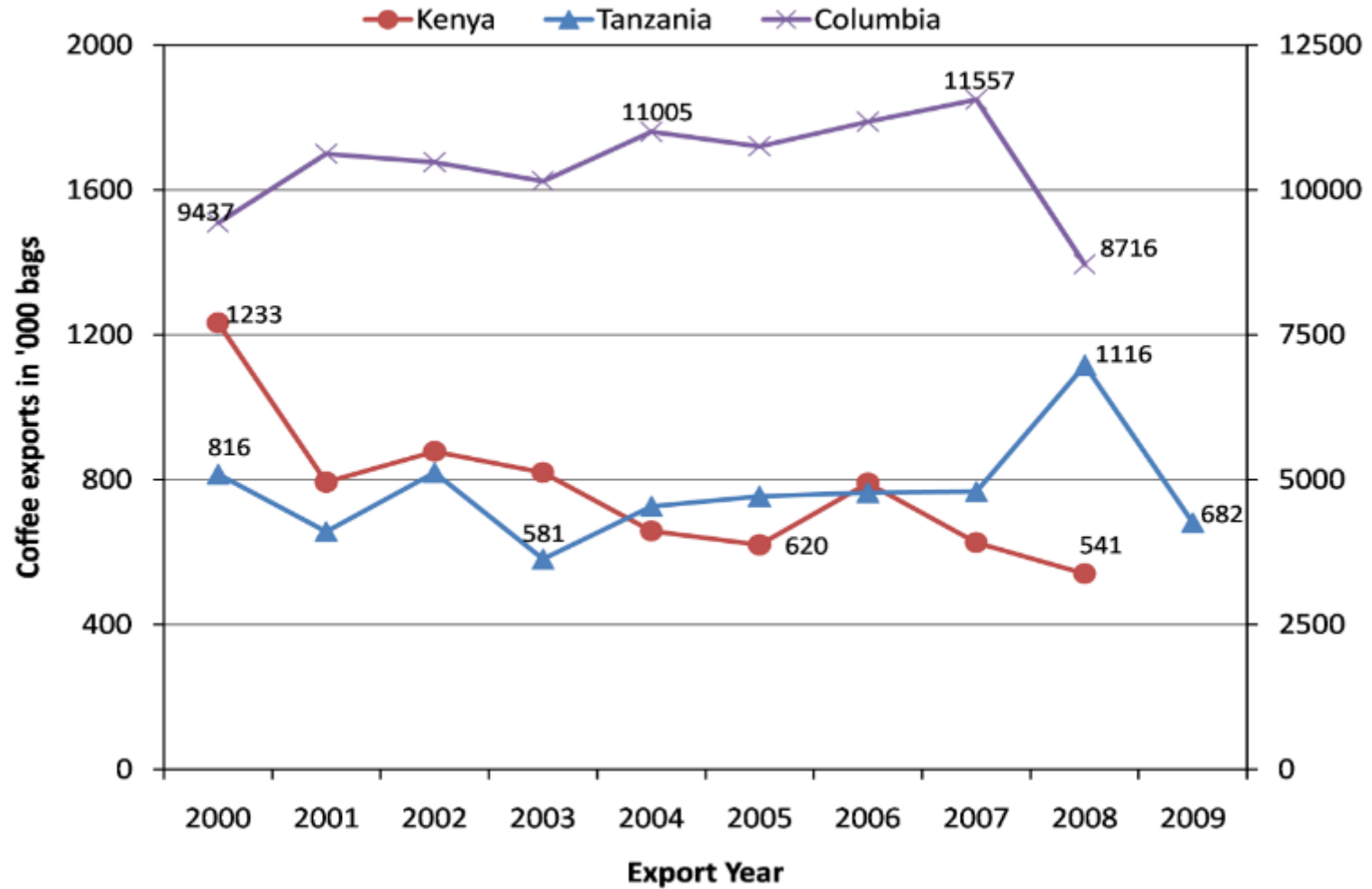
Key

-  District boundary
-  Coffee growing area



Kenya's coffee exports fell by over 50% between year 2000 and September, 2010; world market share declined from 3.1% in 1986 to 0.5% by 2010 (ICO, 2010).

Source: ICO statistics, 2010

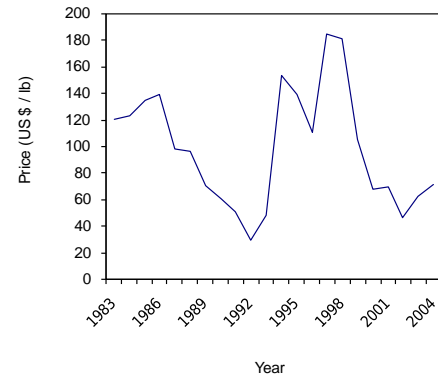


Columbian mild coffee exports by: Columbia, Kenya and Tanzania

Area and average yield of clean coffee by sector in Kenya (2005-2010)

| | Coffee Sector | 05/06 | 06/07 | 07/08 | 08/09 | 09/10 |
|----------------------|---------------|--------|--------|--------|--------|--------|
| Coffee area in Ha | Co-operative | 128000 | 121000 | 118000 | 120000 | 120000 |
| | Estate | 42000 | 42000 | 37000 | 40000 | 40000 |
| Production in tonnes | Co-operative | 27000 | 28400 | 22300 | 29400 | 22300 |
| | Estate | 21300 | 25000 | 19700 | 24600 | 19700 |
| Average yield kg/ha | Co-operative | 211 | 235 | 189 | 270 | 186 |
| | Estate | 506 | 595 | 532 | 616 | 493 |

Coffee crisis



↓
Inputs
(Fertilizers & chemicals)

- Introduction of trees in coffee plots
- Coffee food intercropping
- Manure

↓
Limiting Factors :
Diseases

↓
Agroforestry Systems



CBD

70-75% of production loss



CLR

40% of production loss

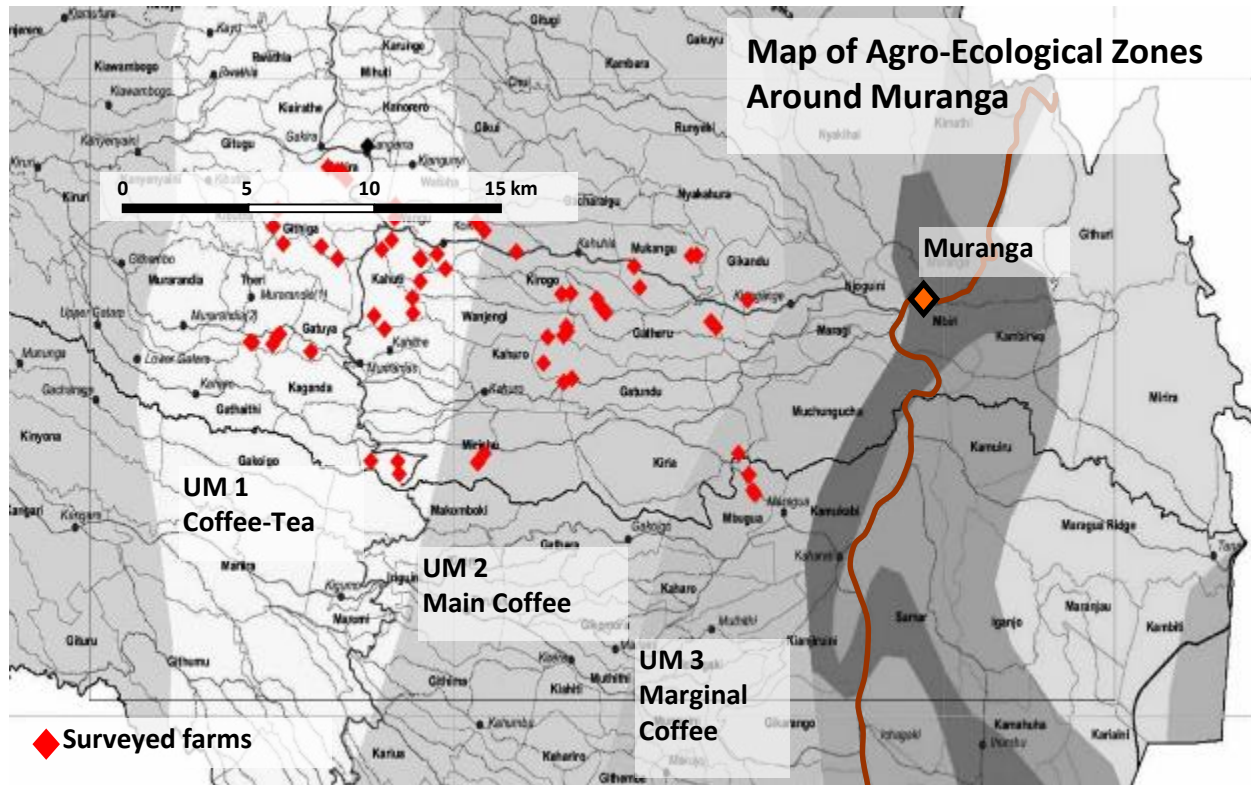


Farm and household characteristics:



- Mean farm size 0.6 ha (0.05-5.6 ha)
- Coffee plot mean size: 1600 m² (100-7000 m²)
- Household size: 5-6
- Mean age of farmers: 61 years (23-93 years)
- Education level: 18% no school, 43% primary school, 34% secondary school, 5% higher
- Full-time farmer: 79%
- Cattle : 79%

Research area: Muranga District (~700 inhab./km²)



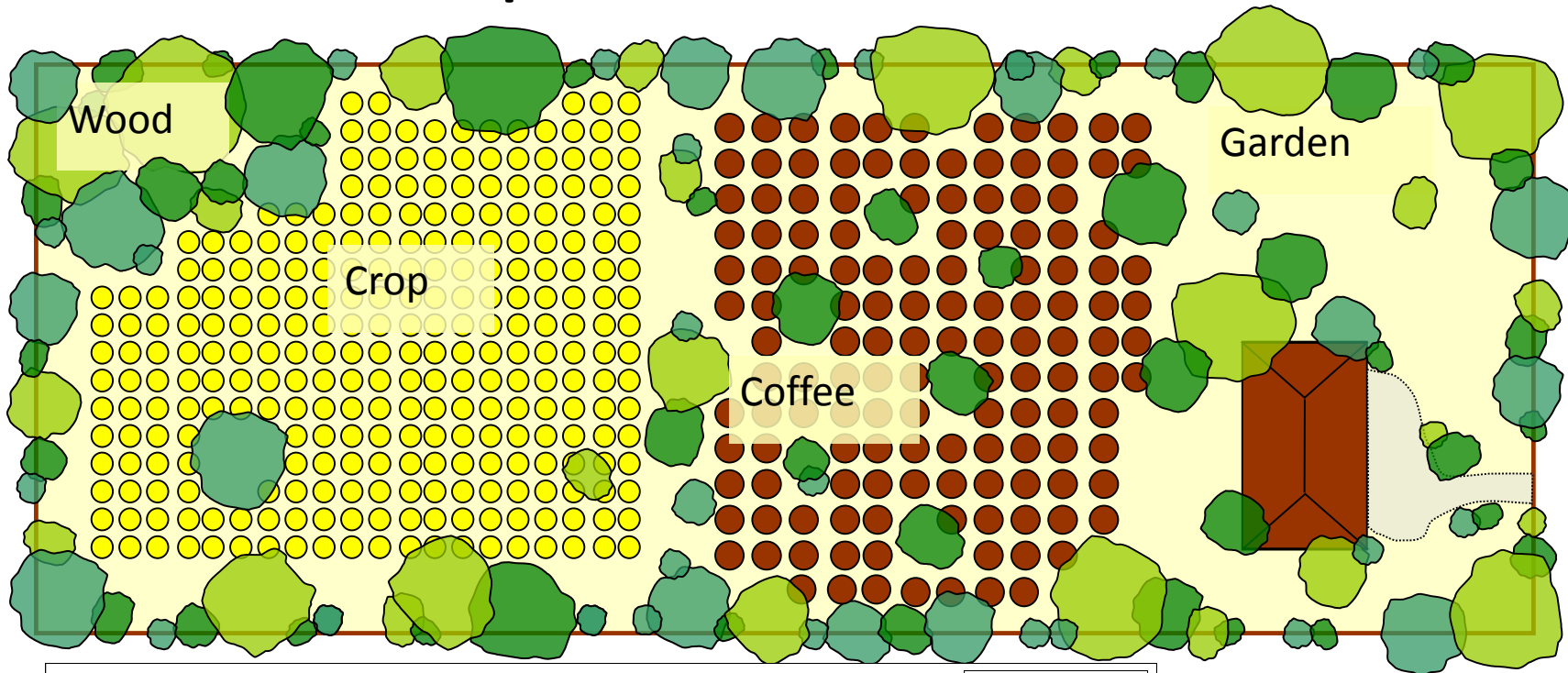
- Precipitation: 1200-2000 mm
- LUS: coffee agroforestry, mixed crop-livestock farming

| AEZ | Zone name | Altitude (m asl.) |
|------|-----------------|-------------------|
| UM 1 | Coffee-Tea | 1650-1960 |
| UM 2 | Main Coffee | 1340-1680 |
| UM 3 | Marginal Coffee | 1400-1450 |





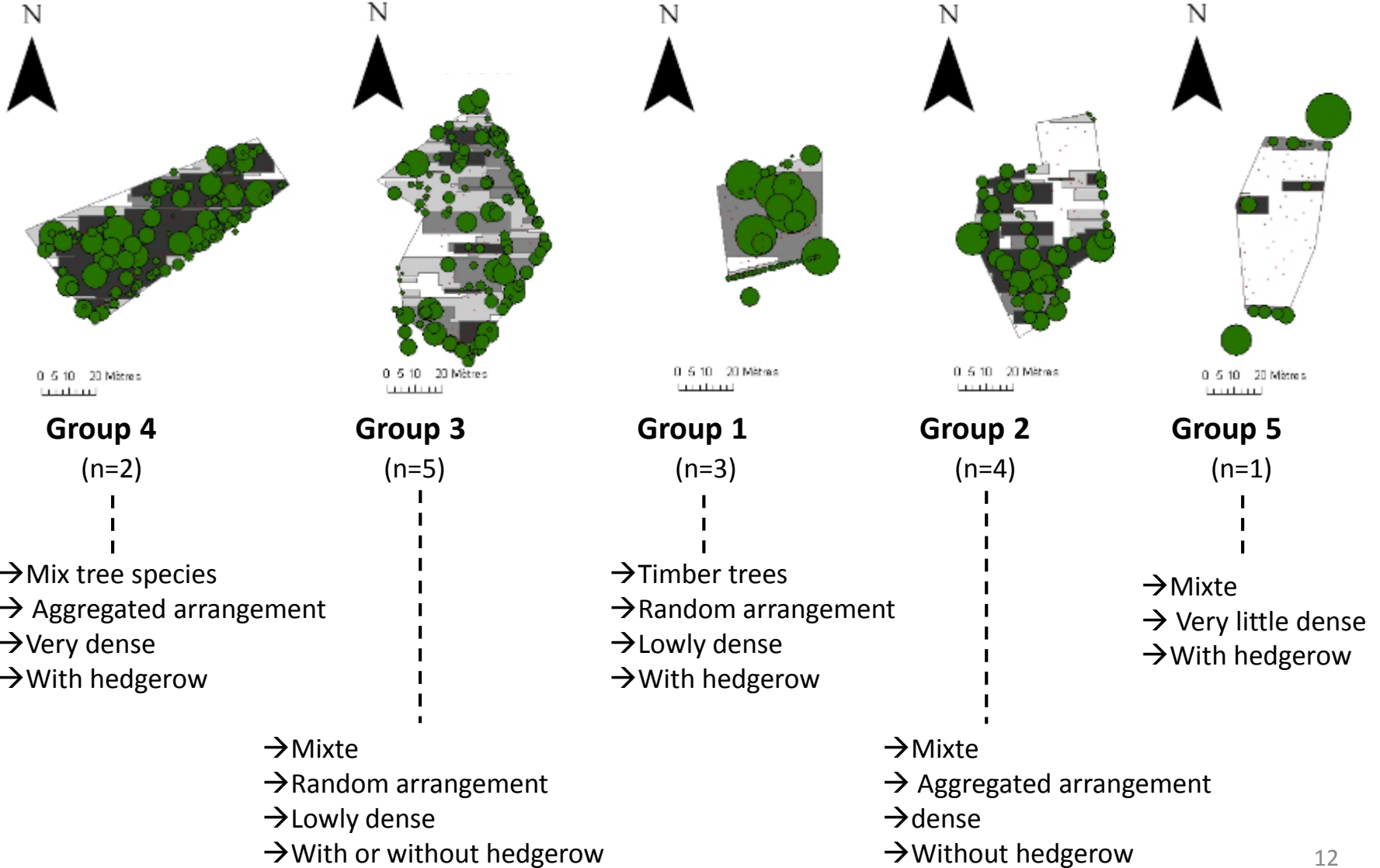
Zonation: Species



Indigenous spp.

TYPOLOGY OF Agroforestry Systems

« closeness/openness of plot »



Uses of the 10 most frequent tree species

Sites With Coffee

| Rank | Species | Services | Products | Frequency (%) |
|------|------------------------------|--------------------------|---------------------------------------|---------------|
| 1 | <i>Grevillea robusta</i> | Shade, mulch, wind break | Timber, firewood, fodder | 96 |
| 2 | <i>Musa paradisiaca</i> | Mulch | Fruit, fodder | 91 |
| 3 | <i>Macadamia tetraphylla</i> | Shade | Fruit, | 83 |
| 4 | <i>Persea americana</i> | Shade, mulch | Fruit, timber, firewood | 83 |
| 5 | <i>Mangifera indica</i> | Shade, mulch | Fruit, firewood, timber, charcoal | 57 |
| 6 | <i>Commiphora eminii</i> | Yam support, fence | Firewood, poles | 48 |
| 7 | <i>Eucalyptus saligna</i> | Wind break | Timber, firewood | 48 |
| 8 | <i>Eriobotrya japonica</i> | Shade, mulch | Fruit, firewood | 44 |
| 9 | <i>Croton macrostachyus</i> | Shade, mulch | Timber, firewood, charcoal, medicinal | 39 |
| 10 | <i>Croton megalocarpus</i> | Shade, mulch | Timber, firewood, charcoal, medicinal | 39 |

WP1

WP2

WP2-1 : Spatio-temporal dynamics of farming systems

WP2-2 : Evolution of rural households strategies and agricultural activities. Contribution of food crops and AFS to food security and well-being of farms

W2-3 : Modelling and prospecting at farm and landscape level

WP3-1 : Productive and environmental interactions between AFS and food crops at plot, farm and landscape levels

WP3

WP3-2: Pathways to improve synergies between AFS and food crops at plot and farm levels

WP4

WP4-1: characterization (biochemical) of the quality of AFS product at plot level

WP4-2: drivers of the quality of SAF product (at plot level and at first transformation)

WP4-3: analysis of the opportunity for eco-certification considering quality

WP5

Results scaling-up, comparison between sites, etc..

Technical, organisational and economical pathways at plot, farm and landscape levels to improve smallholders' food security and well-being.

Recommandations for public policy, agricultural research and rural development sectors

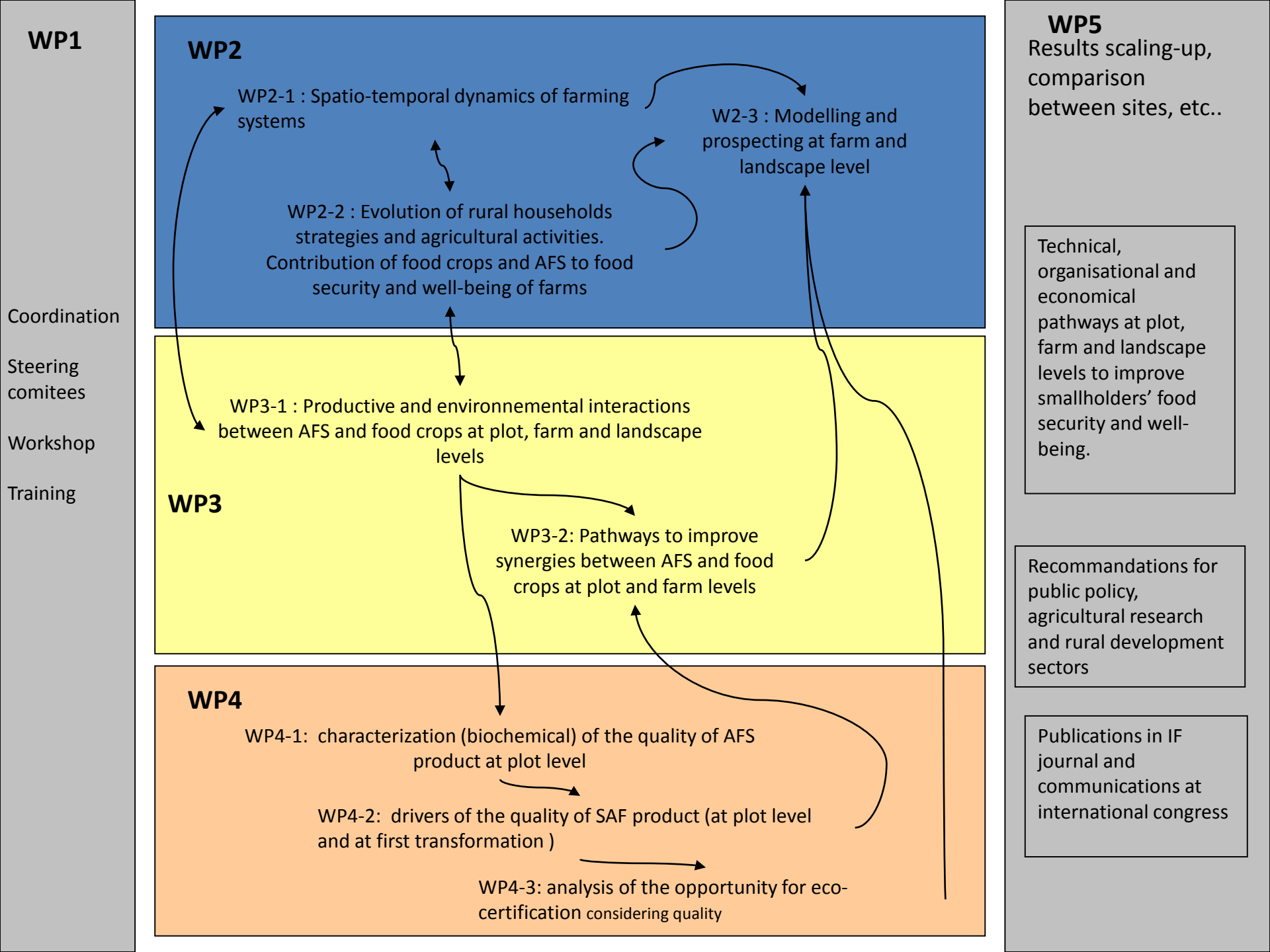
Publications in IF journal and communications at international congress

Coordination

Steering comitees

Workshop

Training



Network of Reference Farms



- ~100 farms (70)
- Description of cropping systems
- Inventory and position of trees in cropping systems, traditional knowledge and uses of tree species
- Sampling & analysis of soil OM (+ ~27 farms by CRF)
- Carbon stocks in cropping systems
- 2014 2 Msc on contribution of trees and manure on soil fertility

- Typology of farms and farming managements in terms of associations of the different cropping systems
- Contribution of agroforestry systems to the overall farm organisation and incomes,
- Typology of the various AFS, based on generic structural characteristics of each target zone and mapping of the distribution of the agroforestry plots in the landscape
- Agro-economic performances of a range of AFS and food cropping systems and their contribution to food security and farmer livelihood
- Synthesis of farmers' knowledge about use and physical attributes of tree species in target zone.
- Assessment of the tree diversity preserved in AFS and food crops combination at plot, farm and landscape levels

- Database of indicators on the plot structure for various agroforestry systems: number of species, number of dominant trees, canopy closure, cover fraction of the different classes of trees (shade, added-value, fruit, etc.), density, planting organisation, shading distribution ...
- Relationships between shade-level, tree-diversity and arrangement and management at plot level, analysis of their variability and their influence on the trade-offs between production and environmental services;
- Quantified assessment of pest and disease impacts on food and cash-crop production in AFS, in relation with management, tree diversity and arrangement and resulting microclimatic conditions;
- Effects of trees on soil fertility conservation in AFS containing food crops;
- Ranking and comparison of the drivers of AFS and food-crops trade-offs between production and services in each target zone















