APPROACHES TO INCREASE COFFEE PRODUCTION – SOIL FERTILITY MANAGEMENT

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Transition from a high yielding coffee before 1990s through the current productivity of below 3kg per tree

Before mid 1980s

After coffee liberalization – 1990s

Current Situation
Soil sampling and mapping

• Soil and leaf analysis service for 45 years provided to coffee growers by CRI

• GPS aided Soil sampling for fertility mapping by agro zones within counties

• Nutrient deficit corrective measures at agro zone and county levels

• Appropriate fertilizer formulations for the specific agro zones at macro-level regions

• Periodic 3-4 year monitoring, referencing to the original sample points

• Addressing need for soil amelioration/conditioning in the mapped areas

• Training farmers in identifying fertilizers for food crops and for coffee
GPS aided soil fertility mapping has been in progress aiming to cover all 32 coffee growing counties and establish plant nutrient deficits that are partly responsible for the declined coffee production.

The results are expected to yield region specific fertilizer recommendations at farmer, agrozone and county/region levels.

Equally, the results may find use in reformulating region specific fertilizers fully addressing the identified deficits.

The 7 counties covered include Meru, Embu, Machakos, Makueni, Uasin Gishu/Elgeyo Marakwet, Bungoma and West Pokot.
Fig 5: Nutrient deficit correction gap, me% including soil reaction and exchangeable acidity for Embu.

Fig 6: Available Phosphorus (P) deficit correction gap, ppm for Embu.

In summary, the results show that Phosphorus is deficient in all agrozones but more acutely in UM2 followed by UM1.
In Machakos County, the available phosphorus correction gap increases with agrozone and this is an indication of increasing coffee productivity potential with agrozone.
Phosphorous was found excessively available in Marakwet West, East and Keiyo North sub counties. This could have been attributed to the observed rampant use of DAP in this maize growing region where many times the crop was found interplanted with coffee.
UASIN GISHU COUNTY

Fig 11: Nutrient deficit correction gap, me% including soil reaction and exchangeable acidity for Uasin Gishu

Fig 12: Available Phosphorus (P) deficit correction gap, ppm for Uasin Gishu

➢ Like Elgeyo Marakwet, **soil acidity** and **Manganese** were found within the sufficiency zone in the sub counties of Kesses, Turbo and Eldoret West while **Potassium** showed notable deficit in the 3 counties. **Magnesium** was slightly in excess in all the 3 counties while Calcium was highly excessive.

➢ **Phosphorus** was excessively supplied in Kesses and Eldoret West sub counties and moderately excessive in Turbo sub county.
Plant friendly soil living organisms

• **Micro organisms** - aided nutrient extraction by plant roots like Mycorrhizae and rhizobium (N fixer)

• Raising population of the micro flora by fresh introduction of **organic matter**

• Utilization of **soil mycorrhizae** under farmer practice
Yield improvement through introduction of micro flora

Fig 3: Under full Farmer Practice (Kitale) – Manure included

Fig 4: Under Partial Farmer Practice (Kitale) – Manure excluded
Root Enhancing micro flora rich humus

- Rooting enhancement by mycorrhizae seeded in a humus enriched potting menu.

Plate 2: Mycorrhizae and Mizizi humus (+)  Plate 3: STD Potting Mixture
Plate 4: Root Mass

Plate 5: Shoot growth
At establishment stage. 11 month old raised by enriched establishment menu

Plate 6: 11 month old - rapid growth

Plate 7: Advanced Cropping – 13 months from planting
Use of agro forestry in coffee farming system

Various woody tree species have potential for soil fertility enhancement.

Important to consider tree species that would be properly managed for green manure, firewood, poles, fodder, bee forage, shade, nitrogen fixation, herbal remedies and nutrition in form of edible fruits and vegetables.

Plate 8: Shaded coffee plot. Source: Komothai Small Holder Farmer – J.M.Muhia
If genetically diversified families can feed on the same plate, WHY NOT KENYANS?

HAVE A GOOD DAY.