

BALANCED NUTRIENT MANAGEMENT

FOR SUSTAINED PLANTATION PRODUCTIVITY

INTRODUCTION

- Balanced nutrient management – a vital necessity to sustain productivity, profitability and soil health.
- Coconut, arecanut and cocoa require a continuous and balanced supply of major, secondary and micronutrients.
- Excess or deficit application in perennial crops, leads to nutrient imbalance, declining soil fertility and reduced yield.
- Therefore, farmers should follow balanced fertilization, organic residue recycling, bio-inputs, and fertigation.

PRACTICES TO ATTAIN BALANCED NUTRITION

1. Apply fertilizers as per the soil test based recommendations and avoid imbalanced fertilizer use.
2. Soil amendment based on soil PH: In acidic soils, dolomite or agricultural lime @ 1 kg per palm/year for coconut and 250—500 g per plant/year for arecanut and cocoa should be applied 15—30 days before chemical fertilizer application. In alkaline soils, apply gypsum as recommended by soil test results to ameliorate soil conditions.
3. Apply fertilizer in 2 splits under rainfed conditions during May and September, and four equal splits under irrigated conditions during September–October, December, February–March, and May.
4. Adopt fertigation where irrigation is available which can reduce chemical fertilizer requirement by about 25-50% while maintaining productivity.
5. Growing leguminous cover crops such as *Pueraria phaseoloides*, *Mimosa invisa*, *Calopogonium mucunoides*, cowpea, *Crotalaria juncea*, and *Sesbania aculeata* in coconut basins during the monsoon season helps improve soil fertility through biological nitrogen fixation and organic matter addition. These crops can contribute approximately 15—25 kg of fresh biomass and 100—200 g of organic nitrogen per basin. In arecanut gardens, cover crops can produce considerable biomass per basin such as *Mimosa invisa* (15 kg), *Stylosanthes gracilis* (9 kg), *Calopogonium mucunoides* (11 kg), and *Pueraria phaseoloides* (11 kg), *Sesbania aculeata* (12 kg) and *Mucuna bracteata* (14 kg) which may be sown during May—June and cut and incorporated into the soil during August- September. Seeds can be procured from National Seeds Corporation Centers.



6. Plant *Gliricidia sepium* in structured rows between coconut paths under coastal sandy soils. Pruning three times a year can produce about 8 tonnes green leaf biomass per hectare and substitute up to 90% N, 25% P and 15% K requirement. Growing *Gliricidia* as fence cum green manure crops in coconut growing regions would provide two tonnes of biomass per year.
7. Recycle fallen leaves, palm wastes, husk, coir pith and other biomass through mulching or vermicomposting. Vermicompost and vermiwash support soil health and plant growth.
8. Use suitable biofertilizers such as *Azospirillum*, *Phosphobacterium* and bio-inoculants such as Kera Probio, Cocoa Probio and AMF-based KerAM to improve root growth, microbial activity and nutrient mobilization. Biofertilizers can be procured from State Agricultural Universities.
9. Open trenches in between coconut palms and apply coconut fronds, husks, pruned materials, coir pith and other on-farm residues as mulch in the basins to conserve soil moisture and regulate soil temperature.



10. Adopt coconut/arecanut-based multi-species cropping systems with intercrops such as black pepper, nutmeg, banana, cocoa and pineapple for better resource-use efficiency and income stability.

11. Integrate dairy, goat or poultry units wherever feasible. Recycling of animal manure can substitute a major share of nutrient inputs and reduce external input cost.

12. RECOMMENDED ANNUAL NUTRIENT SCHEDULE

Crop	Farmyard manure	Green manure / leaves	Recommended chemical dose (N : P ₂ O ₅ : K ₂ O)	Secondary / special nutrient need
Arecanut	12 kg per palm per year	12 kg per palm per year	100 g : 40 g : 140 g per palm per year	Correct micronutrient/secondary nutrient deficiencies based on soil and leaf analysis. Use organic recycling, cover crops, biofertilizers and soil moisture conservation measures using available in-situ biomass.
Cocoa	12 kg per plant per year	Pruned biomass	100 g : 40 g : 140 g per plant per year	Apply need-based secondary and micronutrients as per deficiency symptoms/soil test. Use shade management, biomass recycling, Cocoa Probio and regular organic manure application.
Coconut	50 kg Farmyard manure or 30 kg Green manure		500 g : 320 g : 1200 g per palm per year	Apply 500 g magnesium sulphate per palm in magnesium-deficient areas. Apply fertilizers in two splits under rainfed condition and four splits in irrigated condition. Use soil moisture conservation with in-situ biomass and green manuring, recycling and fertigation wherever possible. Correct micro nutrient deficiencies as per soil test report or deficiency symptoms.

Note: These baseline recommendations should be refined using soil test values, local soil fertility status, soil pH, irrigation condition, crop load and visible deficiency symptoms.

AGRO-TECHNIQUES FOR SAVING CHEMICAL FERTILIZERS

Adopting the following practices can save the recommended chemical fertilizers and reduce costs.

- **Gliricidia manuring** can provide 8 t green biomass and substitute upto 90% N, 20% P and 15% K fertilizer recommendation in coconut.
- **Covering the basin with leguminous crops** generate 15-25 kg fresh biomass/basin and can add 100-200 g organic N.
- **High density multi-species cropping system** generates ~25 t of recyclable biomass annually and can substitute 65% of N & P fertilizer recommendation.
- **Integrated farming system** can substitute 100% of N & P fertilizer recommendations in coconut, and approximately 70% of K fertilizer recommendations in coconut, arecanut, and cocoa.
- **Fertigation** can reduce chemical fertilizer recommendation by about 25-50% while maintaining productivity.

Prepared by: Dr. V. Selvamani, Dr. P. Subramanian, Dr. Bhavishya A and Dr. K. Ponnusamy