

Further, the present fertilizer recommendations are mostly based on results of field trials carried out at research stations located at different agro - ecological zones. Fertilizer mixtures for all crops mainly consisting only of N P and K, but not for the secondary and micro nutrient levels in many cases. When we focus on fertilizer recommendation for coconut, at present there are two recommended fertilizer mixtures for Dry zone and Wet - Intermediate zone.

MODERN FARMING AND FERTILIZER USE

Intensive Cropping with high yielding varieties is a wide spread practice in modern agriculture. In that context chemical fertilizers are added as one of the yield gaining input. Farmers are often not aware of balanced nutrient management in obtaining high yield. Though farmers use high yielding varieties they rarely reach the potential yield from such crops as a result of poor fertilizer management.

SITE - SPECIFIC FERTILIZER RECOMMENDATION

Diagnosing of nutrient status through a systematic approach of a soil and subsequent application of balanced fertilizers to a particular site and to a particular crop/ cropping systems could be termed as site-specific fertilizer application/ recommendation.

SITE - SPECIFIC FERTILIZER FOR COCONUT

The productivity level of most existing lands are very low. One of the main reason for this low productivity levels is improper fertilizer management. The present blanket fertilizer recommendations are not tally with inherent spatial variability of soil. Therefore formulation of fertilizer recommendation for particular site is beneficial. Formulating fertilizer recommendations for coconut based on at least agro - ecological zone and soil series levels would probably be more beneficial.



Marginal Coconut Land

Soil analysis is the base for the site-specific fertilizer recommendation for all crops. Other than that leaf analysis could also be used. Identification of nutrient deficiency symptoms also give some idea about the soil fertility but deficiency symptoms may misguide and complex as they sometime appear as a result of multi-nutrient disorder eg: Chlorosis.

HOW TO IMPROVE FERTILITY

The effective means of enhancing soil fertility and achieving higher production at low cost with least environment hazard is through.

- 1 Site-specific fertilizer recommendation
- 2 Incorporation of organic matter into the soil

Adding of organic matter could be achieved through coconut based farming system where inter crops and animal husbandry are integrated. Farming system improves the soil fertility direct and indirect ways. It provides various type of organic matter which play a significant role in soil fertility improvement. It directly supplies nutrients in variably including micro nutrients, indirectly improves soil physical condition, chemical & biological properties.

Coconut integrated farming, addition of organic matter and application of site- specific fertilizer would increase the productivity of coconut lands. It would be economically viable, environmentally sound and sustainable .

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TRAINING PROGRAM ON SITE - SPECIFIC FERTILIZER USE IN COCONUT - INTER CROPPING SYSTEMS

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Conducted by:



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at
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As Fertilizer is a key input in modern agriculture, awareness and its management and knowledge on soil and plant nutrition is very important at farmer level. This brochure highlight soil characters and its variability, plant nutrition then innovative approaches for soil and fertilizer management in coconut inter cropping/farming systems.

SOIL

Soil is the weathered, fragmented unconsolidated outer layer of the earth crust which serves as the natural medium, for plant growth.

Soils in the earth crust is not uniform and properties are varied horizontally as well as vertically resulting wide varieties. Soils in Sri Lanka have been classified in to 9 orders and further subdivided into 26 soil types. At present these soils have been described up to series level based on differences of their properties and morphological characters.

Soil properties

Knowledge on soil properties is useful to farmers as their management could create a better condition for plant growth.

The important soil properties are;

Chemical properties (Cation exchange capacity, Soil pH, Electrical conductivity, Base saturation)

Physical properties (Soil texture, Color, Particle density, Bulk density, Structure, Water)

Biological properties (All living organisms, Organic matter)

These properties contribute invariably on plant growth by providing plant nutrients as well as soil conditions. Different soils have different capabilities to provide plant nutrients as well as growth promoting requirements like aeration and soil moisture. The inherent low fertility of major soil types of Sri Lanka have been identified as the key factor that limits agricultural crop yield.

Plant Nutrients

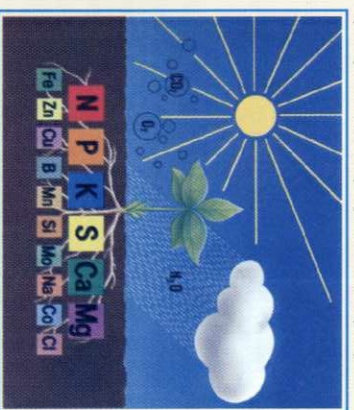
Plant nutrients are chemical elements that required by plants to complete their life cycle.

Nutrients are classified as,

1. Macro & micro nutrients based on the amount required by the plant.
2. Essential & Non essential nutrients based on the role of nutrients.

16 elements required by plants. They are;

Carbon (C), Hydrogen (H), Oxygen (O), Nitrogen (N), Phosphorus (P), Potassium (K), Calcium (Ca), Sulfur (S), Iron (Fe), Boron (B) Zinc (Zn), Copper (Cu), Manganese (Mn) Molybdenum (Mo), Chlorine (Cl), Sodium (Na)



Pictorial illustration of different plant Nutrient requirements

The amount of nutrients required by a plant varied depending upon type of the plant and growth stage (age) of the plant. The minimum and maximum levels of these elements present in plants on dry weight basis shows their different requirement for healthy growth.

FREE ELEMENTS

Element	min %	max %
Carbon (C)	30	45
Hydrogen (H)		6
Oxygen (O)	30	50

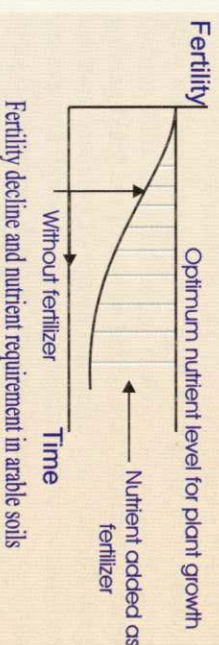
MACRO ELEMENTS

Element	min %	max %
Nitrogen (N)	0.2	4
Phosphorus (P)	0.3	3
Potassium (K)	0.3	3.5
Calcium (Ca)	0.1	10
Sulfur (S)	0.2	2

MICRO ELEMENTS

Element	Mini (PPM)	Max (PPM)
Iron (Fe)	20	100
Boron (B)	10	100
Zinc (Zn)	05	5
Copper (Cu)	01	25
Manganese (Mn)	05	50
Molybdenum (Mo)	0.2	1

PPM = Parts Per Million



In the long run the soil fertility of arable lands get declined due to removal of whole plant or a part of a plant as the harvest. Therefore it is very important to understand and maintain the fertility of a soil at satisfactory level at least by adding the amounts of nutrients which is removed as the harvest. Eg. Coconut remove greater amount of potassium as harvest, therefore K management is a key factor in coconut cultivation. In a sustainable system of agriculture, the other fertility improvement practices should also be adopted.

PRESENT FERTILIZER MANAGEMENT PRACTICES IN SRI LANKA

The present fertilizer recommendations for all crops recommended by respective institutions are blanket recommendations. The main disadvantage of blanket recommendation is that it ignores the spatial variation of inherent soil fertility. When the farmer adds fertilizer to their crops without understanding the soil fertility status of a particular site, it may sometimes lead to high nutrient losses as nutrient may be applied at levels more than the plant requirement. If not plant may suffer with deficiencies where the supplement of nutrient is below the plant requirement. Addition of excess nutrients is a potential risk on environment, a waste or some times harmful to the plants.