



INCREASE COCONUT PRODUCTION WITH FERTILIZER

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The coconut palm is a perennial with a life span of over 70 years, drawing all its nutrient requirements from the soil within the root zone, which is a limited area. Growth of the trunk and roots and leaf and nut production are continuous processes. For all these activities the palm draws nutrients from the soil. Only a small fraction of the nutrients taken up into the palm is returned to the soil by way of crop residues. Thus there is a continuous draw of nutrients which has to be replenished for the efficient performance of the palm.

Of the total nutrients that go into the coconut palm, a substantial portion is lost by the removal of leaves and nuts. None of these components (except perhaps husks) is returned to the soil in the case of coconut, thus depleting the soil considerably.

To maintain soil fertility, addition of merely an equivalent amount of fertilizer to the soil to replenish the nutrients removed by the palm

is not adequate. When fertilizers are added to the soil, they are sometimes made unavailable to the plant due to combination in the soil, leaching, erosion and escape from soil as a gas. Thus, it is quite apparent, that when fertilizing adequate amounts must be added to compensate for these losses and also to meet the requirements of the palm.

The life cycle of the palm has two stages: the growing stage and the reproductive stage. Their nutrient requirements vary. The correct fertilizer dosages have to be estimated and applied for profitable returns. In addition, the fertilizer requirements of coconut depends also on the soil type and the fertility status of the soil. In Sri Lanka, coconut is cultivated under a variety of soil types of varied fertility levels, in different agroclimatic conditions. Coconut is grown in the dry zone, experiencing one monsoon and a rainfall of less than 1300 mm as well as in the wet zone receiving both monsoons and a rain fall of more than 1900 mm.

In the dry zone, coconut soils are mainly sandy (Puttalam, Pallai, Mullativu, Batticaloa, Hambantota) whereas in the wet zone they are mainly lateritic gravel with an underlying hard pan at a depth of 60 to 150 cm (Colombo, Kalutara, Galle, Matara, Ratnapura and part of Kegalle etc.). These two groups of soils are poor in fertility. In contrast, the soils in the intermediate zone receiving rainfall of 1300—1900 mm consist, in addition to the coarse sandy and lateritic soils, deep loamy soils which are relatively fertile (parts of Chilaw, Kurunegala and Kegalle Districts).

The Coconut Research Institute has carried out carefully planned long term field experiments, to study the nutrient requirements of coconut and to formulate appropriate fertilizer mixtures. These investigations have revealed that in the majority of coconut soils, the essential plant nutrients Nitrogen (N), Phosphorus (P), and Potassium (K) are deficient, Magnesium (Mg) deficiency is also widespread.



Crown of a regularly fertilized palm.

The benefits of organic and/or inorganic fertilizer are immense. Some of the benefits are

- (I) Improved growth of the palms and early bearing.
- (II) About 75 percent of the young palms of the ordinary Tall variety, treated with a complete Nitrogen/Phosphorus/Potash (NPK) mixture were in flower in the fifth year after planting, whereas only 30 percent flowered in the plots without fertilizer.
- (III) Increased crops by 60 to 138 percent.

Palms growing in sandy loamy soils in Madampe area, gave the following yield of nuts per ha in the 15th year after planting.

- (I) 5930 without fertilizer
- (II) 10375 with the application of 2 kg NPK fertilizer per palm/year.
- (III) 14130 with 4 kg per palm/year.



Crown of a neglected palm.

In another fertilizer experiment, palms receiving of, 2 kg and 4 kg of a NPK fertilizer mixture annually yielded 7250, 11125 and 13375 nuts per hectare respectively in the eighth year. At this stage of the experiment the yields had stabilized and we could utilize this data to examine the economics of fertilizer use in adult coconuts.

Table 1 gives the comparative economics for the above data at four different farm gate prices ranging from Rs. 1500/- to Rs. 3000/- per 1000 coconuts.

Table 1

Criterion	Farm gate price per nut Rs	Rate of application of NPK fertilizer per palm per year		
		0	2kg	4kg
Yield per hectare	—	7250	11100	13400
Cost of application of fertilizer per hectare (Rs.)		0	1328	2176
Total	1.50	10875	16650	20100
Income	2.00	14500	22200	26800
(Rs.)	2.50	18125	27750	33500
	3.00	21750	33300	40200
Net	1.50	10875	15322	27924
Income	2.00	14500	20872	24624
(Rs.)	2.50	18125	26422	31324
	3.00	21750	31972	38024
Extra	1.50	—	4447	7049
Income due to	2.00	—	6372	10124
Application of fertilizer (Rs.)	2.50	—	8297	13199
	3.00	—	10222	16274

The results show that there is ample justification for the application of 4 kg of fertilizer as it brings in a greater profit than 2 kg.

Long term experiments have also shown that plots without fertilizers (control plots) showed

gradual decline in production with time, an indirect proof of the necessity to fertilizer.

For instance in an experiment at Bandrippuwa a yield reduction upto 70% has been recorded at the end of the 18th year.

At present, the Coconut Research Institute recommends fertilizer mixtures varying from 2.0 to 3.0 kg. per palm per year with Urea, and 2.6 kg or 3.8 kg with Sulphate of Ammonia, depending on the soil and agroclimate. These recommendations are given in another article.

It is pertinent to mention that cutting down or suspending fertilizer application on economic grounds can have disastrous consequences as it leads to a vicious circle of lower yields and therefore less money available for fertilizing in subsequent years.