305/C

Design and development of a power tiller operated fertilizer applicator for coconut cultivation

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Coconut palm is a perennial crop and spends its entire life span of 70 years or more rooted in one place. During this long period a palm removes a large quantity of nutrients and water through its bio-mass. If the soil is unable to supply the nutrients removed with the bio-mass, the palm will be starved of the relevant nutrients with subsequent decline in yield. Investigations carried out have shown that the majority of coconut soils in Sri Lanka are deficient in the major essential plant nutrients N P K. In certain areas, particularly in the wet zone Mg has also been found to be deficient. In the early stages fertilizers should be applied close to the palm on the weeded surface up to a distance of 1 foot from the base, and the soil turned over with mammoties or mammoty forks, As the palm grows older, the area round which fertilizer is applied should be gradually extended up to about 1.75 m from the bole.

Unfortunately, it is observed that consumption of fertilizers by the coconut sector is very low due to high charges and scarcity of labour.

The purpose of mechanisation in the coconut cultivation is to produce more from existing land. Machinery is a complementary input required to achieve higher land productivity. Additional benefits to the user may be associated with a reduction in drudgery of farm work greater leisure, or reduction of risk.

Use of manpower for the application of fertilizer is uneconomical due to high labour cost. Therefore, power tiller operated fertilizer applicator for coconut cultivation was designed and constructed. This machine is not only useful to broadcast fertilizer on the soil but also to mix it with the soil close to the palm on the weeded surface.

The designed machine consists of fertilizer distribution unit and rotary unit. The Maximum spreading width in meter and Machine discharge rate in gr/min were considered as criteria for comparison of merits and demerits. The results show that the Maximum spreading width and Machine discharges rate were 0.7m, and 150 - 230 gr/min, respectively. The cost of production of the designed power tiller operated fertilizer applicator was 10,000 rupees.

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