

MEASURES FOR SATISFYING THE VITAL NEED OF INCREASED COCONUT PRODUCTION

M. de S. LIYANAGE
COCONUT RESEARCH INSTITUTE,
LUNUWILA.

INTRODUCTION

Coconut is an essential food crop, providing 20 percent of the per capita calorific requirement in the diet of Sri Lankans. At the rate of 120 coconuts consumed by a person over the year, it is estimated that nearly 80 percent of the total coconut crop is consumed locally. To cater to the increasing demand for coconuts in the local market as well as meeting export requirements, production of coconuts has to be increased by at least 3.5 per cent annually. The prevailing prices of coconuts and coconut products should be an incentive for the growers to increase production. Unless immediate steps are taken to increase production, not only will the local price of coconuts continue to increase, but coconut will gradually cease to be a major export crop which provides valuable foreign exchange to the country.

The Agronomist is often sceptical as to whether adequate measures have been taken by the majority of coconut growers to achieve the highest possible nut yields from their plantations. There are three principal ways by which coconut production of existing plantations could be increased.

1. By adopting improved management practices to alleviate adverse effects of drought.
2. By encouraging the use of inorganic and organic fertilizers.
3. By replanting senile plantations with selected and improved planting material.

DROUGHT EFFECTS AND THE NEED FOR MOISTURE CONSERVATION

In recent years, frequent droughts have become a recurring feature in the agro-climate of Sri Lanka, particularly in the Intermediate and Dry Zones. As coconut plantations are maintained under rainfed conditions, rainfall is considered the most important factor influencing the yield of coconuts. Uncertainty in the distribution pattern of rainfall, particularly in the Intermediate and Dry Zones where more than half the coconut acreage is found, results in more frequent drought periods. A drought period is referred to as the period receiving less than 50mm of rainfall per month. Moisture stress caused by the drought is mainly responsible for a considerable loss of the potential coconut yields as button and immature nuts fall. Drought also markedly reduces both the number and size of nuts. It has been shown that by eliminating moisture stress, it is possible to achieve at least a 25 per cent increase in production.

In view of the continuous bearing habit of the coconut palm, the majority of growers are inclined to adopt a 'lethargic approach' in the management of their plantations. A complete appreciation of improved practices will undoubtedly help to step up production. Conservation of moisture in coconut lands appears to be an essential management practice, especially in Kurunegala and Puttalam Districts where the annual rainfall is irregularly distributed. In high rainfall areas, coconut palms do not normally respond to rains over 35 mm in a month and the surplus rain water would be lost as run off. In sloping and undulating lands moisture conservation is necessary to reduce run off and increase infiltration, thereby preventing drying of the top soil. Proper management of water derived from rains is therefore important in reducing drought effects on the nut yield. It has been observed that in estates where regular moisture conservation measures were taken, palms have stood the drought much better than others and yielded satisfactory crops all the year round. This emphasises the usefulness of adopting soil moisture conservation measures in coconut lands.

UTILISATION OF HUSK

This is perhaps the best method of conserving soil moisture and reducing the effects of drought. There is ample evidence to show that husks do trap a lot of water that would otherwise be lost as run-off. It is claimed that coconut husk can absorb about six times its own weight of water and

that the beneficial effects of burying husks last for about 5-7 years. Husk burial is particularly beneficial in gravelly and sandy soils but should not be encouraged on lands subject to water logging. The method that is widely adopted is to bury the husks in pits alternately arranged along the coconut rows. For a husk pit of 2.4 x 1.2 x 0.9m dimension dug against the slope of the land, about 600-800 husks are required and should be arranged in layers with spongy concave side facing upwards, alternating with a layer of soil. The topmost layer of husk is placed with convex side facing upwards and finally covered with the remaining soil. In large estates, husk trenches 2.4 m wide, 0.45 to 0.90 m deep and of convenient length could be opened up, preferably in alternate avenues between coconut rows. Husk burial should be done with the commencement of rains and the pits or trenches should be closed after the rains have ceased. Since coconut husk has a high Carbon/Nitrogen ratio, which is not conducive to bacterial growth, it would be desirable, particularly in sandy soils to grow a leguminous cover crop on top of the husk mound and well supplemented with phosphate fertilizer.

Another advantage of utilising husk in coconut lands is that it provides a valuable source of potash to the palm, provided husks are stored in the shade without being exposed to heavy rains. It is estimated that on average about 100,000 husks contain potash equivalent of one ton of muriate of potash. The contribution of potash from husks appears to be particularly valuable in lateritic soils where potash absorbing capacity is high. It is also believed that potash regulates the water economy of the palm by promoting the development of a large root zone and increasing water uptake, thereby inducing a certain amount of drought tolerance to the palm.

COVER CROPPING

Cover cropping has been successfully practiced for conservation of moisture on coconut lands. Once established, a well managed cover crop often acts as a live mulch, reducing evapotranspiration, smothering weeds and increasing infiltration of rain water. Besides, leguminous cover crops help to enrich the soil with biologically fixed nitrogen, equivalent to about 150 kg N/ha.

Cover crops suitable for coconut lands should have a vigorous growth habit, covering the ground rapidly during rains and producing seeds profusely towards the end of rainy season. With the onset of the dry period, the cover should die back completely forming a thick mulch of dried leaves on the soil surface but re-establish from the seed bank with the onset of next rains. Among leguminous covers, CALOPOGONIUM MUCUNOIDES and MUCUNA UTILIS (Wandhuru ma) are more suitable for light soils in all agro-climatic regions, whereas PUERARIA PHASEOLOIDES and PSOPHOCARPUS PALUSTRIS are more suitable for heavy soils in the semi-wet and semi-dry regions. To obtain a satisfactory cover, seeds should be first treated in hot water (75°C) for about three minutes and soaked in water overnight. About 5 kg. seeds/ha are required when sown in 30 cm. rows or 8 kg/ha when broadcast sown. To promote vigorous growth and spread of the cover, it should be supplemented with P and K fertilizer.

MULCHING

Mulching is another efficient method of conserving moisture on coconut lands, particularly in areas subject to periodic Droughts. Mulching with a layer of coconut husks placed with convex sides facing upwards, coconut fronds without butt ends, fibre dust and paddy straw, about 30 cm away from the base of palms upto a distance of 2 m, helps to reduce evaporative demand, increase infiltration and suppress weeds. Husk mulching is particularly beneficial on gravelly soils but should not be encouraged on sandy soils. Also, fibre dust can absorb as much as eight times its weight of water and thereby increase water holding capacity when incorporated into hard lateritic soils.

GREEN MANURING

The majority of coconut growing soils such as sandy and lateritic soils are deficient in organic matter, which is considered very essential for increasing the water holding capacity of soil and also for obtaining the maximum benefit from the application of inorganic fertilizer.

Sun hemp, both cultivated and wild species, are the most suitable green manure crops for growing in situ on coconut lands, capable of producing 10-15 tons of green matter/ha. The green matter yield could be increased substantially by the application of 250 kg. super phosphate/ha. Shrub legumes

such as ipil-ipil (*Leucaena*), *Gliricidia* and *Tephrosia* could be easily cultivated along estate boundaries to provide an additional source of organic matter for incorporating into the soil with the onset of rains.

In sloping and undulating lands, construction of husk bunds (crescent bunds) around each palm, contour bunds and drains helps to retain run-off water and increase infiltration. Crescent shaped husk walls should be built on the lower side at least 1.5 m. away from the palm. A leguminous cover crop may be established on top and inside edge of the husk bund.

USE OF FERTILIZER

Past records reveal that not more than 25 per cent of the total acreage of coconuts are regularly fertilized. In recent years, use of fertilizer has been further reduced to about 18 per cent, owing to the high cost of inorganic fertilizer and due to the threat of nationalisation. In the past, a mere 14.0% increase in the acreage fertilised has given a 34 per cent increase in coconut production. Although coconut palm is capable of giving such a high yield response to fertilizer application, use of fertilizer on coconuts lags far behind those of tea and rubber.

Unless the quantity of nutrients removed by the palm is regularly replenished, the production would decline considerably. Among the major nutrients, potash is the dominant requirement of the coconut palm. Therefore every effort should be made to encourage the use of inorganic fertilizer on coconut plantations and step up production. Owing to the high cost of inorganic fertilizer, increased production should be attempted by getting a higher acreage regularly fertilized with a quantity even below the recommended dosage, say 2 kg of urea based fertilizer mixture per palm, rather than insisting on the optimal fertilizer dosages. From the national point of view, application of a sub-optimal dosage of fertilizer over a large acreage will ensure higher returns per unit investment.

Furthermore, addition of 25-50 kg. dried cowdung or compost per palm will not only improve the efficiency of applied fertilizer but also increase the water holding capacity of soil by about 6-10 times. Organic fertilizer also adds nitrogen to the soil equivalent to about 400 kg. N/ha and could be easily blended with fibre dust to improve the water hold-

ing capacity of soil still further and promote conservation of moisture.

REPLANTING/UNDERPLANTING

It has been estimated that about 15 per cent of coconut plantations are becoming economically unproductive (senile) annually. Generally, plantations over 60 years old showing progressive decline in yield up to 20 nuts/palm/year are considered as senile. Apart from senility, cyclone and pest damage cause a considerable loss in coconut production over the years. As it will take at least 10 years to realise economic benefits from replanting/underplanting, it should be treated as a routine management practice on coconut lands. The progress of replanting/underplanting has, however, lagged behind the expected annual targets. The threat of nationalisation and want of capital are major reasons attributed for the slow progress in replanting. Since there is limited scope for opening up new plantations, replanting/underplanting of senile plantations and dud palms in favourable areas should be given priority.

Replanting/underplanting with selected and improved high yielding coconut seedlings is certainly a necessary step towards increasing production in the future. According to observations, selected tall and tall x tall seedlings (CRIC 60) are suitable for the main coconut growing areas, whereas planting of dwarf x tall hybrid seedlings (CRIC 65) should be undertaken in wetter areas in the Districts of Colombo, Gampaha, Kegalle, Galle, Matara and parts of Kurunegala. Deeper planting of seedlings, say 60 cm below ground level will result in a greater tolerance to drought. In hard lateritic soils, it would be advantageous to plant seedlings in cruci-form planting holes (90 x 90 x 90 cm by 45 x 45 x 45 cm) and add 2-3 kg. of common salt, to promote development of a larger root system and thereby induce a certain amount of drought tolerance in the palm.

Once the seedlings are transplanted, proper care and attention should be given if they are to bear early and heavily. Seedlings should be provided with temporary shade for a period of 2-3 years until they are well established, and kept weed free and mulched up to a distance of 1m. Regular fertilisation with a young palm mixture (YPM) and supplementary irrigation during dry periods will result in a rapid vegetative growth, early flowering and higher yields in subsequent

years. Pitcher irrigation, especially in the dry areas with sandy or sandy loam soils is a cheap and efficient method of supplying water to young palms.

It would appear that the important decision to replant/underplant largely depends on the size of holding and financial status. A large estate for instance can afford to phase out its replanting programme. In small holdings, however, the only way to encourage replanting is to introduce catch cropping with annuals and semi-perennial food crops, providing a regular source of income until the trees start bearing.

OTHER MEASURES FOR INCREASING PRODUCTION

Although information available in Sri Lanka and elsewhere is limited, there are clear indications of the many advantages of supplementary irrigation as an aid to increase production. Provision of irrigation can be expected to minimise effects of moisture stress during drought and increase nut production, especially in the Intermediate and Dry Zones. For instance, application of 373 litres of water to mature palms once a week during the dry season has increased the nut yields by 25-30 per cent in the Intermediate Zone. Further, copra content of nuts could be increased by 46 per cent by irrigation.

A major drawback to the provision of supplementary irrigation in coconut lands is the heavy capital outlay involved. The introduction of a subsidy scheme, such as the one launched by the Coconut Development Authority, to encourage construction of deep wells for coconut lands in Kurunegala and Puttalam District is a useful step to overcome this problem.

Tapping of young palms for sweet toddy, especially in the main coconut belt poses another threat to increased production. A well managed young coconut plantation comes into peak bearing in 10-15 years from transplanting and will continue to bear heavily until the age of 45-50 years or so. Age of tapping the existing young plantation should be therefore checked and brought under strict legislation, if we are to achieve a further increase in coconut production.

†

CONCLUSION

If the growers are to meet the challenge of steadily increasing local and export market demand for coconuts, it is absolutely essential that they take adequate measures to increase production from existing plantations. Among the incentives provided for increased production are a cash subsidy for replanting/underplanting, new planting, rehabilitation, and for husk pits and cover cropping. Availability of coconut fertilizer mixtures at reduced prices, supply of selected and improved coconut seedlings at subsidised rates and facilities to obtain agricultural credit from state banks are the other incentives.

The steps discussed above will no doubt afford a useful aid for maximising production in coconut lands and maintaining the market price of coconuts within the means of the average consumer.