DRIP—A NEW METHOD OF IRRIGATION IN ARECANUT

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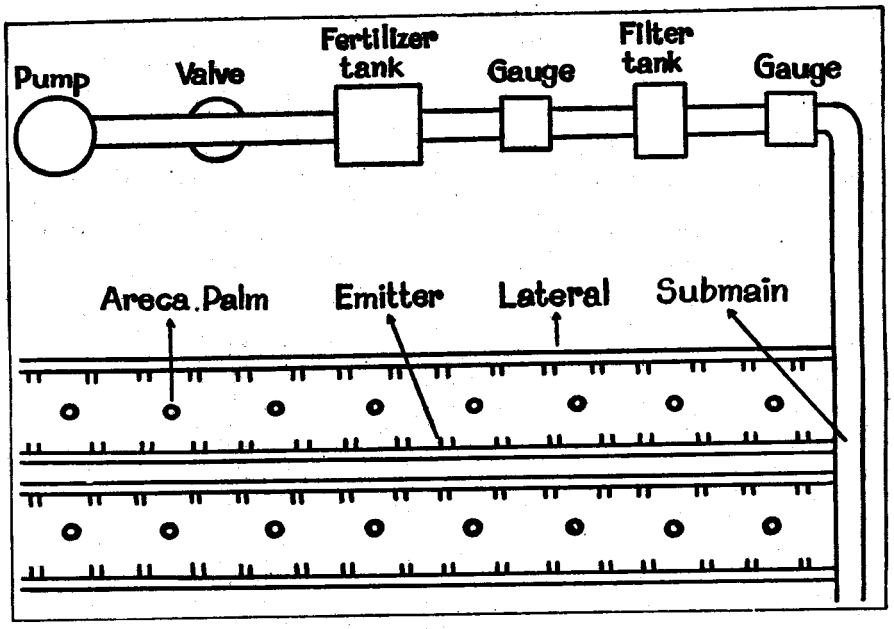
IRRIGATION is an important factor for growing arecanut in the dry-zone regions. Arecanut is a commercial crop whose water requirement is high. The crop is acclimatised to high rainfall areas. If the rains are not well distributed, resort has to be taken to irrigation. It is reported that the yield of arecanut more than doubles up by the application of irrigation. But water too is costly which is vital input in arecanut growing regions of the country. In west coast of India, where more than 50 per cent of arecanut is cultivated, rainfall is confined between June and November. Monsoon is followed by a prolonged summer generally extending from November to May. Excess of evaporation due to high amount of incoming radiation, faster rate of wind speed, greater vapour pressure gradient in the above ground atmosphere and rise in temperature are the regular features of summer in these regions. As the temperature and evaporation rates increase, the evapotranspiration also increases which compels the areca growers to provide supplementary irrigation. During summer the sources of water namely, tanks, wells, streams and rivers dry up altogether and scarcity of water is a common feature in most of the years. If the monsoon is delayed the situation further aggravates.

Irrigation practices as adopted at present by areca growers are of low efficiency. In the conventional method of irrigation by flooding and splashing, the plants take up only 50 to 60 per cent of water that is applied. If the water is plentiful and labour is not too costly, the conventional method of irrigation may be of advantage. In regions where water is in short supply, drip irrigation has been recognised as a promising technology for managing water and increasing its efficiency.



Diagramatic representation of drip irrigation. It improves the efficiency of irrigation and increases productivity.

In drip irrigation, water is applied to the soil at a very slow rate, drop by drop. The system consists of a head which includes a pumping unit to create required pressure, a filter unit to remove the suspended impurities of water, a fertilizer tank to dissolve water soluble fertilizers and bring the solution to the supply line on laterals. The laterals which convey water from the head to the trickle line is of plastic tubing with nozzels to drip water in small quantities.

Drip irrigation supplies plants with the precise amount of water they need. Just enough water is delivered to the root-zone of a plant to replenish the amount consumed in evapotranspiration which is far more efficient than wetting an entire field. In traditional irrigation methods there is a relatively short period of infiltration followed by a long period of redistribution, evaporation and extraction of water by the plants. That causes large time-fluctuations in the soil water contents during the irrigation cycle and the plants grow without stress in an environment of favourable moisture. It also maintains the soil moisture tension at an optimum level for crop growth.

In drip irrigation, since the interspaces between the rows of plants remain dry, the loss of water by evaporation is much less. Run-off and percolation loss arising in traditional methods of irrigation are also minimised. Reduction of loss of water by evaporation and run-off supply of water to the most efficient root zone, and a reduction of water

uptake by weeds are some of the means by which wastage of water is eliminated.

Weed control. These days with the energy supply becoming more limited and expensive, drip irrigation is more advantageous as this requires comparatively low operational pressure. Another feature of the trickle irrigation system is the reduced cost of weed control. This is so because weeds grow only in the wetted spots and weed control may be achieved through the irrigation water. The use of weedicides through the irrigation system offers an answer to weed problems under drip irrigation. It is also possible to use soil fungicides in an irrigation system to combat root rot fungus.

Higher yields. Drip irrigation frequently brings about larger yields and more uniform growth of the crop as approximately the same amount of water is applied to every plant in the yield. It requires little preparation on layout of land for irrigation purposes and is adopted to a wide variety of soil types and terrains.

Dilution of nutrients. Drip irrigation also makes the maximum beneficial use of fertilizer. Applying soluble fertilizer directly through the drip irrigation installation not only achieves a more accurate and even dilution of nutrients but also reduces costs by eliminating the loss of fertilizers by leaching and volatilisation. The system also eliminates the environmental problems associated with the contamination of underground water by agricultural chemicals. Moreover, the plants never experience fertilizer burns in a drip system because the chemicals in the fertilizers are greatly diluted before they reach the plant.

Plugging of holes and meters are some of the problems of the system of irrigation. Clogging of nozzles can impair the efficiency of distribution of water. The low pressure, small orifices and low velocity of flow are main causes for clogging. It is caused by small dissolved particles of the water or by slime that collects around the orifices or inside the tubes. It can be avoided by filtering with screen and sand filters.

At the Central Plantation Crops Research Institute, Regional Station, Vittal, a drip irrigation system was installed during 1979-80 to arecanut with the three levels of fertilizers, namely 50 per cent 75, per cent and 100 per cent as recommended dose of N, P_2O_5 and K_2O. Water was supplied at the rate of 8 litres per palm per hour and to each palm four emitters were provided from four sides at a distance of 25 cm away from the base of the trunk. The system was operated for two hours daily which supplied 16 litres of water per palm per day and 112 litres per week as against 200 litres of water per palm per week in the conventional method of irrigation.

Drip irrigation improved the soil water regime by minimising the fluctuation in the soil water content. It reduced weed growth in the garden. Significant yield increase was also obtained. Palms received irrigation by drip system which had higher percentage of fruit set and had better vigour and growth. There was a saving of more than 50 per cent of irrigation water.