

DRIP IRRIGATING COCONUTS

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DRIP RESPONSE

In the October 1982 issue of the Indian Coconut Journal, an article under the heading "Coconut response to Drip Irrigation" had covered some basics of this technology. Not much could be reported at that early stage in terms of response. Today with many trees in Mahabalipuram and Vandalur developing spadix, and some of them with nuts also (with even the stem not yet fully formed, within 3½ years of planting) it is exactly the type of response that was expected from drip irrigated plants. What is even more amazing is the response of the 16 and 17 year old 2300 coconut trees, within three months of changing to drip system of irrigation, at the Yekediyar Farm on the old Mahabalipuram road. The trees were yielding hardly 30 nuts per annum on an average and many trees among them had not developed even a

spadix so far. But the three months of drip irrigation, with water constraints restricting the drip irrigation per tree to only 60 litres every third day (when actually they should have been given double this quantity on the basis of ET during these summer months) have yet shown almost a miraculous response. All trees are looking so much healthier and lush and appearance of spadix (quite a few on each) uniformly on all the trees in summer - a phenomenon never observed on them for the last 17 years, not even in the rainy season - has brought considerable cheer to the owner, who has spent a lot of money and effort to bring up the farm from its inception. The size of nuts has improved so drastically that they were on the verge of stopping the drip irrigation for fear that the stalk would yield under the weight. Fertilizer experts were taken to the farm to assure them that with adequate phosphorus

and potash application, this fear could easily be overcome.

The response of 10-year old coconut trees at the Srirama-krishna Vidyashala, Mysore, to drip irrigation over the last five years is most spectacular. All trees have started yielding large sized 120 to 150 nuts per tree per annum. In terms of the very sparse yields known from these very same trees over the many years before drip, and considering the current prices for coconuts, nearly any investment on drip irrigation system would have been justifiable.

PROBLEMS IN MOST COCONUT PLANTATIONS

By a reference to the regular feature "You ask, We answer" in the Indian Coconut Journal it can be easily inferred that almost 80% of the problems with coconut trees is caused by lack of irrigation or under-irrigation. The myth that old coconut trees

will develop deep roots to reach the water table is, perhaps, true to the extent that coconut trees do not die so easily in drought conditions. In such unirrigated trees or trees that suffer from lack of rainfall which give deplorably poor yields the effect of irrigation for a few months in the year is ample testimony to the fact that controlled and adequate irrigation can dramatically change the response from coconut trees almost anywhere. The first significant response was observed in late 70s in the Sri Ramakrishna Vidyasala in Mysore, where old coconut and sapota trees started giving heavy yields and the quality of nuts and fruits improved so markedly. Ever since not one drip system on coconut has failed to produce similar results.

CONVERTING OLD TREES TO DRIP IRRIGATION

Experiences of farmers and field workers reported from all over the world of old trees responding to the change over to drip irrigation technology are too many to recall. The significant ones are:

(1) 200-year old vines in Argentina, which were on the verge of being destroyed (to be replaced by young plants) were rejuvenated within a few months of establishing drip irrigation system on them.

(2) 17-year old olive trees, near Mersa Matrouh in Egypt, were struggling to exist, without any yield. Within one year of being put on drip irrigation system supplied from India, the trees changed to a lush growth with olive fruits all over.



With not even the stem fully formed yield of nuts has started on 3½ year trees on drip irrigation in sandy soils

(3) Oranges (loose coat) in Pannaikadu (Kodaikanal) existed only as shade trees for coffee for 15 years, yielding very poor quality (ping-pong ball size) fruits subject to heavy shedding. These 65 trees were equipped with drip irrigation system and the dramatic response was such (size improving to a cricket ball

size with considerably less shedding and plenty of orange peel) that the farmer now treats his coffee as incidental crop and oranges as main!

(4) A block of Packham's Triumph pear trees in Australia were on sprinkler irrigation from 1952 to 1970. They were then

converted to drip irrigation, with one point dripping, located one metre from the trunk and delivering 9 litres/hour. This extremely harsh drip scheme still produced no water stress on the tree and fruit load, fruit size and shoot growth were maintained. Root development had completely shifted to the revised limited soil volume that was being wetted by drip.

(5) In the Goulburn Valley in Victoria, Australia, eleven-year old peach trees were converted to drip irrigation with two wetting points per tree. In four years, the yields improved beyond earlier years and the trees continued to grow vigorously in spite of the poor condition of the soil in general except the two wetted zones.

A CASE FOR SPREADING THE BENEFITS OF THIS TECHNOLOGY

There are large stretches of old and new coconut plantings

along the east coast, most of them struggling to exist. The water needs per plant under drip technology is amazingly low and so any water source already established could be fully optimised by installing a well-designed drip irrigation system as can be seen in Mahabalipuram and the three or four much smaller installations working on this same coastal road. When the soil lacks organic matter and is even half as sandy as in Mahabalipuram there is very little choice if results are to be achieved other than adoption of drip irrigation.

PERFECTION IN SYSTEM DESIGN AND INSTALLATION IMPORTANT

Establishing a successful and trouble-free drip irrigation system is very high technology requiring expertise in hydraulics, agronomy, effect of soil analysis and water quality on the system, fertigation technique using the drip system,

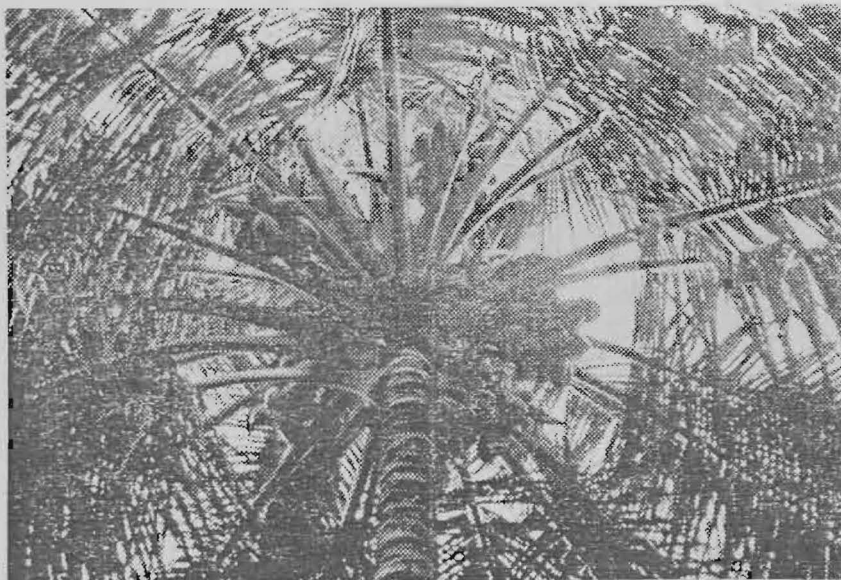
and a host of connected variables. Once the system design is properly made by a competent team of specialists, and more importantly, it has been properly installed, the operation of the system is the simplest and can be successfully run by the most uneducated personnel. Responsibility for maintaining a system and, especially training the operating personnel on simple do's and don'ts are most important.

SYNERGISTICS OF FERTIGATION THROUGH DRIP SYSTEM

The easy and flexible opportunity afforded by the drip system to inject nutrients in diluted and sustained dosages is an excellent agronomic benefit available to the plant. The right fertilizer at the right stage of the plant growth is so simple to inject through the irrigation system. No other known method of nutrient application is as inexpensive to adopt and totally effective. Savings of expensive nutrients of the order of 25-30% is achieved by cutting down losses by leaching and also by wasteful sharing with weeds.

COST BENEFIT ANALYSIS

The optimization of coconut response by drip irrigation system on both new and old trees can not be improved upon by any other technology. Almost all environments are created to plant for it to come out at its best. The water use efficiency helps the coverage of new 3 to 4 times the number of trees with the same water source. The cost of the system varies from Rs. 65 per tree to about Rs. 100.



Development of regular spadix on all the 2300 struggling 17-year old trees in Yekediar farm - response to 3 months on drip irrigation

tree. This depends on the quality of water, vis-a-vis the irrigation requirements, the proximity of water source to the plantation, contour complications involved, planting geometry, etc. To justify this capital investment you need only an incremental yield per annum of 30 to 40 nuts per tree, which will pay back the Rs. 120 so soon within one year of yield. Perhaps even less if you take into account the almost doubling of the size of the nuts that has happened in all the well maintained farms, in addition to exploiting the full genetic potential of the palm. The costs that are saved (which is not so apparent to the not so well seasoned farmer) are the

labour for whatever other irrigation practices, fertilizer application, soil operations, etc., employed (This alone was Rs. 500 per week in the Yekadiyar Farm - yet with such poor results). An improvement in water use efficiency to as much as 80% and more results in pumping energy savings.

CONCLUSION

Drip Irrigation Technology is intensely result-oriented and has brought about revolutionary changes to the agricultural economy of Israel, Mediterranean Islands, like Crete, Cyprus, etc., not to speak of Australia, U. S., etc. Adoption of a less expen-

sive indigenous version is imperative for a large variety of crops in India. Recognising this, the Government of India has come out with a scheme of subsidy for drip irrigation installations (this still needs a lot of streamlining of procedures) and NABARD (National Bank for Agriculture & Rural Development) are keenly under-writing the advances of commercial banks to this technology to reduce the interest rates to around 12%. Every farmer who postpones the implementation of this almost inevitable technology is going to lose the benefits for so much longer.

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