

RAINFALL AND CROPS*

By V. ABEYWARDENA

BIOMETRICIAN

Coconut Research Institute

Introduction

The habitat of the coconut palm, is essentially a tropical one. It flourishes in the hot lowlands with plenty of sunlight and clear skies ; a mean temperature of 80°F and a small diurnal variation not exceeding 10-12°F ; an annual rainfall not less than 50 inches and the absence of pronounced dry spells. However, apart from generalising, we are yet not in a position to assess the exact influence of these climatic factors on the growth and yield of the coconut palm. Therefore, in this talk, we shall restrict ourselves to a consideration of the effect of only rainfall on coconut crops.

Rainfall and Crops

Basically, the influence of rainfall on coconut crops, is similar to that of any other plant. Therefore it is desirable that we consider the influence of rainfall on plant life in general before we understand the peculiar needs and responses of the coconut palm.

Importance of Water.—Of the dominant factors controlling plant life (viz. warmth, light, water and plant nutrients) water, due to its importance as a vehicle for plant nutrients and as a regulator of photosynthetic activity, is recognised as the indisputable key factor in plant growth.

Source of Water.—The main source of water for plants is rain ; really it is that portion of rain which is held against gravity by the soil as soil moisture (or capillary water) less any moisture lost through evaporation from the soil. Water may also be brought to the plant by irrigation or by subterranean movement.

Maximum Transpiration—Maximum Growth.—If we accept as axiom that maximum growth requires maximum transpiration, then rainfall needs to be adequate both from the point of view of amount and distribution. On the other hand excessive rain concentrated within a short period of time can lead to serious soil erosion and the leaching out of essential plant nutrients ; and in low-lying areas, water-logging can be definitely harmful to plants on account of poor aeration and root rot.

Coconuts and the Weather

This general picture giving the source, availability, intake and function of water with respect to the growth and the consequent crop of a plant, applies equally to the coconut palm, but with this difference that while other plants may be satisfied with good rainfall within a particular

*Lecture to Trainees on Coconut Cultivation.

season to ensure a good crop, the coconut palm on the other hand requires uniform rainfall throughout the year; even a short period of adverse weather is reflected in the succeeding crops.

The reason for this is not far to seek. The coconut palm is a perennial producing inflorescences (or potential bunches) at the rate of nearly one per month and each of these inflorescences has a cycle of development lasting nearly one year before the bunch is ready for picking. The situation then will be that at any particular time of the year, there will be (approximately) 12 bunches on the palm at different and equally spaced stages of development; and consequently if the supply of water falls short of the demand at any time in the year, at least 12 bunches will be affected to a greater or lesser degree, depending primarily on the susceptibility of the stage of development of a particular bunch.

Let us now examine this aspect of the susceptibility of the different stages of development of a bunch of coconuts. Each bunch of coconuts from the time of inflorescence to its maturation comes under the impact of a full twelve month's weather cycle of its own and the final yield will be the reflection of the cumulative effect of this impact. In actual fact, although each bunch is influenced by a twelve month's weather cycle, the weather changes during the whole twelve months do not affect a bunch to the same degree. This is because in the cycle of development of a bunch, there are certain critical phases which are extremely susceptible to weather changes, others which are less susceptible and yet others the susceptibility of which is negligible.

Our investigations show that for a particular bunch the first three months from inflorescence (i.e. the period covering the setting of female flowers and the infancy of nuts) are extremely susceptible to weather changes.

Thereafter the weather can affect the yield only by way of immature nutfall or deterioration of the quality of nuts—the extent of the damage depending on the state of maturation of the particular bunch and on the intensity and the duration of adverse weather conditions. The figure gives the typical susceptibility curve for a bunch of coconuts. It will be observed that after the phase of maximum susceptibility, there is a steep drop of the susceptibility, becoming negligible by about the eighth month. Thereafter the weather has a bearing mostly on the quality of nuts and not on the number of nuts.

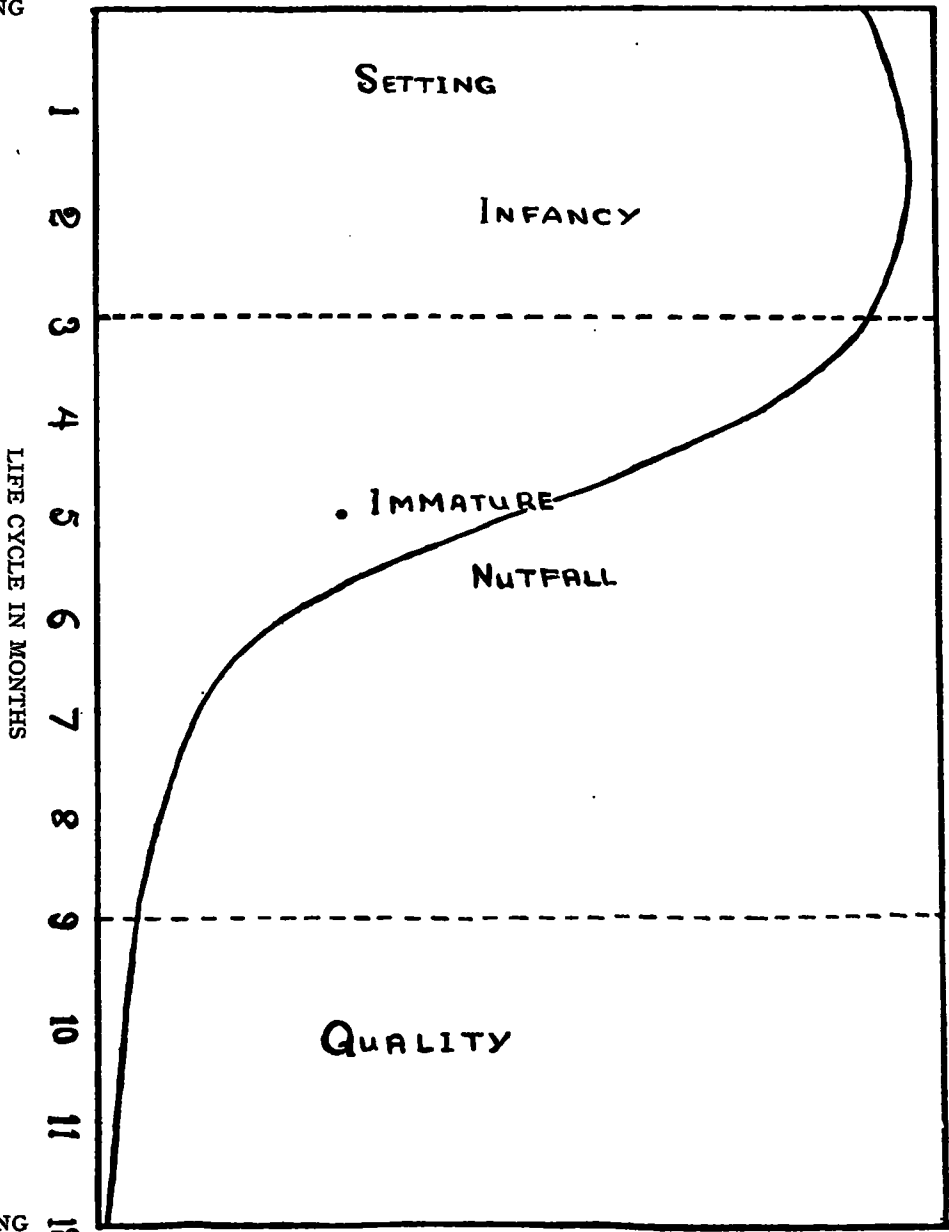
Working on a yearly basis, it is found that the current year's crop is decided mainly by the rainfall during the previous year and the first quarter of the current year. This is so because all bunches would have completed their setting and passed their infancy of development before March of the current year. The rainfall after March of the current year is less likely to affect the current year's crops except in so far as its probable influence on the quality of the nuts and that too will in all probability be restricted to the fifth and sixth picks of the current year.

Generally, the usefulness of rainfall, for a perennial like coconuts, will depend more on its distribution than on the total quantity. The concentration of rainfall within a short period is a sheer waste, if not harmful because once the soil is at field capacity, any further rain will only drain down as gravitational water and will not be available to the plant. Rain must be

SUSCEPTIBILITY

FLOWERING

THE SUSCEPTIBILITY CURVE OF A BUNCH OF COCONUTS



evenly spaced and the spacing should not be too narrow as to cause a waste of water and not too wide as to cause on undue depletion of soil moisture.

Conclusion

It must be remembered, however, that rainfall alone, even if the optimum conditions of amount and incidence are realised, cannot ensure a good crop. Although water is the key factor, there are yet a host of other factors that regulate the water intake by plants. The storage of available water as soil moisture will also depend on the topography and soil texture; and soil evaporation will depend on the vapour pressure gradient, the soil temperature and the plant cover. The intensity of transpiration will depend on the wind, the temperature and humidity of the air and on the plant itself. Moreover there are other dominant factors for plant growth to contend with, such as light, warmth and plant nutrients. We should really have a clear idea of the interplay of all these factors before it is possible to bring some sort of exact control over their influence on crops.

If we limit ourselves to a couple of these factors, we can say that the ideal for coconut growing will be a uniform annual rainfall (say over 50 inches) with a little rain and bright sunshine occurring in swift alternations with emphasis on the absence of pronounced dry spells.

RAINFALL, CROPS AND EXPORT STATISTICS

By V. ABNEYWARDENA

Biometrician

TABLE I

Rainfall—First Quarter 1954 and 1955

	January		February		March		Total 1st Quarter	
	1954	1955	1954	1955	1954	1955	1954	1955
Lunuwila (B/E) ..	4.84	1.28	2.06	1.36	12.82	3.49	19.72	6.13
Madampe (R/E) ..	6.70	0.94	1.12	1.03	8.30	3.18	16.12	5.15
Giriulla ..	10.57	1.58	3.75	0.68	13.89	7.69	28.21	9.95
Kudawewa ..	7.42	1.58	0.48	0.69	7.49	5.02	15.39	7.29
Tirukkivil ..	4.41	14.77	5.82	19.02	5.42	5.31	15.65	39.10

TABLE II

Crops—First Quarter 1954 and 1955

	Crops per palm (nuts)						Crops per acre (nuts)					
	1st Crop		2nd Crop		Total of 1 and 2		1st Crop		2nd Crop		Total of 1 and 2	
	1954	1955	1954	1955	1954	1955	1954	1955	1954	1955	1954	1955
Lunuwila	10.7	11.0	8.8	14.1	19.5	25.1	707	689	579	888	1,286	1,577
Madampe	9.3	9.6	11.2	13.1	20.5	22.7	574	587	677	805	1,251	1,392
Giriulla	6.3	9.3	9.2	10.5	15.5	19.8	373	543	545	611	918	1,154
Kudawewa	7.6	6.3	7.7	8.2	15.3	14.5	465	375	467	488	932	863
Tirukkivil	4.2	2.3	2.1	3.8	6.3	8.6	290	158	146	263	364	421

TABLE III
Exports—First Quarter 1954 and 1955

	1st Quarter 1954		1st Quarter 1955	
	<i>cwt.</i>	<i>Nut Equivalent</i>	<i>cwt.</i>	<i>Nut Equivalent</i>
Copra	99,434	24,858,500	135,840	32,960,000
Coconut Oil	278,087	112,972,844	342,587	139,175,969
Desiccated Coconut	168,692	58,198,740	228,116	78,700,020
Fresh Coconuts	—	1,231,210	—	1,642,901
Total	—	197,261,294	—	252,478,890

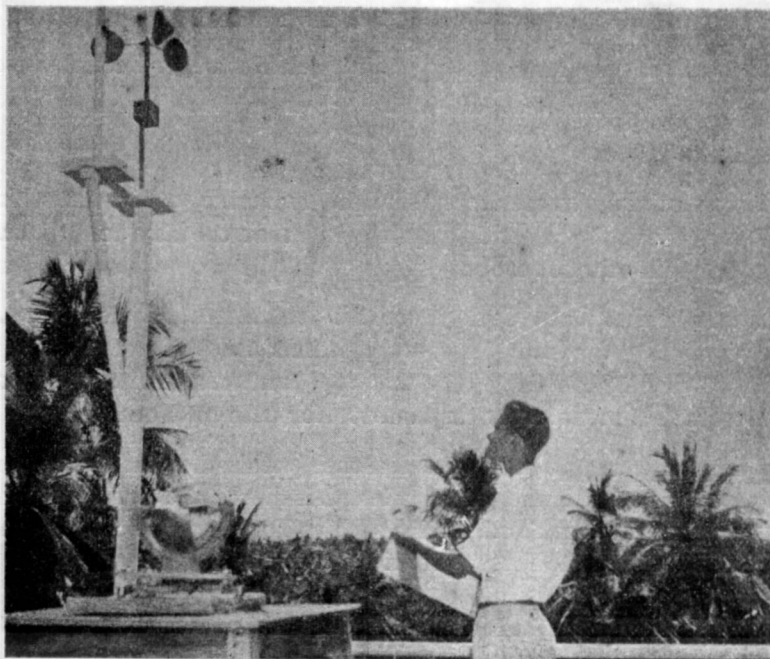
Per cent increase of exports in 1955 as against 1954—28 %

Conversion Factors used :—1 ton of Copra = 5,000 nuts (1,250 nuts per candy).

One ton of Oil = 8,125 nuts (61.5 per cent oil expression).

One ton D/C = 6,900 nuts (325 lb. D.C.N. per thousand nuts).

Lunuwila, 16th July, 1956.



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