INFLUENCE OF WEATHER AND CLIMATE ON COCONUT YIELD

D. T. Mathes
Coconut Research Institute, Lunuwila

Water is essential for plant growth. Lack of adequate soil moisture results in poor yields. Under these circumstances, the palms are unable to achieve their potential. Prolonged droughts have been common in the recent past, resulting in considerable crop losses.

Although the coconut palm exhibits a wide tolerance to climate and weather, there is evidence of moisture stress even in the high-yielding coconut belt in Sri Lanka. This is purely due to the fluctuation of rainfall. A study of the correlation between weather and yield shows that a well distributed rainfall results in a good crop in the following year. Similarly poor distribution of rainfall inevitably reduces the yield in the following year.

The large annual fluctuation of coconut crop due to changes in weather is one of the most disturbing features in management. Very often, however, it is not possible to relate this entire fluctuation directly to the past rainfall.

In this regard, it is necessary to recognize the long reproductive cycle of coconut and consequently, a bunch of coconuts during its development cycle faces the vegaries of weather at all stages of development. A normal healthy coconut palm produces on an average, one mature bunch of coconuts monthly. The development cycle of a bunch is about $3\frac{1}{2}$ years from the primodial stage to the maturity, as shown in Fig. 1 .

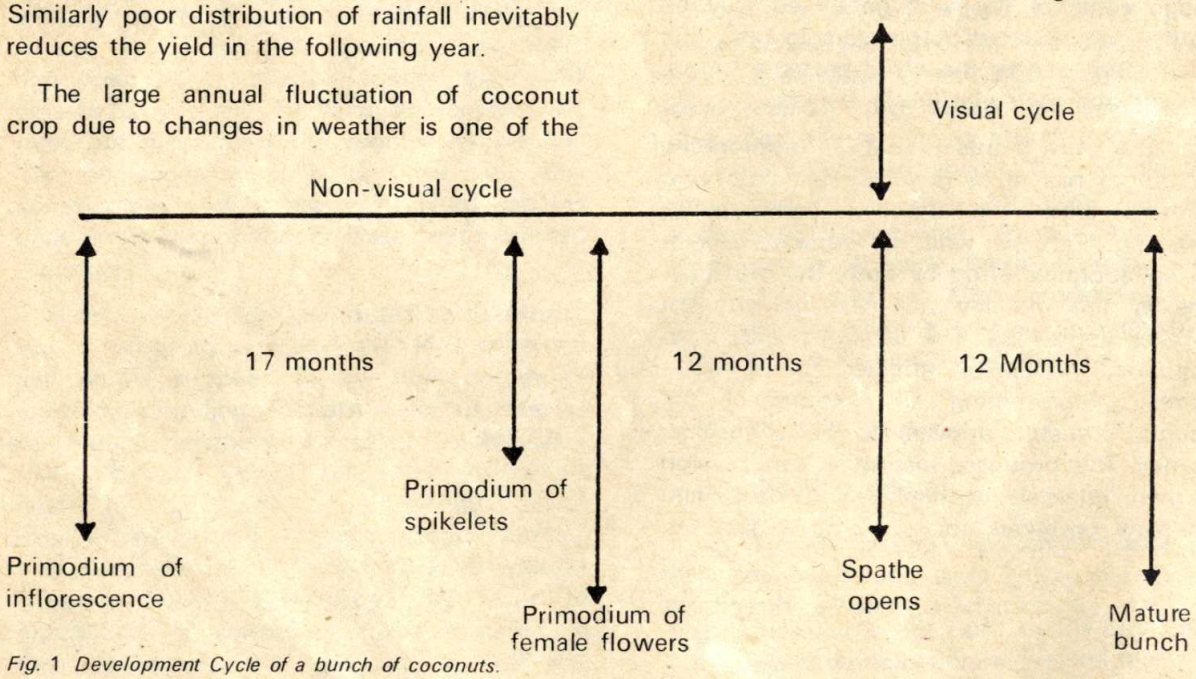


Fig. 1 Development Cycle of a bunch of coconuts.

The adverse environmental conditions affect the different stages of the coconut bunch causing partial loses of its potential crop. The severity of crop loss depends on the stage of development and the severity of weather conditions.

The number of nuts picked at a given harvest will depend on a number of factors whose magnitudes are determined at various stages of development. These factors are (1) the number of inflorescences that emerged during the two month period approximately a year before (2) the number of female flowers or potential nuts these inflorescences carried (3) the setting of these female flowers and (4) the immature nutfall at different stages of the development of the bunch.

The seasonal variation of immature nutfall is perhaps the result of the occurrence of these periods of moisture stress. Yet, different observers have given different explanations as to the causes of seasonal immature nutfall. Some believe that immature nutfall occurs during the drought. Some maintain that immature nutfall occurs during light showers. Yet others maintain that the first rains following a drought cause immature nutfall. It is perhaps pertinent to note here that all these observations are correct.

While there could be immature nutfall due to moisture stress, rain immediatly after a long spell of dry weather can also bring about nut fall. The sudden reduction in temperature due to rain is thought to cause a physical contraction in the immature nut causing it to snap form the spikelet.

Also, continuous rain encourages the growth of fungi that are implicated in nutfall. All these factors contribute towards nutfall: the intensity of each of the factors depends on a variety of environmental conditions.

Mature nutfall is another factor which, though not classified as a crop component, is of no less importance to the coconut grower, especially the absentee land owner. Coconut are harvested at two monthly intervals. Some bunches mature before the harvest and

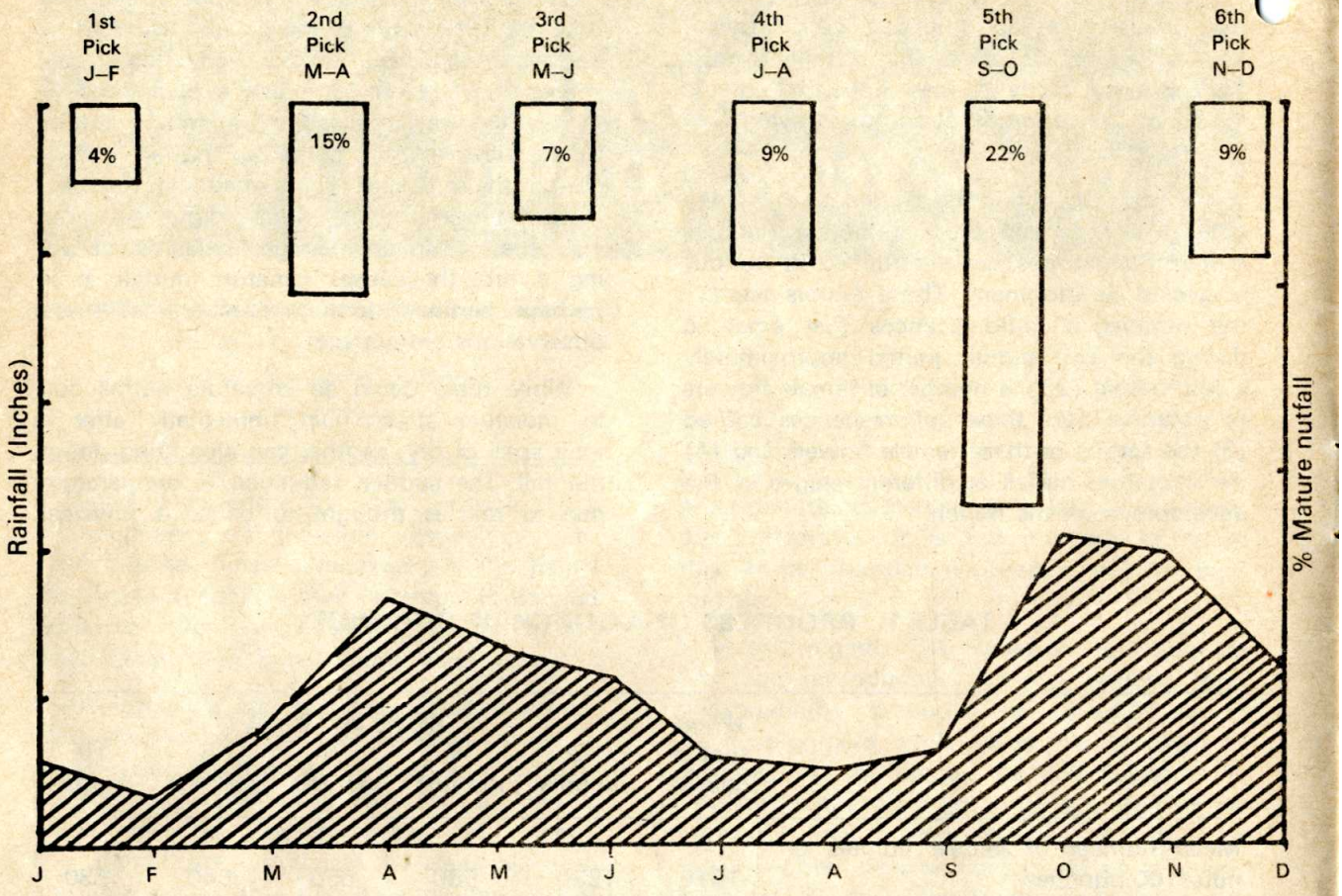
TABLE 1 **PROGRESS OF A BUNCH OF COCONUTS**

	When spathe opens	*At the end of the* 2 *months*	4 *months*	6 *months*	8 *months*	10 *months*
Mean number of female flowers or nuts/100 bunches	1610	1230	580	550	540	530
% of nuts remaining in bunch . .	100%	76.2%	36.1%	34.2%	33.5%	33.1%
% nutfall within each 2 month period		23.8%	40.1%	1.9%	0.7%	0.4%

Source: V. Abeywardena and D. T. Mathes CCPR (1971) Vol. VI 97-106.

Experiments have revealed that only about a third or less of the potential nuts remain upto maturity; the rest is lost at various stages of development. About 65% of the nuts are lost during the first four months after the opening of the inflorescence (Table 1).

It was further observed that immature nutfall is relatively heavy during the periods February/March and August/September which are also periods of moisture stress. Thus it appears that the loss of nuts from a bunch as a result of button-shedding and immature nutfall is determined by the environmental conditions which play on the stage of development.



mature nutfall occurs before the pick. Mature nutfall can range from as much as 4% to 22% of the total crop. There is a fairly regular seasonal pattern in mature nutfall. The mean percentage mature nutfall in each of the picks (ie. prior to the pick) is shown in Fig. 2. It is seen that following a dry period the mature nutfall is comparatively heavier than otherwise.