COCONUT RESEARCH INSTITUTE

Leaflet No. 27

CROP STORAGE

Ceylon is unique in following a practice of storing coconuts prior to conversion into copra or desiccated coconut.

The main reason for this practice is to be found in the standard of ripeness, as accepted in Ceylon. What are called ripe brown nuts in other countries are described as overripe nuts in Ceylon, and the yellowish green nuts which are considered as ripe nuts in Ceylon are classed as under-ripe nuts elsewhere. The harvesting of "Kalati" or unripe nuts, which appears to be on the increase, is a disquieting feature of current harvesting practice.

Methods of Harvesting :

In some countries, natural nut-fall is the practice, but this requires the regular monthly collection of the fallen nuts, if loss of copra and spoilage by germination is to be avoided. Furthermore, there is always the risk of crop thefts.

In consequence, it is the custom in Ceylon to cut down two bunches of nuts, once every two months, making six picks a year. Monthly harvesting might be better, but the cost of collection would be doubled.

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Many years ago, when the reputation of Ceylon copra was very high on the world market, the coconut crop was harvested by climbers who could select the right nuts, but the work was slow, costly and exhausting. A skilled climber could only harvest about 20 to 25 palms a day.

In consequence, this method has given way to harvesting by means of long bamboo poles, fitted with sharp curved knives. This is naturally quicker and cheaper, but less accurate, as it is not easy for the picker to decide which are the correct two bunches to cut down when the palms are tall. Sometimes an unripe bunch gets dislodged from its supporting frond and hangs invitingly, as though ready for harvesting; sometimes unripe bunches are cut down accidentally as the heavy cutting poles are not easy to manage; and sometimes, when the men are working on contract, over-harvesting is deliberate. Skilled men can harvest the crop from about 250 palms per day.

The strictest supervision of these picking gangs is essential. It is not always appreciated that green unripe nuts yield much less copra than ripe brown nuts,

200 nuts	Average copra *per nut*	Out-turn *nuts per candy*
Green unripe nuts	.42 lbs.	1330
Yellowish green nuts	.49 lbs.	1140
Ripe brown nuts (unstored)	.50 lbs.	1120

Method of Crop Storage :

Usually the coconuts are brought into a central depot and stacked sometimes, as in the case of a desiccated coconut factory, the heap of nuts covers an extensive area, but the height of the stack is seldom more than three feet. If the fruits are heaped to a greater height, say 6 feet, the work is slowed down, the underlying soil is compressed and the palms suffer, and as the heap cannot be ventilated, the interior heats up and the riper nuts begin to germinate.

It is advisable in fact to move the site of the dump, since air is excluded from the roots of the palms and as a result of soil compaction, the sheltering palms turn yellow and are inclined to taper off and die.

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The number of nuts, so stored, depends in the case of a desiccated coconut factory, on the price of nuts relative to the selling price of the manufactured product. In the case of the estate, the normal storage period is one month but it may be reduced, if ready money is required or if copra prices are particularly good. On a 1,000 acre estate, there would be a fluctuating stock of about 500,000 nuts.

Purpose of Storage.

The purpose of storing nuts is as follows:-

1. It makes it possible to manufacture copra at a uniformly steady rate, irrespective of crop fluctuations.

2. Copra production can be suspended during periods of stormy weather when it is more difficult to make good white copra.

3. Conversely copra production can be speeded up to take advantage of favourable market prices.

4. Nut storage make husking and splitting very much easier.

5. The contained coconut meat hardens and a better quality of copra or desiccated copra is obtained.

Storage Trials:-

A trial was conducted at the C.R.I. in order to compare the quality of copra, obtainable from stored and unstored nuts of different degrees of ripeness, because of the uniform conditions within the kiln. The nuts were graded to three degrees of ripeness and 1,500 nuts were used in each trial. Afterwards the resulting copra was subjected to piece-by-piece examination with the results shown in the table.

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THE EFFECT OF STORING COCONUTS.

Description of copra	Description of Nuts		
Fresh Unstored Nuts	*Ripe*	*Near Ripe*	*Unripe*
1. Smooth, hard round	9.1	2.9	0.9
2. Smooth, hard but not round	45.1	24.8	7.0
3. Rough, hard but not round	28.1	47.8	23.3
4. Strained, cracked or distorted	8.5	12.4	12.4
5. Rubbery with testa complete	4.5	6.5	27.1
6. Rubbery with no skin	Nil	1.3	22.1
7. Discoloured copra	0.7	2.8	6.3
8. Overripe pieces	0.4	Nil	0.1
9. Broken copra or empty nuts	3.6	1.5	0.8
Stored Nuts	*Ripe*	*Near Ripe*	*Unripe*
1. Smooth, hard round	8.5	5.4	2.2
2. Smooth, hard but not round	19.8	10.7	8.6
3. Rough, hard but not round	54.9	64.5	50.2
4. Strained, cracked or distorted	6.5	9.6	7.3
5. Rubbery with testa complete	3.9	4.0	20.1
6. Rubbery with no skin	0.2	1.2	5.7
7. Discoloured copra	0.2	0.2	0.8
8. Overripe pieces	2.4	0.1	Nil
9. Broken copra or empty nuts	3.9	4.3	5.1

Conclusions.

1. The storage of ripe brown nuts does not improve the quality of the resulting copra, but there is a marked improvement when unripe green nuts are stored thus :—

Yield of No. 1 copra	*from ripe brown nuts.*	*from unripe green nuts.*
Without storage	90.8%	43.6%
With storage	89.7%	68.3%

2. The amount of rubbery copra is reduced by storage for one month.

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Yield of rubbery copra	*from ripe nuts.*	*from near ripe nuts*	*from unripe nuts*
Without storage	4.5%	7.8%	49.2%
With storage	4.1%	5.2%	25.8%

3. The yield of No. 1 copra from unstored brown nuts is slightly greater than that from stored near ripe (yellow green) nuts thus :—

Yield of No. 1 copra	*from ripe brown nuts.*	*from yellow green nuts.*
Without storage	90.8%	87.9%
With storage	89.7%	90.2%

4. Unripe nuts produce an appreciable percentage of offwhite or discoloured copra or desiccated coconut, if the nuts are not stored before processing.

Recommendations.

1. Where a mixed crop is harvested, it is essential to separate the green from the brown nuts, store the former for one month and convert the latter into copra without storage.

2. The harvesting of green unripe nuts must be prevented by more careful supervision.

3. Unripe green nuts should never be bought by millers of desiccated coconut, as the product will be spoiled by yellow granules.

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