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REPORT

ON THE

DEVASTATED COCONUT AREAS

IN THE

PUTTALAM DISTRICT

Board of Management,
Coconut Research Institute,
Lunuwila.

June 5th, 1951.

INDEX

REPORT OF THE TECHNICAL COMMITTEE ON MARGINAL LANDS

1. At a meeting of the Board of Management of the Coconut Research Institute held on 14th October, 1950, a resolution was adopted that a Technical Committee should be appointed to investigate, report on and make detailed recommendations regarding the marginal coconut-growing areas of Ceylon.

2. The following were the terms of reference :—

(*a*) To define the areas most severely affected by drought.

(*b*) To ascertain if conditions are progressively worsening and why.

(*c*) To consider whether completely derelict lands are worth reclaiming and whether deteriorating properties can be saved.

(*d*) If so, to state if Government assistance is necessary, what form that assistance should take and what would be the probable cost of such assistance.

3. The constitution of the original Committee which was appointed by the Board was as follows :—

The Director of the Coconut Research Institute (Mr. F. C. Cooke)
The Soil Chemist (Dr. M. L. M. Salgado)
The Chemist (Mr. W. R. N. Nathanael)
The Acting Botanist (Mr. D. V. Liyanage)
The Planting Officer (Mr. O. B. M. Cheyne)
The Assistant Planting Officer (Mr. P. D. Laurence Fernando).

4. The Committee was given powers of co-option and Dr. J. J. D. Fernando, Government Mineralogist, Dr. R. M. Gorrie, Soil Conservation Officer, Mr. T. P. Senanayake, Assistant Registrar of Co-operative Societies, and Mr. T. Mylvaganam, Assistant Engineer of the Irrigation Department attended one or more of the meetings of the Committee.

5. Four meetings have been held ; three closed sessions at the Headquarters of the Coconut Research Institute and at Battulu Oya and two public sessions at Mundel and Kalpitiya respectively. In addition, members of the Committee have toured the drought-affected areas in the neighbourhood of Rajakadaluwa, Battulu Oya, Mundel, Mangalaweli, Karaditivu (Akkarai Pattu South), Mampuri (Akkarai Pattu North), Talawila (St. Anne's), Kalpitiya and on the Anuradhapura and Kurunegala roads near Puttalam, and have inspected the sand bar at Udappuwa on Mundel Lake.

6. As the response from the public was not altogether satisfactory, it has not been easy to collect concrete facts and figures on which to frame this Report. Our particular thanks, however, are due to the following gentlemen :—Mr. H. Ismail, M.P. (Puttalam), Mr. Marcus S. Rockwood (Architotam), Mr. J. Solomons Fernando (Mangalaweli), Dr. J. P. A. Jayasundera (Nallandarankattuwa), Mr. E. Muttukumaru (Mundel), Mr. H. Muttukumaru (Ambaweli), Mr. D. B. Perera (Angunawila), Mr. X. Jobin (Palugaswewa), Mr. K. D. Victor (Mundel), Mr. G. J. Peris Perera (Battulu Oya) ,Mr. E. B. Tissaweerasinghe (formerly A. G.A., Mannar), Mr. J. H. de S. Wijeratne (Attavillu), Dr. D. T. E. Dassanayake (Director, Department of Meteorology), Dr. J. S. R. Goone-

wardene (Attavillu), Dr. M. L. M. Salgado (Soil Chemist, Coconut Research Institute) all of whom either gave evidence before the Committee, or submitted memoranda, or both.

I. The Ceylon Coconut Commission

7. The Report of the Ceylon Coconut Commission, published in 1949, Chapter VIII, page 28 states :—

"The occurrences of droughts have adversely affected yields in many parts of the Island. The failure of one monsoon or the other will result in diminished yields the following year. The worst effect of the drought is normally felt by the lands which fall in the dry zone and experience only one monsoon. It is rarely or never that both monsoons fail in the wet zone. In Jaffna, Batticaloa and Puttalam, the failure of the 1947-1948 North-East monsoon had dire consequences.

"The photographs we publish show the condition to which plantations were reduced in the Puttalam District. When we visited Kalpitiya, we were surprised to see acres of devastated coconut—the crowns of the trees were virtually non-existent. These bare stumps were and are potential sources of beetle-breeding and it should be the duty of the Coconut Research Institute to advise the owners of lands to remove the dead trees soon. *In this and in similar cases, where coconut trees have been very badly affected by the failure of a monsoon, we recommend the free issue of seedlings.*

"For coconuts, there should be an annual rainfall of 50 inches or more, well distributed throughout the year . . . In Puttalam, Jaffna and Batticaloa though the rainfall is above 50 inches, the precipitation takes place in a few months in one monsoon, and for the rest of the year these areas get little or no rainfall.

"*We emphasise that cultivated lands suffer less from drought than the uncared-for lands.* Hence it is very important that proper cultivation is most essential in areas where rainfall is not well distributed. It has been asked whether coconut cultivation should be pursued in such unsuitable areas. *Before any assistance in the form of seedlings or manure is given to cultivators in such areas, it should be the duty of the Coconut Research Institute . . . to investigate whether coconut cultivation in such lands or areas would prove profitable.* Where lands are uneconomic for cultivation of coconuts no assistance should be granted from public funds."

8. A different aspect of the problems of the marginal coconut lands is dealt with in Chapter XVI, page 57 :—

....."We noticed in the course of your inspections that several road drains and culverts, especially in the Negombo and Chilaw districts had been built above the level of the surrounding lands. These, therefore, tended to impede the flow of water and hold it back. In low-lying areas water could be held up for several days. This naturally affects the coconut trees in the surrounding lands. However much an individual may drain his land to lower the water-table, it is impossible to achieve this object if the Public Works Department culverts and drains form obstructions. *We recommend that the appropriate department* (Public Works Department or District Road Committee or Village Committee) *should take immediate steps to correct such faults of draining* when complaints are received. In future construction of drains and culverts, the engineers and officers responsible should be instructed to see that proper draining is provided to take off excess water from the surrounding lands without impediments to the flow of water."

9. Among the recommendations of the Ceylon Coconut Commission the following have been abstracted from Chapter X, page 34 :—

....."*Subsidies can be given* : (a) *towards manuring*, (b) *towards planting material, and* (c) *towards barbed wire, agricultural implements and machinery*..... A substantial reduction in the price of manures

will provide an attraction to those who wish to undertake schemes of cultivation. We consider that at least a 33⅓% reduction in cost to the coconut planter should be afforded immediately. This can be done by a subsidy to the extent of 33⅓ per cent. by Government. The initial cost to Government for the first year will be in the neighbourhood of Rs. 1,500,000..... On the evidence supplied to us we are convinced that relief and rehabilitation schemes can be made a success only if seedlings are issued at a subsidised rate. We also realise at the same time that seedlings should not generally be issued free, because the value of the thing issued free is not realised and because it is human for planters to devote more attention to something they have paid for than to a thing that is in the nature of a free gift..... The cost of supplying 3 million seedlings annually at subsidised rates will be Rs. 1,000,000 (this no longer holds)..... In replanting schemes, agricultural implements, harrows, mammoties, barbed wire and agricultural machinery should be made available cheaply.....We recommend that the duties should be reduced to a nominal rate.....Government would thus lose Rs. 150,000 annually. We stress the fact that direct subsidies should be given only to genuine planters.

II. What is Marginal Coconut Land ?

10. Marginal coconut land may be defined as land where it is either difficult to grow this crop or impossible to produce it at an adequate profit so as to allow for proper cultivation and manuring. It may be that the soil, climate or topographical conditions may be unfavourable to the *easy* cultivation of coconut and the production of adequate yields, or the land may be so remote from markets that transport costs may make it impossible during periods of low price to sell nuts or copra at a profit.

11. Under such adverse conditions, marginal coconut lands will gradually deteriorate through inadequate cultivation, and neglect will progressively increase as the crops diminish because still less money is then available for drainage, manurial or cultural operations necessary to ensure good yields.

12. With increasing population also, the sub-division or partitioning of deteriorating properties or their joint ownership as a result of inheritance will lead to excessive demands on profits so further reducing the money available for the upkeep of the properties. Ultimately individual or joint holders of pieces of neglected land will fall into the hands of money-lenders and fighting a losing battle, will ultimately lose their lands. The new owners with adequate financial resources, may restore the lands they have acquired or, not being agriculturists, they may neglect them altogether in which case the properties will become entirely derelict or revert to scrub-jungle. *There are many examples of neglected and uncultivated land in the Puttalam District and as, in the opinion of the Committee, the majority are suitable for replanting, they should be considered for immediate resettlement.*

13. *In view of the foregoing the Committee considers that it is particularly important that the over-population of marginal coconut lands either by people or livestock must be avoided, that the allotments should not be smaller than* 10 *acres and that any sub-division of the allotments by individual tenants should be prohibited.*

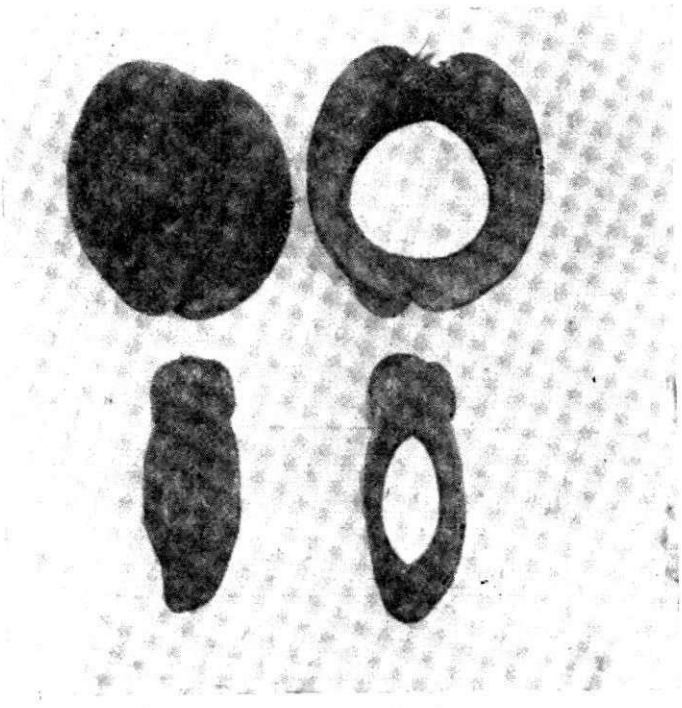
14. It does not necessarily follow that because lands may be apparently uneconomic for the cultivation of coconuts, that these marginal lands should be allowed to pass out of cultivation. *Profit is not the sole consideration ; in certain circumstances, we consider it may be sound economic policy to subsidise the production of a food crop* and help to carry the growers during a short period of adversity. The coconut lands of Ceylon are a national asset and it is necessary to maintain and increase the production of coconuts in order to keep the mills in operation and provide for the needs of the increasing population.

15. So far as lands are to be considered marginal because they have been affected by drought, *we need to emphasise that water is the most essential* plant food of the coconut palm. Without water, other major plant foods such as nitrogen, phosphorous and potash cannot act and the application of artificial fertilisers at the wrong time, *i.e.*, during a period of drought, can even be so seriously detrimental to the welfare of the palms as to cause their wholesale destruction. The effect of sustained drought in one year is to reduce the crop of nuts and the size of nuts in the year following; a succession of droughts, coupled with neglect or faulty agricultural practice, can result in the total destruction of coconut properties.

16. *It is not correct to state that all lands have become derelict through lack of sufficient rain. Some have deteriorated solely due to prolonged neglect and lack of cultivation which has rendered the land infertile.*

III. The Areas Affected

17. In the present report we are concerned only with the Chilaw-Puttalam District. The coconut lands here, which have been affected by unfavourable fluctuations of rainfall and by an unusual succession of four exceptionally dry years, are to be found in the region bounded on the South by the Deduru Oya (near Chilaw) and in the North by the Kala Oya (Karaitivu, north of Puttalam). The devastated area includes the Kalpitiya Peninsula (Akkarai Pattu) and extends East as far as the 5th mile, Puttalam-Anuradhapura road, the 10th mile, Puttalam-Kurunegala road, and Andigama 8 miles East of Mundel.



THE EFFECT OF DROUGHT ON SIZE AND SHAPE OF NUTS

Above : Normal nut from well-cared-for property at Mundel.
Below : Nut from drought-affected property adjoining.
(See paras 15, 28 and 45).

18. Conditions progressively worsen from South to North,—from semi-arid conditions with rainfall of about 50 inches to the dry zone proper where the average annual rainfall is less than 40 inches. Curiously enough, low-lying, normally water-logged lands have shewn a temporary improvement as a result of the drought, but such improvement is misleading unless it can be made possible for these lands to be drained off.

19. Some of the water-logged areas are so low-lying and the sub-soil so brackish that the lands are really not suitable for coconuts and therefore should not be replanted, and *it will be necessary*

for each piece of land to be considered on its merits. It was claimed by one witness that the high water-table in one area was due to the fact that the level of Mundel Lake was being maintained by the sand bar at Udappuwa which was seldom cut as the release of this water upset the fishing in the neighbourhood. The possibility of lowering the water level of the lagoon by two feet by cutting this bar is, therefore, really a question of deciding which is the more important, fishing or the restoration and replanting of the derelict water-logged coconut lands. This is a question for the Administrative Authorities. The problem of draining-off those water-logged lands from which the free flow of water is said to be impeded by the road or by the old railway embankment is a matter for the Public Works and the Irrigation Departments.

20. The problem can be considered in two aspects :—Firstly, the coconut growers can help themselves and improve their coconuts growing on the higher land *by constructing catchwater contour drains with their bunds on the lower side, i.e., below the drain,* to hold back the maximum amount of water in the soil and so check the rapid run-off from the higher lands adjoining and thus prevent the accumulation of storm water and the flooding of the low-lands. Secondly, *an exact survey is necessary to determine the levels and see whether it is technically possible for these low-lands to be effectively drained.*

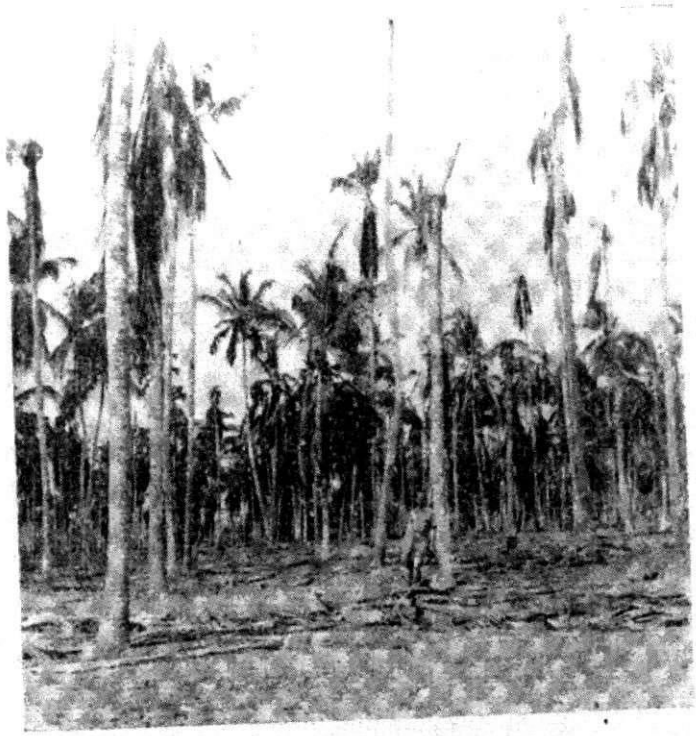
TOTAL COLLAPSE OF A PALM DUE TO DROUGHT
It is estimated that 300,000 palms have been killed in recent years. (Paragraph 26)

21. Some of these lands which are now planted with diminutive, unproductive and dying coconut palms and which even now are being replanted with good seedlings, do not appear to be suitable for this crop ; if so replanting is a waste of effort and money. This is also occurring in other low-lying districts, such as parts of Negombo district, where it is quite useless to replant coconuts.

IV. The Extent of the Damage

22. The exact number of palms, destroyed or so seriously weakened by drought as to need replacement is not known. One authority has expressed the view that about 1,000,000 palms have been lost during recent years ; another witness has assessed the damage at several lakhs of palms ; and another rather more conservatively considers that 50,000 palms were destroyed in 1950 alone.

23. A survey of estates and small-holdings at Nalladarankattuwa, Battulu Oya, Mundel, Mancholi, Mangaveli, Karaitivu, Palavi and near Puttalam, carried out by the Director, Coconut Research Scheme and the Advisory Officer, Chilaw, showed that the long drought had not had an equally bad effect on all properties; they had been affected in varying degrees:—nil, 3%, 5%, 10%, 20%, 25%, 30%, 60%, 70% and 90% dead or dying. On a number of properties the destruction was total and the land was virtually abandoned, although still held under title.



DROUGHT-DEVASTATED COCONUT LAND
This was once a flourishing and well-managed estate
(Paragraphs 23 and 27)

24. An exact census of a limited area, 63 acres of small-holdings at Karaitivu in the driest area, north of Puttalam revealed that 2,670 palms, *i.e.*, about 50 per cent. were dead.

25. The total area under coconuts in the Puttalam District according to the 1946 census is 45,174 acres and we estimate conservatively that of this about 5,000 acres have been lost during the recent drought. This loss has not been felt outside the devastated area, *i.e.*, by the trade in Colombo, for two reasons:—

(*a*) The average yield per acre in this district is low and the *actual loss of crop due to the drought is only of the order of about* 1 *per cent. of the total crop for the whole of Ceylon.*

(*b*) In 1950, the crops in other parts of the country were good and on some estates were up by as much as 25 per cent.

26. We consider that 1,000,000 palms may be accepted as an outside estimate of the total loss, if seriously weakened palms which are very numerous are included for replacement. Of these approximately 300,000 are dead, and the remainder are unproductive and of no further value.

V. Yields and Costs of Production

27. It has been extremely difficult for the Committee to obtain facts and figures for inclusion in the Report, mainly because so few of the properties in the drought-affected areas are able to afford the services of reliable men who are capable of keeping accurate records and calculating the cost of production. Only one of the affected estates has supplied such information. This was an estate which was once described officially as one of the best kept and cultivated estates in

the District. Today following the long series of dry years, this estate has about 30 per cent. vacancies due to death and the remainder of the palms has suffered a very severe set-back in condition, yield and nut-size.

28. Yields in the drought-affected areas vary from nil where the lands are uncultivated and totally neglected to an average of 5,000 nuts per acre per annum on a large estate, with a fertile sandy loam, run on sound agricultural principles, which is situated on the edge of the drought-affected area of the Chilaw-Puttalam district. In addition, nut size, too, is a wide variable,—from 1,000 to 4,000 nuts or more per candy. The over-all average for all properties is about 1,000 nuts per acre or only about ¾ candy of copra per acre per annum.

FIGHTING A LOSING BATTLE

This garden has been virtually abandoned. A watcher has been left in charge to collect the nuts. No other work is done and in time the estate will revert to jungle.

(Paragraph 32)

29. *It is this factor, yield, which is the determining factor in the cost of production.* The difficulties of coconut growers, living in these drought-affected areas can only be properly appreciated by comparison with the yields and the costs of production in other coconut-producing areas. The figures given below are not actual but speculative figures, based on the present cost of production at Bandirippuwa and Ratmalagara Estates, and on figures agreed to by the Planting Committee of the Coconut Research Institute. In all cases, it is assumed theoretically for purposes of comparison that correct cultural and manurial practice is followed.

Comparison of Average Yields and Theoretical Costs of Production for Different Districts, 1950

District	Average Yield Nuts/acre/annum	Average Out-turn Nuts/candy	Comparative per 1,000 nuts	Production cost per candy
Marawila	4,000 ...	1,100 ...	Rs. 54 ...	Rs. 60
Chilaw	3,500 ...	1,200 ...	,, 71 ...	,, 85
Negombo	2,500 ...	1,250 ...	,, 80 ...	,, 108
Kurunegala	2,000 ...	1,300 ...	,, 107 ...	,, 140
Colombo	1,500 ...	1,300 ...	,, 143 ...	,, 186
Galle	1,500 ...	1,300 ...	,, 143 ...	,, 186
Puttalam	1,000 ...	1,500 ...	,, 215 ...	,, 290
,, ...	(0—3,000) ...	(1,000—4,000)		

30. From these figures it is apparent that it is economically impossible for the majority of coconut properties in the Puttalam District to be run at a profit during periods of depression or to be maintained properly without drastic economies, even during periods of prosperity. The worst-devastated properties of course, even with the present high prices cannot be run otherwise than at a loss, if any work at all is done on the property. Economies will have to be effected in the use of fertilisers and these, if used at all, will only be applied occasionally ; cultivation operations may be neglected altogether and lands may be overgrazed by stray cattle, because properties are not fenced.

31. The following table gives figures for the yields and the exact cost of production of the outstandingly good estate, previously referred to :—

Production Figures

Situation of Estate : Palavi, near Puttalam.
Extent : 120 acres.

Year	Rainfall	Copra sold (candies)	Average cost/candy	Average Colombo Price of No. 1 copra
			Rs.	Rs.
1940	53	164	19·72	32·68
1941	56	358	13·86	32·35
1942	40	172	48·08	54·90
1943	51	268	33·42	59·00
1944	60	284	33·22	65·00
1945	44	295	36·78	80·00
1946	61	222	71·89	100·00
1947	40†	242	64·05	125·00
1948	40†	223	88·42	135·00
1949	43†	107	174·50*	150·00
1950	37†	No production	(290·00)	208·00

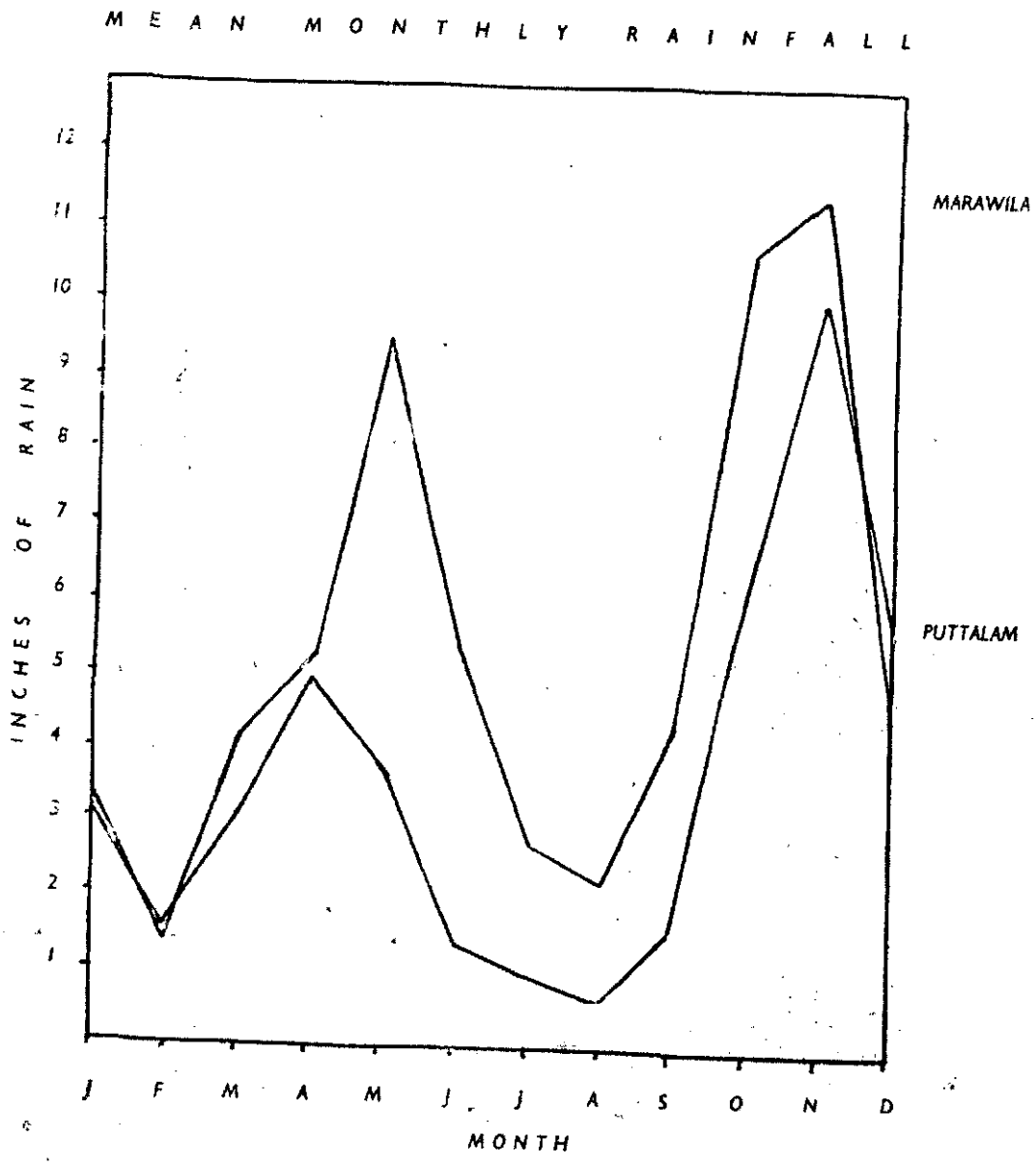
† Drought.
* Theoretical figure, see previous table.

32. While these figures are open to criticism because conditions vary so much from property to property, they offer evidence that the margin of profit to owners of well-managed 100-acre properties in the Puttalam District is not large enough, even in good times, to allow for such serious depreciation of their properties as has occurred. The position of the owners of properties which have not been well maintained is so serious that their gardens are now virtually abandoned, and a watcher is merely left in charge to collect such crop as still remains to be collected.

VI. Are Weather Conditions Worsening ?

33. According to popular belief in the drought-affected area, the conditions during the four years 1947-1950 were unprecedented. This is not correct as a similar drought of equal intensity occurred in the period 1892-1895.

34. It is believed, too, that a gradual change of climate is occurring. The suggestion has been put forward that the large-scale felling of jungle and the deterioration of some of the coconut areas to barren lands is the explanation of the recent marked reduction in the annual rainfall.



MEAN ANNUAL RAINFALL

Station	Ins.	Period
MARAWILA	66·1	79 years
PUTTALAM	44·3	79 years

Marawila is the highest-yielding coconut area in Ceylon. Puttalam is one of the lowest because in certain months the rainfall is so low and in very dry years, is insufficient.

35. The Director of Meteorology is not at all convinced that this is the case. He has pointed out that low rainfall has also been recorded in other parts of the Island where the jungle and plant cover has not been touched. He proposes to undertake shortly an analysis of rainfall trends over the past few decades and he hopes that the effect of any large-scale denudation of forest in connection with colonisation schemes and the food drive will thereby be revealed.

36. Graphs, produced by his Department showing the rainfall at Puttalam, Battulu Oya, Palugaswewa and Chilaw indicate a succession of cycles of wet years and dry years, and an analysis of the rainfall graph for Puttalam, since 1870 shows the following succession :—

Station : Puttalam

Period	Cycle in years	Average rainfall Inches
1870-1883	14 more or less uniform	44
1884-1891	8 mostly wet years	49
1892-1895	4 mostly dry years	37
1896-1906	11 mostly wet years	47
1907-1917	11 mostly dry years	39
1922-1932	11 mostly wet years	47
1934-1950	17 mostly dry years	38
1870-1950	Over-all average rainfall	44·3

37. There is some indication from the above table that conditions may be worsening but it will be necessary for a statistical analysis of the figures for rainfall to be carried out by the Government Meteorologist before a sound conclusion can be reached. We are not competent to express a more definite conclusion than that there is some indication that the weather cycles are lengthening. A long succession of years of drought is very serious for coconuts because the water-table slowly drops and ultimately, if there is an impervious basin of clay or rock, the subterranean reserve of water in an area may dry up completely.

38. With the recent heavy rains in early 1951 it is possible that the long succession of dry years has at last ended, but it is apparent that the rainfall is generally inadequate and that coconut cultivation in this area is a difficult business unless the water supplies can be augmented from wells or rivers.

39. In some places deep wells have been sunk through the hard pan and water found at from 40 to 60 feet. It should be possible to utilise this water for irrigation during periods of intense drought and the Department of Mineralogy has undertaken to investigate the extent and possibilities of these deep-seated reserves of water.

40. The possibility of using water from Mundel Lake and from shallow wells in the neighbourhood is being examined. Analyses over the past three months shows that the salinity of the lake water has varied between 0·4% and 2·8%, (which is the same as sea-water). The well water varies from ·008% to 0·7% (brackish). It is known that the coconut palm can endure brackish water but the upper limit is not known. Investigations are continuing.

VII. Are the Derelict Lands Worth Reclaiming ?

41. The long drought has only emphasised the unsatisfactory conditions in certain areas. Some owners are optimistically replanting areas where coconut palms have never given satisfactory yields and the tragedy will be repeated in a few years time when the new palms become fully grown because their root systems cannot develop sufficiently or the sub-soil conditions are such that the top soil soon dries up and there is insufficient moisture to maintain and develop the growth of the palms. On such properties premature senility soon sets in and soon after coming into bearing the palms begin to taper and lose colour, crops decline, and nut size diminishes ; then, if a drought of exceptional severity arrives, 50 per cent. or more of the palms are destroyed and those, left alive, are practically worthless.

42. The properties in this dry area which we submit will have to be regarded as unsuitable for coconuts are those on heavy clay (which were formerly paddy fields) ; those where there is less than four feet of sand or sandy loam above a clay sub-soil or coral hard-pan ; and those which are low-lying and undrainable, and the palms normally have less than two feet of soil above a brackish sub-soil or permanently high water table.

43. Except for these lands which we consider should be accepted as being unsuitable for coconuts, *the majority of the drought-affected properties can be restored and are worth reclaiming.*

44. On some properties, vacancies and over-age palms only need to be resupplied, on others the land will have to be cleared, brought back into a proper condition of fertility and completely replanted.

45. The outstanding characteristic of the coconut areas around Puttalam and Mundel is that all properties have not been equally seriously affected by the drought. Good sound properties and completely neglected and abandoned coconut lands can be found side by side under identical conditions. The conclusion we reach is that some properties have deteriorated simply because of years of neglect either through ignorance or indifference, or short-sightedness, or lack of financial resources to carry out normal cultivation, husk burial, and manuring ; in consequence the lands

YOUNG COCONUT ESTATE WITH AN INCLINED CLAY SUB-SOIL.

These palms have not been as seriously affected as on other estates because of extensive husk burying and harrowing-in of surface vegetation. Trouble may be expected when the palms become older. (Paragraphs 42 and 45)

have become hard, infertile, and over-grown with coarse vegetation which is competing with the coconuts for plant food and moisture. The absence of fencing of neglected properties allows stray cattle to enter and to consume selectively, and to the point of destruction, such herbage as they find palatable, leaving a predominance of large coarse shrubs. The land becomes over-grazed and patches of bare soil develop between the clumps of shrubby undergrowth.

TOTAL ABANDONMENT

This abandoned estate has reverted to jungle. Adjacent to this there are good properties.
(Paragraph 45)

46. We have no doubt that most of the derelict lands can be restored by the judicious and *regular* application of mixed artificial fertilisers, by the incorporation of all the available husk in the soil in order to conserve soil moisture, by mulching round the palms and arranging husks and leaf fronds to check soil wash, by controlled grazing, by the establishment of contour catch water drains or pits (where necessary) and by closer planting on the triangular system in order to completely shade the land and so check the growth of competing vegetation and the loss of soil moisture where the exposed patches of soil become hot.

47. It is obvious that properties where husk is buried and where competing vegetation is kept down by regular disc-harrowing or slashing are far superior to those where these operations are omitted. *We consider, therefore, that steps should be taken to restrict the milling of husk and the transportation of husks out of the district* into other districts. While income is to be derived from the sale of husks, they are of still greater value if returned to the soil, and it is bad agriculture to rob the soil in order to obtain ready cash.

48. *There must be no burning of vegetable matter, other than butt-ends and trunks, which are breeding grounds for coconut beetles. Government should enforce existing legislation through the A.G.A. and Village Headmen to enforce the removal and destruction of all dead trees in the derelict areas.*

49. The question of the use of artificial manures was left undecided. There is a view that organic manures are to be preferred in the dry areas and there is a distinct preference in favour of the use of goat or cattle manure, with and without wood ashes; sometimes artificials, such as saphos and muriate of potash, are used with the organic manures. In one sandy area very vigorous

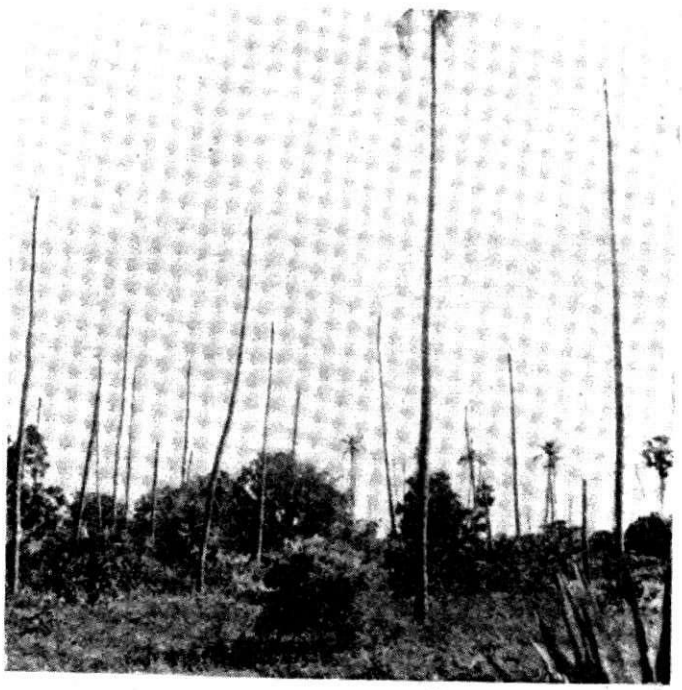
young coconuts were seen by the Committee in association with catchcrops, tobacco and chillies which had been frequently manured with artificials in very small regular amounts, but in general the use of complete mixtures of artificials alone is not favoured in this District.

50. While a combination of bulky organic manures and artificials would be the most desirable, this would be an ideal difficult to realise. If these derelict areas are to be restored and if replanted areas are to be brought back into early bearing, we see no alternative to the liberal use of artificial fertilisers.

VIII. Is Government Assistance Necessary ?

51. *We consider that bona-fide coconut growers in this district are in need of financial aid to clear, recondition, and replant their devastated lands*, otherwise many of the properties will pass out of cultivation and revert to jungle and so be lost to the nation.

52. In view of the fact that the margin of profit during periods of low prices is small and following periods of drought may disappear altogether the owners of small over-populated properties have no money left to restore lands and will be forced to abandon them or sell them to redeem their accumulated indebtedness. Similarly there must be some inducement to the proprietors of the better estates to re-supply their vacancies and bring their properties back into normal production again because the profits they have made in the past have not been sufficient to meet the re-capitalisation of their properties.



TOTAL NEGLECT

On a number of properties the destruction is total and the bare stumps are breeding grounds for coconut beetles.

(Paragraphs 7, 23 and 48)

53. With the steady increase in population in this area, properties have disintegrated into infinitesimal shares by divided ownership or have been broken down to uneconomically small units by partitioning, indebtedness or litigation ; such properties have degenerated seriously owing to divided ownership or indebtedness, accentuated by the effects of the long drought. As a result there is a congestion of population and considerable land hunger.

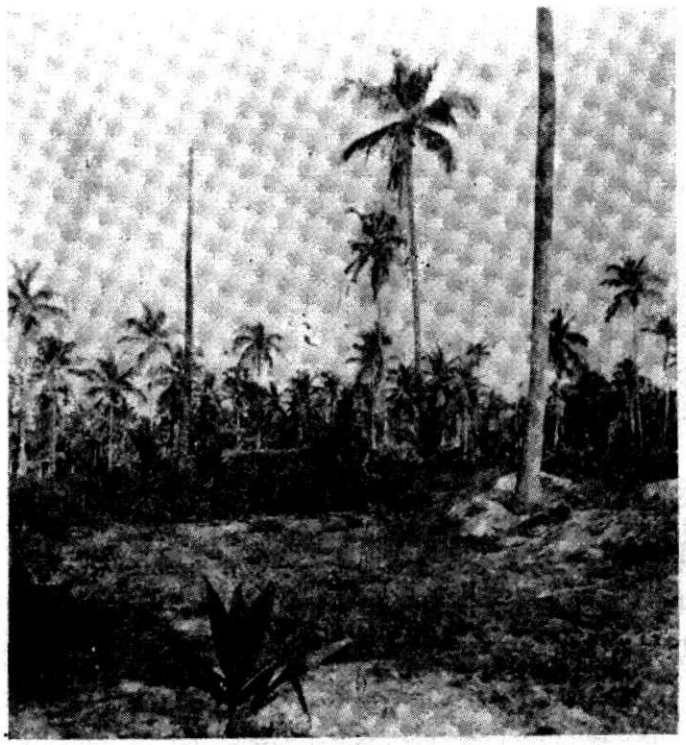
54. The possibility of alienating virgin jungle land for coconuts needs to be considered. A Land Utilisation Board should be constituted for this District and if suitable land can be found. We consider it should be given to those whose devastated lands are not considered suitable for replanting with coconuts and the land-hungry people who are the children of coconut growers.

55. The Coconut Industry is the chief economy of the Puttalam District where it has existed for over a century. *We feel, therefore, that in view of present difficulties, this area should be treated as a "distressed area"* requiring some form of financial assistance to tide the people over a period of adversity and to ensure that the acreage under coconuts is maintained and even extended.

IX. What Form Should the Assistance Take ?

56. *Our first recommendation is that a District Land Utilisation Board with executive powers should be set up* :—

(*a*) to decide which lands are suitable for replanting with coconuts and so justify the expenditure of public money on their rehabilitation ; (*b*) to decide which lands are unsuitable for coconuts and to make recommendations regarding their re-afforestation with teak or utilisation for fruit and other food or cash crops, such as paddy, maize, tobacco or chillies ; (*c*) to decide what neglected or abandoned lands both large and small should be acquired for resettlement after due warning has been given to the neglectful owners ; (*d*) to decide whether applicants for seedlings and for other financial aid are *bona fide* coconut growers, and what financial assistance is necessary and justified.



REPLANTING

A devastated estate after restocking with fresh seedlings. Note the catch crop of artificially manured chillies in middle rear of picture. These plants are lightly manured fortnightly and the size of the coconut palms here is twice the size of those in the foreground.

(Paragraph 46)

57. This Board should meet at half-yearly intervals between monsoons to consider applications and issue orders for the acquirement and utilisation of agricultural lands.

58. The constitution we recommend is as follows :—

A.G.A., Puttalam (Chairman) ; (*b*) Advisory Officer, C.R.I. (Secretary) ; (*c*) Soil Chemist, C.R.I. ; (*d*) Agricultural Advisory Officer, Department of Agriculture ; (*e*) District Forest Officer ; (*f*) District Irrigation Engineer ; (*g*) Soil Conservation Officer, Department of Agriculture ; and (*h*) An Unofficial, who should be a practising planter living in this District.

59. In this connection we recommend that a *Senior Advisory Officer, C.R.I., should be appointed for this district* at a higher salary than the other Advisory Officers, *i.e.*, a super-scale appointment

because of the special duties and difficulties. He should be an officer of exceptional ability and tactful personality, able to convince people and get things done in the face of difficulties. He should ensure that the principles of correct agricultural practice are understood and applied and he must get to know all the coconut growers and be able to report to the Land Utilisation Board regarding applications from individual small-holders, resident planters or landed proprietors. He should follow up deliveries of seedlings in order to see that they are actually used by the purchaser and are correctly planted.

60. *We further recommend that two demonstration planting plots should be established, one of which should be in the Kalpitiya Peninsula* to show the method of planting on the triangular system, and the preparation of planting holes, and to demonstrate correct methods of cultivation and soil management as applied to coconuts, growing in the dry zone.

61. Under the present system of tenure there is very little mixed farming and a dangerous dependence on coconuts as a sole source of income. We consider that in a simple system of settlement in this District, the unit should be not less than 10 acres,—8 acres to be placed under coconuts, planted on the triangular system at 72 palms or 79 palms to the acre (26′ or 25′ apart), and 2 acres to be used for fruit trees, food crops and cash crops such as tobacco, chillies or pineapples and for the rearing of livestock, such as rabbits, poultry and pigs.

REHABILITATION

This land has been cleared of dead and useless palms and is ready for re-planting. The removal of all dead palms is essential to prevent the breeding of coconut beetle.

(Paragraph 48)

62. However, the inescapable problem arises " *How are poor settlers going to exist during the first seven years while the palms are coming into bearing?* " One solution would be to give them free seedlings and an annual allowance of Rs. 1·50 per plant, according to the number of palms maintained in good cultivation. Another solution would be a system of long-term loans given to them individually through a co-operative society or societies. This is not always very satisfactory.

63. *Alternatively derelict estates could be acquired and operated by a co-operative society* on the lines suggested in the Report of the Ma-Oya Marv Mount Estates Committee (Sessional Paper XIV of 1946, Appendix 2, page 5). A long-term loan would need to be granted to the co-

operative society and the estate as a whole would be operated as a " co-operative-cum-collective farm." It would obviously be more convenient for Government to deal with a single society than with hundreds of individual colonists in a settlement.

64. The members of the Co-operatives would hold some land direct from the Society ; the Society would sub-let to individual members a homestead of about 2 acres to be used for fruit trees, a vegetable garden and the raising of domestic livestock. At the same time they would supplement their incomes by working as labourers on the main estate. This co-operative estate would be worked on the same lines as a proprietary or company estate, the main difference being that the profits would be divided among the members, that is the labourers, in proportion to work done.

65. There would be an elected " Board of Directors " which would engage its own superintendent and the District Advisory Officer, C.R.I., would act as the Visiting Agent. This would make it possible for the entire settlement to adopt large-scale cultivation methods and follow the best estate practice, the property could be effectively fenced, correctly and regularly manured, and rapidly cultivated by a mechanical tractor. The number and quality of dairy cattle could be controlled, the cattle could be scientifically fed and a central dairy could be established.

66. We have only recommended the acquirement of derelict properties for re-settlement because most of these are good lands which for some reason have been neglected and have degenerated. *We do not recommend the acquirement of good estates* which are properly managed and are quite able under normal conditions to pay their way. We do not consider that it is really in the best public interest to acquire such estates and that so long as owners are doing their best, it is sound policy to leave them to continue, and so provide regular wages, comfort and security to the people in their employ and at the same time ensure, by good soil management, the highest possible yields of coconuts to meet the growing needs of the milling industries and people of Ceylon.

67. In such cases, *i.e.*, estates and holdings of 25 acres or over, seedlings at reduced prices and long-term loans for rehabilitation and if necessary the purchase of pumping machinery and tractors at a low rate of interest should be allowed on the strict condition that the land is not immediately resold to another owner the moment it has been resupplied and reconditioned.

68. The feasibility of again growing paddy on clay lands which have been proved unsuitable for coconuts, depends on the possibility of renovating the numerous abandoned tanks to feed these paddy fields. One witness pointed out that raising the bunds of these derelict tanks would only result in raising the water-table of the surrounding country side, so rendering other coconut lands derelict. If this is correct, it means that the tanks in the neighbourhood require to be deepened to remove the silt accumulations of centuries. To complete such a task within a reasonable period of time is beyond ordinary manual labour and it would be necessary to employ rapid mechanical methods of excavation.

69. One useful suggestion was that clay soils, which have proved to be unsuitable for coconuts, should be used for brick making and that a large scale brick and tile industry could be established inside the tank area at Naldarankattuwa to help the district by providing other employment. The bricks which are made of 1 part of cement and 15 parts of clay do not require burning. This is an important recommendation in view of the failure of the coconuts because the clay is also too heavy for chena cultivation and so will otherwise be waste and useless land.

X. What would be the Cost to Government ?

Seedlings

70. We could not agree whether the seedlings should be issued free or not. There is a strong body of opinion among witnesses that they should, but agricultural experience has shown that, if planting material is issued free, it is misused and not properly accounted for. It would be obviously undesirable for the Coconut Research Scheme to sell seedlings at two different prices or to give seedlings free to some people and not to others. We recommend, therefore, that Government should make a block vote to the Land Utilisation Board so that seedlings could be obtained from the Coconut Research Scheme at the prevailing and already subsidised price of 50 cents and these could either be distributed free or sold at a nominal price of 10 or 20 cents each. The actual cost of production now is about Re. 1/- each.

71. The total requirement will amount to about 350,000 seedlings which could necessitate an enhanced vote of Rs. 175,000 to the Replanting Project and of Rs. 175,000 to the Land Utilisation Board, a total cost to Government of Rs. 350,000 in all.

Cost of Planting

72. The cost of planting a single seedling is made up as follows :—

	Rs.	c.
Cutting the hole	0	50
Preparing the hold including husk	1	00
Cost of the seedlings	0	50
Husks for mulching	0	50
Fencing (share of estate fence)	1	50
Manuring	2	00
Weeding for six years	1	00
Emergency watering	0	50
Total cost per plant ...	7	50

73. Thus the owner of a 100-acre estate planted 60 per acre, with 50% vacancies will require a loan of about Rs. 20,000 for simply resupplying the estate, if he has to pay for his seedlings at the Standard price. *The total loan fund required for this purpose might amount to* Rs. 1,000,000.

Acquisition of Derelict Lands

74. One witness has estimated that it would not cost Government more than Rs. 300 per acre to acquire derelict coconut land. The extent of such land is at present unknown but a gross *estimate of cost can be suggested*, viz., Rs. 1,000,000.

Cost of Planting or Replanting

75. The Planting Committee of the Coconut Research Scheme has recently estimated the approximate capital cost, at current wage rates and prices and excluding the cost of the land, of bringing into full bearing and production 100 acres of land, already cleared and stumped (see appendix). This includes buildings, houses, salaries, wages, animals, wells and a tractor.

76. The figure arrived at was Rs. 1,209 per acre. For purposes of estimating for the Co-operative Estate proposal a figure of Rs. 1,200 per acre might be accepted and a 300-acre society

would thus require Rs. 360,000. This would settle a superintendent and 24 families. *Thus the total cost to Government of establishing* 10 *such co-operative settlements on virgin or reclaimed derelict land would be* Rs. 3,600,000 *for* 250 *families.*

Taxation

77. We suggest for the consideration of Government that coconut properties should be taxed in such a way that there will be an encouragement for owners to bring their lands to the highest state of productivity, and induce the owners of derelict or neglected lands either to improve them or dispose of them. All properties in the Chilaw-Puttalam district have been affected by the drought to the extent of reducing the yield of nuts and their size. In some cases the crop is negligible.

78. *We suggest, therefore, that taxation might be based on acreage and not on yields* so that owners would be forced to recondition or replant their lands and compelled to work for maximum yields per acre or else to dispose of their lands. This would, of course, necessitate a differential system of rating coconut properties according to locality.

Conclusion

In concluding this Report we wish to place on record our appreciation of the assistance given by all gentlemen named in the Introduction of this Report and the willing manner in which they had complied with our requests for information. It has not been at all easy to obtain sufficient information on which to frame the Report for reasons stated previously and the unavoidable delay in presenting this Report is regretted.

F. C. COOKE,
Director, Coconut Research Institute, Ceylon
(Chairman).

M. L. M. SALGADO,
Soil Chemist.

D. V. LIYANAGE,
Acting Botanist (on overseas study leave).

O. B. M. CHEYNE,
Planting Officer (on overseas leave).

L. FERNANDO,
Assistant Planting Officer.

W. R. N. NATHANAEL,
Chemist (Secretary). (On overseas leave).

APPENDIX I

Estimate of the Cost of Planting 100 acres with Coconuts

The Planting Committee of the Coconut Research Institute

The approximate capital cost at current costs and prices exclusive of the cost of land of bringing into full bearing and production 100 acres of land already cleared and stumped.

(*a*) Buildings required during the first seven years for a 100-acre block :—

	Rs. Cts.	Rs. Cts.
Superintendent's house	3,000 00	
One watcher's house	1,750 00	
Seven labourers' cottages for seven families	10,500 00	
Cart shed	500 00	
Two carts and bulls	600 00	
Two wells	1,500 00	
Roads	1,200 00	19,050 00
(*b*) Salaries for seven years (Superintendent, Rs. 200 p.m. ; Watcher, Rs. 70 p.m.)		22,680 00
(*c*) Lining, holing, filling and planting at an average cost of Cts. 80 to Re. 1 per hole at 79 holes per acre	7,110 00	
(*d*) Cost of plants* (79 per acre) varying from Re. 1 mother palm seedlings to Cts. 50 block nuts	7,900 00	
(*e*) Fencing at Rs. 75 per cwt. of barbed wire and Rs. 1·25 per Milla fence post	12,075 00	
(*f*) Weeding, trenching and watering	10,000 00	
(*g*) Tools	1,000 00	
(*h*) Levelling ant-hills, and so on	1,000 00	39,085 00
Cost of upkeep for the next six years, viz., up to 7th year :—		
(*a*) Weeding at Rs. 16 per acre per annum	9,600 00	
(*b*) Supply and cost of plants at Rs. 9 per acre per annum	5,400 00	
(*c*) Pests and diseases	5,100 00	
(*d*) Watering (depends on the situation)	—	
(*e*) Manuring and application	16,037 00	
(*f*) Upkeep of fences and drains and buildings	4,000 00	40,137 00
Total cost for the seven years ...		120,952 00

APPENDIX II

References

Ceylon Geographical Society Bulletin : Vol. 3, No. 2

Holmes, C. H. ... ... Climate and Vegetation

Cooray, P. G. ... ... Effective Rainfall and Moisture Zones in Ceylon, page 39

Ceylon Geographical Society Bulletin : Vol. 4, No. 1

Sirimanne, C. H. L. ... ... In Search of Water.

SUMMARY AND CONCLUSIONS

1. Water is essential to all forms of life and may be considered the most important plant food of the coconut palm. (Para 15).

2. The last four years of drought are not unprecedented; a similar period occurred in 1892-1895. (Para 13).

3. There is some indication that dry and wet weather cycles appear to be getting longer. (Paras 36 and 37).

4. The effect of sustained drought on well-cared-for properties is to reduce the crop of nuts and nut-size in the year following; the effect on neglected properties or properties unsuitable for the crop is to cause the death of the palms. (Paras 7, 41 and 45).

5. Neglect, absence of fencing and inadequate cultivation is a more serious factor than drought. (Para 45).

6. It is estimated that 1,000,000 palms have either been killed or so seriously affected, as to require replacement, during the past four years. (Para 26).

7. The actual loss of crop, however, expressed as a percentage of the total annual crop of Ceylon is probably only of the order of 1 per cent. (Para 25).

8. Properties in the Puttalam District which are unsuitable for coconuts are those on heavy clay, those with less than four feet of sand or sandy loam above an impermeable sub-soil and those which are low-lying and undrainable. (Para 42).

9. The majority of the devastated properties in this District, however, can be restored and are worth replanting. (Para 43).

10. Family increases and sub-division of properties reduces the margin of profit, making less and less money available to maintain the properties, so yields decline. (Paras 12 and 13).

11. Overpopulation of marginal lands must be avoided. (Para 13).

12. Yield is the determining factor in the cost of production. (Para 29).

13. It is not possible for the majority of the properties in this area to be operated at a profit during periods of low prices. This is the real and underlying cause of the neglect. (Para 30).

14. Profit is not the sole consideration. This is a food crop and it may be sound economic policy to subsidise the cultivation of coconuts during periods of low prices in order to prevent a serious set-back. (Para 14).

15. On the better properties, it is only a question of re-supplying vacancies; others will need to be reconditioned and completely replanted. (Para 44).

16. Such lands can be restored by the application of cattle manure and fertilisers, by regularly incorporating husk and herbage in the soil, by surface mulching, by the establishment of catch water drains, and by closer planting on the triangular system. (Para 46).

17. *Bona fide* coconut growers are in need of financial aid to clean up, recondition and re-plant their devastated lands, otherwise in many cases it will not be done. (Para 51).

18. The coconut industry is the leading industry in this District and the principle source of income. (Para 55).

RECOMMENDATIONS

1. The Puttalam District should be treated as a " distressed area " and receive special relief. (Para 55).

2. A Field Officer of outstanding ability and initiative should be appointed as Senior Advisory Field Officer (C.R.I.) and stationed at Puttalam. (Para 59).

(At present funds are not available for this appointment).

3. A demonstration plot or plots should be established in this District on seriously devastated lands. (Para 60).

4. A District Land Utilisation Board (D.L.U.B.) with executive powers should be set up. (Para 56).

5. Properties (estates and small-holdings) which need only to be re-supplied should be assisted with long-term loans at a low rate of interest and seedlings should be supplied at concession rates. (Para 67).

6. Derelict properties, if considered suitable for coconuts should be acquired, settled by landless villagers and restocked as Co-operative-cum-collective farms. (Paras 63-65).

7. Swampy lands at present under coconuts need to be surveyed to see if they can be drained or if flooding can be prevented by proper storm-water conservation measures in the adjoining higher lands, or by regularly cutting the sand-bar at Udappuwa. (Paras 19-21).

8. Lands, unsuitable for coconuts, should be considered for re-afforestation or for planting with fruit trees or annual food crops. (Para 56).

9. The possibility of alienating virgin jungle for coconuts on which to settle landless people needs to be considered. (Para 54).

10. A brick and tile industry could be established on the clay soils to diversify the economy of the District. (Para 69).

11. The deepening of abandoned tanks by mechanical means should be considered. The bunds should not merely be raised. Unsuitable coconut lands could then revert to paddy cultivation. (Para 68).

12. Existing legislation regarding the removal of dead palms should be enforced. (Para 7)

13. Steps should be taken to restrict the number of coir mills in this District and the transportation of husks to other Districts should be forbidden. (Para 47).

14. The possibility of drawing on underground sources of water during periods of drought needs to be explored. (Para 39).

15. The suitability of the water of Mundel Lake for irrigating coconut palms should be examined. (Para 40).

16. A statistical analysis of the figures of rainfall in the District should be made to see if the wet and dry cycles are lengthening. (Para 35).

17. The system of taxation of the coconut industry should be examined to see if it is possible to introduce taxation on an acreage basis whereby neglectful or disinterested owners of coconut properties can be induced either to improve or dispose of their land. (Paras 77 and 78).

18. Subsidies could be given through Co-operative Societies to reduce the cost of fertilisers, fencing posts, barbed wire, implements and tractors. (Para 9).

19. The financial requirements of these proposals are :—

	Rs.
For Advisory service, demonstrations and seedlings	500,000
Allowances or loans for replanting	1,000,000
Acquisition of derelict lands	1,000,000
Cost of 10 Settlement Schemes	3,600,000
Subsidies	not estimated

20. The Committee could not agree whether seedlings should be distributed free or sold at a special reduced price. (Para 70).