

- A study of the most significant factors which make certain parts of the oriental tropics a great concentration point for the Commercial Coconut Industry.

# LOCATION FACTORS IN THE COMMERCIAL COCONUT INDUSTRY

By GEORGE F. DEASY \*

**W**ELL over nine-tenths of all the copra and coconut oil that enters world commerce from primary producing areas comes from five centers: the Philippine Islands, the Netherlands East Indies, the South Sea Islands, British Malaya, and Ceylon (Figure 1). No other part of the Tropics offers serious competition to these five regions in commercial coconut production (Table 1). (It is estimated that some forty per cent of the annual coconut harvest of the world is consumed in the countries of origin. The remaining sixty per cent enters international trade.)

The factors determining this concentration of the commercial coconut industry within a restricted segment of the Tropics have never been systematically and comprehensively stated in geographical literature. Complete lack of explanation of the situation, or over-emphasis of one or two factors, has been the common method of treatment. In a few instances, the factors involved in the localization of the coconut industry within a particular island or group of islands have been adequately discussed, but the application of these and other factors to the world situation has apparently thus far not been undertaken.

The purpose of this paper, therefore, is to indicate and briefly evaluate, in so far as data are available, those environmental, economic, political, and ethnic factors that have operated and are operating in unison to make certain portions of the Asiatic and

Pacific Tropics the outstanding commercial sources of one of the world's major vegetable-oil raw materials.

## Temperature Factor

The coconut palm is a true tropical tree; it cannot withstand cool or cold weather. A mean annual temperature of about 68 degrees F. is necessary, and the optimum yearly temperature for best growth and maximum yields is 80 degrees F. or higher. The diurnal temperature range should be small, preferably not exceeding 10 degrees F. The minimum temperature that the tree can withstand is approximately 45 to 50 degrees F. In a word, the coconut palm is limited to regions that are "always hot".

Despite these limitations, however, a glance at the map in Figure 2A will show that there is a vast area in the Tropics which meets the temperature requirements of the tree. This includes most of the land between the Tropics of Cancer and Capricorn, exclusive of the highland regions. The temperature factor, therefore, merely sets the outer limits, beyond which the culture of the coconut palm is usually impossible. Other factors must operate to bring about the greater localization of the commercial coconut industry.

It should be noted in connection with the temperature factor, however, that the poleward borders of the "Always Hot Zone," with their lower mean an-

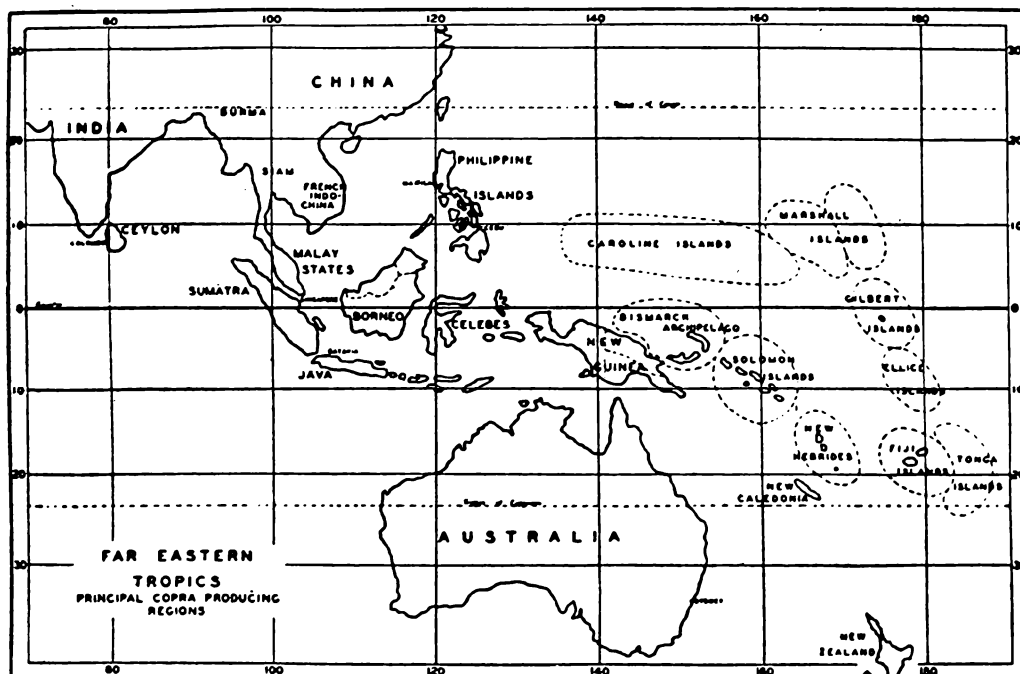


Fig. 1. Showing Far Eastern Tropics: the principal copra producing regions.

nual temperatures, their greater daily temperature variations, and the possibility of "cool spells" during periods of invasion by temperate-zone air masses, are not so favorable to widespread and successful coconut production as are those parts of the zone lying closer to the Equator. Hence, other things being equal, such regions as the northern West Indies, northern Peninsular India and Indo-China, southern Brazil, southeastern Africa, and northern Australia are not likely to be major coconut-producing centers.

### Precipitation Factor

In addition to constantly high temperatures, the coconut palm requires heavy rainfall. The tree can survive and produce a little fruit with an annual precipitation of as little as 40 inches, but for profitable growth and yields a yearly rainfall of at least 60 inches is required. Optimum conditions would necessitate a rainfall of 80 inches or more. Precipitation apparently cannot be too great, for there are records of thriving groves in regions receiving as high as 190 inches a year.

The rainfall likewise must be well distributed throughout the year. The tree stores little moisture and it lacks a tap root; hence it is not suited to regions with a long and pronounced dry season, in which the water-table drops some distance below the surface level. However, if the yearly rainfall is very high, and if surface conditions are such that the ground-water level remains high, the tree is able to survive and produce abundantly in areas with several months of dry weather.

The application of the above precipitation restrictions to those regions with suitable temperature characteristics results in a considerable reduction in the potential commercial coconut-producing areas. Figure 2B indicates those portions of the "Always Hot Zone" receiving an average annual precipitation of 60 inches or more. In most cases this rainfall is well distributed throughout the year. In a few instances, however, there is a distinct dry season (the Indian and Indo-Chinese areas, for example), but the total fall of rain is sufficiently great to maintain soil moisture at appropriate levels throughout the year. All remaining parts of the "Always Hot Zone" either receive too little rainfall, or that which occurs is too distinctly seasonal in character. The precipitation factor, therefore, removes from consideration as possible major coconut-producing centers: (1) much of the Mexican, Central American, and northern West Indian regions; (2) a considerable proportion of the South American area; (3) most of the African section; (4) all of the Arabian section; (5) much of the Indian and Indo-Chinese regions, and (6) all of the Australian section. The only segments of the "Always Hat Belt" that remain essentially unchanged are the East Indian and Pacific areas. Decided differences in rainfall exist between the wet windward and dry leeward sides of many of these islands, but they cannot be indicated on the small-scale map used.

### Soil, Ground-Water, Plant Propagation and Transportation Factors

Even though the climatic factors are favorable for the coconut palm, certain ground-water and soil

conditions must exist for the tree to thrive. Generally speaking, for best results the following are necessary: (1) a loose, porous soil and sub-soil, preferably sand or alluvium (heavy clay soils are detrimental to growth and yields); (2) a continuously high water-table, and (3) rapid and continuous movement of ground-water (stagnant ground-water is very injurious to the palm).

Such a combination of soil and ground-water conditions can exist in a number of different sites. Perhaps the most common place where they are simultaneously encountered, however, is along seashores backed by highlands. Porous sandy beaches experience rapid and constant movement of ground-water caused by the ebb and flow of the tide, and are the last to react to a period of drought by a lowering of the water-table. Hence, while the coconut palm will grow and is actually found in many inland sites within the wet tropics where suitable soil and drainage conditions exist, the seacoasts seem to offer the largest expanses of favorable territory and the coconut industry tends to be concentrated there. In India, for example, coconut groves are located over three hundred miles from the sea, and at altitudes ranging up to several thousand feet.

Furthermore, many of the present producing palms were not planted by man but are instead natural growths. Such trees are invariably found along coasts, since the coconut fruit is lighter than water and is frequently washed to adjacent shores where it takes root and grows. No other simple method of seed dispersal exists to produce extensive inland natural growths. Hence, this factor also tends to localize the coconut industry along coasts.

Finally, copra is a bulky, cheap commodity. It is not well adapted to long and costly overland shipments in tropical regions, where transportation costs are excessively high. Therefore another factor—that of location or accessibility—tends to localize the commercial coconut industry of the world along coasts.

The map in Figure 2C shows the net results of the operation of all the above factors. The major potential commercial coconut-producing areas are seen to be confined to the coastal portions of those parts of the Tropics possessing suitable temperature and rainfall characteristics. All parts of these coastal districts shown on the map do not have suitable soil and drainage features, but local data are lacking in most cases to differentiate the areas on this basis. The main argument, however, that it is coastal rather than inland districts that are most suitable for commercial coconut production, still stands. In this way all of interior South America and Africa can be eliminated from consideration.

### Political Factor

In so far as natural environmental conditions are concerned—i.e., temperature, precipitation, soil, drainage, and accessibility—all the coastal areas previously indicated in Figure 2C are apparently equally well adapted to the commercial production of coconuts. The introduction of the political factor, however,

changes this picture.

Certain of these tropical coastal areas are colonial possessions of some of the major copra and coconut oil importing countries of the world. The remainder lack political affiliations. It is only natural that the mother countries should favor the coconut products of their dependencies, either by direct tariff regulations and processing taxes or by the more intangible and elusive but equally effective business, commercial, and shipping ties that exist between the various parts of an empire. It is not coincidence that enables the Philippine Islands to furnish the United States with most of its copra and coconut oil, or Malaya, Ceylon, and the British South Sea Islands to supply the British Empire with its imports of similar products, or the Dutch East Indies to find their major market in the Netherlands (Tables II, III, and IV). Colonial possessions, therefore, possess a very real and tangible asset over their potential non-colonial competitors.

The colonial areas benefit in still another way from their status as wards of the Great Powers. Their internal financial and political life is generally stable. Hence, when large purchasers of coconut products who have no tropical colonies, such as Germany and Denmark, look about to establish suitable commercial contacts, they usually favor the stable colonial countries to the exclusion of the unstable non-colonial areas. Likewise, when investments are being made in modern coconut plantations, it is generally the colonial areas that are chosen for development.

Figure 2D shows the results of the political factor as it modifies the potential commercial coconut-producing areas. All of Central and South America except British Honduras and the Guianas, as well as some of the West Indies islands, lack the necessary political ties. It is chiefly the Asiatic, Pacific, and African coastal areas that possess assured middle-latitude markets (Siam is an exception).

### **Labor Supply, Competitive Crop, and Ethnic Factors**

For a region to become a truly large producer of coconut products it must possess not only the basic environmental complex to permit production and the necessary political connections to stimulate production, but it must also have a sufficiently large and dense population adequately to utilize the favorable existing opportunities.

Table V shows the total population and population density per square mile of each of the remaining potential commercial coconut-producing countries, excluding Oceania. Population figures for the actual potential producing areas within each country are not available, but labor within the confines of individual political units is usually rather highly mobile, if conditions warrant the movement. The total population of all African colonies having suitable coastal areas is about 71 million, but the average population per square mile of these countries is less than 14. The Asiatic countries have a total population, excluding India, of over 110 million and an average population density of about 92 per square mile. Including India,

the Asiatic segment has a total population of 464 million, and a population density of 153 per square mile. In addition it has easy access to the Chinese millions. The South and Central American areas have a combined population of approximately one-half million, and an average population of only slightly over three per square mile. The colonial West Indies have a total population of only some four and one-half million, but a population per square mile of over 260. The total population and the population density of Oceania is not known, but both must average fairly low.

Analyzing these figures, we find that all of the potential producing colonies do not have a sufficiently large and dense population for extensive coconut production. This is especially true in view of the fact that the coconut industry is only one of many types of economic activities carried on in most of the countries concerned. In general it may be stated that the population of the South and Central American colonies is both too small in total numbers and too sparse to make those areas outstanding producers of coconut products, even though the whole populace were to engage in that industry to the exclusion of all others. In the case of the colonial West Indies, while the population density is sufficiently great to permit adequate exploitation of available coconut-producing possibilities, yet the total population is only four and one-half million, and only a small fraction of these is engaged in the coconut industry. So far as population is concerned, however, the West Indies offer greater promise of becoming an important commercial coconut center than any other part of the New World. The potential coconut countries in Africa have a fairly large total population, but they are spread over such an enormous area that the population density is quite low. The result is that many possible coconut-producing areas are left undeveloped.

Only in the Asiatic section do we find a favorable combination of dense and large total population. Even excluding India, the population of this section is almost one and one-half times the combined populations of all other potential producing countries, and the density is over six times as great. Including India (and China as a potential labor source), the predominance of the Asiatic section in labor supply is overwhelming. This large total population means that even though only a small fraction of the people engage in this particular line of economic activity, the resulting production will be extremely large. The great density of population means that the potentialities for coconut production will be utilized to a far greater degree than they would be in a sparsely populated region.

The net result of the population factor is to exclude as major potential coconut producers (1) the Central and South American colonies; (2) the colonial West Indies, and (3) the potential African areas, and to favor the predominance of the Asiatic areas. This leaves only the Pacific segment to be accounted for.

Oceania, with a few exceptions, is unlike most other potential coconut-producing countries in that it can produce few alternative crops or products of commercial value. (There are a few exceptions to this

statement. Sugar, for instance, is the major crop of the Fiji Islands, and crops or mineral products other than copra constitute the major exports of a few additional islands.) Many of the South Sea Islands are coral reefs or sandy stretches which are suitable for coconut cultivation but absolutely unfit for most other types of crops. Hence, almost the total productive population of Oceania is obliged to engage in commercial coconut production if it wishes to obtain the benefits to be derived from international trade (Table VI). Consequently, despite the relatively small total and the low density of population, one might still class Oceania as a major potential commercial producer of coconuts.

This same situation holds true for many of the smaller islands of the Netherlands Indies, where des-

pite the relatively sparse population the export of copra is great because of the lack of alternative economic pursuits. It does not apply to the larger islands of the Indies Archipelago, where more varied environmental conditions give the occupants a choice of export products.

The competitive crop factor operates in exactly the opposite fashion in the case of the tropical West African region. This section has long been the center for the oil palm, the second most important vegetable-oil plant of the Tropics and an excellent substitute for the coconut palm. Hence, greater apathy to the cultivation of the coconut palm is probably found there than anywhere in the Tropics. It is significant to note that the only parts of Africa supplying appreciable

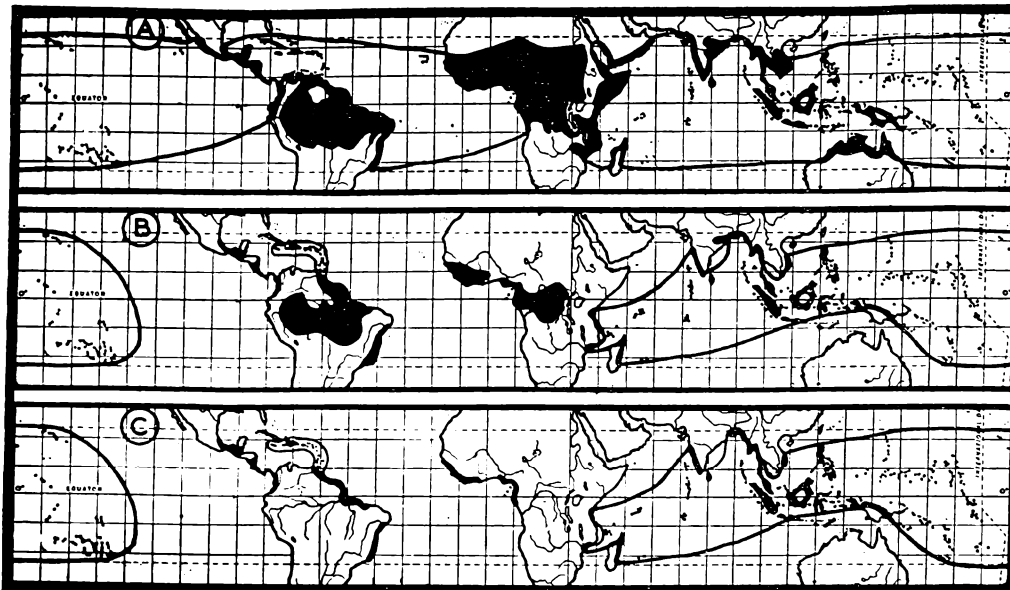
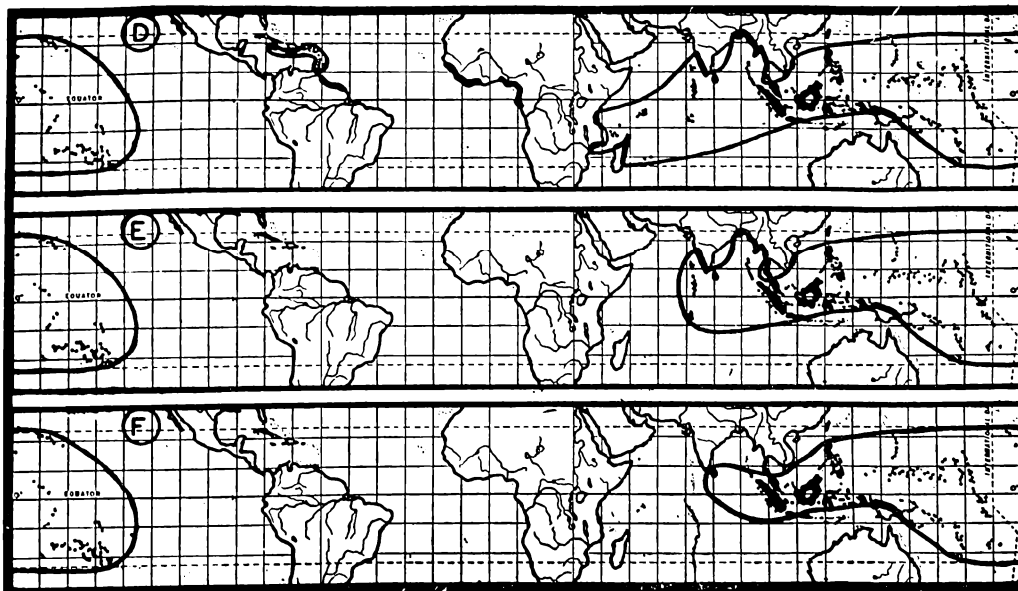


Fig. 2. Showing how environmental, economic, political, and ethnic factors have operated and are operating in unison to make certain portions of the Asiatic and Pacific Tropics the outstanding commercial sources of the world's major vegetable-oil raw materials.



quantities of coconut products to commercial channels are found on the eastern coast of that continent (Mozambique, Zanzibar).

In addition to the labor and competitive crop situations, the ethnic factor must here be considered. The Asiatic and Pacific segments of the Tropics are chiefly populated by Malayan and Polynesian races, peoples steeped in centuries of coconut culture and possessing the necessary knowledge and skill for tending the crop. The African and American segments, on the other hand, have a predominant Negroid population which lacks the traditions of coconut culture found in the Orient. The results of this factor, while intangible and difficult to evaluate, undoubtedly tend to foster the commercial coconut industry in the Asiatic-Pacific sections and to retard the industry in Africa and the New World.

Mapping the conclusions arrived at in the discussion of the above factors (Figure 2E), it is found that: (1) the Central American, South American, West Indian, and African potential colonial coastal areas are excluded from becoming major commercial coconut-producing centers because of the labor supply, competitive crop, and ethnic situations; (2) the Asiatic coastal areas remain potential commercial coconut centers because of their large available labor supply and ethnic background, and (3) Oceania compensates for its deficient labor supply by its ethnic background and by being forced to concentrate on the coconut crop to the almost complete exclusion of all others. The net result is the retention of the Asiatic and Pacific sections as potential major commercial producers of coconuts.

### Domestic Market Factor

In all the areas designated in Figure 2E, the cultivation of the coconut palm is widespread and of great importance. India (including Burma), French Indo-China, Malaya, the Netherlands East Indies, the Philippines, and the South Sea Islands all produce vast quantities of coconuts each year. However, the commercial coconut industry, with its emphasis on exports, is not developed in certain of these areas—particularly India, Java, and French Indo-China. Instead, in these three countries, most or all of the yearly crop is consumed at home. In the remaining areas, copra and coconut oil exports account for a large percentage of the total production.

This situation appears to be largely a function of the relationship between size of population and total area of potential coconut land. If the population of one of the producing countries is excessively large with respect to the available coconut areas in that country, then local consumption of coconut products will account for all or most of the domestic output and little will be left over for export. This is the case in India, Java, and French Indo-China. India's 353 million people form an almost unlimited market for the products of her restricted coconut-producing coastal sections (note small size of potential coconut areas in Figure 2B). Likewise, Java's 42 million people consume most of the coconut products of an island that is but little larger than the state of Ohio, and only limited parts of which are suitable to the produc-

tion of the palm. Furthermore, while the population of French Indo-China is not excessively large (23 million), yet in relationship to the very restricted coastal coconut-producing areas available (Figure 2B), it is sufficiently great to consume most of the local product.

On the other hand, the relationship between total population and potential coconut-producing land in the remainder of the Oriental Tropics permits the export of large quantities of copra and coconut oil. The Malayan Peninsula has a population of but five million, the island of Ceylon has but six million, all the Outer Possessions of the Dutch East Indies (i.e., all but Java) have total population of only nineteen million—less than one-half that of Java alone, and the Philippine Islands combined have only thirteen million people. All of these regions are islands or peninsulas, with extremely long coastal coconut areas that have a productive capacity far in excess of local demands (Figure 2B). Hence, all of these regions are major exporters of coconut products.

The population question, therefore, is seen to be critical in the commercial coconut industry. If population is either too sparse in density or too small in total numbers, then coconut output is insufficient to permit a region to rank as an outstanding source of coconut exports. This is the case in almost all the potential colonial coconut-producing areas outside the Oriental Tropics. If, on the other hand, population is too great in comparison with available coconut land, then domestic demands absorb all or most of the local production. This appears to be the case in the Indian, Javanese, and Indo-Chinese portions of the Oriental Tropics. The intermediate population situation that exists in the remainder of the Asiatic and Pacific regions appears to be most favorable to the export of large quantities of coconut products.

### Length Of Coastline

It is sometimes stated in geography texts and agricultural works dealing with the subject of coconut production, that the coconut industry is centered in the Orient rather than other parts of the Tropics because the many islands of the East Indies, the Philippines, and the Pacific, as well as the long Malayan Peninsula afford tens of thousands of miles of coast well suited to the growth of the palm. This statement infers that it is merely lack of suitable coastal sites with the necessary climatic and soil conditions that has prevented the development of a large commercial coconut industry in the extra-Oriental Tropics. That such reasoning is fallacious can readily be proved by reference to a few maps and figures.

Ceylon exported, in 1936, a total of 108,000 metric tons of copra and copra-equivalent of coconut oil; British Malaya, during the same year, shipped 152,900 metric tons of similar products (including reexports). The whole of South America exported only 700 metric tons; the whole of Africa only 74,000 metric tons; the whole of Central America and the West Indies only 5,400 metric tons, during 1936.

However, reference to Figure 2C shows immediately that the coastal areas of both Ceylon and

TABLE I  
MAJOR COPRA AND COCONUT OIL  
EXPORTING REGIONS,  
1 9 3 6 \*

ASIA . . . . .	1,339,800	
Philippine Islands . . . . .	542,800	(First)
Netherlands Indies . . . . .	509,600	(Second)
British Malaya . . . . .	152,900	(Fourth)
Ceylon . . . . .	108,000	(Fifth)
British Borneo . . . . .	11,400	
French Indo-China . . . . .	10,700	
Siam . . . . .	3,700	
Timor . . . . .	600	(1935)
Portuguese India . . . . .	100	
India . . . . .	.....	
OCEANIA . . . . .	217,300	(Third)
New Guinea . . . . .	67,800	
Fiji Islands . . . . .	35,100	
Solomon Islands . . . . .	25,500	
French Settlements in Oceania	22,100	
Western Samoa . . . . .	13,200	
Japanese Mandated Islands..	12,200	
Tonga . . . . .	12,100	
Papua . . . . .	10,700	
New Hebrides . . . . .	10,600	
Gilbert and Ellice Islands . .	5,200	
New Caledonia . . . . .	2,800	
AFRICA . . . . .	74,000	
Mozambique . . . . .	34,200	
Zanzibar . . . . .	13,200	
Tanganyika . . . . .	7,600	
Togoland . . . . .	7,400	
Seycheles . . . . .	5,100	
Gold Coast . . . . .	2,600	
Madagascar . . . . .	1,600	
Mauritius . . . . .	1,200	
Nigeria . . . . .	200	
Others . . . . .	800	
CENTRAL AMERICA . . . . .	5,400	
Trinidad and Tobago . . . . .	4,300	
West Indies . . . . .	1,000	
British Honduras . . . . .	100	
SOUTH AMERICA . . . . .	700	
British Guiana . . . . .	700	
WORLD TOTAL . . . . .	1,637,200	

\* Metric Tons; coconut oil in terms of copra.  
Source: International Institute of Agriculture, 1939.

TABLE II

PERCENTAGE OF UNITED STATES IMPORTS OF  
COPRA AND COCONUT OIL COMING FROM THE  
PHILIPPINE ISLANDS\*

YEAR	PER CENT
1929 . . . . .	79
1930 . . . . .	76
1931 . . . . .	80
1932 . . . . .	70
1933 . . . . .	81
1934 . . . . .	93
1935 . . . . .	99
1936 . . . . .	99
1937 . . . . .	94
1938 . . . . .	98
1939 (Jan.-June) . . . . .	100

\* Coconut oil in terms of copra.  
Source: United States Department of Agriculture.

British Malaya are far shorter than the potential coconut-producing coastal portions of Africa, or South America, or Central America and the West Indies. Obviously, if the coastlines of the three non-Oriental areas are each longer than the coastlines of the third and fourth largest exporters of coconut products in the world, then length of coastline by itself cannot be employed to explain the lack of development of a commercial coconut industry in the New World and African areas. If the potential coastal coconut zones of these latter regions were fully employed, they would rank the New World and Africa well up among the leading coconut producers. Factors other than length of coastline must be invoked, therefore, in order to explain the present retarded condition of the industry in those areas. These factors have been previously discussed in this article.

### Incorrect Interpretation of the Competitive Crops Factor

A statement occasionally used in explaining the predominance of the Oriental Tropics in commercial coconut production is: "The great coconut areas are not very well suited for the establishment of other export crops such as coffee, tea, cacao, rubber." This is an incorrect application of the competitive crops factor.

If the "great coconut areas" signify the Oriental

TABLE III

PERCENTAGE OF COPRA AND COCONUT OIL  
EXPORTS OF THE PHILIPPINE ISLANDS GOING  
TO THE UNITED STATES \*

YEAR	PER CENT
1929-33 . . . . .	85
1934 . . . . .	65
1935 . . . . .	90
1936 . . . . .	78
1937 . . . . .	93
1938 . . . . .	79

\* Coconut oil in terms of copra.  
Source: United States Department of Agriculture.

TABLE IV

PERCENTAGE OF UNITED KINGDOM IMPORTS  
OF COPRA COMING FROM BRITISH EMPIRE  
PRODUCTS \*

YEAR	PER CENT
1927 . . . . .	74
1928 . . . . .	76
1929 . . . . .	71
1930 . . . . .	68
1931 . . . . .	62
1932 . . . . .	91
1933 . . . . .	100
1934 . . . . .	98
1935 . . . . .	100

\* Source: International Institute of Agriculture.

coconut-producing countries, one has only to recall the vast tea and rubber exports of Ceylon, the rubber and tin of British Malaya, the sugar and Manila hemp of the Philippines, the rubber and petroleum products of the Netherlands Indies, to understand the inaccuracy of the above statement. Only in Oceania and certain of the smaller of the Dutch East Indies is it true that the environment is "not well suited for the establishment of other export crops."

If, on the other hand, the "great coconut areas" referred to above mean the actual sandy coastal sections of the Oriental producers, then the statement holds true for both non-Oriental as well as Oriental producers. Ideal coconut land is seldom well suited to the growth of other export crops. For instance, most coastal coconut areas experience high winds.

TABLE V  
POPULATION FIGURES FOR POTENTIAL  
COCONUT-PRODUCING COLONIES \*

	POPULATION	DENSITY PER SQ. MILE
<b>AFRICA</b>		
French West Africa .....	14,702,000	8.1
Liberia .....	2,000,000	46.5
Gold Coast .....	3,269,000	41.5
Sierra Leone ....	1,890,000	67.7
Nigeria .....	19,365,000	57.2
French Equatorial Africa .....	3,423,000	3.6
Belgian Congo ...	10,067,000	11.2
Kenya .....	3,262,000	14.8
Tanganyka .....	5,147,000	14.0
Mozambique .....	4,006,000	13.5
Madagascar .....	3,798,000	16.0
<b>Total</b> .....	<b>70,929,000</b>	<b>13.4 (average)</b>
<b>ASIA</b>		
India .....	338,172,000	214.7
Burma .....	14,667,000	62.8
British Malaya ...	5,137,000	96.5
Ceylon .....	5,780,000	228.2
Netherlands Indies	64,540,000	87.7
French Indo-China	23,030,000	80.8
Philippine Islands.	13,099,000	114.5
<b>Total</b> .....	<b>464,335,000</b>	<b>153.6 (average)</b>
<b>CENTRAL AND SOUTH AMERICA</b>		
British Honduras.	56,000	6.5
British Guiana ...	333,000	3.7
French Guiana ...	37,000	1.1
Netherlands Guiana	169,000	3.1
<b>Total</b> .....	<b>595,000</b>	<b>3.2 (average)</b>
<b>WEST INDIES</b>		
Puerto Rico .....	1,806,000	525.8
British West Indies	2,204,000	174.8
French West Indies	551,000	494.6
French West Indies .	551,000	494.6
Netherlands West Indies .....	91,000	225.8
<b>Total</b> .....	<b>4,652,000</b>	<b>265 (average)</b>

\*Figures for years between 1931 and 1938.  
Source: "Foreign Commerce Yearbook, 1938."

TABLE VI  
VALUE OF COPRA AND COCONUT OIL AS  
PERCENTAGE OF TOTAL EXPORTS,  
1936

	PER CENT
Netherlands Indies .....	7.7
Philippine Islands .....	19.6
Ceylon .....	8.2
British Malaya .....	4.2*
Oceania	
Solomon Islands (av. 1931-35) .....	75.6
Tonga .....	86.8
Western Samoa .....	61.6
Fiji Islands .....	19.0**

\*Including reexports.

\*\*Fiji is one of the exceptional South Sea Islands that depend chiefly on the export of products other than copra (in this case sugar).

Source: International Institute of Agriculture, 1939.

Consequently they are usually unfit for a tropical lowland crop like cacao. Furthermore, the ground-water in many coconut sections is brackish in character, which fact absolutely excludes most other crops such as sugar cane thrive best where a definite and pronounced dry season is part of the climatic regime. These liabilities, however, are not exclusively restricted to the Asiatic-Pacific sections; they occur throughout the potential coconut regions of the world.

Either interpretation of the original statement

## PHILIPPINE MECHANICAL SHOPS

MACHINERY CONTRACTORS AND MANUFACTURERS

*Manufacturers of  
Coconut Defibering Machines  
for the  
National Coconut Corporation*

**D. S. PONGOS**  
Manager

7th Ave. Corner Rizal Ave. Ext.

Grace Park, Caloocan, Rizal

Tel. Cal. 285

thus proves it to be incorrect. Hence, the competitive crop factor alone cannot be used to explain the outstanding position of the Orient in the commercial coconut industry.

**Conclusions**

The coconut palm (*Cocos nucifera*) shows a circum-equatorial distribution. It is a common coastal tree, and to a lesser extent a tree of the interior, throughout the Tropics. Extensive stands exist in tropical Central and South America, in the West Indies, and in Africa. The widespread presence of the tree in tropical Asia and Oceania is proverbial.

However, the coconut palm, like most other crops, has its half-dozen or so major centers of production, consequent upon the fact that only in narrowly restricted areas is there to be found that almost ideal set of natural and human conditions which result in maximum production with least cost and effort, and which give to those limited areas the necessary advantages to produce leadership.

This study attempts to select and evaluate those environmental, economic, political, and cultural factors which are most significant in accounting for the great concentration of the commercial coconut industry in certain parts of the Oriental Tropics. No claim is made that the factors considered are the only ones involved in the problem, nor is it claimed that the selected factors have been appraised as to their precise function and value. Lack of anything approach-

ing complete data and the fallibility of human judgment prevent such exactitude. Nevertheless, the author does feel that the major factors involved in the localization of the commercial coconut industry have been dealt with more adequately than in any previous publication, and that a more coherent and comprehensive picture of the distribution of the industry has been presented.

\* Reprint from "Economic Geography" (April, 1941 issue) published by Clark University, Worcester, Massachusetts.

*Compliments*

*of*

**Manila Office Equipment Co.**

**24 David, Manila, Philippines**


**Tel. 2-15-96**

*Compliments*

*of*

**FRED WILSON & CO., INC.**

**MACHINERY & SUPPLIES**



**Manila**

**Cebu** **Iloilo**

*Compliments*

*of*

**ACME ENGRAVING PLANT**

*Maker of Fine Cuts*

*Owned and Operated*

*By*

**RAMON ROCES, INC.**

Publishers \* Printers \* Engravers

1049 Soler Tel. 2-43-61

**RAMON ROCES BUILDING**

**Manila, Philippines**