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Changes in the production of tobacco and its impact on peasant farming in the Jaffna Peninsula, Ceylon

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CHAPTER I

INTRODUCTION: PURPOSE AND METHODS

Transition from semi-subsistence economies to market-oriented economies is associated with the evolution of peasant societies. Such changes, which have already occurred in the developed nations, are only now occurring in many of the less-developed nations. However, in some of the less-developed countries such changes did begin as early as the seventeenth century. Such societies change their cropping programs and methods of cultivation in response to market prices of farm products. Yet they have not been willing to adopt changes involving the introduction of radically new input factors in the system of agriculture. This has been the case especially when demands have been made for changes in the traditional methods of agriculture used in the cultivation of certain crops.

It would be possible to study progressive changes in systems of agriculture from historical records and statistical data. However, adequate data is normally not available in the less-developed countries. The research worker has to rely heavily on field data for drawing conclusions about the changes that have occurred in the system of agriculture, and the manner in which the peasants perform their agricultural tasks. If the study is to be comprehensive, such

data will have to be gathered at the level of the farm. Without direct contact with the peasants, the research worker will not be in a position to obtain correct information.

This thesis is concerned with an effort to apply the micro-geographic and historical approaches to the study of the changes that have occurred in the system of agriculture in the Jaffna Peninsula, in Ceylon, over a period of four to five centuries. An attempt will also be made to describe the farming operations as they are found today. Further, the factors that seem to preclude the farmers from adopting certain innovations in the system of agriculture, even though changes in the demand for tobacco necessitate some changes in the system, will be indicated.

A. Background to the Study. The farmers under consideration traditionally practiced a semi-subsistence system of agriculture. By the seventeenth century, in the face of pressure from their Dutch rulers, the farmers had successfully incorporated the cultivation of tobacco into the system of crop rotation. The success of tobacco cultivation depended largely on the demand for tobacco outside the farming region.

The crucial production for the export markets was threatened in 1879, when the Indian Government imposed heavy tariffs on Jaffna tobacco. However, tobacco was permitted to be imported into India on a quota basis until 1961, when it was banned. That part of the tobacco that was not exported to India under the quota system was marketed among the Indian plantation workers of Ceylon. Some of the farmers shifted from the cultivation of chewing tobacco to strong-flavored

smoking tobacco at the beginning of this century. This was possible because the indigenous population had adopted the smoking habit by this time. However, the tobacco smoking habits of the people have undergone considerable change during the last quarter century, with preferences shifting from strong-flavored tobacco to mild tobacco, from chewing to pipe smoking, and from cigars to cigarettes. Under these circumstances, the farmers have had to reduce the area devoted to strong-flavored tobacco. The effects of these changes are apparent in the crops grown by the farmers and to a lesser extent in the practices adopted by the peasants.

The Department of Agriculture of Ceylon began to provide certain economic incentives to the farmers to cultivate cigarette tobacco in the early fifties, but the farmers have shown little interest in adopting new varieties of tobacco. Under the circumstances that prevail now, the peasant has either to change his farming practices completely to grow varieties of mild tobacco, which under local conditions bring lesser profit, or to continue the old farming practices with an increase in the production of certain high-value food crops.

B. Objectives. It is one of the overall aims of the writer to apply the methodology suggested by James M. Blaut for the analysis of peasant farming, to farming in the Jaffna Peninsula.[1] This involves the application of systems analysis to a detailed description of the farm and all the features associated

[1]James M. Blaut, "The Ecology of Tropical Farming Systems," Plantation Systems of the New World, Social Science Monographs, Vol. VII(Washington, D.C.: Pan American Union, 1958), p. 88.

with it. This method of analysis has not been attempted in previous studies of peasant farming in Ceylon. It is the aim of the writer not only to analyze the most important elements of the farming system, but also to determine their qualitative and quantitative characteristics and their relationship to the other elements.

Another important general objective of this study is to trace the evolution of the Jaffna farming system over the past several centuries, with the aim of tracing the time and place of origin of the farming system. Such studies of origin and progressive changes incident in the farming system would provide additional insight into the evolutionary trends of the present-day farming in the Jaffna Peninsula. It is the aim of the writer to show that the farming system is of South Indian origin and that it migrated to the Jaffna Peninsula without any major changes. Following its origination, the farming system in the Jaffna Peninsula underwent a major transformation from a semi-subsistence system to a commercial system with the introduction of tobacco. A second major change is the recent decline in importance of certain high-value food crops.

The more detailed questions that are examined during the study include the following: (1) What practices have been adopted by the peasants to maintain their income under conditions of declining demand for strong-flavored tobacco?; (2) Do the peasants respond to changes in the prices of products and factors--that is, do they behave in an "economically rational" manner?; (3) What are the factors that have favored or hindered the adoption of innovations by the farmers of the peninsula?

C. Method and Field Procedure. The writer makes use of data obtained in the field, from a group of farms, to study the nature of peasant agriculture in the Jaffna Peninsula. This involves a detailed analysis at a micro-geographic scale. No previous attempts have been made by research workers to provide detailed information pertaining to the peasant agriculture of the peninsula. Most of the surveys conducted by government departments were concerned with an analysis of the amount of food and cash crops that are produced in this region. In fact, no attempt has been made to study the peasants and the way they respond to constraints arising from a decline in demand for certain products they grow. Most of the new agricultural methods introduced by the Department of Agriculture have not been successfully adopted by the peasants, because no attempt has been made to acquire adequate knowledge of the material resources and cultural processes that are involved in local production and farming activities. Such information can only be obtained by a comprehensive study of the individual farms.

Data from individual farms cannot be analyzed successfully unless some analytical approach is applied. Systems analysis provides the desired analytical framework for such an approach. The farm is considered to comprise a set of elements not merely existing together but also closely related to each other in their attributes.[1] It is therefore possible to demarcate the farm in which these elements are functionally related into "arbitrary sections of the real world," and to consider the farm as a system and its components as subsystems.[2]

[1]Richard J. Chorley, "Geomorphology and General Systems Theory," Geological Survey Professional Paper 500-B (Washington: 1962), p. B2.

[2]Peter Hagett, Locational Analysis in Human Geography (New York:

The elements of the Jaffna tobacco farming system are quantitatively differentiated into internal elements and boundary processes. The boundary processes that operate from outside and affect the farming system are analyzed to explain the changes that have occurred in the farming system. It is therefore necessary under these circumstances to analyze certain phenomena on a regional scale. In fact, certain changes in the farming system can only be explained in terms of the regional distribution of the critical phenomena.

The structure of the farming system is defined. This helps to understand the system's qualitative and quantitative characteristics and the nature of the relative significance of the individual elements for the operation of the system.

The process by which the semi-subsistence agricultural system was transformed into a partly commercial agriculture and its subsequent evolution are then described. The farm operating under a semi-subsistence agriculture is a partially independent unit, and there is very little productive movement of people and farm products across the boundary of the farm. The farm that is found in the Jaffna Peninsula at present is dependent on external factors.

A decline in the demand for farm products that are sold outside the farm results in a great setback to the farming system. The farmers' decisions to grow various crops and to adopt various practices are determined by conditions that operate outside the farm.

It is not sufficient that the study should be confined merely to the transformation of the semi-closed system to an open system. It is necessary to

St. Martins Press, 1966), p. 17.

trace the place and time of origin of the farming system of agriculture. This approach to the study is necessary to explain the characteristics and location of the farming system as it is found at present.

Field procedure. The field research for this study began in 1962, when the writer initiated a survey to plot the red soil regions that are so closely associated with the tobacco farms of the peninsula. This survey enabled the investigator to locate the group of farms from which the data for this study was obtained. In addition to the preparation of the map on soils, the writer collected relevant literature on tobacco cultivation in Ceylon, with special emphasis on the Jaffna Peninsula, for the period 1879-1960. The writer secured the co-operation of the District Agricultural Officer to obtain information pertaining to tobacco cultivation for earlier periods. The records of the Department of Agriculture were very valuable in this regard.

The writer had no difficulty in selecting the farms and the areas where the data were to be collected. At the outset, between December, 1962, and April, 1963, the writer made a detailed survey of six tobacco farms (one in the village of his residence and the others in the adjoining villages). It was not possible to obtain detailed information on all the farms, even though all were accessible. However, information on the farm of the writer's village was quite accurate and complete, because it was on the land belonging to the writer's family, although cultivated by a tenant farmer. Even if there was some bias in the selection of the farm, it was merely a pilot study. The selection of the farm in his family's land gave insight into the farming system within the Jaffna

Peninsula. Observations were made with regard to the cultivation, manuring, and watering of the plants. The farmer was questioned with regard to income and expenditure. This was a preliminary survey, but valuable information was gathered and the stage was set for the peninsula-wide survey that was carried out with the assistance of the field overseers of the District Agricultural Office of Jaffna in the period 1965-66.

There are 102 villages involved in the production of tobacco, and the field overseers were asked to interview at least two farmers in each village. The writer adopted this method for gathering primary data as an expedient sampling procedure. The selection of the farms had to be done on the basis of a sampling scheme, and the village was chosen as the unit from which the farms were selected. The overseers were given the option of selecting the two farms from each village, but the farms were to be separated from each other. Each overseer was expected to cover ten to twelve villages. They were familiar with their respective areas and had access to the records of the village council and the co-operative societies. They were required to obtain data pertaining to the area under tobacco, onions, chillies, and minor crops in each village. The two farms were randomly selected in each village with the hope that these would be representative of the farms of the village. The questionnaire for the survey was prepared by the investigator in consultation with the officer of the District Agricultural Office in Jaffna. The data obtained by this method was useful in determining the changes that have taken place in the production of various crops in the Jaffna Peninsula over the last ten years.

Even though the survey was of a peninsula-wide nature, special emphasis was placed on two of the eight administrative divisions. The administrative divisions of Valigamam North and Valigamam East were chosen because they were the most important tobacco growing areas of the peninsula. These two divisions accounted for thirty-two villages. The investigator himself selected the representative farms in each village of these two divisions. Therefore, apart from the survey carried out by the field overseers, the investigator himself made detailed studies. It was not possible for the investigator to obtain detailed information for all sixty-four farms included, but an attempt was made at least to get detailed information from one farm in each village. It should be mentioned that the writer selected only farms that were, on the average, a quarter of an acre in size, so as to facilitate comparison. As mentioned earlier, the farms selected were chosen from the center of a tobacco growing area in each village so that the farms in each village were clearly separated from the farm of another village.

As previously discussed, the writer had already obtained some information about six farms of this region, and this information was useful in determining what was to be observed and recorded on the sample farms. In addition, the writer revisited the farms where he obtained information during the pilot survey. In the final survey the writer was especially interested in the impact that the changes in the production of tobacco have had on the peasants of the peninsula. At the same time, information on the functioning of the farming system was also gathered. The writer was assisted by his brother and another relative in recording data pertaining to the farming system. An attempt was made, as has

been mentioned earlier, to visit at least one farm in each village during the important operations, such as manuring, transplanting, hand-watering, irrigating, harvesting, curing, etc. On the average, five to six half-days were spent in each village, which in most cases involved simply visiting a single farm. Normally, one person visited one farm in the morning and the other farm of the same village in the evening. The writer, being a teacher, had sufficient time at his disposal during Christmas vacations and during the weekends to make frequent visits to these farms.

Finally, archival research for this study was done in the United States, using the library facilities at Clark University and Harvard University, from November to January, 1967-1968. This was the most difficult aspect of the study, because of the nature of the needed data. It involved going through not merely historical records, but also Tamil literary works and memoirs left by various eighteenth-century Dutch Governors of Ceylon.

The plan of work can be outlined as follows:

Chapter II outlines the physical and social resources of the Jaffna Peninsula insofar as this helps to provide an overall perspective on the problems that are discussed in this study.

Chapter III describes the semi-subsistence farming system that existed in the peninsula prior to the introduction of tobacco. The place and date of origin of this semi-subsistence farming system are traced from historical records. The mechanisms involved in the diffusion of this system to the peninsula are discussed. Reference is also made to the creation of the tobacco

farming system.

Chapter IV discusses the factors leading to the expansion in the area under tobacco cultivation prior to the early fifties, and the causes that have led to a decline in the production of tobacco within the last decade.

Chapters V and VI describe in detail the individual elements of the tobacco farming system as it operates at present. These elements and other processes are brought into functional relationship.

Chapter VII describes the effect of the adverse factors that have been described in Chapter V. Jaffna Peninsula is considered as a single region, and changes in the crop structure of the region are analyzed over a given period. The chapter also indicates the nature of the changes that are preferred by the farmers of the peninsula.

Chapter VIII focuses on the factors that have favored or hindered the adoption of certain innovations that have been discussed in the previous chapter. Such an analysis is helpful in predicting whether major changes can be introduced in the farming system. Due to the lack of sufficient data, it was not possible to build a functional model to predict such changes.

In the final chapter, the changes in the farming system are reviewed and changes in the future are predicted.

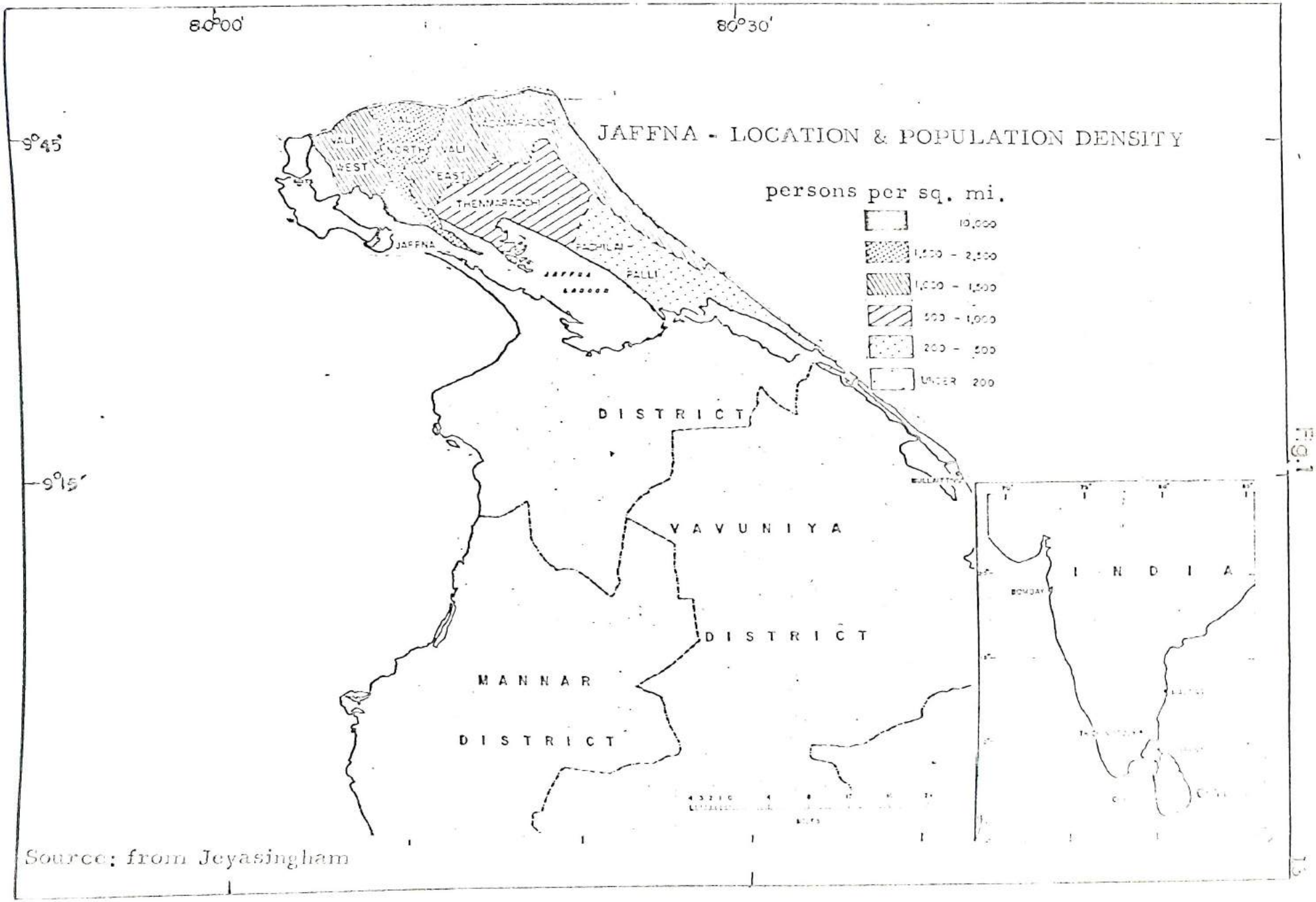
CHAPTER II

THE NATURAL AND CULTURAL FRAMEWORK OF JAFFNA'S AGRICULTURE

A. Natural Resources. Ceylon has long been a focal point for shipping in the Indian Ocean. Its strategic situation off the southern tip of the Indian Sub-continent has tended to enhance its intrinsic significance, both historically and in current times, as producer of specialized agricultural materials. Jaffna Peninsula is situated in the northern section of Ceylon. The peninsula, including a few islands to the west, covers an area of 443 square miles and had a population of 490,000 people in 1958(See Fig. 1).

For a proper understanding of the nature of the farming systems of the Jaffna Peninsula it is necessary to be familiar with the natural resources of the area, including landforms, hydrology, climate, vegetation, and soils. This does not imply that natural resources have been mainly responsible for the highly developed farming system that is found in this area. B. H. Farmer states that the distinctive character of Jaffna Peninsula is due not only to the physical conditions which prevail there, but also to the technical skill and attitude toward work of the inhabitants.[1]

[1]B. H. Farmer, Pioneer Peasant Colonization in Ceylon (New York:



Source: from Jeyasingham

(1) Landforms. An understanding of the landforms of the Jaffna Peninsula requires some consideration of the geology, structure and relief of the area.

The bed rock of the peninsula is composed of limestone of Miocene age. This limestone base is completely covered by sand in the southeast but is exposed in several places in the western part. The landscape is seemingly flat with low swells. The highest part of the peninsula is about 50 feet above sea level and is located in the northeastern coastal section.

The limestone bedrock forms a series of islands, joined to the rest of Ceylon by a narrow sand bar.[1] The sandy tracts that stretch in the northwest to southeast direction are sand spits, formed by long-shore drift, associated with the Northeast and Southwest Monsoons. The vast expanses of marshland in the center and the east of the peninsula appear to be filled lagoons.

(2) Drainage. The drainage features of the peninsula are determined largely by the underlying limestone. One important feature of the landscape is the presence of "solution pans," called by Thornbury "sinkhole ponds," and locally named kulams ("natural ponds" in Tamil.) The low-lying areas associated with the coastal belts and the lagoons are imperfectly drained while the relatively high lands in the center of the peninsula are well drained

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Oxford University Press, 1957), p. 50.

[1] E. J. Wayland and A. M. Davis, "The Miocene of Ceylon," Quart. Journal of the Geological Society, Vol. LXXIX, Part 4 (1923), pp. 577-602.

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(Fig. 2). The drainage differences created by minor variations in the peninsula have influenced the amount of differentiation in the profile characteristics of the soils. This will be discussed in greater detail in the section on soils.

Finally, well irrigation is made possible by the water-bearing qualities of the limestone. The average quantity of water in a well, according to Babtist, is about 4500 gallons and a single well can irrigate 2 or 3 acres.[1] The importance of well irrigation to the farmers of this region was clearly brought out by Tennent, in the mid-nineteenth century, in the following passage:

> The arable soil of Jaffna is generally of a deep red colour, from the admixture of iron, and being largely composed of lime from comminuted coral, is susceptible of the highest cultivation, and produces crops of great luxuriance. This tillage is carried on exclusively by irrigation from innumerable wells, into which water rises through the madrepore and sand; there being no streams in the district.[2]

(3) Jaffna Peninsula, lying within 10 degrees of the equator, experiences high temperatures throughout the year. The average monthly temperatures and mean monthly diurnal temperature ranges are given in Table I.

Jaffna receives on the average about 50 to 55 inches of rainfall annually (Table II).

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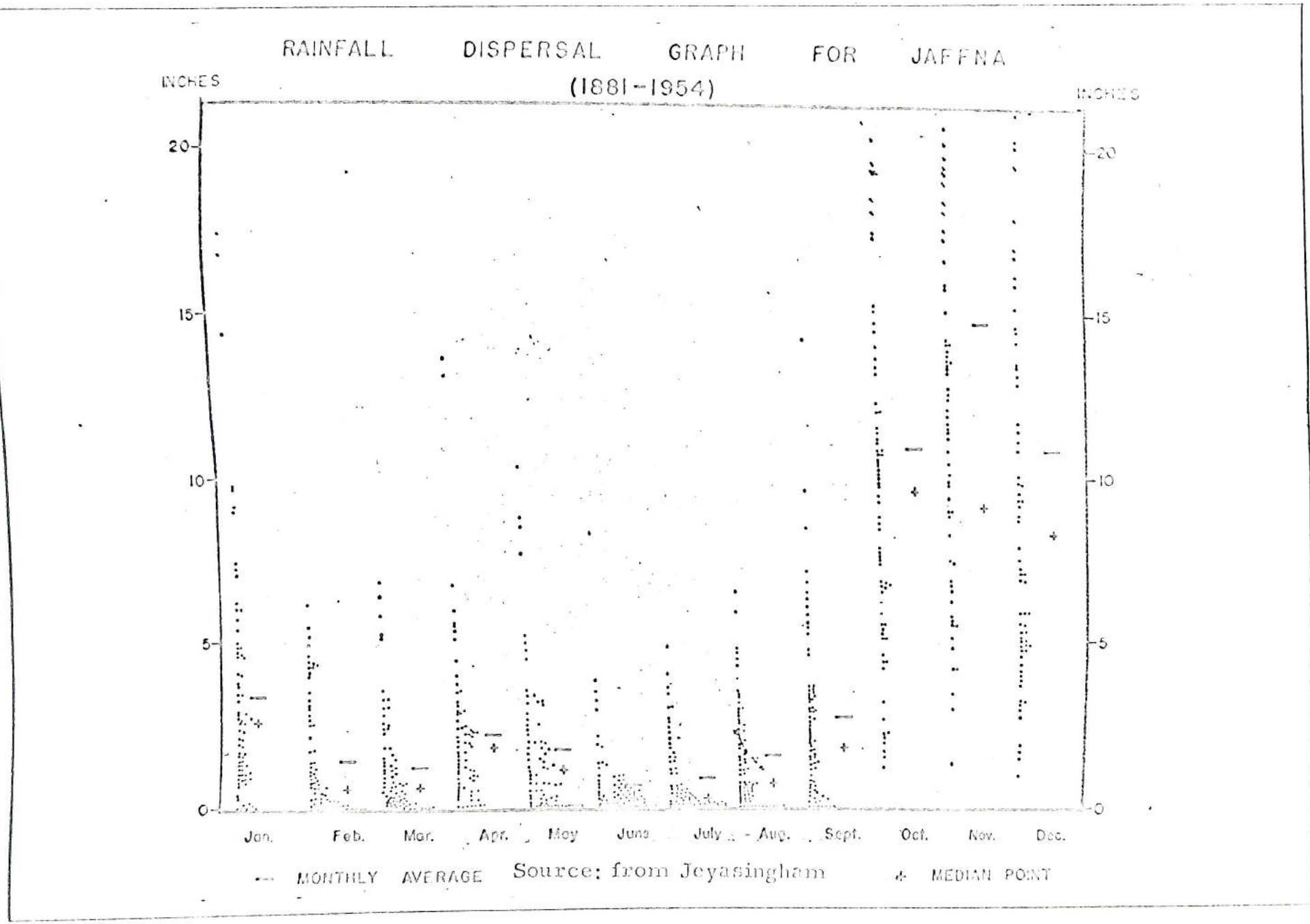
[1] K. N. Jeyaseelan, "A Soil Catena Associated with the Jaffna Miocene Limestone," The Proceedings of the Annual Session of the Ceylon Association for Advancement of Science, 1958 (unpublished).

[2] J. E. Tennent, Ceylon (London: 1859), Vol. I, p. 20.



Source: from Jeyasingham

Fig. 2

TABLE I

TEMPERATURE VALUES FOR JAFFNA
25 years record

Mean Monthly Temperature (F.):

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
77.6	79.0	82.2	84.7	84.7	84.6	82.9	82.4	82.6	81.6	79.2	77.6	81.5

Mean Monthly Diurnal Temperature Range (F.):

11.0	13.2	12.7	9.4	6.5	5.7	6.2	7.1	8.2	9.0	9.5	7.5	8.8

Source: Thambyapillai, G., "Dry Zone Climatology," Journal of National Agricultural Society of Ceylon, Vol. 2, No. 1(1965).

The seasonal weather regimes fall into five periods. (1) The Convectional-Convergence Season, which is from March to April, is characterised by high temperature and high humidity. Afternoon thunderstorms are an important feature of the weather during the period. Jaffna receives less than five inches

TABLE II

JAFFNA--MEAN MONTHLY RAINFALL
1911-1940 (in inches)

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
4.4	1.5	1.6	2.2	2.0	0.4	0.5	1.1	2.6	9.3	17.3	10.4	53.0

Source: G. Thambyapillai, "Dry Zone Climatology," Journal of National Agricultural Society of Ceylon, Vol. 2, No. 1 (1965).

of rainfall during this season. (2) The Pre-South West Monsoon Season of May is characterized by slightly higher temperatures while rainfall is 2.0 inches. (3) The Southwest Monsoon Season extends from June to September. The initiation of this season has vital agricultural significance to the Dry Zone of Ceylon. Virtually all agricultural activity comes to a standstill in northern Ceylon except in the Jaffna Peninsula where cultivation is carried on with the help of well irrigation. Temperatures are high and rainfall decreases from 2.0 inches in May to 0.4 inches in June. (4) The Convectional-Cyclonic Season is from October to November. This season seems to be marked by cyclonic activity, and the storms bring almost 50 per cent of the mean annual rainfall to the peninsula. Rainfall of nine inches to seventeen inches is sufficient for the cultivation of crops without irrigation. (5) The Northeast Monsoon Season is from December to February. This season is characterized by decreasing temperature and rainfall. In December it averages 76.0 degrees F. Rainfall ecreases from 17.3 inches in November to two inches in February. This season inaugurates the crop year (see Fig. 2).

(4) Soils. Most of the information on soils used here is derived from the soil survey conducted by Jeyaseelan in 1958[1] and from the soil studies conducted by Joachim and Kandiah.[2]

The limestone-derived soils for the most part are shallow and are

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[1] Jeyaseelan, op. cit.

[2] A. W. K. Joachim and S. Kandiah, "Studies on Ceylon Soils," Tropical Agriculture, Vol. LXXXV, No. 2 (1935); and A. W. K. Joachim, "The Soils of

either free of boulders or rocks in the surface soil or have rocky outcrops. These soils vary in color from dark red in the higher ground to olive lower down at the level of the lagoons (Fig. 3). Accompanying this change in color are changes characterized by increasing clay content, increasing numbers of soft concretions in the sub-soil, and increasing mottling. Jeyaseelan is of the opinion that this is due to the differentiation in drainage caused by slight variations in the topography and therefore calls the groups of soils a "soil catena." The following drainage classes are recognized:

Relative Position	Drainage Number and Name of Category
Highest ground	1 Excessive
High ground	2 Good
Medium level ground	3 Moderately good
Low level	4 Imperfect
Very low	5 Poor

A summary of the nature of the soil categories will be discussed below.

Type 1: Excessive drainage. There are no variations in the soil horizons in the natural soil, and it remains uniform until it abruptly meets the parent rock. It should be mentioned, however, that the soil is also composed of sand that has been transported into the area by wind. Therefore the soil is dark red to red sandy clay loam which gradually changes to a sandy clay at a depth of about 18 inches. The surface soil exhibits very little aggregation and is loose and friable when dry, non-coherent when moist, and

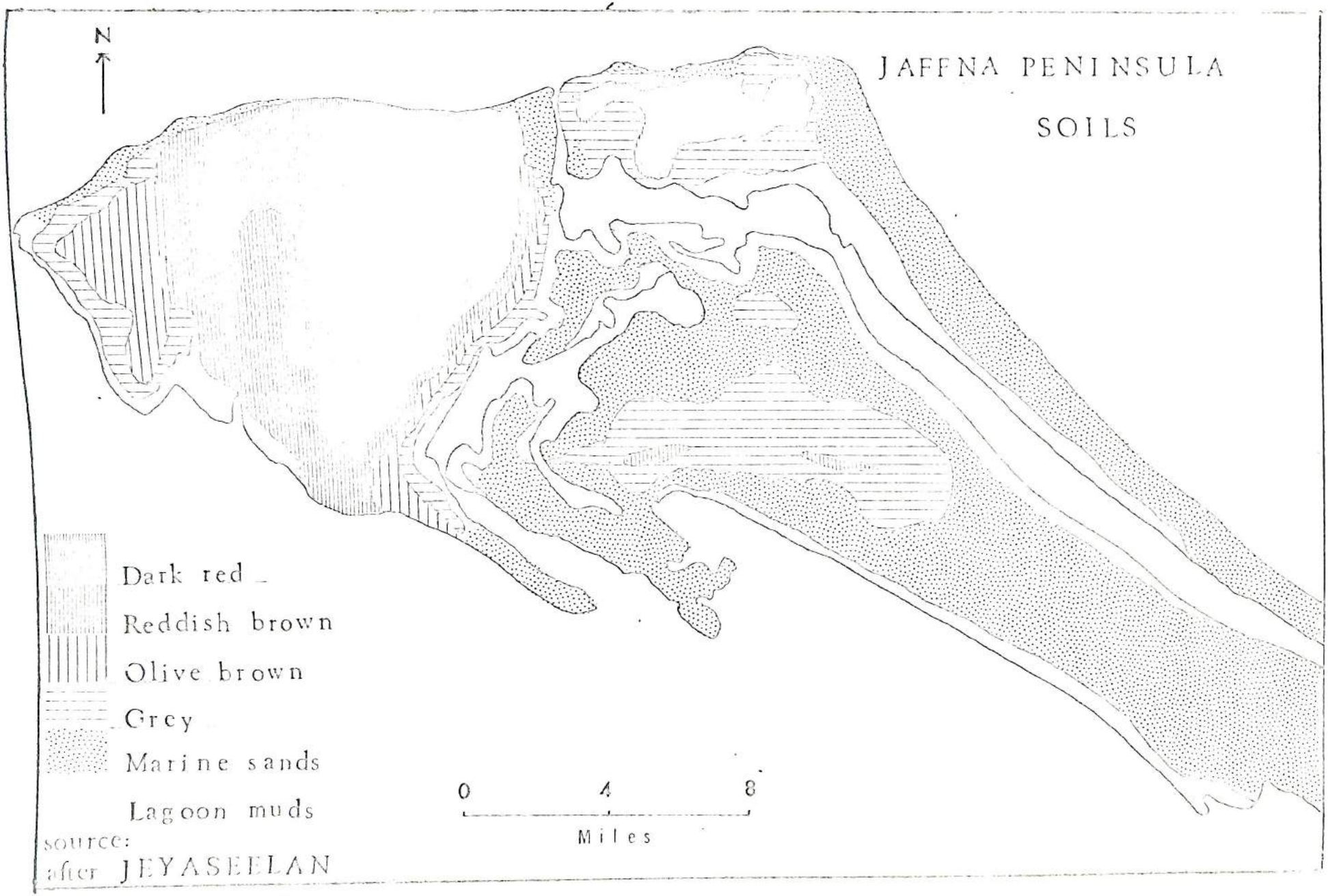

N
JAFFNA PENINSULA
SOILS
Dark red
Reddish brown
Olive brown
Grey
Marine sands
Lagoon muds
0
4
8
Miles
source:
after JEYASEELAN

Fig. 3

non-plastic when wet. The profile is highly permeable, an d therefore there is little tendency to hold water. The soil is dry in the dry season, causing excessive desiccation and oxidation of iron and resulting in the red color of the soils. The pH value of the soil averages 7.2.

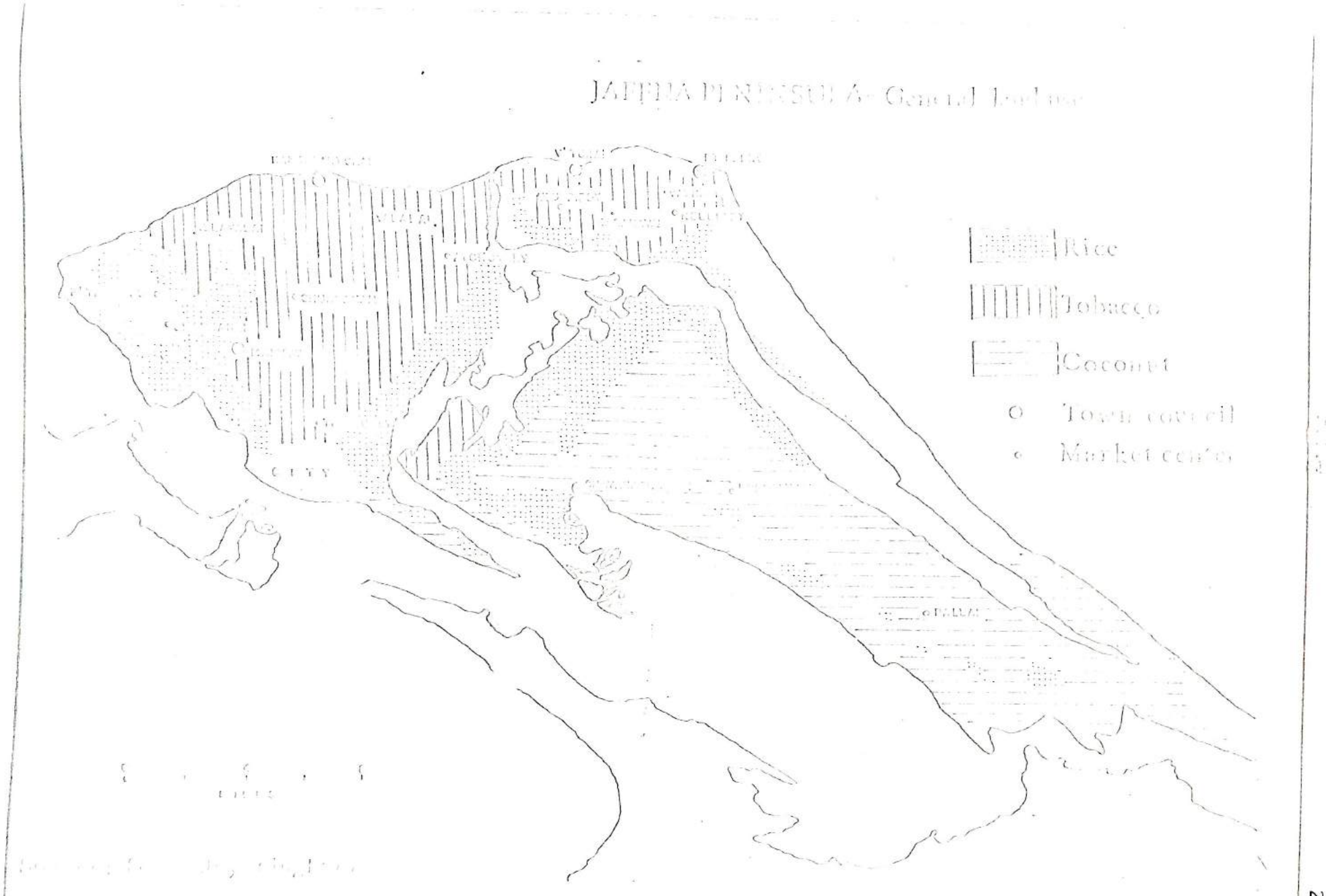
This soil category is important for this study, because these soils are intensively cropped with tobacco, onions, chillies, and dry grains (Fig. 4). Jeyaseelan says:

> As the depth of the soil is insufficient, stones are removed so as to have about three feet of soil mantle. Heavy and frequent dressings with organic matter and irrigation from wells enable the cultivators to obtain good harvests.[1]

Type 2: Good drainage. The soils of this category do not differ very greatly from the excessively drained soils except that mass infiltration of water into the soil is higher. The soil color is reddish brown because they suffer some degree of desiccation. The sandy clay loam has a pH value of 7.5. These soils are important for the cultivation of tobacco, onions, chillies, and dry grains.

Type 3: Moderately well drained. This soil occurs half way between the highland and lowland. The water table moves up and remains within three to six feet of the surface for about two months of the year. The soil develops under more moist conditions than those in Categories 1 and 2. The profile differentiation that was seen in the good drainage soils proceeds further and there is a definite textural variation, associated with structural

[1] Jeyaseelan, op. cit.


JAFFNA PENINSULA
Rice
Tobacco
Coconut
Town council
Market centre

difference, between horizons. These are sandy loams and are of an olive brown color. There is the development of crumb structure in the soil, and the lower horizons are slightly plastic when wet. The pH value is not less than 7.5. Some of the land under this category of soil is under paddy cultivation , and rainfall is supplemented with well irrigation.

Types 4 and 5: Imperfectly and poorly drained. These occur in the lowlands and are cultivated with rice every year. The water table is about six feet below the surface in the dry season, and the soil has standing water for about two months in normal years. The horizons are distinct in texture, structure, and color. The pH is about 7.8 and the color of the soil is olive grey.

This study is more concerned with the soils associated with the cultivation of tobacco and therefore it will not be necessary to deal with all the categories. On the whole, the soils are generally poor in organic matter and nitrogen but are rich in bases such as potassium, phosphates, and iron. The imperfectly drained soils lack iron but have enormous quantities of calcium carbonate. The soils are therefore not favorable for cultivation of crops, yet the area is intensively cropped.

(5) Vegetation. It is not certain whether the original vegetation was forest cover , for there is no naturally occurring free growth of trees in the peninsula today. Bare lands carry scrub vegetation except for an occasional Banyan, Margosa, or Bo-tree. In the homestead areas, tamarind, coconut, and palmyrah palm are seen. The palmyrah palm is the only

valuable tree that grows favorably under the dry conditions. The Tamils have planted these in large quantities in the peninsula. The extent of the area under palmyrah in the mid-nineteenth century was brought out by Tennent in the following passage:

> Throughout this remarkable portion of Ceylon the characteristic of the landscape is the profusion of the beautiful palmyrah palm.... These valuable trees flourish in great topes and forests, that cover miles in various parts of the peninsula and adjacent islands.... The number of palms in this district alone must be close upon 7,000,000, the edible products supply one-fourth of the food of 220,000 inhabitants.[1]

It should be mentioned, however, that with increasing population and increasing need of land for cultivation, the area under palmyrah has decreased considerably during the last three decades.

B. The Social Setting. A brief account of the social setting is necessary so as to understand peasant farming in the Jaffna Peninsula. The peasant of Jaffna is not merely an individual, but he is also a social creature, and it is not possible to understand his behavior without knowing something about his village society and his values. It is also necessary to consider Ceylon's society as a whole so as to make the picture complete.

The people. Ceylon's society is made up of communities distinguished from one another on ethnic, religious, or linguistic grounds. The largest minority group is the Tamils, who form 11 per cent of the total population of

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[1] Tennent, op. cit., Vol. II, pp. 519 and 522.

over eleven million. They are chiefly concentrated in the Northern and Eastern Provinces. About half live in the Jaffna Peninsula.

As a people, the Tamils are descendents of the Tamils who came to Ceylon, in successive waves of immigration and military invasion, from South India between 400 A.D. and 1200 A.D. Life in the Jaffna Peninsula is hard and agricultural resources are limited; as such, many of the Tamils sought opportunities in the other parts of the country.

The people of Ceylon are also distinguished from each other along caste lines. The Tamil caste system follows the familiar lines of the Hindu society. A special characteristic of this system is to acknowledge the superiority of the educated caste from which the priesthood is drawn, followed by the farmer caste. Wriggins says:

> In the Tamil Hindu areas of Ceylon, the caste stratifications are clearer and the position of the upper cultivator caste--the Vellala--has not yet been challenged, either by modern economic conditions or by other caste-conscious groups.[1]

Members of some of the lower caste are still employed as laborers by the Vellala caste group in their farms. However, within the past two decades these laborers are being paid in cash instead of in kind. There is a tendency at present for these laborers to form strong organizations to demand high wages for working in the farms of the cultivator caste.

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[1]W. H. Wriggins, Ceylon: Dilemma of a New Nation (New Jersey: 1960), p. 25.

The details of the culture of the Hindu Tamils of Ceylon and their religion are preserved in a number of ancient classical works. Quite a large number of primitive superstitions are found among the adherents of the Hindu religion. The Hindu religion has the most important influence on the development of the social framework and almost every aspect of life. The Hindus, for instance, are forbidden by their religion to eat meat and fish, although in practice they often only abstain from beef and pork.

Over seventy five per cent of the population of Jaffna lives in rural villages. Although much affected now by outside influences, the village functions as a unit, being largely made up of related families who are somewhat bound together and to the village by ties of kinship, custom, and religion. In some villages the social cohesion finds expression in a marked co-operation, as seen in the habit of pooling resources for planting, ploughing, harvesting, etc. The villages have their traditional boundaries and are administered by "village committees."

The family is the basic unit of the peasant society. The average household consists of five persons. The eldest male is the dominant family figure and makes decisions on most important matters, while the wife is more likely to control the household.

At the base of the rural social pyramid and forming perhaps 35 per cent of the rural population of Ceylon as a whole are the landless laborers who are employed for manual tasks and who for the most part belong to the unprivileged caste groups.[1] They work on the land periodically, ploughing,

[1] Ibid., p. 36.

manuring, planting, weeding, and harvesting, climbing trees, and performing masonry work.

Less than ten per cent of the total farming population are tenant cultivators.[1] Normally the tenants cultivate the land and pay rent in cash annually. There is no security of tenure.

Higher up on the scale, around forty per cent of the agricultural families are owner-cultivators.[2] Statistics are inadequate to give accurate data on absentee land-holdings.

There are many elements of change which are at work altering the traditional family, village, and social structure. The cash economy has penetrated deeply into rural areas. The people need goods which can only be provided by the outside world.

The land available for peasant farming has been declining, while the population has been increasing. The population of Jaffna Peninsula has increased from 240,000 in 1871 to 484,979 in 1953. Some of the intensively farmed areas have densities up to 2,300 persons per square mile. Land fragmentation under the Hindu laws of inheritance and Hindu custom has also led to the creation of tiny holdings, in most cases between a quarter and half an acre.[3] Land is so scarce that some young families are already in the process of moving out of the peninsula to take up cultivation in the new government-sponsored colonization

[1] Farmer, op. cit., p. 64.

[2] Ibid., p. 67.

[3] Ibid., p. 68.

scheme.

C. The Economic Setting. Like other countries in South Asia, Ceylon is predominantly agricultural. Roughly 55 per cent of the gross national product is accounted for by the growing, processing, and transporting of agricultural commodities, and more than half of the gainfully employed work in agriculture and forestry. Tea, rubber, and coconut provide 35 to 40 per cent of the country's gross national product and account for 90 to 95 per cent of foreign exchange earnings.

Specialization in the production of crops for export has gone so far that nearly one-half of all food consumed by the people of Ceylon has to be imported. The non-export agricultural crops that are produced by peasants include sugar, vegetables, fruits, pulses, tobacco, potatoes, onions, chillies, coffee, etc. There has been a tendency for an increase in the production of these crops so that they are beginning to replace imports as much as possible.

Ceylon has been able to profit greatly from its agricultural and climatic resources, which facilitate the production of high-return export products. Mainly because of these circumstances, the Ceylonese economy produces one of the highest per capita incomes in South and South East Asia. The gross national product per capita is nearly two and one-half times that of India and Burma.[1] Life expectancy is twice what the Indian can anticipate. In recent years, however, the income per capita has only been maintained at a constant level. Present rates of capital formation appear inadequate to induce a

[1] Wriggins, op. cit., p. 164.

sufficient expansion of production. Efforts are being made at present to diversify the economy, raise production, improve the standard of living, and free Ceylon from her dependence on three commodities in the fluctuating world market. Jaffna is the part of Ceylon where the farmer produces rice, tobacco, onions, chillies, and dry grains.

Most of the villages in Jaffna Peninsula are provided with electricity , and the region is also provided with a good network of roads. The products of the farms are sold in local market fairs and market centers. Jaffna is the city of the whole peninsula, while the others are merely towns or market centers. The city is provided with agricultural products from all parts of the peninsula, while the city is the center of social, economic, and cultural activities of the whole peninsula.

D. Political Setting. In Ceylon, as in many of the countries of Asia, the people are divided on the basis of traditional family, caste, ethnic, linguistic, and religious differences. As long as there was opposition to colonialism the Tamils and the Sinhalese were united. When the British withdrew, a certain degree of ethnic competition arose among the people of Ceylon. The Sinhalese seized the opportunity with the majority support of the people to gain power which was hitherto not accessible. The national unity had been weakened when the Ceylon Tamil minority found its position severely challenged when the majority group introduced legislation making Sinhalese the official language of the country. The Tamils have been forced to demand a separate state in the predominantly Tamil areas of the Northern and Eastern Provinces. The Tamils

feel that they are being discriminated against in matters relating to allocation of government jobs and in relation to the development of the predominantly Tamil areas.

CHAPTER III

ORIGIN OF THE FARMING SYSTEM

In this chapter an attempt will be made to trace the elements involved in the tobacco farming system backward in time. This will help us to understand the farming system as it functions at present. Historical records will help us to determine the possible "birth date" and "birth place" of the system. This method of analysis was suggested by Blaut as a "trial methodology for an analysis of peasant farming ecology," as applied by him in a study of peasant farming in Singapore.[1]

This chapter is divided into three sections. Section A describes the semi-closed farming system that existed in the Jaffna Peninsula prior to the introduction of tobacco. In Section B the possible place and date of origin of this semi-closed system are traced from historical records. The mechanisms involved in the diffusion of this system to the Jaffna Peninsula are also discussed. In Section C an attempt is made to determine the manner in which the semi-closed system was transformed into a more open system based on the cultivation of tobacco.

[1] J. M. Blaut, "The Ecology of Tropical Farming Systems," Plantation Systems of the New World, Social Science Monographs, Vol. VII (Pan American Union, Washington, D.C., 1959), p. 88.

A. Subsistence agriculture and associated practices. The farming system that prevailed in the Jaffna Peninsula prior to the introduction of tobacco can be described as being of a semi-closed type. The villages under this type of economy were to a large extent self-sufficient in staple foodstuffs and little was brought from outside. Anthony Pavilijoan, the Dutch commander of Jaffna District in the first half of the seventeenth century, described the economic conditions of the people of the peninsula during that period as follows:

> The scarcity of rice and tobacco is fully due to the careless administration and the laziness on the part of the inhabitants, who live three months of the year on rice, for three months of the year on roots, for three months on fruits and for three months on the kernel of the coconut. This is why they care so little about raising of rice and the cultivation only just suffices to provide for their needs.[1]

The commander seems to imply that the people were only able to cultivate rice during the three months of the year when there was rain and supplemented this with the products of the palmyrah and the roots of some plants for their food at other times. Except for palmyrah no other plants could survive the dry season unless they were cultivated with the help of irrigation. "Kernel of the coconut" refers to the fruit of the palmyrah tree. Therefore palmyrah seems to have provided a large proportion of the food, and continues to do so even to the present day. Hendrick Zwaardercroon, another Dutch commander of the Jaffna District in the mid-seventeenth century, also wrote in a memoir that the palmyrah fruit

[1]Anthony Pavilijoan, Instructions from the Governor-General and Council of India to the Governor of Ceylon, 1656-1665 (To which is Appended the Memoir Left by Anthony Pavilijoan, Commander of Jaffna Patnam, to his Successor in 1665). Translated by Sophia Pieters (Colombo: H. C. Cottle, 1908), p. 91.

rather than rice provided the food for the people.[1] Tennent, writing on the economic conditions of the people of the peninsula in the early half of the nineteenth century, indicated that the palmyrah palm supplied a quarter of the food for 220,000 inhabitants. He also wrote:

> Its fruit yields them food and oil; its juice "palm wine" and sugar; its stem is the chief material of their building; its leaves besides serving as roofs of their dwellings and fences to their farms, supply them with matting and baskets, with head dresses and serves as a substitute for deeds and writings.[2]

It is possible now to summarize some of the main elements of the farming system which existed in the peninsula prior to the introduction of commercial production of tobacco.

(1) From the preceding discussion we can see that there seems to have been a strong emphasis on the cultivation of paddy during the wet season and of dry grains during the tail end of the rainy season.

(2) The cultivation of paddy and dry grains was confined to the low-lying areas around ponds called kulams. These ponds correspond to the kulams of South India. They are depressions formed on the limestone as "solution pans" or "sink hole ponds." Thornbury describes these features as follows:

> Most of them vary in depth from 10 to 30 feet. In area they range from a few square yards to an acre or more....Dolines may become clogged with in-wash clay to such an extent that they hold

[1] Memoirs and Instructions of Dutch Governors (Includes Memoirs of Hendrick Zwaardercroon, Commander of Jaffna Patnam in 1697), Translated by Sophia Pieters (Colombo: H. C. Cottle, 1911), p. 30.

[2] J. E. Tennent, Ceylon, Vol. I (London: Longman, 1859), p. 111.

> water above the water table.[1]

Such features are found to be distributed in large numbers in the peninsula. Tennent describes the importance of these ponds in the following passage:

> The flat surface of the ground is in many places an obstacle to the extension of rice cultivation, as much as it prevents the water from flowing down over the necessary terraces; and to obviate this difficulty the natives of many districts are obliged to reduce the level of their fields with incredible labor and toil, hollowing them to the depth of several feet, heaping up excavated earth in high mounds, and thus admitting the rains and collected water flow into cavities where it is retained till the grain is ripe.[2]

It is possible that, with an increase in the population of the peninsula, land became limited for the cultivation of rice. This may have forced the people to introduce cultivation into the higher lands where the well-drained soils are not favorable for the cultivation of rice. Therefore it can be stated that there was a gradual movement of the farming system onto other soils (Fig. 4).

(3) The well-drained areas were cultivated with dry grains with the aid of well-irrigation. Such wells were sunk in the limestone rock with the aid of slaves who traditionally belonged to a caste of "well diggers" and who had come from India with their masters. These areas at present are devoted to the cultivation of tobacco, onions, chillies, and dry grains.

(4) The original inhabitants of the peninsula, according to Kularatnam, utilized the silt of the ponds for fertilizing their farms. The use of leaves

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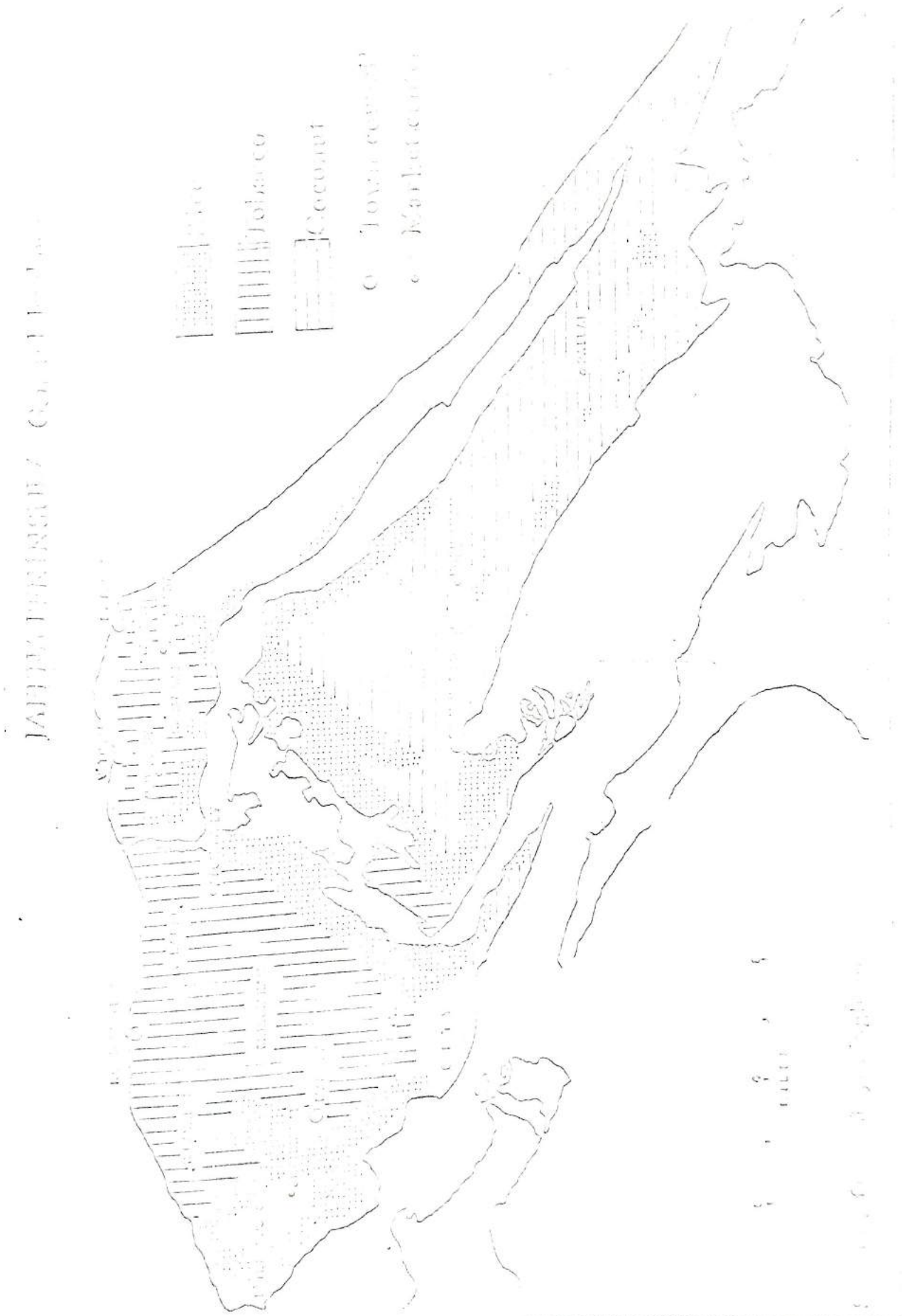
[1]W. D. Thornbury, Principles of Geomorphology (New York: John Wiley and Sons, Inc., 1965), pp. 322-323.

[2]Tennent, op. cit., Vol. II, p. 531.



and animal compost as manure may have been known to the inhabitants, as this practice seems to have originally been followed in South India, where the inhabitants of the peninsula originally came from.

(5) Cattle and goat manure seem to have been used by the farmers to cultivate their crops. Oxen were used as beasts of burden and to draw the plough. The importance of cattle for providing manure for the farms was recognized by the Dutch in the seventeenth century. Pavilijoan wrote in one of his memoirs that most of the cattle of Jaffna were killed by the Dutch when they captured Jaffna from the Portuguese. He also wrote that more than 1600 cattle died due to serious epidemics.[1] The Dutch commander seems to have replaced the lost cattle by others imported from Madras. The Dutch apparently felt the need for cattle manure for introducing tobacco cultivation in the peninsula on an extensive scale, as will be discussed below. It is most probable that, as Hindus, the farmers reared cattle partly for sacred reasons. Those farmers who could not afford to possess cattle of their own may have borrowed them from their kin in times of need. This was also a period when the concept of joint family was strong and cultivation was therefore done on a co-operative basis, the members of a kin group pooling their resources.

(6) There was heavy labor input for the operation of the farming system. This was made possible by the operation of the joint family system and the caste system. The members of the vellala caste were the cultivators and the laborers were members of the "lower caste." The laborers were considered

[1] Pavilijoan, op. cit., pp. 96-97.

slaves by the vellala caste group. Tennent, writing on the caste system of Jaffna in the early nineteenth century, had this to say:

> In the northern and Tamil districts, the slaves were employed in the labors of the field and rewarded with small proportions of the produce...Sudras, according to the institutes of Manu, were by laws of caste consigned to helpless bondage, so slavery in Ceylon was an attribute of race; and those condemned to it were doomed to toil from their birth, with no requital other than the obligation on the part of their masters to maintain them in health, to succour them from illness and apportion their burdens to their strength.[1]

Zwaardercroon also wrote that the Nalavas and the Chewias have been slaves from remote times and they are employed as water carriers.[2]

(7) It is certain that hand-applied water was utilized to cultivate crops during the dry season. Slaves provided the work force for this purpose. When water was drawn from wells the slaves provided the necessary labor to operate the water lifts.[3] The system of lifting water from wells for irrigation seems to have originated in India. The method of lifting water corresponds to the "Denki system" which seems to have prevailed in India since before the period under discussion. The mechanism for lifting water from wells can be described as follows: it consists of a lever, the short end of which is loaded so as to more than counterbalance the weight of the empty earthen or palmyrah-leaf-woven vessel which is tied to the long end of the lift. The operator has to pull the rope to lower the vessel into the well, but when raising it he has to exert less force

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[1] J. E. Tennent, Ceylon, (London, 1859), Vol. II, p. 426.

[2] Zwaardercroon, op. cit., p. 92.

[3] Ibid.

than the quantity of water raised would require, because the other end of the lever is weighted.

(8) The tools used for farming were mainly the wooden plough, the digging stick, and the hoe. The use of iron hoes was probably known to the farmers of this region by the thirteenth century, though no mention is made of it in historical records. Rasanayagam is of the opinion that iron implements and brass utensils were in general use in the early centuries of the Christian era in Ceylon.[1] However, there is no evidence that there were iron ploughs in Ceylon during that period.

(9) It is possible that the size of individual farms was larger than those that are found today. However, it is not possible to indicate the average size of those farms. Slaves provided the necessary labor force to work in these large farms. The prevalence of the system of joint family would suggest the operation of large farms. Farmer considers that centuries of settlement and pressure of population may have led to the cultivation of very small units today.[2] The process of partitioning of property by the members of a joint Hindu family has also been responsible for a reduction in the size of the farms.

(10) The peasants seem to have lived in small huts close to the farms. The small huts were built of mud, thatched with palmyrah leaf. The joint family system may have forced the members of a joint family to live in one

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[1] Ibid.

[2] B. H. Farmer, Pioneer Peasant Colonization in Ceylon (New York: Oxford University Press, 1957), p. 62.

compound as is prevalent in certain areas of the peninsula even today.

(11) A system of exchange seems to have prevailed among the farmers of the peninsula. Though agriculture was essentially in a subsistence stage, every peasant had something to sell and certain wants to satisfy. It is probable that periodic market fairs, now called sandies, played a great part in the exchange of products between peasants, and between peasants and towns. It is also probable that festivals held during the agricultural off-season provided another opportunity for the peasants to buy and dispose of their products. The items of exchange seem to have included rice, dry grains such as varagoo (Paspalum frumentaceum), coracan (Cynosurus corocanus), kolloo and samai, along with sesame (Sesamum orientale). Rasanayagam wrote that Marco Polo, who visited Ceylon in 1284 A.D., seems to have indicated that the people of the peninsula had no wheat but had rice and sesame during that period.[1] The dry grains were produced in great quantities even in the mid-nineteenth century, for Tennant wrote:

> The dry grains (as contradistinguished from rice, which is grown in water), produced in Jaffna are more numerous than those cultivated in other parts of Ceylon, varagoo, kolloo, millet, moondy, and pulse of various kinds being raised in addition to coracan and gingele.[2]

B. Origin of the farming system. Some of the main elements of the farming system that prevailed in the Jaffna Peninsula prior to the introduction of tobacco can be traced to Tamilian India. Historical and literary works on

[1] Mudaliyar Rasanayagam, Ancient Jaffna (Madras: 1926), p. 137.

[2] Tennent, op. cit., Vol. II, pp. 534-535.

Tamilian India demonstrate the fact that similar farming systems prevailed in ancient South India. Such works also indicate that most of the components of the farming system that prevailed in ancient South India were brought by the Tamils who emigrated to the Jaffna Peninsula. The migration of the Tamils from South India to Ceylon has been described by Nicholas and Paranavithana as follows:

> The large and gradual increasing Tanil element which formed part of the permanent population of Ceylon from the seventh century became predominant in the Northern Province, and secured control of the area in the thirteenth century; by dint of toil and thrift they have maintained their position to this day and extended it into the Eastern Province.[1]

Rasanayagam suggests that there was large-scale migration of vellala families from South India in the thirteenth and fourteenth centuries when the Mohammedans invaded South India. He also says:

> In such times many respectable vellala families may have emigrated to Ceylon; and there are thousands of families in different parts of the Jaffna Peninsula who trace their descent from one or other of these early colonists.... The pallas were the only slaves who accompanied their aristocratic masters from India and were employed in cultivating the fields of their lords. Tamil chieftains came down with their own slaves in their own vessels.[2]

It is possible to summarize some of the main elements of the farming system that the Tamils seem to have brought from South India to the Jaffna Peninsula.

(1) There is clear evidence that the system of cultivating dry and

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[1]C. W. Nicholas and S. Paranavithana, A Concise History of Ceylon (Colombo: University Press, 1961), p. 5.

[2]Rasanayagam, op. cit., pp. 335-336.

wet lands that prevailed in the peninsula in the fifteenth century A. D. was known to the people of ancient India. Wet lands were devoted to the cultivation of paddy while the dry lands were devoted to the cultivation of dry grains. The only difference is that paddy was not cultivated in the areas associated with natural ponds called "sinkhole ponds." Paddy lands in South India are associated with river valleys. Water was also stored in artificial reservoirs or "tanks" for irrigating paddy and other crops. Such reservoirs were called kulams. It is certain that the Jaffna Tamils introduced the term kulam, originally meaning artificial tanks, to denote their natural ponds.

(2) The Ancient Tamils of South India knew the art of sinking wells to irrigate their dry grains. The wells were necessarily associated with the lands that were removed from the river valleys. It cannot, however, be stated that most of the lands irrigated with well water were associated with well drained soils, as in the peninsula. Tamil literary works, such as the Tholkapiam of the second century A. D., refer to the wet lands devoted to the cultivation of rice as maduram and the dry lands devoted to the cultivation of dry grains as palai.[1] Srinivasa Iyangar explains the system of agriculture that prevailed in the second century A. D., as has been described in the Tholkapiam, as follows:

> The availability of land in this region taught the ulavar, the ploughmen of the maduram, the method of raising cereals after ploughing the ground, and the easy slope of land in the margins of the rivers taught the vellalar, the rulers of the flood, the m ethod of conveying

[1] Tholkapiam is the earliest book on Tamil Grammar, written in the second century, A. D.

> water to their fields. Beyond the trough of the river bed lived the Karaler, the rulers of the clouds, those who stored water in the tanks and conveyed it to the fields through irrigation channels or lift water from wells and springs by water lifts and irrigated the fields they cultivated. Thus were the arts of agriculture developed to such perfection in early days that modern science can add but little to the traditional wisdom of the South Indian farmer.[1]

(3) The Tamils of Ancient South India seem to have cultivated crops such as coracan and sesame in the dry lands. Such crops were cultivated by the Jaffna Tamils in the thirteenth and fourteenth centuries as has been mentioned earlier. Srinivasa Iyangar mentions that the Tholkapiam also refers to the cultivation of coracan and sesame in Ancient South India.[2] Noble, while stating that the Tamilian system of land classification was formulated long before 1400 A.D., describes the crops that were cultivated as follows:

> The typical wet field crop was rice in water. Dry field crops were of three types--puttada or modan, punam, and ellu. Puttada crops were cereals plus pulses grown on permanent fields, punam crops were cereals plus pulses grown on temporary field clearings within forest, and ellu crop was ginelly (Sesamum indicum L.).[3]

It therefore seems probable that the cereals and pulses that were and still are

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[1]Srinivasa Iyangar, P. History of the Tamils from the Earliest Times to 600 A.D. (Madras: Cumarasamy Naidu and Sons, 1929), p. 13.

[2]Ibid., pp. 13-14.

[3]William A. Noble, "Agricultural Classification, Extreme South India," Professional Geographer, Vol. XIX, 1967, p. 247.

cultivated in the Jaffna Peninsula were introduced from South India.

(4) The Jaffna farmer seems to have introduced the system of manuring his farm from South India. The method of utilizing the silt of tanks for fertilizing the farm seems to have originated in India in very early times. It could not have originated within Ceylon because it is a system which is peculiar to the Jaffna Peninsula. In fact, most of the farming practices associated with the farming system of Jaffna are similar to those which are prevalent in South India to this day. Farmer describes this similarity as follows:

> The technology and powers of application of the Jaffna Tamil are very reminiscent of the best agricultural customs to be found amongst the Tamils of South India. In particular, the Jaffna cultivator rivals the Coimbatore ryot in his careful attention to organic manuring; cattle and sheep are folded on the fields, leaves of trees are used as green manure, and every scrap of vegetable matter is turned to the soil.[1]

It is possible therefore that the use of leaves and animal compost as manure may have been known to the Jaffna farmer as this practice seems to have originally been followed in South India, where the inhabitants of Jaffna originally came from.

(5) The tools used in the semi-closed system of farming that existed in the peninsula prior to the seventeenth century A.D. are similar to those used by the farmers of South India in the early Christian era. Oxen were used to plough the fields as many times as possible, and it is also certain that the hoe was also used by them. Tamil literary works of the early Christian era refer to the ox and the plough very often, indicating the importance of them to the farmer

[1] Farmer, op. cit., p. 50.

and the country at large. Thaninayagam refers to the importance of the plough to the ancient South Indian farmer in his work entitled Landscape and Poetry.[1]

Noble states that the farms of extreme South India are worked over with hoes, ploughs and digging forks and therefore, it is possible that these tools were brought by the Tamils from South India.[2]

(6) The practice of weeding the crops was known to the people of Ancient India, too. Srinivasa Iyanger explains the importance of sowing, harrowing and weeding in the system of farming that prevailed in Ancient India when he translates an ancient Tamil poem as follows:

> They plough it many times so that the sod is
> well turned. They sow and harrow and pull out
> many branched weeds in the proper season.[3]

It is therefore probable that some of these practices that are found among the peasants of the Jaffna Peninsula originated in South India.

(7) The caste system which seems to have prevailed in the peninsula in the fourteenth century could be traced to South India. Under the Indian social system the farmers were considered to be the members of a special caste called vellala, while the members of the other castes were considered laborers to the farmers. Rasanayagam describes the system of class division that prevailed among the people of South India in the early centuries of the Christian era

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[1]Xavier S. Thambinayagam, Landscape and Poetry (London: Asia Publishing House, 1966), p. 118.

[2]Noble, op. cit., pp. 247-248.

[3]Srinivasa Iyangar P., op. cit., p. 179.

as follows:

> During the early centuries of the Christian era people were classified according to the nature of the land in which they lived. People were more or less tribal or were divided into clans according to the lands they dwelt in.... The cultivators who were later called vellalas lived in houses thatched with cadjan which had cultivated gardens and spacious flower gardens all around.... The herdmen's houses were straw thatched and raised on pillars. In the yards slept cattle, goats, and sheep. The men bartered ghee for paddy and cattle.[1]

Such features of the caste system that prevailed and still prevail in the peninsula can presumably be traced to South India.

(9) The practice of holding market fairs regularly in the Jaffna Peninsula for the exchange of farm products can be considered as having originated in South India. Srinivasa Iyangar describes the system of exchange that existed in Ancient India as:

> ....the barter of superfluous articles for things which were not easily available in the maduram region like salt and fish with the Paradavar and milk and milk products, especially ghee, with the Idaiyarand stone and stone tools (later iron) with the Karavar.[2]

Tennent describes the unique character of the market fairs of Jaffna, as he saw them in the middle of the nineteenth century, as follows:

> The whole district is covered with a network of roads, and at certain situations there exist what are maintained in no other part of the island, regular markets, to which the peasantry resort from a distance, and bring their fruit, vegetables and other produce for sale. These markets are

[1] Rasanayagam, op. cit., pp. 160-161.

[2] Srinivasa, Iyangar P., op. cit., pp. 13-14.

> generally held in the early morning, before the sun pours down his fiercest rays....[1]

It is therefore possible to trace most of the elements of the semi-closed farming system that prevailed in the Jaffna Peninsula prior to the seventeenth century to South Indian origin.

C. Introduction of commercial production of tobacco. Commercial production of tobacco was introduced in the Jaffna Peninsula in the seventeenth century, though it was cultivated on a very small scale prior to this period. The crop was introduced by the Portuguese government to fulfill two important objectives: (1) As a medicine to combat beri-beri disease, which was common among the Portuguese soldiers; and (2) as a stimulant and relaxant for the Portuguese soldiers and workmen. In gradual stages the local population began to adopt it for chewing with betel and arecanut. The Portuguese had introduced it in South India, where the Indian Tamils were also traditionally used to chewing betel. The Indians also found that tobacco gave additional flavor and stimulation if it was mixed with betel.

As mentioned earlier, cultivation of tobacco became significant only during the Dutch occupation of the peninsula. The Dutch were bent on making as much revenue from tobacco as possible, especially when there was a great demand for it in South India and the East Indies. Some tobacco was also being imported into the country by the Dutch for local consumption. Anthony Pavilijoan, the Dutch Commander of Jaffna until 1697, wrote in a memoir:

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[1]Tennent, op. cit., Vol. II, p. 542.

> The cultivation of tobacco, still less difficult will be found, because the people here could hardly do without it and tobacco which is imported is more expensive and of inferior quality to what was raised here.[1]

The same author writing on the difficulties of introducing commercial production of tobacco, says:

> It may seem, your honour, that the cultivation on such a large scale would at present be impossible owing to the want of oxen, but every endeavor must be made, and animals may be obtained from Marruas (Madras), Nagapatnam where the price for them is only half a real. Your Honour should see that the requested number of animals is ordered yearly.[2]

The Dutch imposed heavy tariffs on all imported tobacco as a measure that would force the local people to grow tobacco on a large scale. Hendrick Zwaardecroon, the Dutch Commander in Jaffna in 1697, wrote:

> The cultivation of tobacco is a matter of still lesser difficulty and since a resolution has been passed in the council to raise the duty by 30% on all imported tobacco, which will make the commodity so much dearer, the inhabitants will not fail to grow it themselves.[3]

Some amount of force was exerted by the Dutch to make the people grow tobacco on an extensive scale in the Jaffna Peninsula. This can be inferred from the passage written by Pavilijoan in a memoir:

> That endeavor must be made to remedy the evil.

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[1] Pavilijoan, op. cit., p. 12.

[2] Ibid., p. 13.

[3] Zwaardercroon, op. cit., p. 98.

> The means thereto, are, however, easier to be thought of than carried out, on account of the obstinacy of the people, who do not want to change their old customs and habits. We must not despair but persevere in our objectives and that they must be induced to turn to resources to better advantage and to improve their prospects.[1]

Shultz refers to this as the "command approach."[2] However, the introduction of the commercial production of tobacco in the farming system did not involve a dismantling of the old farming system. Though there were changes in the crop structure, the nature of manuring of the farms, and the performance of certain daily tasks, there were no major changes in the use of certain tools and the method of irrigation. The components of the tobacco farming system that was created in the Jaffna Peninsula will be discussed in greater detail in Chapter V.

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[1]Pavilijoan, op. cit., p. 93.

[2]T. W. Shultz, Transforming Traditional Agriculture (New Haven: Yale University Press, 1964), p. 102.

CHAPTER IV

EXPANSION AND DECLINE IN THE AREA UNDER TOBACCO CULTIVATION IN THE JAFFNA PENINSULA SINCE ITS INTRODUCTION IN THE SEVENTEENTH CENTURY

This chapter will be divided into two sections. Section A will deal with the factors relating to the expansion of tobacco cultivation in the peninsula. Section B will be largely concerned with the decline in the production and acreage under tobacco cultivation within the last decade. Such an analysis is necessary to demonstrate the fact that the functioning of the tobacco farming system in the peninsula is largely dependent on external circumstances such as the demand for tobacco in the various markets.

A. Factors leading to the expansion of tobacco cultivation. Tobacco cultivation was introduced by the Dutch for the sole purpose of exporting it to India and to a certain extent to the East Indies. This was clearly brought out by the members of a committee appointed to reorganize the tobacco industry in Ceylon as follows:

> The history of tobacco cultivation in Ceylon can be traced back to the seventeenth century and began with the growing of a type of dark, coarse, and strong flavored tobacco, used for chewing, and later cheroot tobacco /smoking/,

> both of which were first grown in the Jaffna Peninsula and exported to Sumatra, Penang and Travancore.[1]

It is true that the local people had adopted the tobacco chewing habit, but this demand would not have warranted the cultivation of tobacco on a commercial scale. Therefore, it is necessary to account for the creation of the tobacco farming system in the Jaffna Peninsula, in relation to the location of the Indian market across the Palk Strait, a distance of less than fifty miles.

The nearness of South India to the Jaffna Peninsula had favored commercial relations between the two countries as early as the thirteenth century. The importance of the ports of the peninsula in the Indian Ocean had been recognized by many medieval travelers. Rasanayagam says:

> Large ships intended for the ocean trade were built in some of the northern ports and the industry, though in a dying state, is still being continued at Kayts and Valvettiturai. On account of the extensive seafaring trade, the necessity to indicate the ports and harbours at night would naturally have arisen and light houses constructed out of mortar and stone or of high tree stumps, with lights placed on them, acted as guides to mariners.... The merchandise was stored in large warehouses in packages, on which the seal of the king was stamped ....A missionary friar, John Montecorvino, speaking of vessels passing through passage (Palk Straits) in his time (1292 A.D.) says that a large number of them must have availed themselves of the channel, for as many as 60 of them were wrecked annually on the coasts....[2]

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[1] Re-organization of Tobacco Industry: Document (Colombo: 1951), p. 18.

[2] Mudaliyar Rasanayagam, Ancient Jaffna (Madras: 1926), p. 149.

The Dutch, who were mainly interested in commerce, made use of these ports on a greater scale. Hendrick Zwaardercroon, writing on the trade that existed between South India and Jaffna Peninsula in the late seventeenth century, said:

> Another product which yields a profit to the inhabitants is tobacco. This is grown very abundantly and the greater part of it is sold by the owners without the least risk to the merchants of Malabar, while the rest is sold here among its own people or to the company's servants. A part is sent to Nagapatan, because the passage to Malabar is too dangerous for them on account of the Bargarwese pirates, who infest the neighborhood.... The company's chaloups and other vessels kept here for the service of the company are used mainly for the passage between Coromandel and Jaffnapatnam and to and from between Jaffna and Mannar. They serve during the southwest monsoon to take palmyrah, tobacco, wood to Nagapatam. During the northeast monsoon they serve to fetch nelli, cotton goods and carst iroon. [1]

Therefore it is certain that the export of tobacco to India commenced in the latter half of the seventeenth century, because there was a demand for it. This demand increased and more and more lands were brought under tobacco cultivation. The rush to extend the area under tobacco did not stop in the middle of the nineteenth century, because Tennent in 1859 stated:

> ...the increasing demand for tobacco causes new lands to be broken for its growth, thus stimulating a constant progressive improvement in the culture of all the inferior lands. [2]

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[1] Memoirs and Instructions of the Dutch Governors (Memoirs of Hendrick Zwaardercroon, 1697, translated by Sophia Pieters) (Colombo: 1911), p. 32.

[2] J. E. Tennent, Ceylon (London: 1859), Vol. II, p. 534.

Thus external trade played an important part in the creation of the tobacco farming system in the peninsula.

Offhand, it might appear that the location of the farming system is little affected by the factor of the site conditions of climate, relief and soils. Dutch records indicate that chewing tobacco was imported into the peninsula from India before it was cultivated on an extensive scale in the latter half of the seventeenth century. It meant that there was enough tobacco available in South India to meet the local demand there. However, Dutch records of the later period indicate that tobacco was exported to Travancore in South India. This can be explained by the fact that the quality of tobacco produced was high enough to be preferred by the people of Travancore. As an illustration of this we could quote what the Committee on the Cultivation and Marketing of Tobacco in Ceylon wrote:

> In spite of an increasing influx of Indian tobacco from Coimbatore and Thinnavely districts with a lower duty, the Jaffna tobacco by reason of its quality and flavour, held its pride of place in the traditional market of Travancore.[1]

The high quality of tobacco was largely due to the nature of the soil and climate of this region. The soil requirements of tobacco are somewhat unique in that in addition to the needs for normal growth, there are special correlations between soil types and characteristics of quality in respect to each of the various types of tobacco. The fine texture, well-drained, friable sandy clay loams are especially favorable for the production of strong tobacco. Moreover, the soil is able to supply the plants with such elements as lime and iron, which are so

[1] Report of the Tobacco Commission; Sessional Paper XIV (Colombo: 1955), p. 5.

necessary for the production of this type of tobacco.

The high temperature, high evaporation and less favorable moisture conditions favor the production of a dense, thick veined, rigid, dark-colored slow-burning leaf with more nicotine, stronger aroma and much resin, which are desired for the production of chewing tobacco. While the farmer has adapted his land use to the site conditions of climate and soil, the tobacco farming system cannot be explained in terms of the site or the internal resources of the region, as if it were confined to the small peninsula and isolated from external influences.

Finally, the cultural factor can be considered as having provided an additional advantage for the location of the farming system in this region. The people of extreme South India and the Jaffna Peninsula have a distinct culture and this is clearly reflected in their habits and customs. Thus, social factors such as customs and habits are as important as the economic factors such as commerce in shaping the type of land use in a region. The people of this distinctive cultural group have chewed betel and areca-nut as a habit from very early times. Tennent says:

> The chewing of these nuts with lime and the leaf of the betel-pepper supplies to the people of Ceylon the same enjoyment which tobacco affords to the inhabitants of other countries.... The custom is so ancient to Ceylon and India that the Arabs and Persians who resorted to Hinduism in the eighth and ninth centuries carried back the habit to their own country....[1]

With the introduction of tobacco the people began to use it with the betel-

[1]Tennent, op. cit., Vol. I, pp. 112-113.

nut to provide additional flavor and stimulant. In gradual stages the people began to adopt chewing tobacco without the betel-nut. The Dutch had to import tobacco from South India to meet the demands of the local people prior to the introduction of commercial production of tobacco in the peninsula. The demand for this variety of tobacco was so great in India and Ceylon that the Dutch took various steps to introduce its cultivation in this region. The production of tobacco was successful because of the demand for it in South India for over 250 years. This demand resulted in an expansion in the area under tobacco cultivation in the peninsula during this period (Table III). Once this demand was withdrawn the production of tobacco began to be adversely affected.

B. The recent decline in the production of tobacco. It was concluded in the earlier section that the functioning of the tobacco farming system is largely dependent on external circumstances. Capital and labor inputs in the farm were dependent on these external factors. The only manner in which the farmer could maximize his family income was to obtain high prices for tobacco.

As long as there was a constant demand for tobacco in South India and Ceylon the Jaffna farmer was able to realize considerable income from its cultivation. However, various events of this century led to a gradual decline in the demand for strong-flavored tobacco within and without the country. As the demand fell there was a corresponding decline in the quantity of tobacco produced in the peninsula (Fig. 5). A broad range of phenomena will therefore be analyzed on a regional scale to evaluate the factors that have led to a gradual loss of certain economic advantages of location of the farming system.

TABLE III

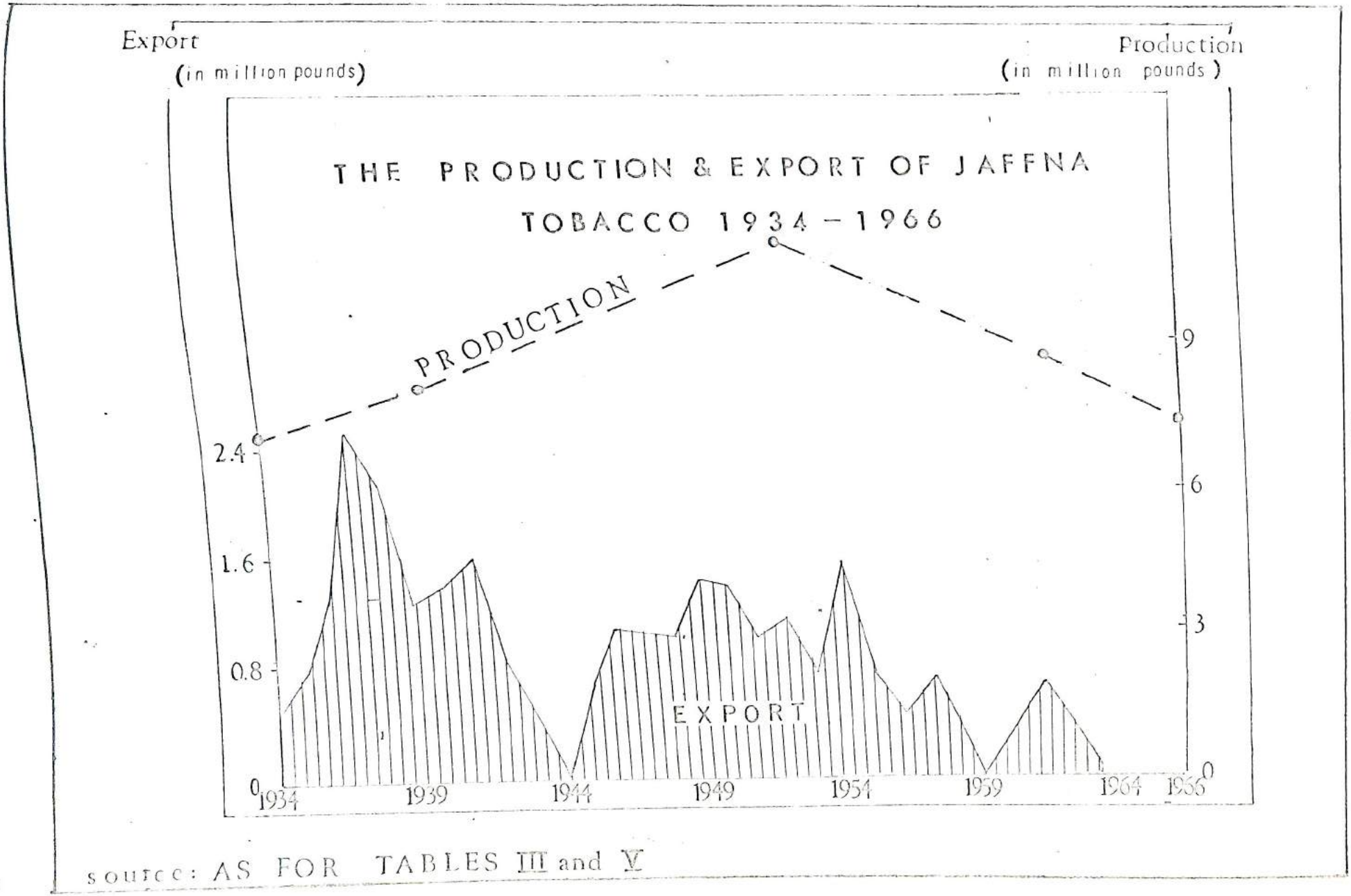
CEYLON-REGIONAL DISTRIBUTION OF THE AREA UNDER TOBACCO BETWEEN 1900 AND 1962 (in acres)

Region (Provinces)	1900	1940	1953	1962
Jaffna Peninsula	3500	4000	4950	4337
Northern (excluding Jaffna Peninsula)				163
North Central			488	738
North Western			2012	2263
Eastern			225	275
Central		2000	7125	8835
Uva				300
Sabragamuva				275
Southern				150
TOTAL	3500	6000	14800	17335

Sources: Records at the District Agricultural Office, Jaffna
Quarterly Bulletin of Statistics (Department of Census and Statistics--Government of Ceylon: 1938-1962)
Bulletins issued by the Department of Agriculture, Colombo and Peradeniya R 15274-2000 (I/64); R 12585-25,000 (3/66)
Reorganization of Tobacco Industry; Document (Report of the Committee appointed by Government of Ceylon, 1951).

1. Changes in the distribution of tobacco cultivation in Ceylon from 1900 to 1962.

Tobacco cultivation in Ceylon was mainly confined to the peninsula until about



source: AS FOR TABLES III and V

Fig. 5

1900. However, it spread to the other parts of Ceylon during the present century when the local people began to manufacture local cigars (Table 3). With this expansion, the production of tobacco was more than its demand and its cultivation received a set-back, with a fall in price. This only affected the production of strong-flavored tobacco which was mainly produced in the peninsula. The necessity, therefore, arose to examine and explore the methods of producing the right type of tobacco in Jaffna for local and foreign markets.

Attempts made to produce pipe tobacco for the London market fell through in 1902 because of the opposition from cigar manufacturers in Jaffna. Experiments carried out in 1911, 1914, and 1918 to produce mild-flavored varieties of tobacco were also not successful. Scherifius, a tobacco specialist engaged by the Government, reported, in 1917, that as far as the peninsula was concerned, cigarette tobacco and high grade cigar tobacco could not be produced. However, experiments conducted in the Central and North Western provinces proved more successful. By 1940 nearly 400 acres were devoted to the cultivation of cigarette tobacco in these favorable areas. From these early beginnings the cultivation of mild flavored and cigarette tobacco varieties began in many parts of Ceylon. By 1950 the area under cigarette tobacco cultivation had increased to nearly 2500 acres.

2. Changes in tobacco consumption. As in other countries, the tobacco-using habits of the people of Ceylon have undergone considerable change during the past fifty years. The general direction of change has been from strong flavored tobacco to mild tobacco, from chewing tobacco to pipe smoking and from cigars

to cigarettes and bidi. Bidi is a special type of cigarette of a poor quality in which leaves of many indigenous plants are used for wrapping. This is mainly consumed in India and Ceylon. The cost of bidi is so low that it can be called a "poor man's cigarette." The traditional cigar smoking and tobacco chewing habits are being given up by the present generation. Owing to this there has been a sharp fall-off or decline in the sale of cigar and chewing tobacco in the local market, and the future of this industry is very bleak. Today the cultivation of this strong-flavored tobacco is entirely dependent on the demand from the habitual cigar smoking and tobacco chewing population in the Jaffna Peninsula, Eastern Province, Up-country (Indian population working as laborers in tea plantations) and to a lesser extent in South Ceylon. Of the island's total production of this strong-flavored tobacco, 90% is utilized by the Tobacco Industry in the Jaffna Peninsula for the making of cigars for the local market.

Besides the Jaffna Peninsula, the cultivation of this local tobacco is carried out on a fair scale in the North Western, North Central and Eastern Provinces (Table IV). The area under strong-flavored tobacco cultivation has declined in Ceylon within the last decade, while the area under mild cigarette and bidi tobacco has increased. In 1940 the area under strong-flavored tobacco cultivation was more than 4000 acres while the area under mild-flavored tobacco cultivation was 2000 acres. The area under cigarette tobacco was about 400 acres in the same year. Due to a rise in demand for strong-flavored tobacco in the early fifties, the area under that variety of tobacco increased to nearly 5,000 acres in 1953 in the Jaffna Peninsula (Fig. 5).

TABLE IV

CEYLON-REGIONAL DISTRIBUTION OF THE AREA UNDER DIFFERENT VARIETIES OF TOBACCO IN 1953 AND 1962
(in acres)

Region (Provinces)	Strong Flavor	Mild Flavor	Cigarette	Bidi	Total
1953					
Jaffna Peninsula	4850		50		4900
Northern	50				50
North Central	450		38		488
North Western	200	800	1012		2012
Eastern	125		100		225
Central		5675	1400	50	7125
Uva					
Sabragamuva					
Southern					
TOTAL	5675	6475	2600	50	14800
1962					
Jaffna Peninsula	3801		295	241	4337
Northern			13	150	163
North Central	300		138	300	738
North Western	150	700	1163	250	2263
Eastern	100		125	50	275

TABLE IV--Cont.

		1962			
Region (Provinces)	Strong Flavor	Mild Flavor	Cigarette	Bidi	Total
Central		5600	2035	1200	8835
Uva			100	200	300
Sabragamuva					275
Southern					150
TOTAL	4351	6300	3869	2816	17335

Sources: Records at the District Agricultural Office, Jaffna
Quarterly Bulletin of Statistics (Department of Census and Statistics--Government of Ceylon: 1938-1962)
Bulletins issued by the Department of Agriculture, Colombo and Peradeniya R 15274-2000 (I/64); R 12585-25,000 (3/66)
Reorganization of Tobacco Industry; Document (Report of the Committee appointed by Government of Ceylon, 1951).

For reasons that have been outlined in this chapter the demand for strong-flavored tobacco began to decline in the second half of the fifties (Table IV). Between 1953 and 1962 the area under strong-flavored tobacco declined by nearly 1400 acres. In contrast, the area under cigarette tobacco increased by nearly 1300 acres during the same period. Moreover, the area under bidi tobacco increased by more than 2700 acres during this period. The area under cigarette tobacco in the Jaffna Peninsula increased from 50 acres to 295 acres during this period.

The decline in the area under strong-flavored tobacco in the Jaffna Penin-

sula between 1953 and 1962 did not mean that the cultivation of tobacco was completely given up on about 1,000 acres. More than half of the 1,000 acres devoted to the cultivation of strong-flavored tobacco in 1953 was taken over for the cultivation of cigarette tobacco and bidi tobacco. The reasons why the cultivation of cigarette tobacco cannot be carried out on an extensive scale in the Jaffna Peninsula will be discussed in Chapters VII and VIII.

3. Trade restrictions. The production of tobacco in the Jaffna Peninsula was largely based on the export market. It is inevitable that any restrictions imposed on the export of Jaffna tobacco will result in great hardship to the peasants. This section will deal with the stages by which the export of tobacco to India came to a complete standstill in the early sixties (Table V).

The trade in (Jaffna) chewing tobacco, popularly known as the Malayalam Tobacco, between Jaffna and Travancore-Cochin States of India has been going on uninterrupted for over 250 years. During the early stages of the trade the sole importer was the Maha Rajah of Travancore, but during the early period of British rule (early 19th century), many others also smuggled tobacco into Travancore. The Maha Rajah put a stop to this smuggling with the help of the Madras government. Usually agents from Travancore arrived in Jaffna during the months of July to September and shipped the tobacco to Travancore from January to March of the following year.

All tobacco imported by sea from Jaffna or introduced into the Travancore State by land from other States in India had to pay the same rate of duty. In fact, the cultivation and production of chewing tobacco was encouraged by both the

TABLE V

CEYLON--EXPORTS OF UNMANUFACTURED TOBACCO
1934-1964
(in thousands)

Year	Quantity (000 lb.)	Value (000 Rs.)	Year	Quantity (000 lb.)	Value (000 Rs.)
1934*	476	-	1950	1363	1769
1935*	723	-	1951	1007	1595
1936*	1299	-	1952	1182	1982
1937	2414	710	1953	786	1296
1938	2100	631	1954	1784	2204
1939	1277	383	1955	769	1297
1940*	1378	-	1956*	469	-
1941*	1597	-	1957	711	1118
1942*	855	-	1958	7	16
1943	-	-	1959	365	677
1944*	103	-	1960*	633	-
1945	670	183	1961	273	579
1946	1148	1140	1962*	179	-
1947	1124	1285	1963		469
1948	1037	1509	1964		3
1949*	1414	1297			

Source: Quarterly Bulletin of Statistics (Department of Census and Statistics, Ceylon) 1938-1964.
*Figures obtained from records at the Jaffna Malayalam Tobacco Co-operative

Ceylon and Travancore governments. In some years approximately 10,000 candies (1 candy = 600 lbs) of tobacco were exported to Travancore. This preferential treatment accorded to the Jaffna peasants was not to continue, however. In 1879 the Travancore Government began to allow the Madras Government to export Coimbatore tobacco into Travancore on a competitive basis. In fact, the Travancore Government imposed an import duty of Rs. 90/- per candy on Jaffna tobacco while the import duty on Coimbatore tobacco was only Rs. 30/- per candy. In 1910 the Travancore Government imposed a prohibitive tariff of Rs. 900/- per candy with a view toward protecting the Indian tobacco industry. This created panic in Jaffna and the Ceylon Government took up this question with the Indian Government and the Colonial Office, with the result that the duty was reduced to Rs. 90/- per candy, subject to the condition of limiting the export per year to 5,745 candies. The duty on tobacco was further increased at different times from Rs. 90 to Rs. 110, Rs. 135 to Rs. 200 and in 1945 to Rs. 300 per candy. Despite an increasing influx of the Indian tobacco from Coimbatore and Thinnevely districts with a lower duty, the Jaffna tobacco, by reason of its quality and flavor, still held pride of place in the traditional market of Travancore.

According to the trading accounts of the 1949 crop, the Jaffna Malayalam Tobacco Co-operative Sales Society, Ltd., which was started in 1934 to get rid of the group of traders, money-lenders, and middlemen who swindled the cultivators, realized a sum of Rs. 3,031,976.81 as proceeds of the sale in Travancore. But 1949 also marked the turn of the tide against the Malayalam tobacco

Sales Society, Ltd., in the absence of data from other sources.

trade and portended a bleak prospect for the future. With the integration of the Native States into the Indian Union the Central Government adopted a policy of uniform tariff for all Indian ports, and raised the duty of all unmanufactured tobacco from foreign countries to Rs. 5,625 per candy. At this juncture, the consumers and traders of Jaffna tobacco in Travancore appealed to their Government to intervene on their behalf urging as their reasons that the enhanced duty would entail great hardships on their people who have long been accustomed to the use of Jaffna tobacco. To this demand from the people of the newly integrated state, the Central Government granted a concession from April 1, 1950. The maximum quota of Jaffna tobacco imported into Travancore on a duty of Rs. 300 per candy was fixed at 1800 for the first year, with a diminishing reduction of this quota by 10% every year during a period of ten years. At the end of the tenth year the duty payable on every candy of Jaffna tobacco would be Rs. 5,625. It will thus be seen that by 1960 the exportable quota was reduced to nil.

It has been demonstrated very clearly that it was uneconomical for any trader to handle a diminishing quota in a foreign country. In proportion to this diminishing quota, the peasant himself had to reduce his production from year to year. Some concessions were allowed for the export of tobacco to Travancore but trade figures (Fig. 1) indicate that the trade has shrunk to its lowest recent level.

CHAPTER V

MATERIAL AND PHYSICAL ELEMENTS OF THE FARMING SYSTEM

In the previous chapters, an attempt was made to explain the present characteristics of the Jaffna tobacco farming system by tracing the internal and external processes operating through time. This chapter and one that follows this will be concerned with a detailed analysis of the farming system as it operates today. The resource-using system under study is called the Jaffna tobacco farming system, even though tobacco is not the only crop that is cultivated in these farms.

The approach used in these two chapters involves the use of data obtained in the field from a group of farms. The farm is considered as a system, and the most important components of this system are analyzed from the data obtained at the level of the farm. Therefore, a micro-geographic approach is attempted by the writer to analyze the most important tobacco farming areas, the Valigamam North and Valigamam East red sandy loams (Fig. 3). Wherever necessary, other areas will be discussed so as to depict the minor variations that exist in the tobacco farming system in the peninsula.

There are, in general, four regions, excluding the islands to the west

of the peninsula, involved in the cultivation of tobacco. The data obtained from the survey carried out by the investigator in the period 1965-66 indicated that, on the average, 3,650 acres are devoted to the cultivation of tobacco in the peninsula and the adjacent islands. Valigamam North and East accounted for nearly 1,354 acres. Of the estimated 12,785 farms devoted to the cultivation of tobacco in the peninsula, nearly 4,754 farms, varying in size from a quarter to half an acre, are found in the regions of Valigamam North and Valigamam East Divisions.[1]

The tobacco region under study has a population density, for the most part, of 1,500 to 2,000 persons per square mile, and the yield from tobacco is between 2,000 to 2,400 pounds of cured leaf per acre.[2] The population density is so high that more than half of the tobacco farms are only about a quarter of an acre in size.[3] It is not only the region where tobacco was initially cultivated for export; it is also a region that has been highly developed due to the introduction of tobacco in the farming system. However, it should be mentioned that this is the region that is most adversely affected by recent changes in the production, consumption, and marketing of tobacco within and outside Ceylon. In general, any changes that have taken place in the evolution of the tobacco farming system since its inception can be seen in this region.

[1] This figure is derived from the unpublished estimates pertaining to the size and number of holdings worked out by the Department of Agriculture, Jaffna Office in 1958.

[2] Report of the Tobacco Commission, Sessional Papers, XIV (Ceylon: 1955).

[3] Department of Census and Statistics, Government of Ceylon (1953).

General Characteristics of the Region as a Whole. The study region lies in the center of the rural section of the Jaffna Peninsula, where the ground is relatively high in comparison to the other areas in the peninsula. Since the area as a whole is comparatively flat and provided with a well-knit system of communications, it is easily accessible from all sections of the peninsula (Fig. 6).

The land area of the study region is utilized in the following manner. A portion of the land is utilized for settlements. The settlements include mainly farm dwellings. The settled areas consist of not merely the structures or buildings, but also the homestead gardens that are associated with the dwellings. The homestead gardens are therefore clearly distinguished from the tobacco farms, which are also referred to as the tobacco gardens in Ceylon because of the small size. The homestead, unlike the tobacco farms, consists of a multi-layered garden with sun-loving and shade-requiring plants such as yams, jak trees, mango trees, manioc, banana and coconut intertilled. The settlements are nucleated and lie at the edge of the farming area.

Of the seventy-nine square miles of Valigamam North and Valigamam East, administrative divisions, scrubland, and land devoted to the cultivation of palmyrah account for nearly half the area. Homestead gardens, settlements, and associated land account for more than twenty-eight square miles. On the average, about ten square miles are devoted to the cultivation of all types of crops. The cropping area is divided into two distinct divisions. Paddy, banana, and the crops grown in rotation with paddy are cultivated in the imperfectly-drained area of the region. This means that tobacco is mainly confined to the

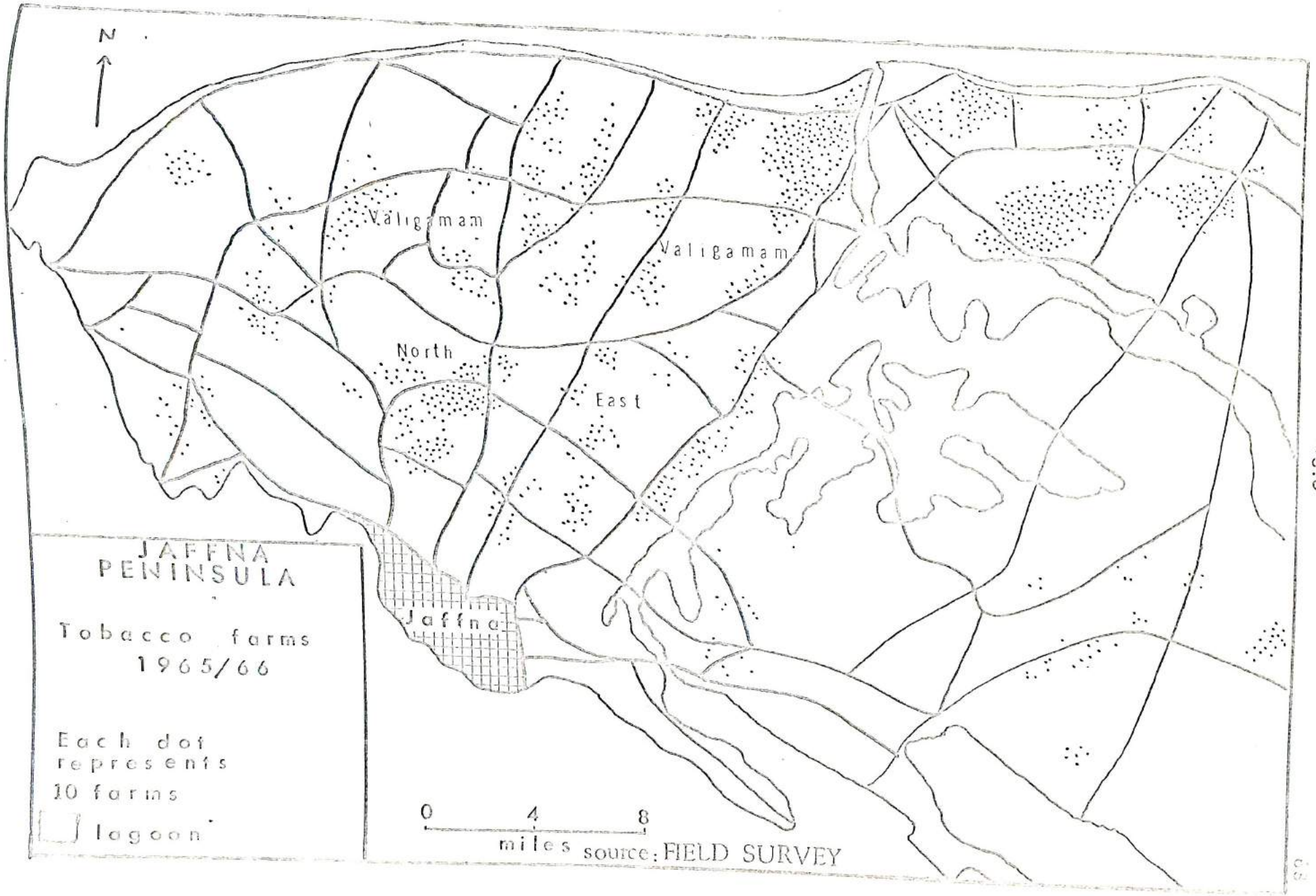

N
Valigamam
Valigamam
North
East
Jaffna
JAFFNA
PENINSULA
Tobacco farms
1965/66
Each dot
represents
10 farms
lagoon
0
4
8
miles
source: FIELD SURVEY

Fig.6

well-drained areas of the region. However, all the farms in the well-drained areas are devoted to the cultivation of tobacco. Tobacco is therefore raised only in a limited area of the study region as a whole. This accounts for the fact that only about 1,354 acres are devoted to its cultivation in the region.

It is necessary to indicate that despite the small area devoted to the cultivation of tobacco, more farmers are devoted to its cultivation than any other crop in this region. B. H. Farmer says that while the paddy farms are, on the average, two acres each, the gardens average only a quarter to half an acre in size.[1] B. H. Farmer also observes that these gardens are mostly in individual ownership.[2] The tobacco farms are consolidated and are devoted to the cultivation of tobacco and other crops that are rotated with tobacco. The tobacco farms can therefore be distinguished from the other types of farms on the basis of the tobacco crop raised, the size of the individual holdings, the large number of farmers devoted to tobacco cultivation, and the type of land devoted to the cultivation of tobacco. Though some differences exist in the size and the number of farms that exist in pockets in the various parts of this region, there is very little functional difference among the farms themselves.

The tobacco farms that are individually owned are not fenced, and they appear in the form of small rectangles in a tobacco-growing area. The individual farms are separated from each other by means of earthen "bunds," which

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[1] B. H. Farmer, Pioneer Peasant Colonization in Ceylon (New York: 1957), p. 64.

[2] Ibid., p. 67.

are, on the average, about six inches high from the ground. These bunds are also utilized by the farmers as footpaths.

A. Crops and Crop Production. The crop elements that make up the tobacco farming system are very complex. Tobacco is cultivated only from December to March, and two or sometimes three other crops are cultivated on the farm after the tobacco crop. Even though other crops are grown on the farm, one is justified in calling it a tobacco farming system. Tobacco is considered to pave the way for the cultivation of food crops on the same soil during the same year. Therefore, in addition to the income derived from the sale of tobacco, the farmer also obtains income from the cultivation and sale of other crops. The other crops include millet, coracan, green gram, manioc, yams, chillies, and onions (Table VI).

Nicotina tabacum is the species of tobacco that is cultivated in the farms. It is a coarse, rapidly-growing annual and in favorable conditions reaches a height of six feet or more, its broad leaves being up to twenty-four inches in length. The local names of the tobacco cultivated in the region are Naramban, Addukolumban, Thaddayan, and Kooran. Naramban and Addukolumban are chewing varieties, while the latter are predominantly smoking varieties. Originally Naramban was exported to Travancore, and therefore it is also called "Malayalam Tobacco." Naramban was the variety of tobacco that was originally cultivated in this region, but when local cigar making became important, some of the farmers turned to the cultivation of the Thaddayan and Kooran varieties.

TABLE VI

TYPES OF ROTATION IN VALIGAMAM EAST AND NORTH*

Months	I	II	III	IV	V	VI
January	Tobacco	Tobacco	Tobacco	Tobacco	Tobacco	Tobacco or Chillies
February	"	"	"	"	"	"
March	"	"	"	"	"	"
April	Fallow	Manioc Millet	Millet	Chillies	"	"
May	Onions	"	"	"	Onions	Millet
June	"	"	"	"	"	"
July	"	Manioc	Coracan	"	"	"
August	Fallow	"	"	"	Fallow	Onions
September	"	"	"	Fallow	"	"
October	Gram	"	"	"	Vegetables	"
November	"	"	Fallow	"	"	Fallow
December	"	"	Tobacco	Tobacco	"	"

*From a survey of farms in thirty-one villages of this region. These observed patterns of rotation are similar to those recorded by the Department of Agriculture in Jaffna in 1960.

The introduction of tobacco in the farming system can be considered significant, because it became the most important cash crop on which most of

the farmers depended for their livelihood. Most of the crops that are grown in succession after the tobacco crop are cultivated without further manuring. The yields of subsidiary crops benefit from the cultivation of tobacco, since only a portion of the large quantity of manure applied for the cultivation of tobacco is used up by this crop. The only expenses incurred in raizing the subsidiary crops after tobacco are for labor and watering.

Data obtained by the survey indicated that the yields from one acre of tobacco varied from 2,000 to 2,400 pounds of cured leaves. This variation in yield appears to be largely due to slight variations in the nature of the soils. In contrast, the farms of less favorable regions like Thenmarachy usually produce 1,500 to 2,000 pounds of tobacco per acre.[1] The survey also indicated that the region under study produced about 1,380 tons of strong-flavored tobacco in the period 1965-66, which was about half of the total tobacco produced in the Jaffna Peninsula during the period.

The quantity of strong-flavored tobacco grown in this region has declined within the last six to seven years. Prior to 1960 the area under tobacco was more than 1,370 acres as recorded by the District Agricultural Office; but as indicated earlier, the area under strong-flavored tobacco had declined to less than 1,280 acres in the period 1965-66. Another important change has been the introduction of cigarette tobacco in some of the farms. Of the 1,354 acres devoted to the cultivation of tobacco in the study area, cigarette tobacco accounted for about

[1] Reorganisation of the Tobacco Industry in Ceylon: Document, Government of Ceylon (1951).

seventy acres and each acre produced nearly 750 pounds.[1] The yields of cigarette tobacco are low in comparison with strong tobacco, and cigarette tobacco does not enter into the system of crop rotation. Thus, it is doubtful that cigarette tobacco will be adopted by the majority of farmers.

Onions are grown in large quantities in rotation with tobacco, and their importance has increased with the decline in the demand for strong-flavored tobacco. Some farmers seem to give more importance to onions than to tobacco cultivation, as indicated by the data obtained by the survey. More than 2,000 acres were devoted to its cultivation in the period 1965-66, and the yields varied from six to eight tons per acre depending on the quantity of manure used by the farmers. As will be shown in Chapter VII, from the data on tobacco the general tendency appears to be that many of the farmers of this region are replacing tobacco with the cultivation of onions.

Chillies (peppers) are cultivated during certain months of the year in rotation with tobacco and onions. If the Departmental records are correct, the area under chillies has increased from about 685 acres in 1960 to 810 acres in the period 1965-66. The survey also indicated that most of the farmers of the division of Valigamam East produced at least one crop of chillies in rotation with tobacco and other crops each year.

It has been difficult to indicate accurately the quantity of other crops cultivated in the farms, especially when the farmers do not have records of the

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[1] Department of Agriculture, Jaffna Office (unpublished data for the period 1965-66).

minor crops they cultivate. Moreover, the amount grown tends to vary from year to year depending on the financial situation of the farmer. These minor crops are also cultivated in all seasons, and therefore there is no definite crop cycle. These crops include, as has been stated earlier, vegetables, millet, coracan, green peas, manioc, and yams. Generally most of the farmers did grow some vegetables throughout the year, and the production was either sold or consumed by the farmer. If the farmer could not sell his vegetables, he normally consumed them himself. It is difficult, for this reason also, to indicate the quantity grown and sold in the area. Departmental figures indicated that there were only ninety-seven acres devoted to their cultivation in 1960.[1] The survey indicated that more than 178 acres were devoted to the cultivation of these minor crops in 1965. Vegetables were sold by the farmers in the local market fairs. The varieties cultivated include egg plant, pumpkin, Kere (local cabbage), okra, long beans, tomatoes, and snake gourd. Manioc is normally cultivated by the farmer both for sale and consumption. It is grown through the year among other crops. For instance, manioc cuttings are planted along with millet beginning; but while millet is harvested in June, manioc remains in the field until November, when it is time to prepare the farm for tobacco. It does provide an important subsidiary food crop to the farmers even though a farmer might only devote a small portion of his farm each year for its cultivation.

Other crops such as green grams, millet, coracan, and yams are multiple-cropped each year in the farms from April to November, when tobacco is not cultivated. Since the farmers were not able to state how much of these minor

[1] Ibid., 1960.

crops they produced each year, it was not possible to calculate the total quantities produced. On the basis of the data obtained by the survey, about five bushels of dry grains are produced each year in a quarter acre farm.

It is not possible to deal at length with a description of the farm animals. On the average, only forty per cent of the farmers owned draft animals; the rest of the farmers depended on the other farmers in the area for ploughing their fields and transporting manure and farm products. A team of bulls on the average cost Rs. 200, and it is not possible for all the farmers to own bulls and carts. The data obtained by the survey is not sufficient to draw any conclusions about farm animals.

B. Farm Structures, Tools, and Settlement. A set of structures and tools are essential for the functioning of a farming system. This section describes the most important farm structures and tools associated with the typical farm in this region. Since the farmer's house and other buildings are situated outside the farm, it is necessary to deal with them separately. This section will be divided into five parts for the purpose of clarity: (1) Shape of the farm; (2) Well; (3) Tools; (4) Farm buildings; (5) Farmer's house and associated buildings.

(1) Shape of the farm. The typical tobacco farm is a single field one-quarter to one-half an acre in area, shaped in the form of an elongated rectangle. With this shape, bullocks drawing a plough do not get exhausted by having to turn continuously. Each farm is separated from another farm by

means of an earthen bund about six inches high from the ground. Therefore, the farms are not fenced and the earthen boundary is the only feature that separates one farm from the other.

This farm field is divided into plots of three feet by three feet. The plot is prepared in the form of a temporary basin with sand mounds all around. A tobacco plant is set in the mound at each of the four corners of the squarish plot. Water that is led into these basins is sufficient to provide the necessary moisture for all four plants. Millet and other dry grains are sown in the basins, while vegetables and manioc are planted on the mounds.

The water lifted from a well is directed to the plots by means of a system of irrigation channels. A main channel carries water from one end of the farm to the other end, while minor channels convey water to the plots. The irrigation channels are also used as paths by the farmer to move from one end of the farm to the other without causing damage to the plants. The bunds that separate the farms from each other are in some cases a foot wide. This permits the farmer to drive his animals to the farm. However, bullock carts are not brought into the farm but are parked at various points on the minor road that traverses the farming region.

(2) Wells. The well is an important element of the farming system. It is situated at the head of two rectangular-shaped farms, and the two farmers share the well and the cost of sinking and maintaining it. Wells are constructed with masonry linings and are dug by a special caste of well diggers. The procedure involved in the construction of the well is to sink a cylindrical-

shaped cement structure far enough below the water table so as to give the requisite source of water and to serve as a reservoir for water. The water passes into the cylinder through springs in the jointed limestone rock.

The depth of wells varies from eighteen feet to thirty feet depending on the nature of the ground. The average quantity of water in the well is estimated by Babtist to be about 4,500 gallons.[1] A typical well is emptied in about three hours, using the standard well lift.

The typical well lift consists of a lever, the short end of which is loaded so as to do little more than counterbalance the weight of the rope and an earthen or palmyrah-leaf woven basket on the long end. The lift itself is made of the trunk of a palmyrah tree and is supported by trunks of two rows of living trees. Trees used for this support, plus a few coconut trees, provide the only shade normally found in a farm. As has been mentioned earlier, the water lifted from the well is directed to the plots by a system of irrigation channels.

(3) Tools. The main tools utilized by farmers for their productive operations include the plough, the hoe, the digging stick, various containers for watering, and the bullock cart for transportation.

The plough is mainly used once a year to break up the soil. It is made of wood and has a sharp iron point. Improved heavy ploughs cannot be pulled by the weak bullocks. A plough team consists of two animals. The light plough merely scratches the soil; but this is essential as it does not lead to a loss of

[1] A. D. Babtist, A Geography of Ceylon for Schools (Madras: Longmans Ltd., 1955), p. 99.

moisture in an area of light rainfall, especially since the rectangular nature of the farm prevents ploughing in two directions at right angles to conserve moisture. As mentioned earlier, all the farmers do not possess ploughs and they are thus forced to hire them from other farmers. Only the farmer who has a team of bulls will possess a plough.

The hoe employed by the farmers is the basic tool in the farming system. Unlike the plough, it is used many times in the year for turning the soil, preparing the plots, cutting channels, watering the plots, and burying green leaves in the soil. This implement is an important factor in the highly intensive cultivation of these small farms.

The typical hoe consists of a handle with a diameter of an inch and a half and a length of about three and a half feet. The handle is made of wood by local carpenters. The size of the blade varies with the nature of the operation. A lighter and smaller blade is utilized for conducting water to the plot, while larger ones are used to turn the soil and to bury green leaves. The larger hoe has a blade which is ten inches long and has a somewhat narrow sharp tip with a gradual tapering of the blade from base to tip. This narrow tip is necessary to dig into the hard surface on the soil and to bury the leaves. In fact, the farmer uses a plough to scratch the hard soil and the hoe does the rest. The hoe blades are imported from India.

Digging sticks and small-handled spades of about a foot in length are used to dig the soil around individual plants and to clear weeds.

The typical implements used for lifting water from the well and for

hand-watering are containers made either of clay or palmyrah leaves. Within the last decade, pails made of aluminum are being used in increasing numbers. The vessel used to lift water from the well is a cone-shaped basket, woven of palmyrah leaves, about one and a half feet in diameter and one and a half feet deep. Clay pots are also used to lift water from the wells to water individual plants when they are transplanted from the nurseries to the plots. These are made locally, and the sizes vary from farm to farm. All the other containers used by the farmer for collecting vegetables and spreading manure are baskets woven from the palmyrah leaf.

It should also be mentioned that there is another method of lifting water from wells for irrigation, but it is not yet so widely used in the Jaffna Peninsula. This is the increasing use of diesel water pumps for irrigating the farm. It is appropriate at this stage to indicate what Jeyasingham wrote in 1958:

> The garden crops and all the trees except the palmyrah are maintained with the help of lift irrigation from wells. The power used for both irrigation and tilling purposes is either human or animal. In recent years, mechanical pumps and plows have become popular; and this brings this agricultural region into greater dependence on the city for the sales and repair services available in Jaffna.[1]

A typical farm makes use of wooden carts drawn by two bullocks to transport produce, green leaves, and manure. The wheels of the cart have iron frames. All the parts of the cart are made and assembled locally. A

[1] W. L. Jeyasingham," The Urban Geography of Jaffna"(Unpublished Ph.D. dissertation, Clark University, 1958), p. 180.

typical cart costs on the average about Rs.250. It should be noted, however, that the farmers carry loads of vegetables and other items on foot to the nearby market fairs. Baskets woven with palmyrah leaf are used for selling and buying vegetables and other products at the market fair.

(4) Farm buildings. There are no permanent buildings in the farm itself, because all the tools and harvested products are removed to the farmer's house, which lies outside the farm. The only permanent structure associated with the farm is the cemented well. There are, however, certain structures that are movable from one section of the farm to another. The farm animals such as the cow are penned in a movable shed which has four corner posts of palmyrah wood and is thatched with palmyrah leaf. It has an area of about thirty-six square feet, but the portion of the shed extends outward and provides minimum shelter to the one or more animals that are tied individually at each of the four corners of the shed. The feed for the cattle is placed in a wooden platform constructed half a foot above the ground in the shed. These sheds are moved from one section of the farm to another during the fallow season so as to distribute the manure all over the farm. During the cultivation season, the shed is placed at one end of the farm.

Goats and sheep are left in open pens which can be dismantled and re-moved to other sections of the farm. Unlike cattle, these animals are brought to the farm only when there is a temporary respite just after the harvest of dry grains. Four poles are dug into the ground , and enclosures made of palmyrah leaf set on wooden frames are built. No roof is provided for these animals,

since they are taken out of the farms during the day to feed on thorny scrub found in certain isolated pockets. The goats and sheep are not owned by the farmer but are hired from goat and sheep keepers.

(5) Farmer's house and associated buildings. The farmer does not live in the farm in this region. He lives in nucleated settlements that are found in one section of the village. It is, however, necessary to deal with the farm house since it forms a part of the farming system. A typical farm dwelling consists of three small apartments that are separated from each other. These include a kitchen, a bedroom, and an open hall in front of the bedroom, mainly used by the women. The walls are made of clay mixed with local clay loams. Palmyrah wood is used for the beams of the thatched roof. Palmyrah leaves, not separated from the stalk, are used for thatching the roof. The houses have limited windows, but the opening between the wall and the roof allows air and sunlight to penetrate into the dwelling place. The houses are made of the same clay and clay loams used for the walls.

Some farmers acquire sufficient money for the construction of stone houses. On an average, nearly a third of the farmers can be described as living in stone-built houses. Elsie K. Cook wrote:

> The Jaffna Peninsula is the only part of the island that stiff clay suitable for houses is scarce, and it is probable that the stone house was developed here at an early date, especially as the limestone can be very easily worked.[1]

[1] Elsie K. Cook, A Geography of Ceylon (Madras: Mackmillan and Co., 1931), p. 287.

The dwelling is centered in the midst of a garden. This garden has a high fence of palmyrah leaves, and thus nothing can be seen of domestic life within. A well is located in the garden.

In addition to the house, the farmer has a cow-shed at the far end of his homestead. There is also a tobacco-curing barn made of mud to smoke tobacco and process it. The barn is circular in shape. It is about five feet high and has an inner diameter of about four and one half feet. The ground is dug to a depth of two feet, and the earth thus excavated is used for the construction of the walls. On top of the wall are three beams fixed at intervals of two and a quarter feet, and on top of these, thin poles are placed six inches apart. These poles are utilized for hanging tobacco leaves in the barn for smoking.

Finally, mention should be made of the shops and other establishments with which the farmers deal. Grocery shops and tea-boutiques are found in all of the nucleated settlements. Tea boutiques and community centers established by village committees function as the main centers for social contact and technical communication among farmers. The other structures that relate to the farming system are the buildings of the co-operative purchase and sale societies in the various villages. These buildings function not only as storage houses for products bought and sold by farmers but also as general stores for retailing fertilizers, seeds, pesticides, food, and general articles of merchandise. The market fairs are mainly open places under shady trees where the farmers meet to buy and sell products practically every day.

As indicated earlier, most of these farm tools and farm structures are

probably of South Indian origin.

C. Elements of Crop Ecology. This section will deal with the ecological factors as they are related to the farming system. The discussion demonstrates that the farmers' knowledge of the physical environment is quite complete and that they manipulate their environment in a rational manner. Most of the techniques adopted by the farmer to utilize the ecological factors have not been introduced from outside the farming system, and some of the major limitations of the environment have been overcome by them. They have even created a microenvironment, through their rational behavior, which favors the successful growth of crops. The techniques adopted by the farmers appear to be so advanced that it may be difficult to apply technological advances from outside. Therefore, unless major changes are brought about in the structure and elements of the farming system, it will be difficult to introduce any real changes in the system.

The following section focuses on two critical elements of crop ecology: (1) Soil and (2) Soil moisture.

(1) Soil. It is not an exaggeration to state that the soil which produces good harvests has been created by the farmer. Most of the soils developed from Miocene limestone are shallow, and some have rock outcrops. It is from these areas of shallow soils that the farmer is able to obtain high yields of tobacco and other crops. The farmer has to remove stones so as to provide a tillable soil mantle. The vast quantities of stones removed by blasting and

digging have been utilized for the construction of roads and houses.

Moorman and Panobokke, writing on the man-made soils of the Jaffna Peninsula, said the following:

> Special mention should be made of the man-made soils in the Jaffna Peninsula, where limestone outcrops are dug out and the soil material in between the rocks is uniformly spread on the levelled land so as to produce a suitable medium for irrigated crops....Extreme land pressure is now compelling farmers to reclaim small plots of land from the boulder patches by blasting out the limestone boulders and spreading out the retrieved soil on the levelled land. This operation could be mechanized to claim larger extents than being produced at present.[1]

The soil that is reclaimed in this manner is not naturally fertile. The soils are actually transported alluvial soils, which overlie limestone.[2] The gradual decomposition of the limestone has released bases which have influenced the overlying soil. The soils have an extremely thin A horizon, which often is almost absent. The B horizon, which is again less developed, has a weak sub-angular blocky structure lying adjacent to the limestone.

The top soil is sandy clay loam, but it is freely worked despite its heavy nature. It contains a high exchangeable base content, calcium constituting 80% of the base. The soil is therefore rich in lime, and its phosphoric acid and potash content is quite high. The clay analysis reveals an aluminia content of

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[1] F. R. Moorman and C. R. Panabokke, "Soils of Ceylon," Tropical Agriculture CXVII, No. 1 (1961), pp. 22-23.

[2] A. R. Joachim, "The Soils of Ceylon," Bulletin of the Ceylon Geographical Society, Vol. II, No. 1 (1947), p. 13.

35%; an iron oxide content of 17.7% (the deep red color of the soil being apparently due to this fact); and a silica content of 44%. On the basis of the silica/aluminia ratio, the soil is distinctly non-lateritic type, and is saturated with pH values between 7 and 8.[1]

This remnant of old alluviam mixed with limestone fragments has undergone changes as it developed in the excessively and well drained areas of the Jaffna Peninsula where tobacco is cultivated. The physical character of these soils can best be described by means of a composite profile description, given below. The horizons are given in arbitrary depths, since, as described in Chapter II, they are not well developed. The profile is a composite of all the excessively well drained soils examined by Jeyaseelan, upon which tobacco cultivation depends (see Table VII).[2]

This description of the excessively and well drained soils of this region demonstrates that despite the heavy nature of the soils, they are well drained, because the high limestone content tends towards the development of a granular structure in the soils. There is also a weak crumb structure, and the loose nature of the soil favors this excessive drainage. The top eight inches of the soil does not turn coherent or plastic when moist. Only at a depth of below eight inches does the soil become definitely plastic when wet. The soils become sticky only at a depth of about 13 inches when wet. All these factors add to the rapid downward seepage of surface moisture. Therefore, the farmers have to

[1] K. N. Jeyaseelan, "A Soil Catena Associated with the Jaffna Miocene Limestone," The Proceedings of the Annual Session of the Ceylon Association for Advnacement of Science, 1958 (unpublished); [2] Ibid.

TABLE VII

GENERALIZED PROFILE DESCRIPTION

Depth	Character: Texture		Particle Size (m.m)	Percentage
0-8"	Sandy clay loam	sand	50	65-66
		silt	50-2	4
		clay	2	30-31
	Structure Weak crump structure Very little aggregation & loose Moisture relations Friable when dry & non-coherent when moist, non-plastic to slightly plastic when wet Color Dark red to reddish brown Organic & foreign matter Organic matter is very low pH: -7.2-7.5			0.96-0.64
8-13"	Sandy clay loam	sand		61-64
		silt		8-10
		clay		28-31
	Structure Weak crump structure Moisture relations Fairly friable when dry & plastic when wet Color : red to yellowish red Organic & foreign matter pH: 7.5-7.6			96-1.04
13-18"	Sandy clay loam	sand		69-70
		silt		3- 8
		clay		23-29
	Structure Very faint structure Moisture relations Non friable when dry; sticky & plastic when wet Color: Brown to dark brown Organic & foreign matter pH: 7.6-7.8			1.04-1.20

create certain conditions to preserve water in sub-soil for absorption by plants.

Another serious limitation in the soil is the low percentage of organic matter which characterizes most of the tropical soils. The long dry season does not favor the growth of luxuriant vegetation to be added to the soil. Moreover, even if organic matter is available, it is destroyed as it is supplied. Without the humus content, it would be impossible to cultivate crops successfully. The farmer provides the humus artificially.

It is appropriate at this point to demonstrate the steps taken by the farmer to set right the drawbacks of low organic content and lack of moisture conservation in the soil. The farmer hoes leaves of plants and trees in large quantities into the soil. These leaves are available from trees that bear abundant foliage following the heavy rains of November and early December. Sufficient moisture is provided by means of irrigation during the dry season to accelerate decomposition of the leaves. Irrigation is applied to the soil on the average of once every three days during the dry season to provide the necessary environment for the rapid increase in the population of bacteria and fungi which decompose the leaves. The humus so provided helps to conserve moisture in the soil during the dry season and also to regulate the supply of moisture to the plant roots. The humus helps to conserve the soil moisture that is available to the plants.

This practice of hoeing leaves into the soil has the added benefit of binding together the loosely aggregated particles, thereby rendering it better able to withstand drought. It further assists in the development of roots of plants.

Thus, the soils of the tobacco region possess the artificially provided equivalent of good structure and high organic matter. This artificial soil structure assists in aerating the soil at depths below 13 inches, where it is sticky and plastic when wet. However, except for manioc, most of the plants do not have roots extending deeper than 13 inches, and, as such, aeration is not a problem in the farming system. Further aeration is provided by the frequent tilling of the soil.

The chemical analysis of the soil indicates that it lacks nitrogen. The problem of providing cheap nitrogen to the soil is also solved by providing leaves with a high content of nitrogen to the soil. The local tulip leaves that are dug into the soil in large quantities by the farmers contain nitrogen to as much as 1.87% of dry matter. In addition, an ash content amounting to nearly 9.5% of dry matter is also provided to the soil in this manner. A further addition of nitrogen to the soil is provided by the addition of cattle manure. The soils do not lack nutrients otherwise. The soils are prepared for cultivation in such a manner that the farmer is able to produce a tobacco that is coarse and high in nitrogen and nicotine content. This is the type of tobacco that was exported to India and that is desired for chewing and the manufacture of strong-flavored tobacco in Jaffna. Among the varied benefits that the naturally occurring lime in the soil provides are easy working of the soil and good drainage.

2. Soil Moisture. Soil moisture plays a very important part in the cultivation of crops. The farmers of the tobacco region have to provide nearly all the requirements of soil moisture to cultivated plants. It is the object of this discussion to indicate in a general way the various steps taken by the farmer to

provide the appropriate soil moisture to the plants.

Jeyaseelan has estimated the amount of evaporation of this region to be close to one inch per day at a temperature of 80 degrees F. and one-half inch at a temperature of 77 degrees F.[1] On this basis, the only moisture surplus month is November (receiving on the average 17.43 inches of rainfall). Therefore, the farmer has to provide water artificially if he cultivates crops during other months. Even if we lower the average daily evapotranspiration to only one-quarter inch per day, it amounts to nearly 91 inches, while the mean annual rainfall is only 53.1 inches. Irrigation is an artificial means to prevent deficiencies in the moisture content of the soil. An intelligent irrigation practice, based on knowledge of the soil and moisture, is necessary to retard the occurrence of water-logging of the soils. However, with a well-drained soil this problem does not arise. On the contrary, the farmers of this region are faced with the problem of having to conserve moisture in the soil. This he does by providing humus artificially to the soil.

This artificially provided humus can retain moisture provided by irrigation only for a limited period. Therefore, the farmer provides water to the plants periodically. He employs two methods to water the plants. When the tobacco plants are in the vegetative period, the consumptive use of water is very low. However, evaporation removes moisture when the temperature is high. When the tobacco plants are in the early vegetative growth period, in the month of January, the temperature averages 77.6 degrees F., while the mean monthly

[1] Ibid.

rainfall is 4.4 inches. Thus, at the rate of nearly a half-inch evapotranspiration daily, there is a moisture deficiency of about 11.1 inches. The farmer cannot provide irrigation by channels until the plants are firmly established in the soil. Therefore, during the early vegetative growth period he waters the plants individually by hand. It should be mentioned that the water table does not influence the moisture available to the plants, since it lies eighteen feet to thirty feet below the surface. Only the water provided by the farmer or by precipitation is available to the plants.

The average quantity of water that is utilized to water the thousand plants occupying a quarter-acre farm daily is about 33 cubic feet or 240 gallons. This figure is derived from estimating that the content of water from a pot is .33 cubic feet and that about nine to ten plants are watered from a single pot. Since the water provided to the plants at one time is barely sufficient, they are watered daily. Since the plants are watered individually, it is not possible to indicate the total amount of water used for hand-watering in inches. But it can be estimated that about 4200 gallons of water are provided to the tobacco plants in this manner every year (14 days plus three days when plants are watered twice just after transplanting).

The plants become firmly established within two to three weeks. It is at this period that the farmer begins to irrigate the tobacco plants. Israelson and Hansen indicate that under normal circumstances, the average consumption of water by plants tends to increase from about 0.2 inch to about 0.7 inch during

the flowering period.[1] This means that the farmer has to increase the supply of water to the plants. There is also the increasing amount of potential evapotranspiration, since the temperature increases on the average to 79 degrees F. in February and 82.2 degrees F. in March. During these months, the average amount of potential evapotranspiration is about one inch per day. On the basis of the calculations, about 0.66 inch of water is provided to the plants once in three days by means of lift irrigation from wells.[2] The method of irrigation is to flood the small plots surrounded by leaves.

The 0.66 inch of water applied once in three days when the potential evapotranspiration is about one inch appears to be insufficient for the plants. What is more, about 10% of this may be lost in conveyance to the plots. The surface soil is well drained so that evaporation from the surface is reduced. The water that escapes into the sub-soil is retained by the humus. With all soils, there is a certain amount of water contained which is impossible to remove with sufficient rapidity to meet plant needs. The water that is removed to the sub-soil is not drained too rapidly. It is estimated that on the average, two days are required before water is drained completely from the soil. Even when the water provided by irrigation has been drained off, there still remains the

[1] O. W. Israelson and V. E. Hansen, Irrigation Principles and Practices (New York: John Wiley and Sons, Inc., 1962), p. 257.

[2] The average size of a farm is 10,890 square feet (one-quarter of an acre). On the basis of one cubic foot of water equaling 7.48 gallons, the 10,890 square feet of farm (one-quarter acre foot of water) will account for 81,457.5 gallons. The 4,800 gallons irrigated will result in (4,800 gallons divided by 81,457.2 gallons) 0.555 foot of water, or a water depth of 0.66 inch.

moisture content of the soil that is called field capacity. However, when plants are growing, the field capacity may be used up within a short period. Finally, there is the contribution made by dew to the moisture requirements of soils. The months of January and especially February and March are characterized by dew in the early morning hours, as a result of clear skies with very low night temperatures. Therefore, the deficiency in the water requirements of the plants appears to be rectified by the presence of dew in the mornings. Israelsen and Hansen indicate that in portions of the Negeb Desert southwest of the Dead Sea, dew is largely responsible for summer growth of grapes.[1] There is no doubt, therefore, that it will have a beneficial effect in a more humid region like the Jaffna Peninsula. It is also recognized that dew is especially effective in reducing the amount of water moving through the plant, and in some cases, dew is absorbed by the plant. The farmers in the peninsula indicate that it is during the dew period that the plants grow very rapidly and that a reduction in the length of the dew period affects plant growth adversely.

The 0.66 inch (average depth of water available to the plants) has been computed by considering that the whole area of a quarter-acre farm will be covered with water. In actual fact, a part of it will be taken up by the well and a small area around it. Moreover, there is the portion of land occupied by the criss-crossing of the channels and the levees. The method of irrigating the plants once in three days enables the farmer to provide an appropriate amount of moisture to the plants. Irrigation is provided in the mornings when insolation is

[1] Ibid., pp. 6-7.

not high. It is not possible to state at what point of field capacity the plants begin to wilt.

CHAPTER VI

BEHAVIORAL ELEMENTS

This chapter will deal with the productive tasks involved in the raising of tobacco and other crops on the farm. Wherever possible the tasks will be measured by the scale of labor use. The data on productive tasks were obtained by the writer by visiting sample farms in Valigamam North and Valigamam East. Since observations could not be made of all tasks, the writer had to rely partially on what the farmer had to say. It should be mentioned that the season for cultivating tobacco is limited, so that every farmer strives to perform all the farming operations within the period. Variations that exist in the behavioral elements in the different regions will be brought out. Brief mention will be made of the farming operations.

The chapter will be divided into five sections: (A) Tobacco Cultivation; (B) Other Crops; (C) Labor Inputs; (D) Farm Economics; and (E) Elements of Decision Making.

A. Tobacco Cultivation. The farmer utilizes the rainy months of October and November (when cultivation comes to a standstill) for the manuring of the farms. At the end of November, ploughing is done. Along with ploughing, cattle

manure is applied to the farm. On the average, four cart loads of manure are spread on the quarter-acre farm, and hoed into the soil. The practice of penning cattle is only prevalent in some of the tobacco farms. Other farmers purchase cattle manure from dealers who collect and transport manure to the various parts of the region. About 25% of the farmers collect cattle manure in their own carts from the paddy growing area where cattle are raised in greater numbers. The tobacco farmer is not in a position to raise cattle since he does not possess straw to feed them. The one or two cows or bulls he has are fed on palmyrah leaves and rice-straw purchased from paddy growers. After ploughing and manuring the farm, the farmer buries green manure in the soil. This consists of leaves, which are obtained from local tulip trees that have abundant foliage during the rainy season.

While the land is being prepared for cultivation, the farmer also raises tobacco seedlings. This he does by preparing nursery beds of three feet by three feet in late November. The nursery beds are manured with decomposed cattle manure. One ounce of seeds sown in four such beds is sufficient for planting one acre of tobacco. The beds are shaded with woven coconut leaves and kept moderately wet for seven days. After the seventh day the shade is removed, but the plants are not removed for transplanting until seven weeks have passed.

The next behavioral element is the process of transplanting. This begins during the fourth week of December and extends into the second week of January. Transplanting only takes place when the land has been hoed and levelled properly. Even sticks are used to break up chunks of soil into relatively small clods.

Since the soil is not very clay-ish, it breaks down easily, especially when it is dry.

The seedlings can be removed from the nursery beds only when the soil is moist. The farmer sees to it that the nursery beds are kept moist on the day of the transplanting. The spacing of the transplanted tobacco plants is determined by the farmer. He uses thin rope to determine the spot where the individual plants are to be raised. Normally the plants are set about three feet from each other. Once the individual sites of the plants are determined, the farmer hand-waters the spots. This is done in the evening just before the transplanting operations. Two seedlings are normally planted in one spot so that at least one may survive. The young plants are shaded with leaves as they are planted. After the third week, only one plant is allowed to grow in a spot. The plants that are uprooted are used to fill gaps where both plants have failed.

Young plants are watered from pots twice daily for a period of three days. On the average, the 1,000 plants in a quarter-acre farm require at least 90 to 100 pots of water. The amount of water used for watering the plants is just sufficient to wet the plants and a couple of inches of soil within which the root of the plant is confined. After the third day the young plants are watered only once in two days. Since the quantity of water required for a plant increases with its growth, it is necessary to increase the amount of water applied. Therefore, it takes the whole of the morning and a part of the evening to water the whole farm at this stage. However, the intermittent drizzles of this period enable the farmer to reduce the amount of hand watering.

About a fortnight after transplanting, when the plants are well established, the farm is weeded and light hoeing is done. The weeding is done around the plant. Well-powdered cattle manure is then applied in handfuls to the base of the plants, followed immediately by watering. After another fortnight a second weeding and hoeing is done to prepare plots and channels for irrigation. Generally, further cultivation will not be necessary unless the fields are weedy. Beyond this stage, the farmer merely irrigates the plants with the help of lifts or water pumps. Irrigation is usually done once every three days during the rainless period.

(1) Irrigation. Water is raised from wells for irrigating the plants in two ways. The traditional method requires three to four men to lift water from the well and direct it by way of the channels to the plants. Two men are required to walk on the lever, while a third person directs the vessel or basket in its ascent and empties its contents into the reservoir. The water that moves along the channel is directed to the plants by a fourth person.

The average content of the cone-shaped vessel used for lifting water from the well is about 1.75 cubic feet. Two sample observations were made by the investigator to determine the number of lifts that were necessary to irrigate a quarter-acre farm. Though the results are not exact, they give some idea of the amount of water used to irrigate an average farm. On the average, 340 to 345 lifts of water were necessary to irrigate the farm. The well was nearly dry at the end of the three hours it took to provide the required amount of water to the farm. As mentioned earlier, the average depth of water in the farm when

irrigated was estimated to be 0.66 inch.

It is also necessary to discuss the pumps used by some of the farmers to water their farms. The power required by the pumps to lift water to an elevation of 25 to 30 feet is normally 1 to 1.5 horsepower. Using the data provided by Israelsen and Hansen, we estimate that 1 to 1.5 horsepower pumps with 2-inch pipe, used by the farmers of this region, could lift the amount of water required to irrigate the farm in about 70 minutes. However, the farmer is not in a position to use the pump so efficiently. It is only possible to conduct a limited amount of water along the temporary channels. Moreover, as the time of raising water is prolonged the farmer is able to obtain more water because natural springs and joints in the limestone will replenish part of the water that is removed gradually. Therefore, even a farmer using a diesel pump takes nearly two hours to irrigate his farm.

(2) Topping and Suckering. Topping is performed when the plants have issued 10 to 13 leaves. This operation consists of pinching off the growing point with the finger and thumb. Usually four to six suckers are removed before harvesting, each requiring on the average two days.

(3) Harvesting and Curing of Tobacco. General procedures for harvesting and curing of the principle varieties of tobacco will be discussed below.

Chewing tobacco (Naramban) is cured in the following manner. The harvesting is done by cutting each leaf with a slice of the main stem attached. The leaves so cut are allowed to wilt in the farm from one to one and one-half hours, depending on the intensity of the prevailing sunlight. Then the leaves are taken

by cart to the homestead where they are heaped in the form of a circle and covered with palmyrah leaves. The leaves are so arranged in the stack that the tips of the leaves point towards the center and the stems point outward. Next morning the leaves are sorted and tied into hands of five leaves each. By this time the top half of the leaves has wilted to a large degree, permitting the leaves to be easily handled. The wilted leaves are then smoked in the barn at the rate of 600 to 700 hands per load. Dried palmyrah fruit shells and coconut husks are used as fuel for smoking. It takes five to six hours for this smoking process. The next morning the smoked tobacco is removed from the barn and stacked in a heap. On the third day after the first smoking the leaves are again tied in the barn for a second smoking. Subsequently, when the tobacco is removed, the mid-rib, veins, etc., are completely cured and devoid of moisture. The tobacco is kept in stacks for three days and then hung under sheds for four to five days. It is finally removed and stacked, at which point it is ready for purchase by traders.

In the case of Smoking tobacco (Thaddyan), the harvested leaves are placed into circular pits after they have been aired in open sheds. The tobacco is left to ferment for two complete days in the pit dug in the ground. After two more days they are removed, tied together and smoked according to the same process outlined for chewing tobacco. After smoking, the leaves are hung in an air curing shed till the mid-ribs and leaves are thoroughly dry. They are then bulked and are ready for sale. However, the bulked tobacco must be occasionally inspected and re-bulked to avoid fungus infection until it is sold.

The wrapper varieties of tobacco of the Thenmarachi region are not

smoked but are fermented in pits and air cured.

Finally the tobacco leaves are sorted into three grades depending on the size of leaves and their quality (based on softness, color, flavor, and dryness).

(4) Marketing. Two systems of marketing are in operation. The common practice is to sell the cured leaves to the dealer at the house of the farmer. The graded leaves are sold on the basis of thousand leaf lots. A few of the farmers sell the tobacco as a standing crop in the farm so that they will have more time to devote to the cultivation of onions and other crops immediately following the tobacco harvest. However, such farmers will get a very low price for the green tobacco.

B. Other Crops. Some of the behavioral elements associated with the cultivation of onions, chillies, dry grains and vegetables are outlined in this section as they are associated with the tobacco farming system.

Since onions follow the cultivation of tobacco the land is merely hoed and not ploughed. Two hoeings are normally done and the three feet by three feet plots that are used for the cultivation of tobacco are strengthened. The onion seeds are planted directly in the plots and are flood irrigated from the outset. Apart from irrigation, weeding of the onions is done at least twice before it is harvested. Harvesting consists of merely pulling out the onions and removing the seeds from the plants. The onions are then put into jute sacks and taken by the farmer to the co-operative societies which purchase them.

Chillies and vegetables are transplanted from nurseries into the three feet by three feet plots by the farmer. The planting is done in the basin itself

and not on the edge of the plot as in the case of tobacco. Moreover, the plants are hand watered in the plot for a few days till the plants are firmly established. They are then flood irrigated as in the case of tobacco. However, unlike tobacco and onions, these are not harvested on the same day. The farmer only removes those parts of the chillies and vegetables that are ready for consumption each day, to be sold in the market fair. Dry grains are broadcast in the plots and in most cases manioc is intertilled with them as has been described earlier. Manioc is planted on the edges of the basins in which the dry grains grow. Generally, except for tobacco and onions, most of the subsidiary food crops are sold in the market fair. If the farmer is not in a position to sell these products in the market fair he takes them home to be consumed by the family.

Table VIII summarizes the farming cycle described above, as well as the labor inputs described in the following section.

C. Labor Inputs. In this section an attempt is made to estimate the labor supply available in terms of the labor performed by an average adult male during a single day of work on the farm (a man-day). Since female labor is insignificant it is only necessary to add 0.1 of a man-day to the one man-day for the labor contributed by children. While a man works from 5 a.m. to 11 a.m. and again from 3 p.m. to 6 p.m., the children work on the average about three hours a day. Moreover, the children perform less difficult tasks than the men and so it is necessary to reduce the contribution made by them. In fact, the children only give a helping hand in transplanting, weeding, watering, and taking produce to the market. The total family labor on the farm per day averages approximately

TABLE VIII

FARMING CYCLE AND LABOR INPUTS*
(on a quarter-acre farm)

Productive Tasks	Time	Man-days
Land idle (penning of animals)	Late October Late November	-
Ploughing and preparing tobacco nursery and spreading cattle manure	Late November Early December	4
Burving green manure	Mid-December	3-4
Transplanting and associated practices	Last week of December to mid-January	6
Hand watering	Mid-January to end of January	6
Preparation of blots and channels	End of January	3
Second manuring and digging	Mid-February to early March	8-9
Flood irrigation	Early February to mid-April	13-14
Removal of buds and suckers	Early February to mid-April	3
Harvesting	Mid-April on	1
Curing and grading	Mid-April to early May	10
Onions hoeing (or chillies)	Late April to early May	3
Irrigation (onions or chillies)	Early May to mid-July	14
Weeding and harvesting (onions)	May to July	13
If another crop of chillies or onions, same processes repeated	Early July to October	30
Not possible to calculate for vegetables, dry grains, manioc, and fallow		120
MAIN PRODUCTIVE TASKS		425
All possible work performed by farmer and laborers (TOTAL)		

*See Section C for derivation of total

Source: Intensive study of 62 farms in the Valigamam East and North Divisions in 1965-66; pilot survey carried by the writer of six farms in the tobacco region in 1962-63.

1.1 man-days.

The farmer works about 320 days per year, since the farm is fallow one month a year and the total man-days including the contributions made by the children will be 352. It should be mentioned, however, that most of the work done on the farm is performed by the farmer and that hired labor amounts to only about 14% of the total man-days (Table VIII). The farmer employs labor for irrigating, and curing of tobacco. Therefore, six additional hours have to be added to the work done by the farmer and the children for irrigating the farm (irrigation lasts for three hours a day). Considering that tobacco has to be irrigated for about 25 days (once every three days for two and one-half months) an addition of 16.6 man-days have to be added to the 325 man-days (150 divided by nine hours which is equal to one man-day). Another day has to be added to the labor used for harvesting at the rate of four to five hours for two days. Another ten man-days of hired labor employed for curing tobacco have to be added to the total man-days. In all, at least 160 man-days are required for the cultivation of tobacco alone.

Additional labor is necessary for the cultivation of onions, chillies and other subsidiary food crops. Hired labor is mainly employed for irrigating, weeding and harvesting these crops. Onion cultivation requires additional labor for the seeding, weeding and harvesting, since these operations have to be performed within a limited time period. This is the only time when the wives and children of the laborers (members of the lower caste) are employed. On the average, five to six women and their children are employed for planting, har-

vesting and weeding of onions. The women only work about six hours a day (8 a.m. to 2 p.m.). Their contribution is calculated as one-half man-day for the period they work. On this basis about 13 man-days must be added to the 29 man-days contributed by the farmer for the cultivation of onions. If chillies and other crops are cultivated during the rest of the year an additional 17 man-days are necessary as hired labor. On the average, therefore, at least 425 man-days are necessary for the functioning of a quarter-acre tobacco farm (Table VIII). This should be considered only as a rough estimate, however.

D. Farm Economics. In this section we will consider the farm as a productive system. The rough estimates of labor inputs and statements pertaining to farm income and expenditure derived from the interview data will be utilized for this discussion. This discussion is necessary to determine whether the farmer is able to realize sufficient family income from the performance of the productive tasks that have been described earlier in this chapter.

As indicated earlier, 62 farmers of Valigamam North and East Divisions were interviewed by the writer to obtain information with regard to the expenses and receipts involved in the production of tobacco from a quarter-acre farm (1,000 tobacco plants).

The net income that the farmer derives from cultivating the farm is dependent on the relationship that exists between the input and output elements. These input and output elements are expressed in terms of cash. However, it is not possible to express all the productive tasks performed by the farmer in terms of cash. Farm expenditure will include all the costs involved in production,

marketing and to a certain extent the upkeep of the farm. Cash figures are expressed in terms of Ceylon Rupees (one Ceylon Rupee equaling approximately 21 cents American in 1965). The cost of farm labor per day averages four Rupees.

More than 75% of the farmers of the study region require at least 718 Rupees annually for the cultivation of tobacco. Only about 15 of the 62 farms registered an average expenditure of 578 Rupees. These 15 farms are found to be located in the poorly-drained parts of Valigamam East. They are recorded as belonging to Class II in Table IX with regard to the estimated cost of cultivating a quarter-acre tobacco farm. The breakdown of farm expenses (Class I) indicates that of the total average expenditure of 718 Rupees involved in the cost of production of tobacco, manure accounts for nearly 430 Rupees (60%). This shows that much attention is paid to these inputs. It was not possible to include in this breakdown the cost involved in the purchase of insecticides and expenses involved in repairing and replacing tools.

The differences that exist between the expenses involved in running farms can be accounted for as follows. Some of the farms are situated close to the poorly-drained paddy growing areas, where cattle manure is readily available. The farmer is thereby spared the expense of having to haul the manure from a distance. Moreover, the farmer feels that there is no reason why he should increase the expenses when the yields from the farms are low due to unfavorable soil conditions. In some of the sandy tracts of Thenmarachy the expenses average as low as 480 Rupees.

TABLE IX

ESTIMATED COSTS OF CULTIVATING A QUARTER-ACRE TOBACCO FARM

(Expenses will be grouped into two classes so as to indicate the variations that exist in the expenses involved)

Items of Expenditure (in Rupees)	Class I	Class II
Cattle manure	130	100
*Turning the soil	14	15
Hire goats for manure panning	55	-
*Plowing	8	12
Green manure	150	125
*Burying green manure	12	12
*Preparing beds and channels	12	12
Manuring and digging	100	60 (12*)
*Enlarging beds and weeding	12	12
Watering and irrigation	70	80
*Removal of buds	10	10
Cutting, transporting, smoking	70	70
Rent for quarter-acre farm per year	75	70
TOTAL	718	578

*Expenditure on the items marked (*) are considered savings by the farmer, as he performs the work himself. Others not marked include only labor.

Source: Intensive survey of 62 farms in Valigamam North and East.

Farm receipts indicate only the cash that is derived from the sale of tobacco. Tobacco leaves are graded into two types for sale. Grade I consists of the best leaves which sell at the rate of 200 Rupees per thousand leaves. A plant can only yield five or at most six such leaves. Grade II leaves are sold at 35 Rupees per thousand leaves (also five to six leaves per plant). On this basis a plant will sell for nearly one Rupee and 17.5 cents (assuming that a plant

yields five good and five inferior leaves). Therefore, the farmer will derive on the average 1175 Rupees by the sale of a thousand plants. Comparing this figure with the figure for expenses, we find that the farmer derives a net income of 457 Rupees from the cultivation of tobacco. The net income from farms that are situated on poorly-drained soils (Class II) was as low as 270 Rupees (roughly 850 Rupees per thousand plants less cost 580 Rupees as indicated in Table IX).

Tobacco accounts for only a part of the net income derived from the operation of the farm, so one must take into consideration the income derived from the cultivation of the other crops in rotation. It has been possible to determine the income derived from the cultivation of onions from individual studies of certain farms and from information obtained from the co-operative societies. On the average the net income from the cultivation of onions accounted for nearly 370 Rupees. The study also indicated that on the average the net income from the sale of chillies was less than 300 Rupees. Departmental records indicate that the net income from the cultivation of chillies in the early fifties was as high as 450 Rupees on the average. This reduction in the profit is due to the attacks of the leaf curl disease.

The income derived from the cultivation of other subsidiary crops could not be obtained because the farmers were not able to indicate the quantities they grow and sell. Moreover, the farmer consumes a substantial portion of these crops himself. On an average it can be estimated that the farmer derives a net income of 50 Rupees per year from the cultivation of subsidiary crops.

About 75% of the farmers realize on an average (Class II) 1,000 to 1,200

Rupees from cultivating: tobacco, 460; onions, 370; chillies, 300; subsidiary crops, 50.. The farmer who grows one crop of tobacco and two crops of onions and subsidiary crops will obtain a higher income than if he grows one crop of tobacco, two crops of chillies and subsidiary crops.

The income does not represent a real profit to the farmer if his own labor input is considered. If all the 425 man-days are taken into consideration, the cost of labor will be 1,700 Rupees (wages four Rupees per day). It should be mentioned, however, that the farmer hires labor that costs roughly 275 Rupees (14%). However, since the farmer does not go to the other farms as a laborer, he does not consider the labor contributed by himself as a cost.

The farmer considers any cash from selling all products that he has left after paying all expenses as the family income. It is this cash that is available to him for all the family expenses in one year. However, it is doubtful that this net income can be considered as an indication of the economic success of the farming system. This net income may be reduced if the farmers do not make some modification in the structure and functioning of the farming system as a result of a decline in demand and price of tobacco. The next chapter explores some of the modifications currently being made by the peasants.

E. Elements of Decision-Making. The characteristics of the farming system are determined to a large extent by the resource-using decisions made by the farmer at different times and for various reasons. The reasons behind decisions with regard to resource use can be ascribed to three basic process elements, which Blaut calls "value elements," "skill elements," and "perceptual

elements."[1] These three elements will be analyzed as they relate to the character of the tobacco farming system.

This analysis will be based on observations made by the writer and data gathered from the farm questionnaires. The data again is based on the results of the survey of 62 farms in the Divisions of Valigamam North and East. The discussion will be largely qualitative rather than quantitative.

(1) Economic Value Elements. The principle motive underlying nearly all productive decisions made by the farmer has been to maximize family income in terms of cash. He grows tobacco as the main crop instead of staple food crops because he knows that by selling tobacco in a processed form he is able to acquire income that is not only sufficient for purchasing food and other necessities but also in the long run to provide the family with a stone-built house; a diesel irrigation pump of his own; a good education for the children; ownership of a farm, etc. Money is utilized for all transactions beginning from the payments made as a tenant to the payments made by him for the weeding of onions. At the same time he tries to make the maximum money by trying to perform most of the functions himself. Only when the farmer is unable to perform certain tasks is he forced to hire labor. He carries his vegetables and other products to the nearest market fair on foot, and returns to the farm to do his work. Most of the farmers were unable to indicate the cost and returns with regard to the sale of subsidiary food crops such as manioc, millet and vegetables because they did not depend on the market for their cultivation. They were able to compute

[1] J. M. Blaut, "The Ecology of Tropical Farming Systems," Plantation Systems of the New World (Washington: 1959), p. 88.

roughly the cost and returns in terms of cash crops such as tobacco. Nearly 50% of the farmers do not maintain a written record of what they sell and spend. Every farmer who was interviewed was only able to indicate the cost and returns in terms of probabilities, although on the basis of the current cost of labor one is able to set a price on farm labor (as indicated earlier).

It is not possible to indicate how some of the non-economic values governing semi-subsistence farming can be applied to the farming system. It is true that the farmer cannot live by tobacco alone, but the history of farming in this region indicates that the farmers formerly lived entirely on the subsidiary grains, manioc, and vegetables which they now grow in small quantities in rotation with tobacco, onions and chillies. It is unlikely that the farming system will revert to semi-subsistence conditions in the future. The survey indicates that in the event of a radical fall in the price of tobacco, the farmers are prepared to shift to onions and chillies or other crops for which there is a stable market. These values of the farmer play a large part in determining their productive enterprises. The business attitude of the farmer is evident from the fact that he is trying to adjust his cropping program on the basis of market prices and it is certain that he will not adhere to the same unprofitable cropping pattern in the future. Economic rationality appears to be an important value element. It can be said that the typical farmer does not carry on farming to keep himself fed, and to him agriculture is less a way of life than a business for profit. However, this does not mean that he depends entirely on the sale of his produce to purchase vegetables, manioc, millet which form a substantial portion of his foodstuffs.

From the foregoing discussion it can be asserted that the farming in this region can be explained primarily in economic terms. The people have been farmers for many centuries but their values have changed with time and they are now oriented towards cash.

(2) Non-Economic Value Elements. There are certain features in the farming system that do not reflect the motive of maximizing income.

The sex-based division of labor can be ascribed to non-economic factors. Hindu society is tradition-oriented; and this is reflected in the use of labor in agriculture. Santi Priya Bose used the phrase, "The place of a woman is the home and she should not go out to work," to test attitudes towards tradition among the peasants of a small rural area in Calcutta, because this attitude is a common feature in the Hindu society.[1] It should be mentioned, however, that women of the lower caste perform some functions of laborers when they go in groups to the farms during certain seasons of the year to seed, weed and harvest onions. The farmer's wife does not perform these functions.

Farmers' children attend schools mainly for an economic reason. This is not that the farmer's child will help to improve his income in the future, especially when the amount of land is limited, but that the child will be able to seek a living in non-farming enterprises. It is appropriate at this stage to quote Wriggens, who states very clearly what has been happening in the Jaffna Peninsula:

> It was the people from the north--the Tamils--
> who first experienced the pressures of population

[1] S. R. Bose, "Peasant Values and Innovations in India," American Journal of Sociology, 67 (1962), p. 555.

> and limited local resources. Hence, the growing public service presented itself as a carrier which they well suited by virtue of another historical circumstance. More missionary schools in relation to the population had been established in Tamil areas than in Sinhalese areas. Tamil children were good at figures and their parents goaded them in their academic work with fear of unemployment or hard work as a price of failure. In addition, their religious beliefs allowed them wide latitude in adopting foreign ways for work purposes without disturbing their fundamental Hindu traditions.[1]

This shows that the farmer was prepared to forego the labor potential in the child who is being provided free education by the Government.

Finally, mention should be made that as in most peasant societies the practice of spending a part of the hard-earned income on ceremonies still prevails.

(3) Skill and Perceptual Elements. The manner in which the farmer uses the resources at his disposal is determined by what he recognizes as being relevant to his interest and the knowledge and skill he possesses with regard to the altering of the environment for productive purposes. In order to understand the functional characteristics of the farming system it is necessary to know clearly what the farmer's attitude is towards the characteristics of the physical environment as it relates to farming. All decisions are determined by what he considers to be "opportunities" and "limitations" in the total environment.

It is possible to illustrate in a general way a few of the changes that have resulted in the total environment as related to the "farmer's apperception of

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[1] W. H. Wriggens, Ceylon: Dilemmas of a New Nation (1960), p. 237.

resource-using situations."[1] The most important feature of the resource-using situation is that the farmers have converted a barren land into a productive region entirely through what they felt was the best method. For instance, as discussed in Chapter V, the soil on which tobacco grows has been entirely produced by the farmer. The environment has been altered by the farmer to permit commercial production of tobacco. This has been very well stated by Tennent as early as 1859 as follows:

> ... whilst the increasing demand for tobacco causes new land to be broken up for its growth, thus stimulating a constantly progressive improvement in the culture of all the inferior lands.[2]

The farmers are aware of the appropriate method of watering and manuring the plants, as has been mentioned earlier. The method of using water resources for cultivation is an important technology possessed by the farmers. It originally involved a correct decision to develop and use the renewable water resources for intensifying cultivation. They have developed the art of sinking wells for raising water and conducting it to the plots. They are aware that irrigation adds water to the supply of moisture essential to plant growth, but they are not aware that too much irrigation results in wastage of water. They tend to provide as much water as available to the plants, thinking that it accelerates plant growth. They are aware that irrigation cools the soil and the atmosphere, providing a favorable environment for plant growth. They also possess the

[1] Ibid.

[2] J. E. Tennent, Ceylon (London: 1859), Vol. II, p. 534.

knowledge that atmospheric dew is favorable for the growth of tobacco, as described in Chapter V. For instance, there is a general belief that the prevalence of dew in February and March favors the rapid growth of tobacco. They are not aware that the dew comes during the months when the temperature is high and much of the water provided by irrigation is lost through evaporation. It is true that the farmers do not understand each of these scientific features associated with plant ecology, but they seem to be aware that certain methods will improve the conditions associated with inferior soils.

Farmer's reactions to artificial fertilizers are not clear. Most of them feel strongly that they cannot substitute mild tobacco for strong-flavored tobacco because the latter cannot be cultivated by the application of green and cattle manure as described in Chapter V. Moreover, new varieties of tobacco will not fit into the system of crop rotation and agricultural practices which they have been used to. The income from mild tobacco cultivated by the application of artificial fertilizers is very low when compared to the income derived from the cultivation of crops dependent on the application of green and cattle manure. It is doubtful whether any other method of cultivation other than what is prevalent at present will suit the farming system in the Jaffna Peninsula. The farmers are not inefficient in using the agricultural factors of production that they have at their disposal. In the words of Schultz:

> Thus the popular assumption that a different (better?) allocation of existing poor collection of agricultural factors in these communities would substantially increase agricultural

> production is inconsistent both with economic logic as applied to the behavior of farmers in such an equilibrium and with the available empirical evidence. Strange as it may seem, it is true that on the basis of strict allocative test, these farmers are more efficient than farmers in most of modern agriculture, because the latter are in a state of disequilibrium, a consequence of their 'too rapid progress.'[1]

As to the knowledge of market conditions, the farmers interviewed were not certain of the prices they would receive for the crops in the future. They live in an atmosphere of uncertainty, especially when the price for tobacco and onions is determined by decisions made by the Government and upon natural disasters that might affect tobacco production in other areas.

[1] W. S. Schultz, "Economic Growth from Traditional Agriculture," Agricultural Sciences for the Developing Nations (Washington: 1964), No. 76, p. 187.

CHAPTER VII

PRACTICES ADOPTED BY THE PEASANTS TO MAINTAIN THEIR INCOME UNDER CHANGING CONDITIONS

This chapter analyzes the changes that have been introduced in the farming system as a result of the decline in the demand for tobacco. For reasons of data availability, Jaffna Peninsula is considered as a whole to indicate the major changes that have occurred in the area's crop structure. Survey results are presented which explain these changes on a regional scale. Wherever possible these changes are analyzed at the level of the individual farm.

A. Introduction of New Varieties of Tobacco and New Farming Practices.

Changes in the price structure of strong-flavored tobacco have brought about some minor changes in the crop structure of the farming system. New crops have not been introduced on an extensive scale in this region as a result of these changes. However, the importance of tobacco has declined in certain farms, and the production of other crops such as onions and chillies has increased.

The only crops that are new to this region are new varieties of tobacco such as cigarette and bidi. Cigarette tobacco was first introduced in the peninsula in the early fifties with the idea of replacing the area devoted to the

cultivation of strong-flavored tobacco. At first it seemed promising, since nearly 500 acres were devoted to its cultivation in 1957-58; but by 1965-66 the area had declined to less than 300 acres (Table X).

TABLE X

JAFFNA PENINSULA--DISTRIBUTION OF CIGARETTE TOBACCO AND BIDI TOBACCO BETWEEN 1953 AND 1965-66 (in acres)

Division	1953		1958		1965-66	
	Cig.	bidi	Cig.	bidi	Cig.	bidi
Valigamam North	21	-			22	40
Valigamam East	30	-			52	32
Valigamam West	-	-			169	67
Vadamarachy	-	-			10	78
Thenmarachy	12	-			35	30
Pachilai-pallai	-	-			10	8
Islands	-	-			-	4
TOTAL	63	nil	500	nil	298	259

Source: A. B. Attygalle, "Ceylon's Cigarette Tobacco Industry," Tropical Agriculture (Peradeniya: 1954), Vol. CX, No. I; and S. V. Manuel Pillai, "Cultivation, Curing and Processing of Bidi Tobacco," Tropical Agriculture (Peradeniya: 1954), Vol. CX, No. 4, pp. 284-288 (1958 and 1965-66, District Agricultural Office, Jaffna).

In 1949, due to the falling market for Jaffna tobacco, trials were started

by the Tobacco Division of the Department of Agriculture to develop a cigarette industry in the Jaffna Peninsula as a substitute. The results indicated that only certain areas were favorable for the production of good-burning quality leaf. The quality of cured leaf was on the whole poor, and there was a high percentage of perishable leaf.

The outstanding qualities of cigarette tobacco are its bright lemon to orange color, its distinctive and mild aroma, and its high sugar content. These are in contrast to the dark color, coarse texture, strong flavor and aroma, and high nitrogen and nicotine content of the chewing and smoking tobacco grown in the peninsula. Cigarette tobacco must possess good burning quality, resulting in evenness of burn and light adhesive ash. Cigarette tobacco produced in the peninsula has shown poor color and coarse texture. Its leaf is thin and papery and the burning quality has been unsatisfactory.

In 1950-51 and 1951-52 further trials were carried out at four centers in farmers' fields, and, although there was an improvement in the quality of leaf, the tobacco manufacturing companies in Ceylon (except that from one center in Valigamam East) reported unfavorably on the burning of the tobacco. According to Attygalle and Jayanette, these trials indicated that the poor quality of the leaf could be eliminated by reducing nitrogen in the fertilized mix.[1] This meant that the practice of heavy organic manuring and cattle penning which enriches the soil was to be avoided. Improvement in the burning quality appeared to be possible

[1]A. B. Attygalle and Jayanetti, "Improvement of the Quality of Flue-Cured Cigarette Tobacco in the Jaffna Peninsula," Tropical Agriculture CXI, No. 3 (1955), pp. 194-198.

by lowering the nitrogen, lime, and magnesium content and increasing the potash content of the leaf. This could be achieved by suitable application of artificial fertilizers. Also, the percentage of chlorine has to be reduced if the burning quality of leaf is to be improved. However, the chlorine content of the cigarette tobacco produced in the peninsula is more difficult to control, owing to the proximity of the tobacco growing centers to the sea and the lagoons. The nature of the parent soil material (limestone) and the well water cause the soils to be high in chlorine content.[1] Results of trials carried out in the mid-fifties indicated that there are a couple of centers in the peninsula where, because of the relatively lower nitrogen and chlorine content in the soil, cigarette tobacco of satisfactory quality can be produced. The farmers have to alter their traditional practices by reducing organic manuring to produce cigarette tobacco of satisfactory quality in these areas. Therefore, it appears that the farmer is at a disadvantage with regard to the production of cigarette tobacco (Table X). The farmers are not in a position to produce the right quality cigarette tobacco. Even if the farmers were able to rectify certain defects inherent in the soil, the corrective measures would raise the cost of production to such an extent that it would not be possible for the Jaffna farmer to compete in the open market.

It is necessary to discuss practices involved in the cultivation of cigarette tobacco so as to demonstrate how different they are from those which are associated with the cultivation of strong-flavored tobacco. One of the main reasons

[1] S. K. Kandiah and D. M. Rodrigo, "The Effect of Manuring," Tropical Agriculture CXI, No. 3 (1955), pp. 199-203.

why it has not been adopted by a large section of the peasants was that it involved a major change in the decision-making and behavioral elements of the farming system.

(1) Organic manuring in the form of cattle manure, compost, green manure, penning cattle, or sheep, is highly detrimental to the production of cigarette tobacco. On the contrary, these are essential for the cultivation of strong-flavored tobacco. It is generally recommended that for optimum soil fertility, organic manure be added to a previous crop and not as a direct application. It so happens that tobacco is the first crop that is cultivated after the rains in the well drained soil areas of the peninsula. Moreover, the leaf used for organic manure are only available in large quantities at the end of the rainy season when they are hoed into the moist soils. Artificial fertilizers consist of nitrogen in the form of sulphate of ammonia, phosphoric acid in the form of superphosphates, and potash in the form of sulphate of potash. These are actually supplied to the plants by the farmers in organic form when strong-flavored tobacco is cultivated. There is no need for the farmer to measure carefully the amount of fertilizer he has to apply in the cultivation of strong-flavored tobacco. The Jaffna farmer has evolved a cultural method which is intended to control weeds and maintain good soil structure. The cultivation of cigarette tobacco by precluding organic manuring prevents these benefits. The farmers feel that the application of artificial fertilizer actually hardens the soil. All the farmers who were interviewed were of the opinion that cigarette tobacco does not fit into the system of crop rotation that gives them sufficient income.

(2) The method of planting, priming, and topping are not very different, although the number of leaves remaining on each plant commonly varies from sixteen to twenty-two with cigarette tobacco and from about ten to twelve with chewing and strong cigar types.

(3) The harvesting and curing of cigarette tobacco differ from that associated with strong-flavored tobacco. The chewing and the cigar tobacco leaves are usually harvested separately with the section of the stem attached to each, while cigarette tobacco leaves are harvested by cutting off the leaves only. Strong-flavored tobacco is fire-cured, while cigarette tobacco is flue-cured. Moreover, cigar tobacco is air-cured in open sheds, not in buildings provided with ventilators. The method of curing strong-flavored tobacco, adopted by the Jaffna farmer, is a simple one and requires little capital. In the case of cigarette tobacco, it has to be cured in specially constructed buildings. These flue-curing barns are concrete structures 16 feet by 16 feet and 20 feet high, and they will accommodate leaf from five acres. The approximate cost of constructing a flue-curing barn is about 3,000 to 3,500 Rupees, as indicated in farm bulletins published by the Department of Agriculture in Ceylon. Heat is applied with due attention to gradual changes in color and in drying. A load will take four to five days to be cured. All these processes have to be done carefully, and these practices are new to the farmer. Moreover, he does not have enough land to grow sufficient tobacco or the money to construct these expensive barns. The entire process of curing and grading is highly technical and can only be undertaken by a co-operative society under expert advice. Under these circum-

stances, the curing is done under the green leaf purchase scheme whereby the tobacco manufacturing companies buy the leaves at agreed prices and cure them in their own flue-curing barns at different centers. The companies also advance seedling and fertilizers to cultivators whose cost is subtracted from the purchase price. Therefore, the peasant realizes a lesser income from the cultivation of cigarette tobacco, even though the price of strong-flavored tobacco is falling. The net income derived from the cultivation of cigarette tobacco in a quarter acre farm averages between 150 to 250 Rupees, while strong-flavored tobacco provides a net income between 350 and 460 Rupees (Table XII).

Bidi is the other variety of tobacco that has been introduced in the farming system. Unlike cigarette tobacco, it is acceptable to the farmer, since it fits into the system of crop rotation practiced by the farmer. It was only recently introduced, in the early sixties, and by 1965 nearly 260 acres were devoted to its cultivation in the peninsula.

Bidi tobacco, like strong-flavored tobacco, responds well to heavy organic manuring. Cattle manure and green manure can be applied so that following crops will benefit, too. The planting and topping are similar to that for strong-flavored tobacco. The harvesting is done in the dry weather and the leaves are sun-dried. Indeed, the cost of curing is very low and curing and grading are simple. The Ceylon Bidi Manufacturing Association buys the cured and graded leaves at a guaranteed price fixed for the various grades. But only registered cultivators can grow bidi tobacco on a quota system. The Department of Agriculture has controlled the acreage in order to avoid over-production. There is

a restriction on the amount of land that can be brought under its cultivation in the peninsula. Therefore, even though bidi tobacco can be cultivated successfully throughout the peninsula, it cannot entirely replace strong-flavored tobacco. The net profit from the cultivation of a quarter-acre farm averages 375 Rupees (Table XII). No other new crops have been introduced successfully in the peninsula, to replace strong-flavored tobacco.

B. Increasing Production of Crops Other Than Tobacco. There is a strong tendency among the farmers of the Jaffna Peninsula to increase the production of certain food crops, which have been cultivated in this region for many centuries, as against the production of tobacco. The farmers feel that this is the only method by which they can maintain their income in the face of declining prices for tobacco at present. The Department of Agriculture is also encouraging the production of food crops by purchasing the produce through guaranteed price schemes. The restrictions imposed on the production of bidi tobacco can be ascribed to this.

The results of the findings of the survey clearly demonstrated the fact that the farmers have increased the area under onions at the expense of the area under tobacco within the last three to four years. The area under onions has increased from about 2,114 acres in 1960 to about 3,505 acres in 1965. In contrast to this, the area under tobacco has decreased from about 4,337 to about 3,650 acres during the same period. The greatest increase in the production of onions was seen in the important tobacco divisions of Valigamam North and Valigamam East (Table XI). This feature of the change is more evident in this

TABLE XI

JAFFNA PENINSULA--DISTRIBUTION OF THE AREA UNDER MAJOR CASH CROPS BETWEEN 1960[1] AND 1965[2]
(in acres)*

Divisions	Tobacco		Onions		Chillies	
	1960	1965	1960	1965	1960	1965
Valigamam North	845	705	500	977	277	303
Valigamam East	885	649	620	1120	408	510
Valigamam West	505	378	539	655	99	97
Vadamarachy	864	888	299	365	210	203
Thenmarachy	216	224	30	32	104	110
Pachilai-palai	164	164	5	3	16	20
Islands	805	595	111	353	89	126
Jaffna Town	53	47	10		9	
TOTAL	4337	3650	2114	3505	1212	1369

[1]Source: District Agricultural Office (1960-61).

[2]Figures obtained by the survey carried out by the investigator assisted by the overseers of the District Agricultural Office, Jaffna. Each overseer was requested to gather information from a group of villages over a period of three months. Since the District Agricultural Officer of Jaffna was anxious to gather such information for his official record, he directed the overseers to obtain accurate information

*It was not possible to obtain accurate figures on the cultivation of subsidiary food crops, but the information gathered indicated that there were no major changes.

area, because the area was mainly associated with the production of strong-flavored tobacco that was exported to Travancore. The other administrative divisions of the Peninsula were associated with the production of tobacco for local cigar manufacture or for chewing among the local population of Ceylon. The survey also indicated that Valigamam East was where the greatest change was observed with regard to the production of tobacco and onions. The income from tobacco in certain farms is so low that the farmer is able to derive a better income by cultivating three crops of onions in the same farm (January, May and August planting in one year). It was not possible to gather accurate information on the manner in which such changes were introduced in the 12,785 farms that were devoted to the cultivation of tobacco. Moreover, these changes have just begun to take place, and thus, it is not possible to locate the farms exactly where these changes are occurring. The writer observed only a few changes in the farms he investigated.

In one farm, the farmer planted 25% of the farm with onions and the rest with tobacco during the tobacco growing season. He also grows two other crops of onions after the tobacco season. Another farmer cultivated three crops of onions, but he had to manure the field as he did for tobacco earlier. There was yet another farmer, who planted 25% of the farm with chillies and the rest with tobacco. He grows one crop of onions and another crop of chillies after the tobacco season. The area under chillies in this region as elsewhere has increased from 1,212 acres in 1960 to an estimated 1,369 acres in 1965 (Table XI).

Table XI seems to indicate that, on the average, 376 acres of land that

were originally devoted to the cultivation of tobacco in Valigamam North and East Divisions were diverted to the cultivation of onions between the period 1960 and 1965. There has been the tendency during this period for some of the farmers to cultivate a portion of their farms with onions even during the tobacco season. This accounts for a substantial increase in the area under onions as against tobacco during this period. Table XII clearly indicates the steps taken by a few farmers to maintain their incomes in the face of declining prices for tobacco.

The total family income from the cultivation of three crops of onions was on the average Rs. 1083. The income from onions was only slightly lower than that from the cultivation of tobacco in this farm. However, the income from the cultivation of tobacco would be definitely higher in the areas where the land is more favorable, as in Valigamam North Division.

There were certain definite advantages in cultivating onions instead of tobacco by certain farmers. The farmers who are not in a position to produce good quality tobacco cannot sell their produce immediately after curing. The marketing of this tobacco is done by traders who buy the tobacco from the growers at very low prices and sell it through their agents at the consuming centers. A farmer with an inferior quality tobacco is forced to sell his produce at a low price, especially when he needs money to cultivate other crops.

In contrast to the marketing of tobacco, onions are within the guaranteed price scheme and, therefore, the farmer cannot fail to find its cultivation profitable. Unlike tobacco, there is a rising demand for the onions grown in the Peninsula. The importance of onions to the economy of the country was clearly

TABLE XII*

COST OF CULTIVATING A QUARTER-ACRE FARM WITH THREE CROPS OF ONIONS IN ONE YEAR

Items of Expenditure	Rupees
Ploughing	10
Green manure	70
Burying manure	12
Manuring and digging	70
Irrigation	60
Weeding and planting	50
Seeds (6 cwts.)	150
Rent for land	70
Transport and harvest	25
Total Cost	517
Average yield for the first crop 35 cwts. sold at Rs. 25 per cwt.	875
Net Income	358
Net income for second crop: Average yield (lower) 31 or 32 cwts.	775
less cost (lower--no manuring as before)	400
Net Income	375
Net Income from the third crop was slightly lower:	350

*The cost of cultivating three crops of onions in one farm has been compiled from the information obtained from one farmer who had adopted this practice in Valigamam East.

brought out by the Planning Council of Ceylon in the "Ten Year Plan," as follows:

> Our imports in 1957 amounted to only 2,000 cwt. valued at Rs. 15,000. Local production that year has been estimated at 982,000 cwt. The total consumption of onions was thus 984,000 cwt. On the same assumptions as made earlier, this would have risen to 1,358,000 cwt. by 1968. The local production of 982,000 cwt. is obtained from an area of roughly 17,426 acres. The average yield per acre thus works out to 56 cwt. At this yield the additional area which ought to be harvested for self-sufficiency is only 6,400 acres.
>
> It is clear that a target of 6,400 extra harvested acres is not difficult to reach. It is simplified further because some of the land can and is even at present double-cropped. Accordingly the extra land acreage required is not likely to exceed 4,500 acres. The cultivation of onions is undertaken largely in the Northern Province.[1]

The above analysis indicates how important the cultivation of onions is in the Jaffna Peninsula. The average yield of onions per acre in the peninsula is as high as 120 cwt., because of the agricultural practices involved in the cultivation of onions. On the basis of the assumptions put forward by the Planning Council of Ceylon, Jaffna Peninsula was producing 420,600 cwt. of onions in 1965, which is nearly a third of the requirements for the country in 1968 (one-third of 1,358,000 cwt.).

As has been indicated earlier, the area under chillies has also increased during the period of 1960 to 1965. Since their cultivation is less remunerative than the cultivation of onions, it has not been adopted by many farmers. It is probable that with increased control of leaf curl disease, the production of

[1] *Ten Year Plan* (Report of the National Planning Council of Ceylon) (Government Printing Press: 1959), pp. 278-279.

chillies will increase at a rapid rate. Moreover, since the increase in the area planted to onions and chillies exceeds the increase in the area under tobacco, one can safely infer that in an attempt to offset the loss of income from tobacco, the farmers also substitute onions and chillies for subsistence crops in the cropping period following tobacco.

It is not possible that the cultivation of strong-flavored tobacco will be discontinued in all sections of the peninsula in the near future. There will be some demand for strong-flavored tobacco from the local rural population of Ceylon. It is necessary that the production of tobacco be kept within the laws of demand and supply. This can only be done by reducing the area under tobacco, especially in the areas where the yields and quality of tobacco are low. There is already a tendency for some cultivators to discontinue its cultivation in areas that are less favorable for its cultivation.

Recent shifts in crop areas demonstrate that the farmers are able to adjust the farming system to changes that occur outside the system in terms of prices of farm products.

CHAPTER VIII

FACTORS THAT SEEM TO HAVE FAVORED OR HINDERED THE ADOPTION OF INNOVATIONS

This chapter considers some of the important factors that seem to have favored or hindered the adoption of innovations by the farmers of the Jaffna Peninsula. Such an analysis will enable us to understand why the farmers have not adopted the cultivation of new crops, such as mild varieties of tobacco, and the use of modern agricultural tools.

An analysis of this nature necessitates the consideration of some of the major innovations that have been adopted by the farmers in the past. This method of analysis will be useful in predicting the changes that might occur in the farming system in the future.

The Chapter will be divided as follows: 1) Factors that seem to have hindered the adoption of innovations prior to the eighteenth century; 2) Factors that seem to have hindered or favored the adoption of innovations in the present century.

A. Factors that seem to have hindered the adoption of innovations prior to the eighteenth century. Prior to the introduction of commercial production of tobacco in the farming system in the latter part

of the seventeenth century, the peasant society was largely a folk society. This folk society has resisted any changes in the crops or agricultural techniques associated with the farming system as indicated in Chapter III. The attitude of the farmers towards the adoption of innovations can be ascribed to dominant values held by the people of that period. The values held by the farmers of the time were of a tradition-oriented folk-type. These attitudes held by the farmers can be related to the following factors:

(1) In a folk-society, the individual cannot decide on what is right or wrong. In accepting any new practices, the farmer in such a society has his attitude and the attitudes of the family group and village to consider. The rigid order of the society resisted many changes. In a village there was a fairly uniform pattern of social organization, so that is was not possible for a member of a lower caste to move up into an upper caste; nor was it possible for a person to be married outside the extended family group. In all, there is a poor cultural climate for change.

(2) The folk-society as described in Chapter III had a subsistence economy, and each village existed in isolation from other villages. The agricultural factors that the farmers employed had been used without significant alterations for generations, as described in Chapter III. Therefore, nothing new could have been learned from contiguous sources. The economic activity of the society was dominated

by subsistence needs, with the result that there was no necessity for the farmers to adopt a business outlook. The farmer was satisfied with what he was able to produce for his sustenance. Thus, there was little need for the farmer to seek better methods of production.

(3) Many scholars are of the opinion that the adoption of innovations by a society is related to the attitude of the people towards tradition, religion, and familism. If this is true, there is no doubt that the farmers of the Jaffna Peninsula, who still possess tradition-oriented folk-type values, would have resisted all form of changes in the period prior to the eighteenth century.

Despite these unfavorable factors, the farmers adopted the commercial cultivation of tobacco in the farming system as early as the seventeenth century, but it is certain that the farmers were forced by the Dutch to adopt its cultivation. The Dutch were successful in this, because they provided the necessary facilities for the transport and marketing of the products. The farmers would not have taken the risk on their own to adopt the cultivation of tobacco unless they were certain of the yields from it. This is all the more important to farmers who produced crops that were barely enough for their survival.

B. The factors that seem to have favored or hindered the adoption of innovations in the present century. The introduction of tobacco in the farming system substantially modified the attitude of the farmers towards farming. The farmer now takes a business attitude towards

farming. The cultivation and marketing of tobacco has taught the farmer not only how to purchase his basic necessities, but also how to possess certain luxuries. The farmer's desire is to provide more and more necessities and luxuries for his family in his efforts to make the maximum income from farming.

This attitude of the farmer has favored the adoption of innovations in the present century.

Other favorable factors are the thrift and industry of the Tamil family. The farming region is integrated into a large market economy through an integrated communications network. The farmer strives to produce crops that fetch high prices in the market. He calculates with care the value of his labor in producing crops against his working for hire, and he acts accordingly, as indicated in Chapter V. Moreover, as indicated earlier, the business attitudes of the farmer are clearly evident in the manner in which he changes his cropping program on the basis of market prices.

The adoption of innovations is normally associated with rationality on the part of the farmer. The farmers of this region have shown a marked ability to reason in their agricultural activities. The practice of burying green leaves, the application of cattle manure, irrigation from wells, and the system of crop rotation are some of the efficient methods adopted by the farmer to secure the maximum benefits from the unfavorable soil. Moreover, the farmers lay great emphasis on the

the education of children and hard work for success in their life.

Finally, the Government is making an effort through the Department of Agriculture and the Agricultural Extension Service to provide the necessary guidance to farmers to adopt certain innovations. The traders and firms that serve the farming community offer for sale chemical fertilizers, water pumps for irrigation, and new and improved seeds. The farmers have formed co-operative societies to obtain credit and to buy and sell products. The co-operative societies function as centers for the purchasing of certain farm products which fall within the Government Guaranteed Price Schemes. Under these circumstances, it would seem that there is a favorable climate for the adoption of innovations by the farmers. More than sixty per cent of the tobacco farmers have adopted oil pumps for raising water from the wells within the last ten years. This was done through their co-operative societies under a system of mortgaging their property and repaying on an installment basis over a long period. It should be mentioned that the Government also makes loans to these societies.

Despite these favorable conditions, the farmers have not been willing to adopt the cultivation of new crops, and hoes and other primitive tools have not been replaced by better tools and equipment. The green leaves and cattle dung which are used for providing manure to the soil are not being replaced by chemical fertilizers. It is not possible for the writer to analyze in detail the reasons why the farmers have

not been willing to adopt the cultivation of certain varieties of tobacco for which there is an increasing demand, as against the cultivation of strong-flavored tobacco.

(1) The needs of the community. The farmers of the Jaffna Peninsula have not adopted the cultivation of cigarette tobacco, because it is not adapted to the agricultural requirements of the farming community. There are certain reasons why the farmers are not willing to adopt the cultivation of cigarette tobacco as indicated by the survey. Most of the farmers strongly believed that only crops like strong-flavored tobacco that depend for their cultivation on the application of green leaves and cattle manure would fit their system of crop rotation. The extent of arable lands in the peninsula is so limited that large-scale cultivation is not possible. The question of the cultivator's allowing a portion of his land to be fallow and cultivating another part does not arise. Thus, he seeks ways and means of getting the full benefit out of his small holdings. This drives him to intensive cultivation with rotational crops, and the crops have to be chosen according to the nature of the soil and the season best suited to raise them. His long experience as a cultivator has proven beyond doubt that strong-flavored tobacco must be the first crop raised. Since the demand for strong tobacco is declining, farmers have substituted the cultivation of onions, which does not require any changes in the method of cultivation.

As has been mentioned in Chapter V, the cultivation of strong-

flavored tobacco or onions requires intensive manuring, for which [illegible] green manure, cattle manure, or cattle penning are necessary. Although manuring is done intensively for the cultivation of strong-flavored tobacco, only a portion of the manure is used by this crop. This also applies to the cultivation of onions, if it is the first crop. Other crops or another crop of onions and subsidiary crops, such as small millet, green gram, manioc, chillies, etc., can be successfully grown on this soil without further manuring. The only expenses incurred in raising these crops are for labor and watering.

Subsidiary food crops such as onions and chillies cannot be raised immediately after cigarette tobacco cultivation unless the soil is manured again. In the month of May, which could be the time of manuring after cigarette tobacco cultivation, Jaffna experiences little or no rain, as indicated in Chapter II. During this season it would not be economical to pen cattle, as the cost of fodder is high and the tulip leaves needed for green manuring are not available. Table XIII indicates the agricultural practices involved in the cultivation of cigarette tobacco recommended by the Department of Agriculture.

Table XIII also indicates very clearly that the Jaffna farmer has to change the system of crop rotation if he adopts the cultivation of cigarette tobacco. Moreover, cigarette tobacco is so susceptible to Bacterial Wilt disease that the farmer cannot grow chillies, tomatoes, and egg plant, which have been some of the most important subsidiary

TABLE XIII

CULTIVATION OF CIGARETTE TOBACCO, AS RECOMMENDED BY THE DEPARTMENT OF AGRICULTURE, FOR THE JAFFNA PENINSULA

Months	First Year	Second Year	Third Year
December to March	Tobacco	Exotic Vegetables or Yams	REPEAT CYCLE
Rest of the Year	Onions and Vegetables	Cereals	

Source: Cigarette Tobacco Pays, Cash Crop Bulletin No. 3, issued by the Publicity Division, Ceylon Department of Agriculture (Colombo, 1959).

food crops grown by him over the centuries. The system of rotation recommended by the Department of Agriculture also indicates that the farmer can only cultivate tobacco and onions once in two years, which means that the farmer's income will be reduced. Therefore, the farmer has not been willing to adopt the cultivation of cigarette tobacco.

It cannot be said that the farmers are not willing to use chemical fertilizers and pesticides for the cultivation of crops, because they do not believe in its effectiveness. The farmers have adopted the use of certain pesticides to control diseases associated with the cultivation of strong-flavored tobacco and chillies. Moreover, the farmers have

also adopted the use of diesel pumps wherever they could afford them. However, the farmers feel strongly against the use of machinery, because it does not suit their needs. Most of the farmers had the following reasons for not adopting the use of mechanical equipment for cultivation:

(a) The farmer cannot afford to posses machinery of his own. This means that he cannot prepare his farm when he wants.

(b) The farmer feels strongly that in the event of having to hire machinery to prepare the farm for cultivation, the cost of cultivation will increase. This is particularly true when he does most of the preparation of land himself.

(c) The farmer also feels that there is a tendency for the machinery to sink into the soil when it is wet. The farmer has to wait for the appropriate soil conditions to use machinery. If the farmer uses the how, he is able to cultivate the farm just after the rainy season when the soil is still moist.

These comments indicate that the farmer will be willing to adopt an innovation only when it suits his agricultural practices.

(2) The absolute margin of profit. It has been shown in Chapter VII that the farmers have adjusted the crop structure of the farming system in relation to changes in the price of strong-flavored tobacco. It has also been indicated that the farmers were not willing to utilize chemical fertilizers for the cultivation of new varieties of

tobacco, because the profits derived by a change in the method of cultivation were very much lower than what was derived from the old method (Table XIV). It should be mentioned that the farmers are provided with all the facilities to cultivate cigarette tobacco under two schemes: (1) Green-leaf Purchase Scheme and (2) Cured-leaf Purchase Scheme. The green-leaf purchase scheme is primarily meant for the peasant cultivators who have neither the capital to construct flue-cured barns nor the technical knowledge to cure the leaves. The manufacturing companies advance the seedlings and fertilizers to the farmers and buy their green leaves at agreed prices. When payments are made for the green leaves, the value of the seedlings and fertilizers is recovered from the growers at the rate of Rs.20 per acre for seddlings and Rs.60 per acre for fertilizers. Despite the fact that the cost of fertilizer is low for the cultivation of a quarter-acre farm, the farmer is not able to derive a profit that is higher than that from the cultivation of strong-flavored tobacco or onions.

The rate of acceptance of innovations by the farmer appears to depend on the profitability of adopting the new agricultural factor of production. The Department of Agriculture made a mistake in taking for granted that it would be profitable for the Jaffna farmers to adopt the cultivation of cigarette tobacco and bidi tobacco on the evidence that it was profitable in other areas in Ceylon. What really matters is its yield to the community (Table XIV). It is true that the price of

TABLE XIV

ECONOMICS OF TOBACCO CULTIVATION IN THE JAFFNA PENINSULA AS COMPILED FROM INFORMATION RECEIVED FROM TOBACCO GROWERS AND FROM RECORDS AVAILABLE AT THE DISTRICT AGRICULTURAL OFFICE IN JAFFNA

(Average for quarter-acre farms in the Peninsula in Rupees)

Type of Tobacco	Cost	Yields	Gross Income	Net Profit
Cigarette[1]	200 - 250	200 - 250 pounds at Rs.2 per pound	350 - 500	150 - 250
Strong*	580 - 720	500 - 600 pounds at 1.75 to 2. per pound	850 - 1180	350 - 460
Bidi[2]	625	250 - 350 pounds at Rs.2.25 to Rs.2.75 per pound	1000	375

[1] The quality of tobacco produced is low, and as such, the price is low.

[2] The figures are for the best farms obtained from Vadamarachi.

*Net income from the cultivation of onions, instead of tobacco, as the first crop is on the average Rs.358, as indicated in Chapter VII.

plants and fertilizers is relatively cheap and made easily available, but the yield is relatively lower.

Finally, the knowledge that was required in the adoption of new agricultural factors of production, such as the cultivation and curing of cigarette tobacco, the use of chemical fertilizers, and the preclusion of organic manuring, also played its part in preventing the people from adopting this innovation.

CHAPTER IX

CONCLUSIONS

The preceding chapters demonstrate that the method suggested by James M. Blaut for the analysis of peasant farming can be usefully applied to the data obtained by the writer for the study of farming in the Jaffna Peninsula. Any shortcomings in the application of the methodology to this study can largely be ascribed to the lack of adequate data and the fact that Blaut's method was only known to the writer after he had collected a part of the data. It is appropriate at this juncture to determine the extent to which the writer has been able to apply successfully all the stages outlined by Blaut for the study of the tobacco farming system in the Jaffna Peninsula, especially in relation to the nature of the changes it had undergone from the time of its origin.

The writer had very little difficulty, as indicated in Chapters III and V, in identifying the farming system as it functions in the Jaffna Peninsula. The writer was also able, as indicated in Chapter III (Sections A and B), to identify the date and place of origin of the farming system that was defined. The latter was most helpful in explaining why the Jaffna farmers, like the South Indian farmers, follow certain

agricultural practices and resist the introduction of certain innovations for the creation of a successful cultivation system. This has also been helpful, as indicated in Chapter IV, in the section on decision making, in the marked ability of the farmers to reason, in their agricultural activities, even though these are based on traditional methods.

Secondly, the individual elements of the farming system, using the method of systems analysis, have been to a large extent enumerated in Chapters V and VI. Each element of the system had to be discussed in detail, so as to bring out the fact that, despite the traditional methods involved, the farmers are able to produce large quantities of farm products for sale. The writer was able to distinguish, using the method of systems analysis, the external elements from the internal elements that contribute to the functioning of the farming system. The external factors have been discussed in Chapter IV, while the internal factors were mainly confined to Chapters V and VI. The external factors have been very helpful in indicating the changes that have been taking place in the farming system within the past two to three centuries. Any changes that are taking place in the system of agriculture at present can only be explained in terms of these factors.

The internal elements of the farming system, such as the crops, farm structures, tools, soil, soil moisture, and all the elements relating to the behavior of the farmers, that have been enumerated in Chapters V and VI, are useful in determining why the farmers have not

been willing to adopt any radical changes in the system of agriculture involving the cultivation of new crops, which require the application of artificial manure and other methods. One has to accept the fact that elements of decision making, that have been discussed in Chapter VI, Section E, have not been dealt with in great detail more clearly. The thorough study of peasant values and perception would require highly intensive data collection. Thus, peasant behavior with regard to the introduction of changes in the cropping programs and methods of cultivation in response to market prices of farm products, was largely inferred from the changes in the crop structure of a large region over a given period. This was the only practical method available given the limited time and data.

The writer has only been partially successful in analyzing the separate elements of the farming system in terms of their quantitative characteristics and their relations to each other. This is evident in the section on labor inputs in Chapter VI. Moreover, the lack of quantitative data prevented the writer from attempting to construct a functional model, as was done by James M. Blaut in the study of peasant farming in Singapore. This meant that the writer could not utilize a functional model to predict the changes that would take place in the future. On the contrary, the writer had to supplement the data obtained at the level of the farm with data obtained on a regional scale to predict the changes, as has been attempted in Chapter VIII.

The writer believes that the longterm record of strong-flavored tobacco cultivation serves to demonstrate that its cultivation has been declining within the past decade. In recent years, tobacco cultivation has been largely confined to the other areas of Ceylon. The Government has long urged the Jaffna farmers to grow cigarette, mild-flavored tobacco, and bidi tobacco, but under conditions of poor soil and low returns for the new varieties of tobacco, the farmers have not been willing to adopt them. However, given favorable market conditions, the Jaffna farmer has found it profitable to increase the area under subsidiary food crops, especially onions and chillies.

In sum, the Jaffna farmer has adopted farming practices to maintain his income under conditions of declining demand for strong-flavored tobacco. The farmers of Jaffna Peninsula have shown marked ability to reason in their agricultural activities. As has been stated earlier, the practice of burying green leaves, the application of cattle manure, irrigation from wells, and the system of crop rotation are some of the efficient methods adopted by them to secure maximum benefits from the unfavorable soil. They also respond to changes in the prices of products. Thus, they behave in an "economically rational" manner. However, attempts to bring about modern improvements that are not in harmony with traditional adaptive practices will meet with difficulties. It can be concluded that under present conditions non-staple food crops for cash sale will be cultivated in greater quantities

by the Jaffna farmer.

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